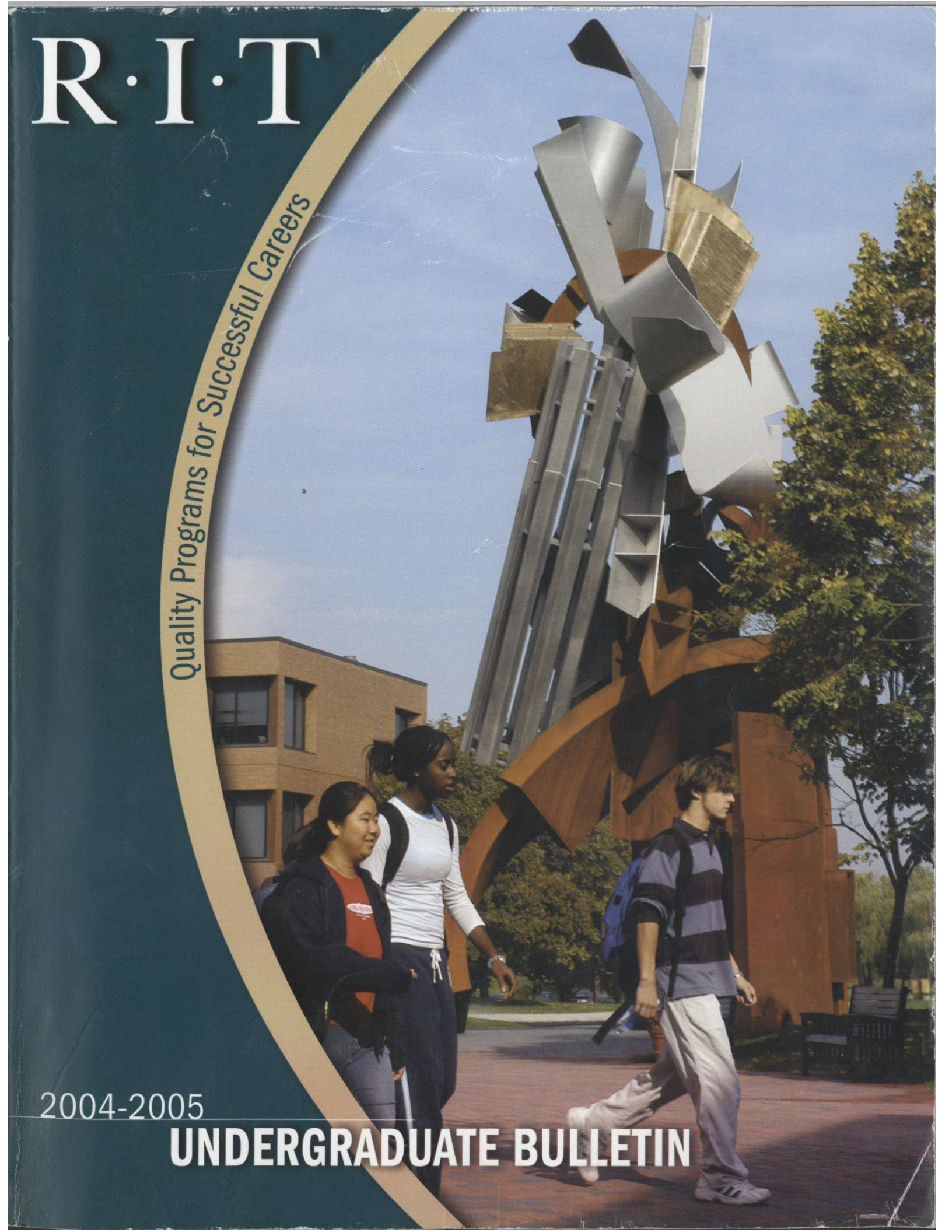


R·I·T

Quality Programs for Successful Careers

2004-2005

UNDERGRADUATE BULLETIN



Rochester Institute of Technology

2004-2005 Institute Calendar

Fall Quarter (20041)

April 26-September 13, 2004
 Fall Registration. Use telephone, Student Information System, walk-in or mail-in options. Students will be billed.*

August 29
 Move-in for new students

September 3
 Move-in for returning students

September 6
 Day and evening classes begin

September 11
 Saturday classes begin

September 13
 Last date to drop/add courses

October 15
 Last date to withdraw with a "W" grade

November 12
 Last day class

November 20
 Last Saturday class

November 15, 16,17,18, 19
 Final exams—day classes

November 19
 Last evening class

November 21-November 28
 Fall/winter break

Winter Quarter (20042)

October 19-December 6,2004
 Winter Registration. Use telephone, Student Information System, walk-in or mail-in options. Students will be billed.*

November 29
 Day and evening classes begin

December 4
 Saturday classes begin

December 6
 Last date to drop/add courses

December 18
 Last day of classes before break

January 3, 2005
 Day and evening classes resume

January 8
 Saturday classes resume

January 21
 Last date to withdraw with a "W" grade

February 18
 Last day class

February 26
 Last Saturday class

February 21, 22,23, 24,25
 Final exams—day classes

February 25
 Last evening class

February 27-March 6
 Winter/spring break

Spring Quarter (20043)

January 25-March 14, 2005
 Spring Registration. Use telephone, Student Information System, walk-in or mail-in options. Students will be billed.*

March 7
 Day and evening classes begin

March 12
 Saturday classes begin

March 14
 Last date to drop/add courses

April 15
 Last date to withdraw with a "W" grade

May 13
 Last day class

May 14
 Last Saturday class

May 16, 17,18,19, 20
 Final exams—day classes

May 20
 Last evening class

May 20
 Academic Convocation

May 21
 Commencement

May 22-June 5
 Spring/summer break

Summer Quarter (20044)

April 19-June 13, 2005
 Summer Quarter Registration. Use telephone, Student Information System, walk-in or mail-in options. Students will be billed.*

June 6
 Day and evening quarter classes begin

June 11
 Saturday classes begin

June 13
 Last date to drop/add summer quarter courses

Holiday-no classes

July 15
 Last date to withdraw with a "W" grade

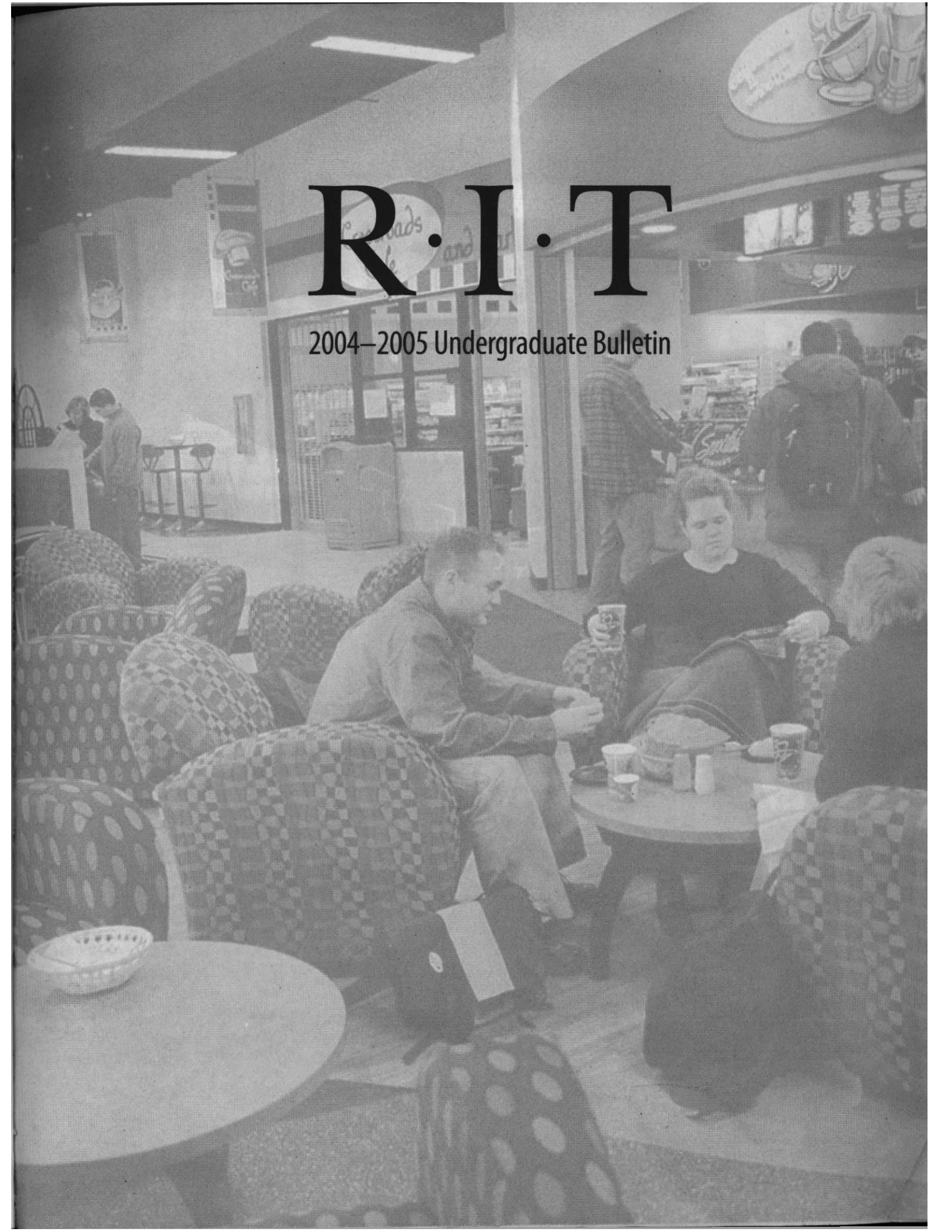
August 15
 Last day class

August 16,17,18,19
 Final exams—day classes

August 20
 Last Saturday class

August 22
 Last evening class

** Refer to quarterly schedule of courses for specific registration dates and times.*



R.I.T.

2004–2005 Undergraduate Bulletin



Welcome

About this Bulletin

The academic programs, course curricula, policies and standards described in this *Undergraduate Bulletin* are in effect for students admitted to RIT during the 2004-2005 academic year. The purpose of this bulletin is to provide students with a comprehensive source of information to use in planning their undergraduate education.

Master's and doctoral degree programs, plus other post-baccalaureate offerings, are described in RIT's *Graduate Bulletin*, available through the Office of Graduate Enrollment Services.

The RIT *Undergraduate Bulletin* does not constitute a contract between the Institute and its students on either a collective or individual basis. It represents RIT's best academic, social and financial planning at the time of publication. Course and curriculum changes, modification of tuition, fees, dormitory, meal, or other charges; plus unforeseen changes in other aspects of RIT sometimes occur after the bulletin has been printed, but before the changes can be incorporated in a later edition. Because of this, Rochester Institute of Technology does not assume a contractual obligation with its students for the contents of this *Undergraduate Bulletin*.

RIT Undergraduate Bulletin 2004-2005

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Contents

Calendar	inside front cover
An Introduction to RIT	3
Accreditation	4
Sponsored Research Projects	4
Campus and Community	5
Graduation Requirements	7
Academic Programs of Study	10
College of Applied Science and Technology	13
College of Business	45
B. Thomas Golisano College of Computing and Information Sciences	52
Kate Gleason College of Engineering	61
College of Imaging Arts and Sciences	75
College of Liberal Arts	93
College of Science	105
National Technical Institute for the Deaf	127
Course Number Index	161
Course Descriptions	162
Academic Policies and Procedures	345
Counseling and Academic Services	347
Campus Life	356
Admission to Undergraduate Study	369
Expenses and Financial Aid	374
Administration and Faculty	388
Terminology	409
Index	410
Campus Map	inside back cover

RIT will admit and hire men and women; veterans; persons with disabilities; and individuals of any race, creed, religion, color, national or ethnic origin, sexual orientation, age, or marital status in compliance with all appropriate legislation.

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An Introduction to Rochester Institute of Technology

Respected internationally as a world leader in career-oriented education, Rochester Institute of Technology has been setting an innovative pace since 1829, when Colonel Nathaniel Rochester became the first president of the Rochester Athenaeum. In 1891, the Athenaeum merged with Mechanics Institute, which had been founded by a group of businessmen to instruct in "drawing and such other branches of studies as are most important for industrial pursuits." In 1944, recognizing the increasingly specialized professional nature of its programs, the university adopted the name it holds today.

A private, coeducational university in upstate New York, RIT offers academic programs that combine outstanding teaching, a strong foundation in the liberal arts and sciences, modern classroom facilities and work experience gained through the university's cooperative education program, internships, and other opportunities.

Few universities provide RIT's variety of career-oriented studies. Our eight colleges offer outstanding programs in business, engineering, art and design, science and mathematics, liberal arts, photography, computing, hospitality management, and many other areas.

More than 200 different programs—including such distinctive offerings as microelectronic and software engineering, imaging science, film and animation, biotechnology, physician assistant, new media, international business, telecommunications, and the programs of RIT's School for American Crafts and National Technical Institute for the Deaf (NTID)—draw students from every state and more than 90 foreign countries.

Approximately 11,000 full-time undergraduate students, 1,800 part-time undergraduate students, and 2,300 graduate students attend RIT. More than 90,000 RIT alumni can be found around the globe.

Almost one-third of our undergraduates are transfer students from two-year colleges or other four-year institutions, and adult students make up a significant portion of the total enrollment. Our full-time undergraduate students include 1,100 deaf students, and deaf and hearing students often share the same residence halls and classes on campus.

RIT's cooperative education program is the fourth oldest and one of the largest in the world. We place more than 2,600 students in co-op work positions with approximately 1,300 employers every year, and more than 500 companies visit RIT to conduct employment interviews on campus.

As a major university, RIT offers academic opportunities that extend far beyond science and technology, including more liberal arts courses and faculty than are found at most liberal arts colleges. With a strong foundation in the humanities and social sciences, RIT graduates understand both technological developments and the larger philosophical and ethical issues presented by technology.

RIT encourages the appreciation of diversity through a variety of liberal arts courses, campus events, and special programs (including an annual International Banquet, Black History Month, Martin Luther King Jr. Celebration, and Hispanic Heritage Week). Students are encouraged to take

advantage of the diverse educational opportunities RIT provides, because the world in which they will live and work will be composed of people from many backgrounds, lifestyles and cultures.

RIT has been recognized by *U.S. News & World Report* magazine as one of the nation's leading comprehensive universities and one of America's "Best College Values." Many other college guidebooks have ranked RIT among the nation's top schools, including Kaplan's *Unbiased Guide to the 320 Most Interesting Colleges* and Princeton Review's *Best 345 Colleges*.

Colleges and Degrees

As a university, RIT is made up of eight separate colleges, each of which offers a number of academic programs. The descriptions that follow provide an overview of each college and its programs.

The College of Applied Science and Technology (pages 13-44) offers a wide variety of degrees, diplomas and certificates to full- and part-time students. Programs and courses are offered during the day, evening, on Saturdays and by distance delivery. Bachelor of science programs include civil engineering technology; electrical, computer and telecommunications engineering technology; manufacturing and mechanical engineering technology; electrical-mechanical engineering technology; food, nutrition, travel and hotel management; packaging science; environmental management, and applied arts and science. Many of these programs also offer master's degrees. Associate degrees, diplomas and certificates are offered in several areas and are especially appropriate for the part-time adult student who is looking for convenience, quality and practicality. The manufacturing engineering technology program has been recognized as one of the top five in the United States by the Society of Manufacturing Engineers. Many new students in this college transfer from two-year schools to the college's BS degree programs.

The College of Business (pages 45-51) offers the BS degree with majors in accounting, finance, international business, management, management information systems, marketing, and graphic media marketing. An emphasis on technology and a global perspective are the foundations for these programs. It is one of few business colleges in the United States to offer a cooperative education program. The college awards BS, MBA, and MS degrees and has earned accreditation from the Association to Advance Collegiate Schools of Business (AACSB International). An accelerated BS/MBA option offers outstanding undergraduates an opportunity to complete both degrees in five years. An upper-division certificate program in management information systems is also available. The "America's Best Colleges" edition of *U.S. News & World Report* magazine has ranked RIT's College of Business among the top 4% of undergraduate business schools in the nation.

The B. Thomas Golisano College of Computing and Information Sciences (pages 52-60) is one of the largest and most comprehensive colleges in the nation devoted to the study of computer science, information technology, software engineering, and related fields. In 1972, RIT was among the first institutions in the United States to offer a full undergraduate degree program in computer science. Academic innovation has continued in recent years, as RIT developed the nation's first undergraduate degree programs in information technology and software engineering. The college awards AAS, BS, and MS degrees and all BS programs require cooperative education.

The Kate Gleason College of Engineering (pages 61-74) offers BS degrees in computer, electrical, industrial, mechanical, and microelectronic engineering. Degree options also are offered for students interested in specializing in areas such as ergonomics, manufacturing, aerospace, automotive, or biomedical engineering. Starting in their third year, students in all engineering programs participate in the college's cooperative education program. For those who need time to decide on a particular major, the college also offers an engineering exploration program in the first year. Accelerated degree programs (combined BS and master's) are available in all departments. Historically recognized as one of the premier colleges of engineering dedicated to undergraduate teaching and cooperative education, the college has recently added the nation's first Ph.D. program in microsystems engineering.

The College of Imaging Arts and Sciences (pages 75-92) includes the School of Art, School of Design, School for American Crafts, School of Film and Animation, School of Photographic Arts and Sciences and School of Print Media. Specialized labs and darkrooms, studios, computer facilities, photo and graphic design archives, and a broad range of high-tech equipment are provided for students. Degrees include the associate, bachelor of fine arts, bachelor of science, master of fine arts, master of science, and master of science for teachers. RIT is generally recognized as the nation's top-ranked university for printing/publishing and for the study of photography.

The College of Liberal Arts (pages 93-104) provides a comprehensive program of liberal arts education that is the foundation for all RIT students' educational experience. In addition to core requirements, students elect a concentration or a minor from a wide variety of disciplines in the humanities, social sciences, or behavioral sciences. The college also offers bachelor of science degree programs in criminal justice, economics, professional and technical communication, psychology, public policy, and social work, and master of science degree programs in communication and media technologies, public policy, and school psychology. A one-year RIT exploration program is offered for students who are undecided about which degree program to pursue.

The College of Science (pages 105-126) is career oriented, emphasizing the practical aspects of science and mathematics. The college offers a variety of degree programs in the sciences; mathematics and statistics; imaging science; and medical sciences, including a physician assistant program, biotechnology, bioinformatics, polymer chemistry, and other unique programs. A general science exploration option is popular with students who want more time to decide on their major. The premedical core is a set of courses required for admission to most medical, dental, and veterinary schools. The college awards associate, bachelor of science, and master of science degrees, as well as the nation's only doctoral degree (Ph.D.) in imaging science. Many of the college's bachelor of science degree programs offer a cooperative education option.

The National Technical Institute for the Deaf (pages 127-159) provides technical and professional programs for approximately 750 deaf students enrolled in diploma or associate degree programs and provides extensive educational access services for more than 450 deaf students who are pursuing a bachelor's or master's degree or taking courses in RIT's other colleges. Within NTID, students may choose a variety of associate degree options/concentrations in accounting technology, administrative support technology, art and computer design, applied computer technology, automation technologies, business technology, computer aided drafting technology, computer integrated machining technology, digital imaging and publishing technology, laboratory science technology, and applied optical technology. The college also enrolls hearing students in its ASL-English Interpretation programs.

Accreditation

RIT is chartered by the legislature of the State of New York and accredited by:

The Commission on Higher Education
Middle States Association of Colleges and Schools
3624 Market Street
Philadelphia, PA 19104-2680
215-662-5606

and

New York State Education Department
Office of College and University Evaluation
5 North Mezzanine
Albany, N.Y. 12234
518-474-2593

In addition to institutional accreditation, curricula in the colleges are accredited by appropriate professional accreditation bodies. Where applicable, specific mention of these is included in the college descriptions. Students wishing to review documents describing accreditation should contact the Office of the Associate Provost for Academic Programs.

Sponsored Research Projects

Externally sponsored projects are a vital and integral component of RIT's educational and research activity. Faculty and students undertake sponsored projects for a variety of important reasons: to add to the body of knowledge, for professional development, and to strengthen academic programs. Sponsored projects enhance the Institute's academic programs, broaden its research resources, provide opportunities for student participation in research, strengthen university-industrial partnerships and serve the wider community.

Moreover, grants and contracts enhance existing resources and provide new opportunities for faculty, staff, and students. External funding comes from federal and state agencies, private foundations, and corporations. RIT's major sponsors include the National Science Foundation (NSF), the National Institutes of Health (NIH), the Department of Education (USDE), the Department of Defense (DoD), the National Aeronautics and Space Administration (NASA), and New York State. Additional information is available through the office of Sponsored Research Services at 585-475-7985, research@rit.edu, or on the Web at www.research.rit.edu.

Campus and Community

Home to more than one million people, the greater Rochester area is a major technical and industrial center and is well known for its rich cultural and intellectual opportunities. Rochester is the third-largest city in New York State and the home of a number of major corporations. A strong technology-based economy has made Rochester one of the 10 largest exporting cities in the United States.

The city provides a perfect setting for students seeking a dynamic and diverse environment, with a variety of opportunities for employment, entertainment, and personal growth. Large enough to include numerous restaurants, plenty of live music, movie theaters, parks, beaches, and shopping areas, Rochester is also small enough to explore and enjoy. A city bus line and RIT shuttle bus service provide transportation to and from campus.

Within walking distance of one another in the downtown area are the Rochester Museum and Science Center, Strasenburgh Planetarium, the Memorial Art Gallery, and the International Museum of Photography. A short distance from these are the Eastman Theatre, home of the city's philharmonic orchestra, and the Strong Museum's hands-on children's exhibits and turn-of-the-century memorabilia.

The nearby mountains, Lake Ontario, and the Finger Lakes provide plentiful year-round recreational opportunities.

The Campus and Its Facilities

Conveniently located five miles from the Greater Rochester International Airport and the New York State Thruway (Interstate 90), the RIT campus is situated in the suburb of Henrietta, only a few minutes from downtown Rochester.

Students, faculty, and staff moved from RIT's original downtown Rochester location to its 1,300-acre suburban campus in 1968. The campus landscape has been undergoing several stages of growth and renewal recently, including new academic buildings, student apartments and Greek housing, walkways, plantings, and lighting. A 73-foot high steel and bronze sculpture by Albert Paley and a Japanese garden add further interest to a campus that is still growing. A new 160,000-square-foot field house was completed in 2004.

Excellent facilities and up-to-date equipment add to the quality of academic life. RIT is a leader in academic computing, and students work with state-of-the-art computer equipment regardless of their major. Central computer systems can be accessed via a high-speed data network connecting our library, academic facilities, residence hall rooms and on-campus apartments. *Yahoo! Internet Life* magazine has named RIT one of "America's Most Wired Colleges." RIT is also among a select group of institutions with access to the Internet 2 research network.



The Sentinel—a 73-foot high, steel-stainless steel-bronze work of art created by renowned sculptor Albert Paley—is a campus focal point and reflects RIT's unique blending of art and technology. ©2004 Photo by Jan Regan.

Students also have access to a laser optics laboratory, an observatory, an animal care facility, more than 100 color and black-and-white photography darkrooms, electronic prepress and publishing equipment, ceramic kilns, glass furnaces, a blacksmithing area, a student-operated restaurant, computer graphics and robotic labs, and some of the most up-to-date microelectronic, telecommunications, and computer engineering facilities in the United States.



Amy Kennicutt, an international business major, studies for a quiz in the lounge in the Max Lowenthal Building. ©2004 Photo by Shaivn Dowd/Democrat and Chronicle.

RIT Libraries

Wallace Library is a multimedia resource center with access to more than 980,000 items. The library's Web-based workstations provide access to a wide selection of resources. Users can access the library catalog, search many electronic commercial databases and surf the Internet. Both videotapes and DVDs can be checked out at the circulation desk. E-books, audio books, and wireless laptop computers are also available.

A second floor computer lab provides access to graphic interface workstations, image scanning and a host of interactive CD-ROM titles. Interlibrary loan services and in-house book requests are accessed on-line. Individual carrels and small-group rooms provide more than 1,000 study spaces.

A smaller library within Wallace Library, the Cary Library, contains more than 20,000 volumes of rare books illustrating fine printing and other materials detailing the history of printing, book design and illustration, papermaking, and other aspects of the graphic arts.

Student artwork and photographs are exhibited in library gallery areas. Outstanding student work is purchased and displayed permanently.

The latest enhancement to the library is Java Wally's cafe. Serving a variety of beverages and treats, it has quickly become a popular gathering place.

Housing and Recreational Facilities

Serving approximately 6,000 students, RIT's residence halls and campus apartments offer many living options to meet the diverse needs, interests and backgrounds of our students. Students may choose from a variety of living arrangements, including residence hall floor assignments by same gender, coeducational, wellness, alcohol/substance free, intensified

study, over 21 years of age, or mainstream floors (hearing/deaf students living on the same floor). Living options in Greek fraternities and sororities, and in special interest houses such as Art House, Business Leaders of Tomorrow, Computer Science House, Engineering House, House of General Science, International House, Photo House and Unity House are also available. Internet and campus data network access is available in all residence hall rooms.

RIT also houses students in nearly 1,000 individual townhouse and apartment units on campus in one of the nation's largest university-operated apartment systems. Apartment housing is available to students in five RIT apartment complexes. Campus data network access is provided in most apartment complexes.

Approximately 400 upperclass students are housed at the university-operated RIT Inn and Conference Center located near the campus. Residents of the RIT Inn enjoy many of the perks of a first-rate hotel, including an indoor/outdoor swimming pool and fitness center.

Our Student Life Center offers recreational facilities that include a gymnasium, racquetball courts and an indoor track. Other indoor facilities include two more gyms, an ice arena, wrestling rooms and a weight training room.

Outdoor facilities include lighted tennis courts, an all-weather track, playing fields and a fitness trail. A new synthetic turf field with astroplay surface was completed in spring 2004 for intramural, club sports, recreation and intercollegiate athletic teams. This state-of-the-art field is lighted and usable throughout the year.

Gordon Field House and Activities Center

RIT's new Gordon Field House and Activities Center also opened in spring 2004. The \$25-million facility is designed to serve many needs. The two-story, 160,000-square-foot building features three areas:

- The event venue/athletic field, can be divided into three sections, holding more than 8,000 people for special events such as convocation, guest speakers, or concerts, and also accommodate activities such as lacrosse, tennis, floor/field hockey, indoor track, baseball, softball, soccer and volleyball.
- The aquatics center includes a competition pool, recreational pool, and spectator seating. The eight-lane, 25-meter competition pool features a moveable bulkhead to provide separation between the diving and swimming areas. The recreational pool includes a spa area with hot tub, water spouts and a current channel for relaxation and therapy.
- A fitness center of approximately 16,000 square feet, with separate areas for free-weights training and cardiovascular equipment.

Graduation Requirements

To earn any academic credential from RIT, you must satisfy a number of requirements. Graduation requirements may vary slightly from program to program, and all students are strongly encouraged to seek out and use the academic advising resources within their colleges. In general, students should expect to satisfy the following requirements before they can graduate from RIT:

A. Completion of academic curricula

1. Satisfactorily complete all of the courses in your academic program. General education requirements and specific course requirements for each program are identified in the following pages. This bulletin *and careful consultation with your academic adviser* provide the best resources for planning your academic program at RIT.
2. Your program curricula may include several types of courses, including cooperative education, field experience, practicum, thesis and research, and wellness. Most RIT students will need to satisfy a wellness requirement, and many academic programs require one or more quarters of cooperative education.
3. The curriculum in effect at the time of your admission into a program will normally be the one you must complete in order to graduate. Occasionally, with faculty approval, course substitutions and other minor curricular modifications may occur. Although there is no time limit within which you must complete your course requirements, the curriculum under which you are certified to graduate must be no more than seven years old.

B. Grade point average standard

1. Successful candidates for an undergraduate degree, diploma or certificate must have a program cumulative grade point average of at least 2.0.*
2. Graduation honors are conferred on associate and bachelor's degree recipients who achieve a 3.40 or higher program cumulative GPA.

C. Residency and minimum earned hours

At least 45 of the credit hours used toward a degree program must be earned by successfully completing RIT courses. In addition, at least 30 of the final 45 hours of any program must be earned through RIT courses. Credit earned through transfer, credit by exam/experience, CLEP, advanced placement or audit are excluded from these residency calculations.

RIT academic programs vary as to the total number of credit hours required; however, under no circumstances will a student be allowed to graduate with a bachelor's degree with fewer than 180 cumulative earned hours (90 hours for associate degrees). Cumulative earned hours include RIT courses, transfer credit, credit by exam/experience, CLEP and advanced placement credit.

D. Demonstration of writing skills

Students must demonstrate, to the satisfaction of the dean of their college, that they have the writing skills needed for successful entry into their chosen careers. The criteria and standards for evaluating abilities are determined by each academic department.

E. Full payment of all financial obligations to RIT

The Liberal Arts General Education Curriculum

Although some baccalaureate degree programs and all associate degrees have modified general education requirements in the liberal arts, most RIT students in degree programs are required to complete the 54-credit-hour general education curriculum described below to earn their bachelor's degree.

The basic curriculum is divided among introductory core courses, advanced course work and a capstone senior seminar in the liberal arts.

I. The introductory core totals 28 credit hours composed of the following 200- to 300-level courses:

- A two-course sequence in writing and literature combines composition and literature during two quarters (8 credits)
- Three courses in the humanities (12 credits)
Fine arts: one course required from visual arts, or musical arts, or film arts or theater arts
History: one course required from either Modern American or Modern European History
Philosophy: one course required from Ethics or Critical Thinking or Ethics in the Information Age or Science, Technology and Values
- Two courses from the four areas of social sciences (8 credits)
Introduction to International Relations or American Politics
Principles of Economics I
Introduction to Psychology
Foundations of Sociology or Cultural Anthropology

II. Advanced course work totals 24 credit hours. Two options are available:

- Option 1. Minor in the liberal arts
- Five courses designated by liberal arts departments (400- to 500-level) (20 credits)
 - One liberal arts elective course selected by student (400- to 500-level) (4 credits)
- Option 2. Concentration in the liberal arts
- Three liberal arts courses designated by liberal arts departments (400- to 500-level) (12 credits)
 - Three liberal arts elective courses selected by student (400- to 500-level) (12 credits)

* The physician assistant program requires a program cumulative grade point average of 2.8 or better.

Liberal Arts General Education Curriculum
(54 Credit Hours)

Required Core Courses

200- to 300-level courses (28 of 54 credit hours)

Writing & Literature I, II (4 cr. each)

History: Modern American or Modern European (4 cr.)

Fine Arts: Visual or Music or Film or Theater (4 cr.)

Philosophy or Science, Technology & Values (4 cr.)

Two courses from the following 4 areas in social science:

**Introduction to International Relations
or American Politics (4 cr.)**

Principles of Economics I (4 cr.)

Introduction to Psychology (4 cr.)

Foundations of Sociology or Cultural Anthropology (4 cr.)

Required Advanced Study

(24 of 54 credit hours)

Two options: select either a minor or
a concentration in liberal arts

Minor Option _____ or _____ Concentration
(24 cr.) Option (24 cr.)

Course I (4 cr.) Course I (4 cr.)
400- to 500-level 400- to 500-level

Course II (4 cr.) Course II (4 cr.)
400- to 500-level 400- to 500-level

Course III (4 cr.) Course III (4 cr.)
400- to 500-level 400- to 500-level

Course IV (4 cr.) 1 Elective (4 cr.)
400- to 500-level 400- to 500-level

Course V (4 cr.) 1 Elective (4 cr.)
400- to 500-level 400- to 500-level

1 Elective (4 cr.) 1 Elective (4 cr.)
400- to 500-level 400- to 500-level

Required Senior Seminar Course

(2 of 54 credit hours)

Total: 54 credit hours

Liberal arts minors require **five** liberal arts courses in the designated discipline and one liberal arts elective and are available in American history, American politics, applied communication, art history, communication and culture, creative writing, criminal justice, economics, European history, Spanish, Japanese, French, Italian, German, history of the modern world, international relations, literature, mass media, philosophy, psychology, science, technology and environmental studies, sociology/anthropology, social welfare policy, art history, and women's studies.

Liberal arts concentrations require three liberal arts courses in the designated liberal arts discipline and three additional liberal arts electives. In addition to the areas listed above, concentrations are also available in American artistic experience, American English for ESL students, ASL, environmental studies, foreign language culture (Arabic, Chinese, French, German, Japanese, Russian, and Spanish), global studies, Latino/Latina/Latin American studies, minority relations, music, peace studies, perspectives on religion, science and technology, social change and technology, and women's studies.

III. Senior Seminar in the liberal arts (2 credits) is a capstone experience that provides seniors the opportunity to synthesize their liberal arts experience in a small class through the examination of one topic that changes every few years. Past topics have included diversity and community, environment and citizenship, and the Constitution. The Senior Seminar offers the opportunity for service learning in the greater Rochester community. A series of guest lectures organized by the Senior Seminar faculty are part of the capstone experience. Senior Seminar is an interdisciplinary course taught by faculty from various liberal arts disciplines.

Academic advising

Liberal arts requirements vary within the individual degree programs on campus. Therefore, it is important that students carefully plan their liberal arts program to meet their specific degree requirements. Advising staff are available every day in the College of Liberal Arts' Office of Student Services, on the second floor of the Liberal Arts Building, to provide assistance in planning and selecting appropriate liberal arts courses.

Through this office, the college provides academic worksheets for each degree program to help students maintain records of progress toward their degree.

**The Mathematics and Science
General Education Curriculum ***

The general education curriculum in mathematics and science is a component of all RIT bachelor of science degree programs and is completed through one of the three options described below. These options offer a balance between mathematics and science. Students should consult with their individual program chairperson or academic adviser for specific course requirements and approved sequences.

(Required minimum number of credits in parentheses)

Plan A: Balanced (22)

1. Mathematics—One three-course sequence (10)

2. Science—One three-course sequence (9) and associated laboratories (3)

Plan B: Emphasis on Science (20)

1. Mathematics—One two-course sequence (6)

2. Science—One two-course sequence (6) and associated laboratories (2)
Two additional science electives (6)

Plan C: Emphasis on Mathematics (22)

1. Mathematics—One two-course sequence (6)

Two additional mathematics electives (8)

2. Science—One two-course sequence (6) and associated laboratories (2)

* The RIT Mathematics and Science General Education Curriculum requirement applies to all students pursuing the bachelor of science degree. Students in bachelor of fine arts programs need not complete this requirement.

Wellness Education Requirements

RIT recognizes the need for wellness education in today's society. To meet this need, RIT offers a program of specifically designed courses to help students develop and maintain a well-balanced, healthy lifestyle and acquire a foundation for using free time enjoyably and constructively.

The wellness education requirement is designed to help students make healthy choices that support their academic and social interactions in college and beyond. The learning experiences provided through the wellness curriculum are an integral part of the total educational experience at RIT.

First-Year Enrichment: Center for Student Transition and Support

Freshmen only

All entering first-year students transitioning from high school to college are required to satisfactorily complete the First-Year Enrichment course and two different wellness activity courses to satisfy their graduation requirement. NTID Pre-Baccalaureate, AAS, or AOS students must complete the Wellness for Life course and one wellness activity course to satisfy their graduation requirement.

Course offerings

1105-051

First-Year Enrichment I

First part of the two-quarter version of the First-Year Enrichment course, designed to assist first-year students in making healthy decisions and choices to support their transition, adjustment, and social integration into college. Students must pass both FYE I and II to satisfy the wellness requirement for graduation. Offered fall quarter only.

1105-052

First-Year Enrichment II

Second part of the two-quarter version of the First-Year Enrichment course, designed to assist first-year students in making healthy decisions and choices to support their transition, adjustment, and social integration into college. Students must pass both FYE I and II to satisfy the wellness requirement for graduation. Offered winter quarter only.

1105-048

First-Year Enrichment 10 Week

A 10-week, one-quarter version of the First-Year Enrichment course, offered only in winter for first-year students entering the Institute at that time. Successful completion of First-Year Enrichment 10 Week satisfies the wellness requirement for graduation.

Wellness for Life: Center for Human Performance

Upperclass and transfer bachelor's degree students

All upperclass and transfer students seeking a bachelor's degree, who have not completed the requirements for First Year Enrichment (or an equivalent) must successfully complete the Wellness for Life course (or an acceptable transfer equivalent) and two different wellness activity courses to satisfy their graduation requirement.

Upperclass and transfer associate degree students

All upperclass and transfer students seeking an associate degree who have not completed the requirements for First-Year Enrichment (or an equivalent) must successfully complete the Wellness for Life course (or an acceptable transfer equivalent) and one wellness activity course to satisfy their graduation requirement.

In general, college transfer of health, wellness and/or activity courses taken at other colleges may be accepted in transfer at RIT. The Associate Director for Wellness in the Center for Human Performance will review these courses for transfer consideration. Upon approval, documentation will be conducted within the student's home department by those who review transfer credits (adviser or staff personnel).

Credit/Exemption Scenarios

Permanent medical excuse A medical excuse may exempt a student from participation in the activity segment of the graduation requirement, but he or she must still successfully complete First-Year Enrichment or Wellness for Life. The exemption will be granted only by the college dean, with input from

the Associate Director for Wellness. One copy of the medical excuse (signed physician's memo) should be filed with the Center for Human Performance and the other copy taken to the student's academic department.

Intercollegiate athletics Students participating in the Institute's intercollegiate athletic programs will be granted wellness activity course credit for the season(s) of participation, but must still successfully complete First-Year Enrichment or Wellness for Life. The Center for Human Performance encourages student athletes to enroll in wellness activity courses that are different from their intercollegiate experience to ensure full engagement in a variety of leisure-time pursuits.

Club sports Students participating in an RIT recognized club sport may be granted one activity class credit for the year of participation. Multiple participation on the same club (e.g. rugby four seasons) can only be counted one time for activity class credit toward the graduation requirement. Students must see the club sports advisor before the end of the spring quarter add/drop period to facilitate credit.

Veterans Students who have completed six months or more of active military duty are not required to complete the wellness education program, but are encouraged to enroll in any wellness course on a space-available basis.

Age Students who are 25 or older at their date of matriculation are exempt from the wellness education requirement but may enroll in any course on a space-available basis.

Nonmatriculated status Nonmatriculated students are exempt from the wellness education requirement.

Prior bachelor's degree Students who have acquired a prior bachelor's degree are exempt from the wellness education requirement.

NTID students NTID Pre-Baccalaureate, and associate degree students are required to complete the Wellness for Life course and one wellness activity course to satisfy their graduation requirement.

Intramural Participation No credit is granted for intramural sports participation.

Cooperative Education Requirements

Many academic programs at RIT require that students participate in the university's cooperative education program. Other academic programs may offer co-op as an option or provide other experiential education opportunities (e.g., internships). Cooperative education involves alternating quarters of classroom study and full-time paid employment in a position related to the student's academic program. Requirements, which may vary significantly, are included for each program in this bulletin.

Academic Programs of Study

The academic programs, course curricula, policies, and standards described in this *Undergraduate Bulletin* are in effect for students admitted to RIT during the 2004-2005 academic year. The purpose of this bulletin is to

provide students with a comprehensive source of information to use in planning their undergraduate education. Enrollment in other than registered or approved programs may jeopardize a student's eligibility for certain financial aid awards.

Undergraduate Programs	College	Degree and HEGIS'							Evening Option	Page
		Certificate	Diploma	AOS	AS	AAS	BFA	BS		
Accounting Technology	NTID		5002			5002				141
Administrative Support Technology	NTID		5005			5005				142
Applied Arts & Science	Applied Science & Technology		5699			5699		4999	Y	37
Applied Computer Technology	NTID		5101	5101	0799	5101				135
Applied Optical Technology	NTID			5212		5212				154
Art & Computer Design	NTID			5012		5012				139
ASL-English Interpretation	NTID					5506		1199		133
Automation Technologies	NTID			5399		5399				147
Biochemistry*	Science							0414		115
Bioinformatics*	Science							0499		109
Biology	Science				5604			0401		108
Biomedical Photographic Communications	Imaging Arts & Sciences					5299		1217		85
Biotechnology	Science				§			0499		108
Bioinformatics Option	Science							0499		109
Business	NTID				5001					141
Business Administration:										
Accounting	Business							0502	Y	47
Business Administration	Applied Science & Technology					5001			Y	37
Finance	Business							0504	Y	48
Graphic Media Marketing	Business							0509		51
International Business	Business							0513		48
Management	Business							0506	Y	49
Management Information Systems	Business							0599	Y	49
Web Systems Development	Business	5103							Y	50
Marketing	Business, Applied Science & Technology					5004		0509	Y	50
Business Technology	NTID			5004					Y	39
Ceramics & Ceramic Sculpture	Imaging Arts and Sciences					5610	1009			81
Chemistry*	Science				5619			1905	Y	112
Environmental Chemistry Option	Science							1905		114
Communication, Technical:										
Basic	Applied Science & Technology	5008							Y	41
Advanced	Applied Science & Technology	5008							Y	41
Communication, Professional & Technical	Liberal Arts							0601		94
Communications, Public Relations:										
Graphic Communication	Applied Science & Technology	5008							Y	40
Professional Writing	Applied Science & Technology	5008							Y	40
Computer Aided Drafting Technology	NTID		5303	5303		5303				150
Computer Integrated Machining Technology	NTID		5312	5312						152
Computer Science§	Computing & Information Sciences				5101			0701	Y	53
Computing, Biomedical*	Science				§			1217		122
Craft Major, Double"	Imaging Arts & Sciences						1009			
Criminal Justice	Liberal Arts							2105		97
Deaf Studies	NTID	5506							Y	156
Design:										
Graphic	Imaging Arts & Sciences					5012	1009			78
Industrial	Imaging Arts & Sciences						1009			79
Interior	Imaging Arts & Sciences						1009			79
Diagnostic Medical Sonography	Science	5299			§			1299		124
Digital Imaging & Publishing Technology	NTID		5007	5007		5007				145

Undergraduate Programs	College	Degree and HEGIS*							Evening Option	Page
		Certificate	Diploma	AOS	AS	AAS	BFA	BS		
Economics	Liberal Arts							2204		99
Disaster & Emergency Management	Applied Science & Technology	5508								35
Engineering:										
Computer Engineering*	Engineering							0999		64
Electrical Engineering*	Engineering							0909		65
Industrial & Systems Engineering*	Engineering							0913		68
Mechanical Engineering*	Engineering							0910		69
Microelectronic Engineering*	Engineering							0999		72
Engineering Science	Engineering				5609				Y	63
Engineering Technology:										
Civil Engineering Technology	Applied Science & Technology							0925		15
Computer Engineering Technology	Applied Science & Technology							0925	Y	18
Electrical Engineering Technology	Applied Science & Technology							0925	Y	17
Electrical Technology	Applied Science & Technology					5310			Y	14
Electrical/Mechanical Engineering Technology	Applied Science & Technology							0925	Y	21
Manufacturing Engineering Technology (CIM)	Applied Science & Technology							0925	Y	23
Mechanical Engineering Technology	Applied Science & Technology							0925	Y	21
Mechanical Technology	Applied Science & Technology	5301				5315			Y	24
Telecommunications Engineering Technology	Applied Science & Technology							0925		20
Environmental Management & Technology	Applied Science & Technology							0420	Y	32
Environmental Science*	Science							0420		110
Exercise Science	Science	5299.3								125
Film/Video/Animation	Imaging Arts & Sciences					5008	1010			83
Fine & Applied Arts	Imaging Arts & Sciences		5012						Y	82
Fine Arts Studio	Imaging Arts & Sciences					5610	1002			77
Food Management	Applied Science & Technology					5404		1307		29
Food Marketing & Distribution	Applied Science & Technology							1307		30
General Management	Applied Science & Technology					5004			Y	39
Glass & Glass Sculpture	Imaging Arts & Sciences					5012	1009			81
Graphic Communications+	Imaging Arts & Sciences					5009		0699		
Graphic Media	Imaging Arts & Sciences							0699		90
Health Care Billing & Coding Technology	NTID		1202	1202						144
Health Systems Administration	Applied Science & Technology	5299							Y	32
Hotel and Resort Management	Applied Science & Technology					5010		0508		30
Human Resource Administration	Applied Science & Technology					5004			Y	39
Illustration	Imaging Arts & Sciences					5610	1002			77
Imaging Science	Science							1999.20		125
Imaging & Photographic Technology	Imaging Arts & Sciences					5007		1011		86
Imaging Systems Management	Imaging Arts & Sciences							0599		87
Information Technology:										
Applied Networking & System Administration	Computing & Information Science							0702	Y	57
Information Technology	Computing & Information Science					5101		0699	Y	58
New Media-Information Technology	Computing & Information Sciences							0699		59
Introductory Programming	NTID	5103								156
Laboratory Science Technology	NTID			5407		5407				153
Management Development	Applied Science & Technology	5004	5004						Y	38
Mathematics:										
Applied Mathematics*	Science				5617			1703		119
Computational Mathematics*	Science							1703		120
Medical Illustration	Imaging Arts & Sciences						1299			76

Continued from prior page

Undergraduate Programs	College	Degree and HEGIS*							Evening Option	Page
		Certificate	Diploma	AOS	AS	AAS	BFA	BS		
Medical Laboratory Technology!	Science				§			1223		
Metals & Jewelry Design	Imaging Arts & Sciences					5012	1009			81
New Media:										
New Media-Design & Imaging	Imaging Arts & Sciences						0605			81
New Media-Publishing	Imaging Arts & Sciences							0605		91
Newspaper Operations Management	Imaging Arts & Sciences							0699		
Nuclear Medicine Technology!	Science	5299			§			1299		
Nutrition Management	Applied Science & Technology					5404		1306		31
Organizational Development:										
Human Resource Development	Applied Science & Technology	5004							Y	39
Organizational Change & Leadership	Applied Science & Technology	5004							Y	39
Packaging Science	Applied Science & Technology							4999		26
Performing Arts	NTID	5610								156
Photographic Illustration, Professional:	Imaging Arts & Sciences					5007	1011			88
Advertising Photography Option	Imaging Arts & Sciences									88
Fine Art Photography Option	Imaging Arts & Sciences									88
Photojournalism Option	Imaging Arts & Sciences									88
Physician Assistant	Science							1299.10		123
Physics	Science				5619			1902		121
Polymer Chemistry*	Science							1907		117
Printing & Applied Computer Science†	Imaging Arts & Sciences							0699		
Psychology	Liberal Arts							2001		100
Public Policy*	Liberal Arts							2102		101
Quality, Basic	Applied Science & Technology	5004							Y	40
Quality Implementation	Applied Science & Technology	5004							Y	40
Safety Technology	Applied Science & Technology	5312						0420		34
Social Work	Liberal Arts							2104		103
Software Engineering	Computing & Information Sciences							0999		55
Statistics, Applied*	Science							1702		120
Structural Design	Applied Science & Technology	5399								17
Travel & Tourism Management	Applied Science & Technology					5011.1		0510.10		31
Visual Media	Imaging Arts & Sciences						1009			89
Woodworking & Furniture Design	Imaging Arts & Sciences			5317		5012	1009			81

* Higher Education General Information Survey

† Upon approval of the School for American Crafts

§ Students in these programs may receive an /1S in general science (HEGIS #5649) upon successful completion of the first two years.

Dual degrees (BS/MS) option also available

† This program has been approved for discontinuance. No new students will be admitted in 2004-2005.

College of Applied Science and Technology

Wiley R. McKinzie, Dean

The College of Applied Science and Technology (CAST) provides programs that stress technology in many environments, programs to enhance customer satisfaction in the service sector, and programs that enhance the careers of traditional and nontraditional students. Modern technology, whether in the development, integration or implementation stages, is a focal point in each CAST program. This technology may be used to provide the productive manufacture and distribution of durable and consumable goods, the proper flow of information worldwide, the proper protection of the environment or the enhancement of customer satisfaction in the service sector.

The college includes civil engineering technology; electrical, computer and telecommunications engineering technology; manufacturing, electrical/mechanical, and mechanical engineering technology; food, hotel, travel and nutrition management; packaging science; environmental management and technology; safety technology; health systems administration; and applied arts and science. The college offers degree programs at the associate, baccalaureate and master's degree levels, as well as a wide array of diplomas and certificates. The department of military science (Army ROTC) and the department of aerospace studies (Air Force ROTC) are also part of the college. The Center for Electronic Manufacturing Assembly (CEMA) and the National Technology Training Institute (NTTI) are important components of CAST.

Resources

The experiential nature of all of the programs in the College of Applied Science and Technology requires excellent facilities and equipment. The Institute continually updates and adds equipment to all laboratories, including many academic laboratories housed in the Center for Integrated Manufacturing Studies. CIMS educational areas include state-of-the-art labs in CAD/CAM systems, electronics manufacturing, instrumentation, and packaging testing. The CAST building houses the laboratories for electrical, computer and telecommunications engineering technology (electronics, electronic design, wide area networks, digital systems and telecommunication systems), and manufacturing and mechanical engineering technology (mechanical systems and materials). The soils and environmental laboratories from civil engineering technology have been upgraded and relocated to larger facilities.

The college's student-run kitchen and restaurant contain some of the most sophisticated service equipment in the country. Newly remodeled food product development laboratories allow students to create menu items for the growing foodservice industry. Information laboratories provide data that enable students to assess the supply and demand for food commodities throughout the world.

A new environmental management and technology lab simulates many of the industrial and commercial environmental and safety issues of significance to students.

Acceptance of the associate degree

All units within CAST strongly encourage the transfer of students from two-year colleges. Most CAST programs give students with an appropriate associate degree full junior standing, and such students are eligible to graduate from RIT in two academic years, plus the required co-op experience. Students with a less appropriate academic background may have to complete additional course work. Part-time students have an extended schedule to meet the needs of their employers.

Program planning

Each student in CAST is considered individually when his or her program is planned. The variety of subject backgrounds from two-year colleges necessitates an almost tailor-made pattern of courses and knowledge. Every effort is made to ensure that associate degrees retain the integrity they deserve and to avoid repetition of previously studied material.

Faculty

Faculty members in CAST have had considerable experience in their respective industrial fields and/or teaching in two-year and four-year colleges, and have completed graduate programs in their various specialties. While teaching is their primary concern, they serve as active industrial consultants and researchers to maintain current knowledge in their fields. The faculty are committed to student growth and development.



Advising

The College of Applied Science and Technology provides advising services throughout a student's academic career. The faculty adviser, the co-op adviser and the departmental offices each provide a part of that advising. In the departmental offices, all students are assured of the administrative support to effectively deal with registration, records and scheduling. A faculty adviser, who is uniquely prepared to offer career counseling in the major field of study, is assigned to each student. The Office of Cooperative Education and Career Services assigns each co-op student an adviser, who assists in the placement process. With a prearranged appointment, part-time students will find advisers available during the evening. Each of these advisers will also help to identify appropriate RIT support services for specific student needs.

In addition, students have the opportunity to develop a broad appreciation of computer applications and the effects of computers on society via computer science electives, liberal arts courses and a non-computer science concentration in another discipline.

RIT is a leader in the development of baccalaureate programs in engineering technology. The bachelor of science degree in engineering technology meets the growing need of business and industry for engineering technologists at the baccalaureate level.

Degree programs

Engineering technology at RIT offers five-year cooperative education programs leading to the bachelor of science (BS) degree in:

- civil engineering technology
- computer engineering technology
- manufacturing engineering technology
- electrical engineering technology
- electrical/mechanical engineering technology
- mechanical engineering technology
- telecommunications engineering technology

The upper division of these programs is designed to accept graduates of associate degree programs in similar engineering technology fields and to provide continued study in the student's specialization. Each program consists of a balance of professional studies, liberal education, mathematics and on-the-job experience. Through the selection of technical electives, students can build and tailor their program based on previous knowledge and co-op experience to launch a career that best meets their needs and aspirations.

Part-time study

Upper division: Part-time study in all engineering technology upper-division programs is available during the day. The computer, electrical, computer integrated manufacturing, electrical/mechanical, mechanical and telecommunications engineering technology programs also offer courses in the evening for part-time students. These programs allow students with full-time jobs to obtain a BS degree on a part-time basis.

The upper-division programs in electrical/mechanical and telecommunications engineering technology are also offered through online learning.

The requirements for the part-time programs and graduation are the same as for the electrical, computer, and telecommunications engineering technology full-time day programs requiring co-op experience. The part-time mechanical, electrical/mechanical, and computer integrated manufacturing engineering technology programs do not require cooperative education.

Lower division: Engineering technology offers the following lower-division evening programs:

- electrical technology
- mechanical technology

These programs allow students with full-time jobs to obtain an AAS degree on a part-time basis.

Certificate programs are also available during the evening and some through online learning.

Information on these part-time, evening, and certificate programs is available in the *Part-time/Online Guide*.

Accreditation

The following baccalaureate programs are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 1 Market Place, Suite 1050, Baltimore, Maryland 21202, telephone 410-347-7700: civil engineering technology, computer engineering technology, electrical engineering technology, electrical/mechanical engineering technology, computer integrated manufacturing engineering technology, manufacturing engineering technology, mechanical engineering technology, and telecommunications engineering technology. While RIT has not sought professional accreditation for the engineering technology associate programs, they have been designed to facilitate easy transfer for students to the BS programs. Students enrolled in the engineering technology associate degree programs may transfer all of their credits to the TAC of ABET-accredited bachelor of science degree program in the appropriate field.

Careers

The graduate with a bachelor's degree in engineering technology is a distinct type of professional whose main concern and interest is with existing operation, maintenance, and management of products and processes. As such, the graduate qualifies for positions to fulfill a role within the broad engineering requirements of business, industry and government. Graduates find increasing acceptance in positions formerly filled by engineers in such fields as sales engineering, manufacturing engineering, field service engineering, process engineering, and product engineering.

The associate degree graduate—an engineering technician—works closely with engineers and technologists and is prepared for positions requiring skills in fabricating and producing equipment as well as maintaining and operating apparatus and systems.

Cooperative education plan

Year	Fall	Winter	Spring	Summer
1 and 2	RIT	RIT	RIT	-
3	RIT	RIT	Co-op	Co-op
4	RIT	Co-op	RIT	Co-op
5	Co-op	RIT	RIT	-

An integral and significant part of each engineering technology program is on-the-job experience through RIT's cooperative education plan. This involves alternate periods of study and related industrial employment.

The co-op plan provides opportunity for students to learn and become familiar with direct application of techniques, skills and the latest developments in their fields. Students are encouraged to explore and test the wide range of opportunities available. Such things as the specific type of work, the size of the company, the location and familiarization with the industrial community and environment can and do affect an individual's decision on the direction of his or her career. Co-op can provide a suitable trial ground.

Co-op can also provide a significant income during work periods, which helps defray a major portion of one's educational expenses. Each student is helped to find work related to specific career goals. However, as is the case in any employment situation, the major impetus must come from the individual. The typical co-op schedule for engineering technology students is shown in the chart on the previous page-

All full-time engineering technology programs at RIT require students to compete five blocks of cooperative education before they can be certified with a bachelor of science degree. All part-time programs also require either cooperative education or its equivalent work experience beyond the level of an associate degree. Most part-time students are employed full-time and are using the education they gain on a regular basis. Some RIT engineering technology programs require an official entry of co-op while others do a search of background but do not place this on the student transcript. Part-time students in electrical, computer, and telecommunications engineering technology program have the same cooperative education requirements as full-time students. As part of the graduation requirement for a BS in mechanical engineering technology, electrical/mechanical engineering technology and manufacturing engineering technology, the department requires that the work experience of all part-time and distance students must total at least 48 weeks of documented full-time work experience relevant to their major.

Undeclared Engineering Technology Option

George Sutherland, Program Chair
www.rit.edu/~719www/

Students interested in engineering technology or packaging science but undecided about selecting a specific major should consider this option. It allows students to spend up to a year earning credits applicable to all programs while exploring the various options available at RIT. During the first quarter, students take basic technical skills courses in both electrical and mechanical disciplines. They also participate in an Engineering Technology Seminar in which they explore the unique characteristics of each discipline offered within the departments. After the first quarter, students are expected to select a specific major or to focus on either the electrical (computer, electrical, telecommunications) or mechanical (civil, manufacturing, mechanical, packaging) disciplines. During the spring quarter, they are required to select a specific major. In their first two years, students take some courses at different times from students who entered a specific program. In most cases, however, students who spend a full year in the undeclared option are able to start their junior year on track with other students in the same program.

Undeclared engineering technology, freshman year course sequence

<i>Fall Quarter</i>	<i>Quarter Credit Hours</i>
Writing & Literature I 0504-225	4
Computer Tools for Engineering Technology 0610-230	4
Circuit Theory I 0609-214	4
Precalculus 1016-230	4
Engineering Technology Seminar 0606-101	2
<i>Winter Quarter (Students to select from 2 options listed below)</i>	
Electrical Option	
Writing & Literature II 0504-226	4
College Physics I 1017-211, 271	4
Technical Programming I 0618-231	4
Circuit Theory II 0609-215	4
Mechanical Option	
Writing & Literature II 0504-226	4
College Physics I 1017-211,271	4
Solid Modeling & Design 0617-262	4
Electrical Principles for Design I 0609-411	4

Spring Quarter (Students to select from 2 options listed below)

Electrical Option	
Liberal Arts (Core)*	4
Circuit Theory III 0609-216	4
Digital Fundamentals 0618-301	4
College Physics II 1017-212,272	4
Mechanical Option	
Introduction to Statics 0610-302	4
Data Analysis 1016-319	4
College Physics II 1017-212,272	4
Liberal Arts (Core) *	4
<hr/> <i>Total Quarter Credit Hours</i>	<hr/> 84

* See page 7 for liberal arts requirements.

Civil Engineering Technology

Maureen S. Valentine, Chair
Scott B. Wolcott, Undergraduate Coordinator
www.rit.edu/~704www/

The engineering technologist translates the innovative concepts of the engineer into functioning systems and structures, using the language of codes, working drawings and specifications. The mission of the civil engineering technology program is to provide an academically demanding education to meet the needs of students and properly prepare them for a successful career after graduation.

The main objective of this program is to prepare individuals to attain gainful employment in the field of civil engineering technology, construction management, or any other closely related field. In addition, the program teaches the skills necessary for that graduate to pursue additional education, certification and/or professional licensure. Another objective of the program is to allow the graduates to attain increasing levels of responsibility and leadership in their chosen field. The coursework and extracurricular activities teach the students to participate in organizations or activities within and outside of their profession.

These objectives are achieved through a broad-based curriculum that offers students a choice of five elective paths that meet their specific interests.

The program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, Maryland 21202, telephone 410-347-7700, and is operated as a cooperative education program.

Cooperative education plan

Work experience gained while completing alternate work and study quarters is especially valuable. A typical co-op job at an engineering consulting firm might include assisting engineers in design drafting; feasibility and preliminary report writing; and inspecting, surveying, or investigating in the field. Other co-op students work in water and wastewater treatment plants, checking control panels, operating systems, pumps, and other equipment. Students in the construction field typically perform a wide range of duties, from craft supervision to assisting project superintendents, recording change orders, estimating, drafting, and surveying.

The scope of work accomplished varies with the interests of each student and increases in complexity with each succeeding job. Construction companies, facility departments of large corporations, engineering consultants, testing agencies, and all branches of government employ our students. Some students work all their co-op quarters with the same firm, while others choose from various work experiences. All are expected to use their education on the job and bring back innovative, new, and unusually successful technologies to share with classmates.

Faculty

Faculty members have outstanding academic credentials and industrial experiences. They serve as consultants and professional engineers in their fields of expertise. They also participate and serve in local/regional professional associations.

Advisory board

Local and regional industry leaders, from consulting, construction and the municipal market, make up the Industrial Advisory Board. These professionals offer their professional and technical expertise to the program, strengthening the development of its future.

Transfer admission

The admission of transfer students at the third-year level is open to all students who have already received an appropriate associate degree, which should include:

- Technical math (2 semesters of college-level math with an introduction to calculus)
- Drafting (to include CAD)
- Technical physics (2 semesters)
- Soil Mechanics
- Plane Surveying
- Route Surveying
- Statics (mechanics).
- Strength of Materials
- Methods and Materials of Construction

Students lacking these courses are still admitted but are required to take the missing courses concurrently within the program or in addition to the program requirements.

Normally, an associate degree in science is acceptable from an engineering transfer program, with students taking courses they lack concurrently in the program. Typically these students graduate in the same six academic quarters as an engineering technology transfer student.

Graduates

Bachelor of science in engineering technology degree graduates are employed by consulting engineers; construction companies and industries; and federal, state and local government agencies. They are scattered from coast to coast and from New England to Texas and several overseas areas. Their initial job titles range from assistant project manager, structural designer or junior engineer to construction inspector and environmental engineer. Several graduates have completed master's degrees, a large number have gained registration in several states as professional engineers, and several manage their own consulting firms.

Technical electives

It is anticipated that a student will take at least two electives from one of the sequences shown. Other electives may be chosen from within that sequence, from another sequence, or from the other electives shown.

Water Resources	<i>Quarter Credit Hours</i>
Hydrology 0608-482	4
Hydraulic Structures 0608-485	4
Groundwater Hydraulics 0608-480	4
Environmental Controls	
Design of Water Treatment Facilities 0608-510	2
Land Use Planning 0608-514	4
Design of Wastewater Treatment Facilities 0608-520	4
Resource Recovery/Waste Management 0608-525	4



*A freshman mechanical engineering major uses a speed lathe to grind down the tip of a hammer she constructed in her material processing lab.
©2004 Photo by Shawn Dowd/Democrat and Chronicle*

Construction Management

Labor Relations 0608-500	2
Cost Estimating 0608-509	4
Construction Project Management 0608-560	4
Contracts and Specifications 0608-544	2

Structures

Timber Design 0608-470	4
Reinforced Concrete Design 0608-496	4
Structural Steel Design 0608-497	4

Building and Heavy Construction

Construction Equipment 0608-460	2
Construction Safety 0608-505	2
Pavement Design 0608-535	4
Mechanical Equipment 0608-444	2

Other Electives

Data Analysis 1016-319	4
Applied Thermodynamics 0610-440	4
Environmental Geology /Lab 0630-370/72	4

With departmental approval, technical electives may be selected from existing courses in other RIT colleges.

Also, independent study projects may be pursued for credit in cases where students demonstrate unusual ability and obtain sponsorship of a faculty adviser.

Civil engineering technology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Introduction to CET, Freshman 0608-198	1
College Algebra & Trigonometry 1016-204	4
Engineering Graphics with CAD 0608-211	4
Materials of Construction 0608-330	4
Analytic Geometry 1016-228	4
College Physics I & Lab 1017-211,271	4
Writing & Literature I 0504-225	4
Computer Applications I 0608-225	2
Introduction to Statics 0610-302	4
College Physics II & Lab 1017-212,272	4
Civil Engineering Graphics 0608-220	4
Writing & Literature II 0504-226	4
Liberal Arts (Core) *	4
Wellness Education †	0

Second Year

College Physics III & Lab	1017-213,273	4
Plane Surveying	0608-320	4
Effective Technical Communication	0535-403	4
Strength of Materials	0610-303	4
Elementary Soil Mechanics	0608-360	4
Elements of Building Construction	0608-422	4
Calculus for Engineering Tech. I	1016-231	4
Route Surveying	0608-340	4
Elementary Structures	0608-380	4
Calculus for Engineering Tech. II	1016-232	4
Liberal Arts (Core) *		8
Wellness Education †		0
(Or completion of an appropriate associate degree or equivalent)		

Third Year

Introduction to CET, Transfer	0608-199	1
Hydraulics & Lab (or Technical Elective)	0608-420,421	4
Structural Loads and Systems	0608-304	2
Land Development Computer Applications	0608-303	2
Differential Equations for Engineering Tech.	1016-304	4
Structural Computer Applications	0608-305	2
Applied Mechanics of Materials	0608-404	4
Technical Elective		2
Fundamentals of Chemistry	1011-271	3
Chemistry I Lab	1011-205	1
Liberal Arts (Core) *		8
Co-op Preparation	0606-099	0
Cooperative Education (2 quarters)		0

Fourth Year

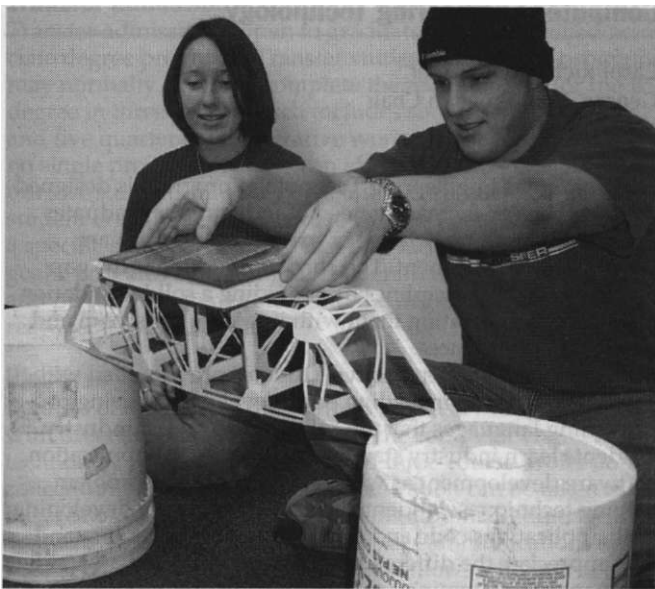
Water & Wastewater Transport Systems	0608-432	2
Structural Analysis	0608-490	4
Chemistry of Water & Wastewater & Lab	1011-272,276	4
Technical Elective		4
Principles of Water & Wastewater Treatment	0608-438	4
Structural Design	0608-496 or 0608-497	4
Soil Mechanics & Foundations & Lab	0608-527, 528	4
Professional Principles & Practices	0608-546	1
Liberal Arts (Concentration) *		8
Cooperative Education (2 quarters)		0

Fifth Year

Transportation Engineering	0608-530	4
Technical Electives		12
Basic Electrical Principles	0609-414	4
Engineering Economics	0617-436	4
Principles of Dynamics in CET	0608-570	4
Liberal Arts (Concentration) *		4
Liberal Arts (Senior Seminar) *		2
Cooperative Education (1 quarter)		0

Total Quarter Credit Hours **196**

* See page 7 for liberal arts requirements.
 † See page 9 for wellness education requirements.



Structural Design Certificate

This certificate is for those with an associate degree in civil engineering technology or a similar program who are employed in a design environment (consulting engineering firm or architecture-engineering firm) and need formal training in proper design techniques to better perform those preliminary design functions that may be allocated to them under the supervision and guidance of a professional engineer. The 20-credit certificate program in structural design consists of five four-credit courses listed below. The program is offered locally and online.

This certificate sequence includes the latest technique in steel design, designated "load and resistance factor design," which is replacing the "allowable stress design" techniques still offered in many engineering and engineering technology curricula.

Prospective students would be either those with an associate degree in civil engineering technology or a similar program employed in a design environment and needing additional training, or those with a bachelor's degree in civil engineering, civil engineering technology, or architecture employed in a design environment.

Admissions requirements for either category would include an official transcript from the previous institution indicating successful completion of the courses equivalent to the program prerequisites.

Courses		
Applied Mechanics	0608-404	4
Structural Analysis	0608-490	4
Timber Design	0608-470	4
Reinforced Concrete Design	0608-496	4
Structural Steel Design	0608-497	4
<hr/> Certificate Total		20

Electrical Engineering Technology

Carol Richardson, Chair
 Thomas J. Dingman, Program Chair
www.rit.edu/ect

The five-year bachelor of science program in electrical engineering technology includes more than a year of cooperative work experience for full-time students. The program also accepts transfer students (see **Transfer admission**, following). The upper-division feature of the program provides a viable option for students who have completed their associate degree and desire to continue their education in technology.

The bachelor of science degree program in electrical engineering technology is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, Maryland 21202, telephone 410-347-7700.

A typical BS program is shown in the chart on the next page. The first two years provide basic courses in circuits, analog and digital electronics, physics, technical calculus and liberal arts. The third and fourth years of the program expand on basic courses with upper-level courses in applied differential equations, liberal arts, advanced circuits and electronics, transform methods, control systems, analog and digital electronics, and mechanical engineering technology. The program is completed with a choice of technical and professional electives. Professional elective sequences are available in electric power systems, electronic communications, computer design, and networking. Several electives also are available from other technical disciplines, and the student's academic adviser will help to determine the best choices.

Students begin their cooperative work experience in the third year of the program and are required to complete five quarters of such experience. A co-op counselor is assigned to each student.

The long-term objectives for the electrical engineering technology program are:

- Graduates, five or more years after graduation will have:
- Attained gainful employment in the field
- Pursued additional formal education and/or certification
- Attained increasing levels of responsibility and leadership in their chosen field

These goals recognize that EET graduates are prepared to go in a wide variety of directions. Graduates enter not only design, but other related disciplines including manufacturing, research, sales and marketing, applications engineering, and education. To attain these objectives specific program outcomes are specified for program graduates. These can be found by visiting the department Web site listed.

Transfer admission

Transfer admission is open to graduates of two-year associate degree electrical or electronic engineering technology programs. Students currently enrolled in engineering science associate degree programs also may apply and be assigned to a slightly different series of courses. Students from associate degree programs closely related to electrical technology and who have appropriate circuits and electronics course levels are also accepted, but may be required to complete some lower-level courses before starting the third year of the program.

Possible Technical Electives

- Senior Project 0609-580
- Robots in Manufacturing 0617-485
- Telecommunications Fundamentals 0614-271
- Voice Telecommunications 0614-465

Possible Professional Electives

- Embedded Systems Design I 0618-561
- Embedded Systems Design II 0618-562
- Robust Design 0610-570
- Fiber Optic Telecommunications Technology 0614-520
- Power Systems I 0609-550
- Power Systems II 0609-552
- Communications Systems I 0609-534
- Communications Systems II 0609-535

Electrical engineering technology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Circuit Theory I 0609-214	4
Pre-Calculus 1016-230	4
First-Year Orientation 0609-207	1
Liberal Arts (Core) *	12
Circuit Theory II 0609-215	4
Technical Programming I 0618-231	4
College Physics I/Lab 1017-211, 271	4
College Physics II/Lab 1017-212, 272	4
College Physics III/Lab 1017-213, 273	4
Digital Fundamentals 0618-301	4
Circuit Theory III 0609-216	4
Wellness Education †	0

Second Year

Electronics I, II, III 0609-203, 361, 362	12
Data Analysis 1016-319	4
Liberal Arts (Core) *	8
Machines & Transformers 0609-337	4
Calculus for Engineering Tech. I, II 1016-231, 232	8
Electronics I 0609-203	4
Effective Technical Communications 0535-403	4
Microcomputers 0618-303	4
Microcontrollers 0618-339	4
or	
Technical Programming II 0618-232	4
Wellness Education †	0
(Or completion of an appropriate associate degree or equivalent)	

Third Year

Digital Systems Design I 0618-438	4
Electronics IV 0609-363	4
Differential Equations for Engineering Tech. 1016-304	4
Liberal Arts (Core) *	4
Career Orientation 0609-407	1
Math/Science Elective	4
Liberal Arts (Concentration) *	4
Principles of Electronic Design Automation 0618-439	4
Concepts in Systems & Signals 0609-333	4
Cooperative Education (2 quarters)	Co-op

Fourth Year

General Education Elective	4
Technical Elective	4
Liberal Arts (Concentration) *	4
Digital Signal Processing 0609-547	4
Advanced Circuit Theory 0609-403	4
Mechanical/Manufacturing ET Elective	4
Advanced Electronics 0609-442	4
Transmission Lines 0609-408	4
Cooperative Education (2 quarters)	Co-op

Fifth Year

Control Systems I 0609-404	4
Management Topics for Engineers 0614-440	4
Senior Seminar	2
Professional Electives	8
Free Elective	4
Technical Elective	4
Liberal Arts (Concentration) *	4
Cooperative Education (1 quarter)	Co-op

<i>Total Quarter Credit Hours</i>	196
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The program shown is that which would be taken by those who start at RIT as freshmen. Each transfer student will be given a program tailored to his or her particular needs upon acceptance. Graduates will have to meet a minimum of 36 quarter credit hours of mathematics and science (including credits transferred) and include mathematics 1019-422 or equivalent.

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

Computer Engineering Technology

Carol Richardson, Chair

George Zion, Program Chair

www.rit.edu/ect

The Computer Engineering Technology program is designed to meet the ever-increasing need of industry for graduates with an in-depth knowledge of hardware and software design and development. The curriculum bridges the gap between the two disciplines by providing a solid foundation of each, and integrating them with intensive classroom and laboratory experiences.

From a software perspective, students are provided with a strong background in leading edge development using programming languages that are fully entrenched in industry. Students learn industry standard approaches to application software development as well as state-of-the-art problem solving techniques. Students learn techniques for developing both applications code and firmware, and they understand and appreciate the difference. Embedded "C" and assembly language programming are performed in numerous courses.

The hardware focus of the curriculum is on digital systems design and development. From low-level gate design to high-end microprocessors and current bus standards, students gain an architectural appreciation of computer systems. The curriculum includes in-depth design and analysis of combinational logic, sequential logic, and state machines, microcontroller systems, microprocessor systems and state-of-the-art computer technology. Students perform schematic entry and programmable logic development in VHDL using industry standard computer aided engineering (CAE) tools.

This emphasis on both disciplines, along with the program's solid foundation of math, science and general education, enable it to meet the goal of producing graduates who are prepared with the depth of knowledge, breadth of experience and attitude of professionalism that will enable them to (i) pursue successful careers in their chosen professional field; (ii) embark on careers of personal and professional growth, and (iii) pursue life-long learning to enhance their undergraduate degree and advance their careers. Specific program outcomes are available on the department Web site.

RIT's computer engineering technology program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, Maryland 21202, telephone 410-347-7700.

Combined five-year BS/MS degree option

The computer engineering technology program, in conjunction with the department of computer science (B. Thomas Golisano College of Computing and Information Sciences) also offers a combined bachelor of science/master of science degree. This accelerated sequence provides an excellent opportunity for outstanding undergraduate students to earn both a bachelor's degree in computer engineering technology and a master's degree in computer science in a cohesive five-year curriculum.

Applications to this program option will be accepted from matriculated undergraduate computer engineering technology students who have completed all the courses in the first five quarters of the baccalaureate program and have maintained a cumulative grade point average of at least 3.4 out of 4.0. At least 55 of these credits must have been earned at RIT. Continuance in this program also requires the maintenance of at least a 3.0 cumulative grade point average and at least a 3.0 in the 45-quarter hours directly applicable to the master of science degree.

Transfer admission

Transfer admission is open to graduates of closely allied associate degree programs. Transfer students from such programs may normally expect to complete the requirements for the BS degree in three years, which includes six academic quarters and five quarters of cooperative work experience. Because no single program of study can effectively integrate all AAS transfer students into the curriculum, each qualified transfer student is evaluated on a course-by-course basis and is given a specific program of study that best meets his or her career goals, provides a meaningful cooperative work experience and permits the student to fulfill the degree requirements in a reasonable period of time.

Electives

Because of the need in the computer industry for graduates with diversified areas of expertise, the computer engineering technology program has a required three-course professional concentration sequence. This concentration can be taken in the area of computer science, systems administration, local area networks, wide area networks, or communications systems. This professional concentration allows students to customize their education yet ensures depth of knowledge in a

subject matter beyond the core curriculum.

In addition to the professional concentration, the computer engineering technology curriculum has two technical electives, one general education elective, and one math/science elective. These provide even greater breadth of knowledge in an already well-rounded curriculum.

Possible professional concentrations

Computer Science

Computer Science for Transfers 4003-263
 Programming Language Concepts 4003-450
 Operating Systems I 4003-440

Systems Administration

OS Scripting 4002-402
 Systems Administration I 4002-421
 Systems Administration II 4002-422

Local Area Networking

Internetworking Lab 4002-342
 Concept Wireless Data Networking 4002-403
 Applications of Wireless Nets 4002-413

Wide Area Networking

Telecommunications Fundamentals 0614-271
 Voice Communications 0614-465/0614-466
 Switching Technologies 0614-475

Communication Systems

Electronics IV 0609-363
 Communication Systems I 0609-534
 Digital Signal Processing 0609-547

Computer engineering technology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
First-Year Enrichment 1105-048	0
Freshman Seminar 0618-101	1
Circuit Theory I 0609-214	4
Digital Fundamentals 0618-301	4
Circuit Theory II 0609-215	4
Technical Programming I 0618-231	4
Technical Programming II 0618-232	4
Pre-Calculus 1016-230	4
Calculus for Engineering Tech. I, II 1016-231,232	8
Circuit Theory III 0609-216	4
Liberal Arts *	12
<i>Second Year</i>	
Microcomputers 0618-303	4
Electronics I, II, III 0609-203,361, 362	12
Microcontrollers 0618-339	4
Technical Programming III 0618-233	4
College Physics I, II, III 1017-211, 212,213	9
College Physics I, II, III Lab 1017-271, 272,273	3
Liberal Arts *	12
<i>Third Year</i>	
Principles of Electronic Design Automation 0618-439	4
Digital Systems Design I 0618-438	4
Effective Technical Communication 0535-403	4
Networking Technologies 0614-477	4
Principles of Optics 1017-320	4
Differential Equations for Engineering Tech. 1016-304	4
Data Analysis 1016-319	4
Liberal Arts *	4
Career Orientation 0609-407	1
Cooperative Education (2 quarters)	Co-op
<i>Fourth Year</i>	
Embedded Systems Design I, II 0618-561, 562	8
Concepts in Systems & Signals 0609-333	4
Advanced Electronics 0609-442	4
Professional Concentration Elective	8
Liberal Arts*	8
Cooperative Education (2 quarters)	Co-op

<i>Fifth Year</i>		
Embedded Systems Design III	0618-563	4
Professional Concentration Elective		4
Electives †		16
Management Topics for Engineers	0614-440	4
Senior Seminar	0520-501	2
Cooperative Education (1 quarter)		Co-op
<hr/>		
Total Quarter Credit Hours		192

Note: One physical education wellness and two different physical education activity courses need to be taken any time during the five years.

* See page 7 for liberal arts requirements.

† The electives must include (1) math/science, (1) general education and (2) technical.

Telecommunications Engineering Technology

Carol Richardson, Chair

James Hurny, Program Chair

www.rit.edu/ect

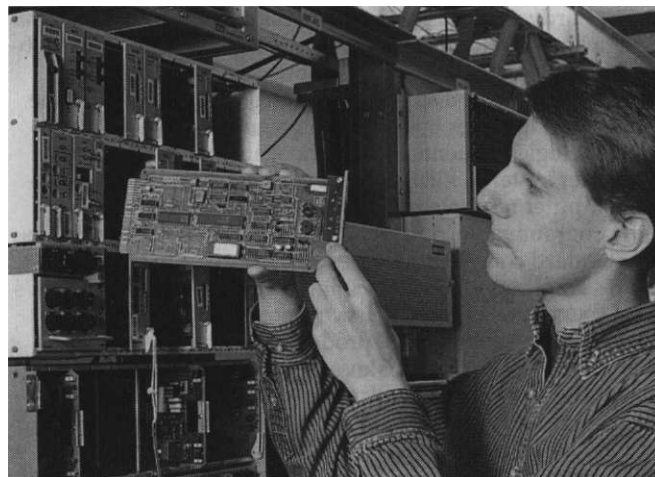
This program is designed to meet the ever-increasing need of the telecommunications industry for people who understand state-of-the-art principles, applications, equipment and regulatory policies. Telecommunications service providers, equipment manufacturers, and telecommunications users all need a cadre of those capable of utilizing equipment to its fullest, both from a technical and from a managerial perspective. The five-year BS program in telecommunications engineering technology includes more than a year of cooperative work experience for full-time students.

The telecommunications engineering technology program is designed to prepare graduates for productive careers in the rapidly changing workplace. Program graduates are prepared to think critically, maintain high professional standards, and identify and solve problems by communicating the solutions in an effective manner. They understand and apply the principles of electrical/electronic theory and practice, and are at home with component-level operation as well as system level design. While learning the broad range of telecommunications technologies, their education allows continued learning to master the newest and most important technology advancements in their field as they arise. The graduate's technical skills are balanced by a significant liberal arts education and the basic principles of telecommunication policy and project management. The RIT telecommunications engineering technology graduate is prepared to apply current technologies and lead the way in leveraging them into the future. A description of the specific program objectives is available on the department Web site.

Two options are available to fulfill your educational goals. The technical option is designed for the person whose interests lie in the applications of equipment, while the management option is designed for the individual who wants to move into the management of telecommunications resources. The two options differ at the junior and senior levels by four courses, allowing students to choose after they have been introduced to the fundamentals of telecommunications, electronics, mathematics, science, and the liberal arts.

Both the technical and management options emphasize the application and understanding of technology required in the telecommunications industry. The technical option allows students to take courses from areas such as computer, electrical and information technology. The management option includes the following business courses: Financial and Managerial Accounting, Organizational Behavior, and Corporate Finance.

Students begin their cooperative work experience in the third year of the program and are required to complete five quarters of co-op. A cooperative education counselor is available for each program.



Telecommunications engineering technology majors may select from a technical option—focusing on equipment—or a management option, preparing them to work for companies that use telecommunications equipment and services.

RIT's telecommunications engineering technology program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 1 Market Place, Suite 1050, Baltimore, Maryland 21202, telephone 410-347-7700.

Transfer admission

Transfer admission is open on a course-by-course evaluation to those who have attended two-year associate degree programs. Students from closely related programs, such as telecommunications technology or electrical/electronics technology, can normally expect to graduate in three years, which includes six academic quarters and five quarters of cooperative employment. Graduates of less closely related programs are also welcome to apply but may expect to take longer to complete the program.

Possible technical electives

Microcontrollers	0618-339
Principles of Electronic Design Automation	0618-439
Internetworking Lab	4002-342
Windows Programming	4002-570
Control Systems	0609-404
Digital Signal Processing	0609-547
Embedded Systems Design I, II	0618-561,562
Digital System Design I	0618-438
Introduction to Multimedia	4002-320
Communications II	0609-535
Electronic Optic Devices	0609-554

Telecommunications engineering technology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit Hours</i>
First-Year Orientation	0614-207	1
Pre-Calculus	1016-230	4
Data Analysis I	1016-319	4
Circuit Theory I	0609-214	4
College Physics I	1017-211	3
College Physics I Laboratory	1017-271	1
Telecommunications Fundamentals	0614-271	4
Circuit Theory II	0609-215	4
College Physics II	1017-212	3
College Physics II Laboratory	1017-272	4
Digital Fundamentals	0618-301	4
Writing & Literature I, II	0502-225,226	8
Circuit Theory III	0609-216	4
Liberal Arts (Core) *		4
		49

<i>Second Year</i>	
Electronics I, II, III 0609-203, 361,362	12
Calculus for Engineering Tech. I, II 1016-231,232	8
Technical Programming I, II 0618-231, 232	8
College Physics III 1017-213	3
College Physics III Laboratory 1017-273	1
Voice Telecommunications 0614-465,466	4
Liberal Arts (Core) *	12
Wellness Education †	0
	48

Technical option, upper division

<i>Third Year</i>	
Differential Equations for Engineering Tech. 1016-304	4
Concepts in Signals & Systems 0609-333	4
Networking Technologies 0614-477	4
Microcomputers 0618-303	4
Electronics IV 0609-363	4
Career Orientation 0609-407	1
Technical Electives	8
General Education Elective	4
Cooperative Education (2 quarters)	Co-op 33

<i>Fourth Year</i>	
Intro, to Telecommunications Policy 0614-480	4
Effective Technical Communications 0535-403	4
Telecommunications Transmission Systems & Lab 0614-483,484	4
Network Management 0614-479	4
Switching Technologies 0614-475	4
Math/Science Elective	4
Technical Elective	4
Liberal Arts (Concentration) *	4
Cooperative Education (2 quarters)	Co-op 32

<i>Fifth Year</i>	
Telecommunications Network Engineering & Lab 0614-561, 562	4
Communication Systems I 0609-534	4
Liberal Arts (Concentration) *	8
Technical Elective	8
Network Planning & Design 0614-574	4
Management Topics for Engineers 0614-440	4
Senior Seminar	2
Cooperative Education (1 quarter)	Co-op

Total Quarter Credit Hours (includes lower division) 196

* See page 7 for liberal arts requirements,
† See page 9 for wellness education requirements.

Management option, upper division

<i>Third Year</i>	
Effective Technical Communications 0535-403	4
Differential Equations for Engineering Tech. 1016-304	4
Financial Accounting 0101-301	4
Concepts in Signals & Systems 0609-333	4
Career Orientation 0609-407	1
Managerial Accounting 0101-302	4
Networking Technologies 0614-477	4
Microcomputers 0618-303	4
Electronics IV 0609-363	4
Cooperative Education (2 quarters)	Co-op 33

<i>Fourth Year</i>	
Intro, to Telecommunications Policy 0614-480	4
Telecommunications Transmission Systems & Lab 0614-483, 484	4
Principles of Economics 0511-301	4
Organizational Behavior 0102-430	4
Network Management 0614-479	4
Switching Technologies 0614-475	4
Technical Elective	4
Liberal Arts (Concentration)*	4
Cooperative Education (2 quarters)	Co-op 32

<i>Fifth Year</i>	
Telecommunications Network Engineering & Lab 0614-561,562	4
Communication Systems I 0609-534	4
Math/Science Elective	4
Liberal Arts (Concentration) *	8
Network Planning & Design 0614-574	4
Corporate Finance 0104-441	4
General Education Elective	4
Senior Seminar 0520-501	2
Cooperative Education (1 quarter)	Co-op

Total Quarter Credit Hours (includes lower division) 196

* See page 7 for liberal arts requirements.

**Manufacturing and Mechanical Engineering
Technology/Packaging Science**

George Sutherland, Chair
www.rit.edu/~719www/

The department provides a supportive, cooperative and synergistic environment for the delivery of undergraduate and graduate programs in:

- Electrical/Mechanical Engineering Technology
- Manufacturing Engineering Technology
- Mechanical Engineering Technology
- Packaging Science

The department is a leader in providing innovative career-oriented education on design, manufacturing, packaging and distribution of goods. The bachelor of science in packaging science has three options: technical, management, and printing. The single associate degree program is in mechanical technology. The three BS programs in engineering technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, Maryland 21202-4012, telephone 410-347-7700.

Instructional and research laboratories for all of the programs are in the College of Applied Science and Technology building and the Center for integrated Manufacturing Studies. Packaging laboratories include dynamics, materials, and environmental testing. Mechanical laboratories include mechanics and materials, thermofluids, plastics, instrumentation, and materials processing. Manufacturing laboratories include CAD, CIM/robotics, and surface-mount technology.

Electrical/Mechanical Engineering Technology

James F. Scudder, Program Chair

Baccalaureate program

With both the increased complexity of product design and the merger of mechanical and electrical aspects of design, there is a growing need for professionals who have a strong foundation in electrical, mechanical and manufacturing disciplines. Graduates from the electrical/mechanical engineering technology program are able to effectively bridge the gap between coworkers with more specialized backgrounds.

The program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 1 Market Place, Suite 1050, Baltimore, Maryland 21202, telephone 410-347-7700.

Program goals

- Prepare graduates for professional careers in the broad field of engineering technology, where an integration of mechanical, electrical, and manufacturing disciplines is important.
- Provide the maximum amount of flexibility in transfer from other RIT programs and a variety of two-year programs, including engineering science and engineering technology.

Program educational objectives

Graduates from RIT's E/MET program will demonstrate:

1. a professional work ethic and a commitment to lifelong learning, quality, and continuous improvement through the clear ability to assume increasing levels of technical and/or management responsibility.
2. participation and leadership while working on teams involved in the analysis, design, development, implementation, or oversight of electrical, mechanical and/or manufacturing systems and processes.
3. an ability to design effective and efficient new products, systems, and processes.
4. effective communication at all levels of the organization.

Curriculum

The foundation of the program includes courses in mathematics through statistics, calculus, and differential equations as well as fundamental courses in physics and chemistry. The electrical core of the program includes courses in circuits, microprocessors, electrical machines, telecommunications, and programmable controllers. The mechanical/manufacturing core includes courses in materials, mechanics, CAD, pneumatics, hydraulics, manufacturing processes, and thermal science. Courses in engineering economics and production management round out the core. Once the student has completed this core, he or she is able to select three advanced courses to specialize in one of many disciplines offered by several engineering technology departments.

Transfer admission

Students with associate degrees in either electrical or mechanical engineering technology can generally transfer to the upper-division portion of the program with third-year status. Students with other backgrounds usually need additional core course work to achieve third-year status. Transfer students will more closely follow the requirements outlined in the upper-division part-time and extension course sequence, since some lower-division courses are replaced by parts of upper-division courses. The actual course sequence will be determined by advisement.

Evening and online learning program

The upper-division portion of this program may be taken part time during the evening and through online learning. This enables students who are employed full time to complete the program even if they reside some distance from campus. Some courses will require a trip to Rochester to complete the required laboratory exercises. These labs will be scheduled on either a single Saturday for the entire course or will be run on a single long weekend. The typical student with an associate degree will require approximately five years to complete the program requirements. Some courses may be available in online learning format only every other year.

Electrical/mechanical engineering technology—BS degree, lower-division course requirements for transfer students*

	Quarter	Credit	Hours
Pre-Calculus 1016-230			4
College Physics I with lab 1017-211,271			4
College Physics II with lab 1017-212, 272			4
Technical Programming I 0618-231			4
Liberal Arts Core Courses †			16
General Education Electives			8
CAD for Mechanical Design 0617-262			4
Intro, to Materials 0610-211			3
Materials Testing 0610-304			1
Pneumatics & Hydraulics 0610-305			4
Manufacturing Processes 0617-220			4
Technical Electives			24
Technical Core Courses			0-20
<i>Typical Transfer Total (varies with background)</i>			80-100

* Students should complete as many of these requirements as possible before taking advanced courses. Online learning students may take equivalent courses at local community colleges.

† See page 7 for liberal arts courses.

Sample technical concentrations

After completing the core, a student selects, with adviser approval, a concentration sequence of three upper-division technical courses. This may be one of the following, or it may be tailored to meet the student's specific needs.

Electrical Systems (select 3 courses)

Power Systems I
Power Systems II
Advanced Circuit Theory
Advanced Electronics
Control Systems

Mechanical Design (select 3 courses)

Robust Design
Failure Mechanics
Machine Design I
Machine Design II

Manufacturing Management (select 3 courses)

Robust Design
Productions and Operations Management II
Product Design
Project Management

Telecommunications (select 3 courses)

Voice Telecommunications
Telecommunications Policy and Issues
Switching Technologies
Networking Technologies
Network Management

Electrical/mechanical engineering technology, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
Circuit Theory I 0609-214			4
Freshman Seminar 0610-101			2
Manufacturing Processes 0617-220			4
Pre-Calculus 1016-230			4
Circuit Theory II 0609-215			4
Circuit Theory III 0609-216			4
Writing & Literature I, II 0502-225, 226*			8
CAD for Mechanical Design 0617-262			4
Computer Tools in Engineering Technology 0610-230			4
Pneumatics & Hydraulics 0610-305			4
College Physics I/Lab 1017-211,272			4
Design, Dimensioning & Tolerancing 0610-220			4

<i>Second Year</i>	
Introduction to Statics 0610-302	4
College Physics II/Lab 1017-212,272	4
Liberal Arts Core Courses *	8
Electronics I 0609-203	4
Strength of Materials 0610-303	4
Data Analysis 1016-319	4
College Physics III/Lab 1017-213, 272	4
Digital Fundamentals 0618-301	4
Calculus for Engineering Tech. I 1016-231	4
Introduction to Materials 0610-211	3
Materials Testing 0610-304	1
Effective Technical Communications 0535-403	4
<i>Third Year</i>	
Fundamentals of Chemistry & Lab 1011-271,205	4
Technical Programming I 0618-231	4
Applied Dynamics 0610-405	4
Calculus for Engineering Tech. II 1016-232	4
Co-op Prep 0606-099	0
Applied Microprocessors 0604-413	4
MET Lab I 0610-407	2
Differential Equations for Engineering Tech. 1016-304	4
Liberal Arts Core Course*	4
Introduction to Chemistry of Materials & Lab 1011-273,276	4
Cooperative Education (Spring & Summer)	0
<i>Fourth Year</i>	
Controls for Industrial Automation 0617-470	4
Telecommunications Fundamentals 0614-271	4
Materials Technology 0610-416	4
Production & Operations Management I 0617-440	4
MET Lab O 0610-109	2
Cooperative Education (Winter) 0606-499	0
Electrical Machines & Transformers 0609-337	4
Engineering Economics 0617-436	4
Liberal Arts Core Course*	4
Technical Concentration	3-4
<i>Fifth Year</i>	
Cooperative Education (Summer & Fall) 0606-499	0
Technical Concentration	7-8
Thermodynamics & Heat Transfer 0610-441	4
Liberal Arts Concentration*	12
General Education Elective	4
Senior Seminar 0520-501 *	2
<hr/> Total Quarter Credit Hours (including transfer credit)	<hr/> 195

* Sec page 7 for liberal arts requirements.

For the electrical/mechanical engineering technology, BS degree, upper-division evening and online learning program, typical course sequence, please see the *Part-time* and *Online Guides*.

Manufacturing Engineering Technology

Daniel P. Johnson, Program Chair

Leaders in the manufacturing engineering profession estimate that the present shortage of qualified manufacturing engineers and technologists is between 50,000 and 100,000 people—and the need is increasing. They also estimate that between 20,000 and 30,000 new jobs are created in manufacturing engineering every year. The two principal factors generating this demand are industrial productivity and technological innovations.

Realizing that competitive positions in world and domestic markets are tied to the productivity of manufacturing units, there is considerable effort by industrial organizations to improve productivity. This nationwide effort is causing organizational and planning changes in many corporations that now recognize the manufacturing unit as the key to profits. For example, many corporations have placed manufacturing engineers in charge of new product design functions in an effort to ensure product *manufacturability*.

Efforts to improve productivity have led to the rapid introduction of new processes and equipment and in increased levels of automation. This has created a demand for personnel well versed in the new manufacturing technologies: computer aided design, computer numerical control, microprocessor controls, robotics, computer-aided manufacturing, flexible manufacturing systems, assembly automation, computer integrated manufacturing, and electronics manufacturing.

The manufacturing engineering technology program is designed to meet industry demands and is operated on the cooperative education plan. The BS in manufacturing engineering technology is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 1 Market Place, Suite 1050, Baltimore, Maryland 21202, telephone 410-347-7700.

Program goal

The goal of the manufacturing engineering technology program is to prepare individuals for professional employment in the manufacturing field. This program is designed to provide the skills necessary for applying both today's and tomorrow's manufacturing technologies. These skills are enhanced by a full co-op program in manufacturing industries. Throughout the academic program, a large measure of hands-on laboratory experiences related to manufacturing technology is provided.

Program educational objectives

Graduates from the Manufacturing Engineering Technology Program will demonstrate:

- A professional work ethic, a commitment to lifelong learning, quality and continuous improvement through the clear ability to assume increasing levels of technical and/or management responsibility.
- Leadership and participation in teams that act as change agents and innovators in product design and manufacturing related organizations.
- The ability to drive the design of manufacturable products, design effective and efficient new production processes and improve the performance of existing operations.
- Effective communication at all levels of the organization.

Curriculum

The curriculum has been designed with the aid and consultation of professionals in the field. The program's major emphasis is on computer integrated manufacturing. Subjects covered include traditional and nontraditional manufacturing processes, fundamentals of electronics and microprocessors, computer-aided design, computer numerical control, robotics, group technology, computer-aided process planning, materials requirements planning, surface-mount electronics design and assembly, flexible manufacturing systems, quality control, engineering economics, value analysis, plastics manufacturing, manufacturing management, and lean manufacturing.

Transfer admission

Transfer students from two-year colleges should have an AAS degree or equivalent in one of the following majors: manufacturing technology, mechanical technology, management engineering technology, engineering science, electrical technology, computer technology, quality control technology, design and drafting technology, or electromechanical technology. Students with other backgrounds may have to take additional courses to meet the entrance requirements.

program

The upper division of this program may be taken on a part-time basis during the evening by those who are employed full time and desire to receive an accredited baccalaureate degree. Manufacturing engineering technology is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 1 Market Place, Suite 1050, Baltimore, Maryland 21202, telephone 410-347-7700.

The typical evening student requires approximately 13 quarters to complete the upper-division course requirements. In the early quarters, the fundamentals of mathematics, science, engineering, electronics and processes are emphasized to provide the background for later courses in computer-integrated manufacturing and technical electives. Students also may elect certain courses from other programs.

Note: Some technical electives are offered only every other year. Please check with an adviser when planning your program technical elective content.

Manufacturing engineering technology, BS degree. typical course sequence

First Year	Quarter	Credit Hours
Freshman Seminar 0601-101	1	1
First Year Enrichment 1105-051,052	0	0
Pre-Calculus 1016-230	4	4
Computing Tools in Engineering Technology 0610-230	4	4
Manufacturing Processes I 0617-220	4	4
Machine Tool Lab	1	1
Writing & Literature I, II 0504-225,226	8	8
College Physics I & Lab 1017-211,271	4	4
Solid Modeling & Design 0617-262	4	4
Intro, to Materials Technology 0610-211	3	3
Materials Testing 0610-304	1	1
Data Analysis I 1016-319	4	4
Manufacturing Processes II 0617-420	4	4
Design Dimensioning & Tolerancing 0610-220	4	4
Liberal Arts (Core)*	4	4
General Education Elective	4	4
Second Year		
College Physics II & Lab 1017-212,272	4	4
Strength of Materials 0610-303	4	4
Intro, to Statics 0610-302	4	4
College Physics III & Lab 1017-213,273	4	4
Sophomore Seminar 0610-102	1	1
Pneumatics & Hydraulics 0610-305	4	4
Electrical Principles for Design I 0609-411	4	4
Calculus for Engineering Tech. I 1016-231	4	4
Principles of Mechanical Design I 0610-315	4	4
Liberal Arts (Core)*	4	4
Effective Technical Communication 0535-403	4	4
Calculus for Engineering Tech. II 1016-232	4	4
Third Year		
Co-op Preparation 0606-099	0	0
Intro, to Electronics Packaging & Lab 0617-455,457	5	5
Materials Technology 0610-416	4	4
Computer Numerical Control 0617-471	4	4
Mechanical Engineering Tech. Lab II 0610-409	2	2
Differential Equations for Engineering Tech. 1016-304	4	4
Controls for Manufacturing Automation 0617-470	3	3
Chemistry & Chemistry Lab 1011-205,271	4	4
Cooperative Education (2 quarters)	Co-op	Co-op
Fourth Year		
Production & Operations Management I 0617-440	4	4
Robots in Manufacturing 0617-485	4	4
Liberal Arts (Core)*	4	4
Engineering Economics 0617-436	4	4
Production & Operations Management II 0617-441	4	4
Technical Programming 0618-231	4	4
Tool Engineering 0617-472	4	4
Liberal Arts (Concentration)*	4	4
Technical Elective/Concentration	4	4
Cooperative Education (2 quarters)	Co-op	Co-op



Mechanical engineering technology students race their Mini-Baja all-terrain vehicles on land and "sea," traveling to competitions in Kansas, Milwaukee, and Montreal.

Fifth Year	Quarter	Credit Hours
Computer-Aided Manufacturing 0617-475	4	4
Liberal Arts (Core)*	4	4
Technical Elective/Concentration	4	4
Liberal Arts (Concentration)*	4	4
Process Design 0617-510	4	4
Liberal Arts (Concentration)*	4	4
Liberal Arts (Senior Seminar) 0520-501*	2	2
Cooperative Education	Co-op	Co-op
Total Quarter Credit Hours		188

* See page 7 for liberal arts requirements,
f See page 9 for wellness education requirements.

Mechanical Engineering Technology

Robert Merrill, Program Chair
www.rit.edu/~719www/

Baccalaureate program

Mechanical engineering technology involves understanding how products and machinery work and how to design, make or use them. From water wheels and steam engines to high-performance automobiles, air-conditioned environments, and jet aircraft, mechanical engineering technology has changed society for the better.

As a mechanical engineering technology student, you will study the foundations of mechanics, materials and energy. You will learn technical skills such as CADD, how to use computers, how to test materials, and how to make parts. You will learn to apply these principles and skills to the various fields of mechanical engineering technology—such as product and machine design, power generation, utilities, and manufacturing—through laboratories and design projects. Full-time students gain valuable industrial experience through the required cooperative education program.

The BS in mechanical engineering technology is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 1 Market Place, Suite 1050, Baltimore, Maryland 21202, telephone 410-347-7700.

Program goals

The goal of the program is to prepare graduates for professional careers in machine design; manufacturing; test engineering; field service engineering; technical sales; thermal analysis; product design; utilities operations; heating, ventilating, and air conditioning design; or plant operations. The program emphasizes the development of a design methodology, and this is reinforced through the use of project-oriented assignments.

Program educational objectives

Program educational objectives for mechanical engineering technology were established with the assistance of the industrial advisory board. These objectives are listed below.

Graduates from the mechanical engineering technology Program will demonstrate:

- A professional work ethic; a commitment to lifelong learning; quality and continuous improvement through the clear ability to assume increasing levels of technical and/or management responsibility.
- Participation and leadership while working on teams involved in the analysis, design, development, implementation, or oversight of mechanical and/or manufacturing systems and processes.
- An ability to design new and improved products, systems and processes that are appropriate for their use.
- Effective communication with all levels of the organization.

Curriculum

In the early quarters, students develop their skills in the fundamentals of mechanics, mathematics, materials technology, and computer-aided design. In later quarters, courses focus both on mechanical design and applied thermofluid engineering. Individuals may specialize by taking technical electives in such areas as product design, air conditioning, thermal power, plastics processing, and manufacturing.

A substantial amount of laboratory work is required, including the preparation of quality reports. Use of the computer is emphasized throughout the curriculum.

Transfer admission

Transfer students enter this program at the third-year level, having received an appropriate associate degree in mechanical technology, design-drafting technology, air conditioning technology, engineering science, or an acceptable equivalent. It is expected that these associate degree programs will have provided the student with background in the following:

Mathematics Through Introductory Calculus

Physics

Computer Aided Design and Drafting

Manufacturing Processes

Statics and Strength of Materials

Computer Skills (word processing, data analysis, presentation graphics)

Metallurgy

Electric Circuits

Statistics

Mechanical Design

Elective concentrations in mechanical engineering technology

In the last three quarters of students' programs, they may elect to take a concentration in one of the following areas: product design; heat, power, and HVAC; or plastics processing.

Custom sequences can be developed with departmental approval.

Evening program

The upper division of this program may be taken on a part-time basis during evening hours by those who are employed full time and desire to receive a baccalaureate degree in mechanical engineering technology.

The typical evening student requires approximately 13 quarters to complete the upper-division course requirements.

Students also may elect certain courses from the computer integrated manufacturing engineering technology and electrical engineering technology programs with department approvals.

Note: Some electives are offered only every other year. Please check with an adviser when planning your program technical electives.

Mechanical technology, associate program

This part-time evening program is designed to prepare technicians for employment in the mechanical design and manufacturing fields. Since it is identical to the lower division of the day school BS degree program, with the exception of Freshman and Sophomore Seminar, it prepares graduates for continuing their studies toward a baccalaureate degree in engineering technology. The program begins with courses in mathematics, physics, computer-aided drafting and design (CADD) and manufacturing processes. The advanced portion of the technical program covers topics in mechanics, hydraulics, materials, and machine design. Courses in composition, communication, social science, and humanities round out the program.

Mechanical engineering technology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Freshman Seminar	0610-101		2
Math by Advisement *			8
Writing & Literature I, II	0502-225,226 *		8
Computing Tools in Engineering Technology	0610-230		4
Manufacturing Processes I, II	0617-220,420		8
Solid Modeling & Design	0617-262		4
College Physics I & Lab	1017-211, 271		4
Data Analysis	1016-319		4
Design, Dimensioning & Tolerancing	0610-220		4
Intro, to Materials Technology	0610-211		3
Materials Testing	0610-304		1
<i>Second Year</i>		<i>Quarter</i>	<i>Credit</i>
College Physics II, III & Labs	1017-212,213,272,273		8
Pneumatic & Hydraulic Systems	0610-305		4
Intro, to Statics	0610-302		4
Sophomore Seminar	0610-102		1
Math by Advisement *			4
Strength of Materials	0610-303		4
Principles of Mechanical Design	0610-315		4
Lower-Division Technical Electives			8
Free Elective			4
Liberal Art Core †			8
Wellness Education (3 quarters) ‡			0
<i>Third Year</i>		<i>Quarter</i>	<i>Credit</i>
Math by Advisement *			4
Applied Dynamics	0610-405		4
Fundamentals of Chemistry	1011-271		3
Chemistry I Lab	1011-205		1
Effective Technical Communication	0535-403		4
Co-op Preparation	0606-099		0
Math by Advisement *			4
Applied Thermodynamics I	0610-440		4
MET Lab I	0610-407		2
Intro, to Chemistry, of Materials. & Lab	1011-273,277		4
Liberal Arts (Core) †			4
Cooperative Education (2 quarters)			Co-op
<i>Fourth Year</i>		<i>Quarter</i>	<i>Credit</i>
Materials Technology	0610-416		4
MET Lab H	0610-409		2
Failure Mechanics	0610-403		4
Applied Fluid Mechanics	0610-460		4
Liberal Arts (Core) *			4
Electrical Principles for Design I	0609-411		4
Machine Design I	0610-506		4
Upper-Division Technical Elective			4
Liberal Arts (Concentration) †			4
Cooperative Education (2 quarters)			Co-op



Packaging science students consulted with clients of the United Cerebral Palsy Association day program to design easy-to-open packages for consumer products commonly sold in supermarkets.

Fifth Year	Quarter Credit Hours
Thermofluids Lab 0610-465	3
Electrical Engineering Technology Elective	4
Upper-Division Technical Elective	4
Liberal Arts (Concentration) *	4
Upper-Division Technical Elective	4
Liberal Arts (Concentration) *	4
Free Elective	4
Liberal Arts (Senior Seminar) 0520-501 †	2
Cooperative Education (1 quarter)	Co-op
Total Quarter Credit Hours	196

" Students enter the math sequence based on competency as determined by their adviser. All students must complete math through 1016-304 Differential Equations for Engineering Technology.

* See page 7 for liberal arts requirements,

† See page 9 for wellness education requirements.

For mechanical engineering technology, BS degree, upper-division evening, and mechanical technology, evening, typical course sequences, please see the *Part-time/Online Guide*.

Packaging Science

Karen Proctor, Program Chair

The interdisciplinary packaging science program, leading to the bachelor of science degree, provides educational opportunities for men and women seeking careers in the multifaceted packaging industry. Graduates are prepared for initial employment in such areas as package development, sales, purchasing, structural design, production, research, and marketing.

The program was developed as a result of a close and long-established relationship between the packaging industry and RIT. The multibillion-dollar industry exhibits dynamic growth and provides employment for many thousands of men and women with wide-ranging skills and expertise.

Packaging is increasingly related to total marketing concepts; it has even greater dependence on new developments in materials and processes. Therefore, the industry requires management personnel with creativity and strong backgrounds in business, engineering, and science.

Program educational objectives

Graduates from the packaging science program will demonstrate:

- A professional work ethic and commitment to lifelong learning through the clear ability to achieve increasing technical and/or management responsibility.
- Ability to lead and participate in teams that act as changes agents and innovators in the packaging field and related organization.
- Ability to design effective and efficient new packaging systems, as well as improve the performance of existing packaging systems.
- Ability to communicate at all levels of the organization and articulate the economic and organizational importance of packaging to companies.

Program characteristics

The program is:

- **Career oriented**—graduates are ready to enter directly into a position of responsibility
- **Interdisciplinary**—students become familiar with the many facets of packaging through courses in several RIT colleges
- **Flexible**—offering three options (management, technical and printing) with ample opportunity for electives according to interest
- **Representative of industry needs**—content developed with the assistance of an industry advisory board, consultants from the industry and educational specialists
- **Adaptable to a modified cooperative plan**—scheduled at the student's convenience, following development of appropriate skills.

Transfer admission

Transferring into the program with advanced standing is particularly advantageous, since RIT has had many years of experience in assimilating graduates of two-year colleges into its programs and moving them directly into a chosen career field. Some candidates now in four-year colleges will find in the packaging science program a career opportunity with outstanding potential. Courses for associate degree holders (AA, AS, AAS) are arranged to meet program requirements and to correct deficiencies resulting from work taken at other institutions not offering the courses required for graduation. With a selective choice of electives, graduates of two-year colleges find it possible to complete the packaging science curriculum in two additional years at RIT.

Principal field of study

The principal field of study is defined to be all courses in the packaging science department, as well as the required courses in the College of Science (for the technical option), colleges of Business and Science (management option), and colleges of Science and Imaging Arts and Sciences (printing option). Matriculated students not maintaining a 2.0 cumulative grade point average in their principal field of study are subject to academic probation or suspension, according to Institute policy.

Packaging science—management option, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
New Student Seminar I, II 0607-200,202	2
Principles of Packaging 0607-201	4
Engineering Design Graphics 0607-301	4
Packaging Materials I, II 0607-311,312	8
Survey of General Chemistry & Lab 1011-201,205	6
Survey of Organic Chemistry & Lab 1011-202, 206	5
Algebra for Management Science 1016-225	4
Calculus for Management Science 1016-226	4
Liberal Arts (Foundation) *	12
Wellness Education †	0
<i>Second Year</i>	
Methods of Evaluation 0607-313	3
Rigid Containers 0607-321	4
Flexible Containers 0607-322	4
College Physics & Lab 1017-211,271	4
Principles of Economics I, II 0511-301,302	8
Computer Applications 0607-341	4
Materials & Processes I, II 2082-321,322	8
Liberal Arts (Foundation) *	12
Wellness Education †	0
Cooperative Education 0607-499	Co-op

<i>Third Year</i>	<i>Quarter Credit Hours</i>
Career Seminar 0607-401	1
Technical Communications 0607-420	4
Packaging Production Systems 0607-431	4
Packaging for Distribution 0607-432	4
Packaging for Marketing 0607-433	4
Shock & Vibration 0607-485	4
Data Analysis 1016-319	4
Financial Accounting 0101-301	4
Organizational Behavior 0102-430	4
Principles of Marketing 0105-363	4
Liberal Arts (Concentration) *	12
Cooperative Education 0607-499	Co-op
<i>Fourth Year</i>	
Packaging Regulations 0607-462	4
Professional (Packaging) Electives	12
Liberal Arts (Electives & Senior Seminar) *	18
Management Electives	8
Free Electives	6
Total Quarter Credit Hours	193

* See page 7 for liberal arts requirements.
 † See page 9 for wellness education requirements.

Packaging science—technical option, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
New Student Seminar I, II 0607-200,202	2
Principles of Packaging 0607-201	4
Engineering Design Graphics 0607-301	4
Packaging Materials II 0607-312	4
College Algebra & Trig. 1016-204	4
Introduction to Calculus I, II 1016-214,215	6
College Chemistry 1011-208	4
Intro, to Chemistry of Materials & Lab 1011-273, 277	4
Intro, to Organic Chemistry & Lab 1011-213,207	4
Liberal Arts (Foundation) *	12
Wellness Education †	0
<i>Second Year</i>	
Packaging Materials I 0607-311	4
Methods of Evaluation 0607-313	3
Rigid Containers 0607-321	4
Flexible Containers 0607-322	4
Computer Applications 0607-341	4
Materials & Process I, II 2082-321,322	8
Data Analysis 1016-319	4
Introduction to Polymer Technology 1029-301	2
Liberal Arts (Foundation) *	12
Free Electives	4
Wellness Education †	0
Cooperative Education 0607-499	Co-op

<i>Third Year</i>	<i>Quarter Credit Hours</i>
Career Seminar 0607-401	1
Technical Communication 0607-420	4
Packaging Production Systems 0607-431	4
Packaging for Distribution 0607-432	4
Packaging for Marketing 0607-433	4
Shock and Vibration 0607-485	4
College Physics I, II, III 1017-211,212,213	9
College Physics Lab I, II, III 1017-271,272,273	3
Liberal Arts (Concentration) *	12
Free Elective	4
Cooperative Education 0607-499	Co-op
<i>Fourth Year</i>	
Packaging Regulations 0607-462	4
Professional (Packaging) Electives	12
Principles of Marketing 0105-363	4
Organizational Behavior 0102-430	4
Liberal Arts (Electives & Senior Seminar) *	18
Free Electives	5
Total Quarter Credit Hours	193

* See page 7 for liberal arts requirements.
 † See page 9 for wellness education requirements.

Packaging science—printing option, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
New Student Seminar I, II 0607-200	2
Principles of Packaging 0607-201	4
Engineering Design Graphics 0607-301	4
Packaging Materials I, II 0607-311,312	8
Survey of General Chemistry & Lab 1011-201,205	6
Survey of Organic Chemistry & Lab 1011-202,207	5
Algebra for Management Science 1016-225	4
Calculus for Management Science 1016-226	4
Liberal Arts (Foundation) *	12
Wellness Education †	0
<i>Second Year</i>	
Methods of Evaluation 0607-313	3
Rigid Containers 0607-321	4
Flexible Containers 0607-322	4
College Physics & Lab 1017-211,271	4
Principles of Economics I, II 0511-301, 302	8
Computer Applications 0607-341	4
Materials & Processes I, II 2082-321, 322	8
Liberal Arts (Foundation) *	12
Wellness Education †	0
Cooperative Education 0607-499	Co-op
<i>Third Year</i>	
Career Seminar 0607-401	1
Technical Communications 0607-420	4
Packaging Production Systems 0607-431	4
Packaging for Distribution 0607-432	4
Packaging for Marketing 0607-433	4
Shock & Vibration 0607-485	4
Data Analysis 1016-319	4
Organizational Behavior 0102-430	4
Packaging Solutions 2082-311	4
Printing Elective	4
Liberal Arts (Concentration) *	12
Cooperative Education 0607-499	Co-op
<i>Fourth Year</i>	
Packaging Regulations 0607-462	4
Professional (Packaging) Electives	12
Printing Elective	4
Liberal Arts (Electives & Senior Seminar) *	18
Free Electives	10
Total Quarter Credit Hours	193

* See page 7 for liberal arts requirements.
 † See page 9 for wellness education requirements.

Hospitality and Service Management

Francis Domoy, Chair
www.rit.edu/hsm

The School of Hospitality and Service Management offers five programs: hotel and resort management, travel and tourism management, food management, nutrition management, and food marketing and distribution.

The programs prepare students for a wide variety of career choices that include, but are not limited to, food management; hotel/resort management; health care; corporate travel management; and food marketing, sales, and distribution. A career in the hospitality industries has become highly specialized in today's business world, and RIT graduates are in demand.

The five programs provide a broadly based view of service management, hospitality, travel, and client care through a common core of courses. This approach promotes an understanding of the interrelationships among the food, lodging and travel service industries, based on the underlying concept of quality service management, and allows students to retain the flexibility to switch majors or jobs if their career goals change.

These diverse and specialized fields require a common set of abilities: creative problem solving, technical knowledge, communication skills and leadership. The first priority is to equip students with these skills and qualities.

Now in their 113th year, RIT's hospitality and service management programs are among the nation's leading hospitality-travel management programs and have been recognized by *Forbes*, *Travel Weekly*, *Nation's Restaurant News*, and *Corporate Travel* magazines. Programs are accredited by the Middle States Association of Colleges and Schools and by the American Dietetic Association. Students from 38 countries have become alumni of the programs.

The curriculum is integrated, encompassing a broad base of competencies defined in partnership with faculty, students and industry. Students take courses that contribute to building a strong concept of the total industry by studying accounting, marketing, finance, economics, business management, behavioral science, service management, nutrition, food preparation, food and beverage service principles, hotel operations, travel, tourism, and other topics.

The goal is to offer students a rigorous, challenging, and interdisciplinary program of study in order to develop their talents. It provides them with the opportunity to develop their full potential in a managerial environment. Small classes promote a dynamic learning interaction among faculty, students and industry professionals.



Henry's is a student-operated on-campus restaurant, which is open to the public for lunch and special events. Students develop new food products, plan menus, schedule staff, manage inventory, and measure service performance. A state-of-the-art renovation integrated the dining room, kitchen, and accounting information systems.

Freshman students not sure of a career field can apply for an undeclared major within the school. Prior to fall enrollment of the sophomore year, a student must decide upon a major. This option allows the student to experience courses in all fields within the hospitality industry before selecting a specific major.

Vision statement

Hospitality and service management will be a leader in hospitality, nutrition, and service management education by creating an environment of both individualized and team-oriented learning, fusing the human values of hospitality, applying future technologies and innovation, and highlighting cultural diversity in a highly integrated global service economy.

Objectives

It is each program's mission to prepare students to excel in their chosen profession by developing:

1. Theoretical and service strategies essential to professional, executive-level management skills
2. The ability to apply knowledge and original thinking to solving management problems
3. The skills and techniques of leadership and teamwork
4. An awareness of and desire for a lifetime of learning
5. An intellectual spirit for constructive thought and action in building a good life and effective citizenship

Cooperative education

Hospitality and service management programs require each student to combine 1,600 hours of practical co-op experience with classroom theory in order to graduate.

Cooperative education (co-op) is one of the many ways students are introduced to hands-on learning and employment in the hospitality and travel industries. Co-op is usually taken in the summer following the freshman and sophomore years and during any quarter in the junior and senior years, except the final quarter of senior year, when students are required to be in residence on campus. Co-op is planned, monitored, and evaluated by the student, the co-op counselor, the faculty adviser, and the employing firm.

Many students find that their career goals take shape and become refined as they progress through co-op experiences. In general, co-op provides students with the opportunity to apply the theory of classroom instruction to an actual work setting.

Faculty

Faculty members have outstanding academic credentials and industry experience. They serve in professional and trade associations at the national level, are frequent guest speakers, and consult in their fields of expertise: travel, marketing, hospitality operations, nutrition, human resources, and health care, to name a few.

Advisory board

National industry leaders compose the National Advisory Board, contributing professional and technical expertise to undergraduate programs and strengthening the development of their future.

Two-year transfer program for foodservice management, hotel and resort management, and travel management

Students who have earned an appropriate associate degree or its equivalent before enrolling at RIT may normally expect to complete the requirements for the BS degree in two years, including six academic quarters and cooperative education.

Transfer students must complete a minimum of 85 to 90 quarter credit hours with an earned minimum grade point average of 2.3 and two quarters of approved cooperative education assignments.

Transfer students with less than two years of college or from other educational backgrounds also can be accommodated. The amount of transfer credit is determined by evaluating the individual's transcript.

In every instance it is the policy of the college to recognize as fully as possible the past academic accomplishments of each student.

Two-year transfer program for nutrition management

RIT makes every effort to facilitate transfer credit. Due to specific areas of study required by the American Dietetic Association and RIT, the amount of transferable credit and estimated time to complete work for the BS degree must be determined by evaluation of each individual's transcript. However, a minimum grade point average of 3.00 is required for admittance into this program.

Facilities

State-of-the-art equipment and laboratories are available to enhance the educational experience of all students. Henry's, a full-service, licensed restaurant, provides an excellent training environment for students, who manage special luncheons and dinners with the help of computerized beverage and point-of-sale systems. The food lab is commercially equipped for developing, testing and evaluating new food products and evaluating equipment.

Information management is a critical element within food, hospitality and travel industries. A computer laboratory and training studio allow students to prepare for the technology they will encounter on the job. Database, spreadsheet, and numerous other software applications are used in conjunction with classroom activities.

Approximately 40 to 50 healthcare, corporate, and community-based facilities are used for practicum experience for nutrition management students.

International programs in Croatia

The American College of Management and Technology in Dubrovnik, Republic of Croatia, is a branch campus of RIT that enrolls approximately 800 undergraduate students. The college offers an associate of applied science degree program and a bachelor of science degree program in hotel/resort management. The Dubrovnik campus provides an exchange opportunity for Rochester campus students who may wish to spend a quarter studying abroad. Classes are taught by a combination of RIT faculty members and European instructors.

Food Management

The foodservice industry employs more people than any other industry in the nation and will continue to do so as the public demands more services. Foodservice offers an array of work places located far and wide: restaurants from full service to cafeteria; fast-food and special chain operations; hotel fine dining and catering; clubs; contract services for manufacturing; business firms; recreation and sports centers; education, health and life institutions; retail stores; governmental agencies; and food vending.

Students in foodservice management experience a sampling of these foodservice sectors during cooperative education. By graduation students will have accumulated more hours of work experience than in any other four-year hospitality management program in the country. It is because of this depth of exposure that RIT students are in demand by food and beverage operations.

The program prepares students for management through lab experience in Henry's, its full-service, beverage-licensed restaurant. In addition, students develop competencies in problem solving and decision making through individual and team-based class projects, computerized exercises and industry-related activities.

Students learn essential principles and procedures for quality in food production and presentation, sanitation, nutrition, menu planning and merchandising, purchasing, product development, cost control, and service management. The program requires several management topic courses, including accounting, statistics, leadership management, technology in service systems, and assessment of service quality. These professional and business courses are balanced by a strong component of liberal arts and science.

The first student chapter chartered by a state restaurant association is available to foodservice management students. The New York State Restaurant Association's goal is to foster interchange of ideas between industry and students and professional growth in organizational and social skills. Juniors are encouraged to attend the annual National Restaurant Association show in Chicago.

Food management, BS degree, typical course sequence

First Year	Quarter	Credit Hours
Contemporary Nutrition	0620-213	4
Service Management Careers in Hospitality Ind.	0619-220	2
Principles of Food Production	0621-225	4
Sanitation & Safety	0621-314	2
Purchasing & Inventory Control	0621-324	2
Basic Computer Application	0619-221	2
HSM Elective		4
Algebra for Management Sciences	1016-225	4
Science Electives with Lab		8
Liberal Arts (Core) *		16
Wellness Education (3 quarters) †		0
Cooperative Education	0621-499	Co-op
Second Year		
Menu Planning & Merchandising	0621-321	2
Restaurant Operations	0621-331	6
Financial Management Hospitality Industry	0622-355	4
HSM Electives		10
Data Analysis I, II, & Lab	1016-319,320, 379	10
Financial Accounting	0101-301	4
Managerial Accounting	0101-302	4
Liberal Arts (Core) *		12
Cooperative Education	0621-499	Co-op
Third Year		
Assessment of Service Quality	0619-410	4
Technology in Service Systems	0619-426	4
Food & Labor Cost Control	0621-424	4
HSM Electives		16
Principles of Economics I	0511-301	4
Principles of Marketing	0105-363	4
Liberal Arts (Concentration) *		12
Cooperative Education	0621-499	Co-op
Fourth Year		
Leadership Management in Service Cultures	0619-470	4
Senior Project	0619-490	4
Product Development	0621-416	6
Free Elective		4
Liberal Arts (Senior Seminar) *		2
Liberal Arts (Upper-division electives) *		12
Cooperative Education	0621-499	Co-op
Total Quarter Credit Hours		180

* See page 7 for liberal arts requirements,

† See page 9 for wellness education requirements.

Food Marketing and Distribution

This program prepares graduates for industry positions in food marketing, sales, and distribution and logistics. Graduates are uniquely qualified for positions in an array of food marketing and distribution industries worldwide. In particular, they understand a variety of issues—foodservice operations and food marketing, logistics, distribution, and packaging.

Many of the normal food management course requirements remain in this option. Other curriculum topics include commodity analysis; food marketing, processing, packaging, distribution; national and global logistics; and quality assurance.

Specific course content is defined in the Course Descriptions portion of this bulletin. An outline of required courses is provided in the chart below.

Food marketing and distribution, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
Principles of Packaging	0607-201	4	4
Service Management Careers in Hospitality Ind.	0619-220	2	2
Principles of Food Production	0621-225	4	4
Sanitation & Safety	0621-314	2	2
Purchasing & Inventory Control	0621-324	2	2
Basic Computer Application	0619-221	2	2
Distribution Systems	0623-206	4	4
Algebra for Management Science	1016-225	4	4
Science Electives with Lab		8	8
Liberal Arts (Core) *		16	16
Wellness Education (3 quarters) †		0	0
Cooperative Education	0621-499	Co-op	Co-op
Second Year			
Commodity Market Analysis	0621-310	4	4
Restaurant Operations	0621-331	6	6
Financial Management for Hospitality Industry	0622-355	4	4
Data Analysis I, II, & Lab	1016-319,320,379	10	10
Financial Accounting	0101-301	4	4
Managerial Accounting	0101-302	4	4
Principles of Economics I	0511-301	4	4
Liberal Arts (Core) *		12	12
Cooperative Education	0621-499	Co-op	Co-op
Third Year			
Packaging for Distribution or Marketing	0607-432 or 433	4	4
Assessment of Service Quality	0619-410	4	4
Technology in Service Systems	0619-426	4	4
Food Service Marketing	0621-315	4	4
Product Development	0621-416	6	6
HSM Electives		16	16
Liberal Arts (Concentration) *		12	12
Cooperative Education	0621-499	Co-op	Co-op
Fourth Year			
Leadership Management in Service Cultures	0619-470	4	4
Senior Project	0619-490	4	4
Food Processing/Quality Assurance	0621-410	4	4
HSM Elective		4	4
Free Elective		4	4
Liberal Arts (Upper-division elective) *		12	12
Liberal Arts (Senior Seminar) *		2	2
Cooperative Education	0621-499	Co-op	Co-op
Total	Quarter	Credit	Hours
			180

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

Hotel and Resort Management

This is a professionally oriented curriculum for students interested in careers involving the management and operation of hotel, resort, leisure-time and related enterprises. A composite of discipline areas allows students to understand the physical characteristics of the properties and to gain the business expertise necessary to manage and market them.

The program builds student skills with a balanced academic program of the basic principles of hotel and restaurant operations, tourism, resort development and management, business and financial management, and liberal arts, together with paid work experience (co-op) for four quarters, hands-on class

projects, laboratories and school activities. Specialized courses include statistics, engineering systems and property management, housekeeping management, human resources management, assessment of service quality, technology in service systems, financial management for hotels, hotel marketing and sales, hotel and resort development, and casino management.

Industry professionals regularly offer their expertise in all of the program courses. Hotel students, in conjunction with a local Rochester general manager, can enroll in a mentorship program sponsored by the Rochester Hotel Association. This allows students to work closely with executive managers on assigned research projects within a hotel.

Hotel/resort students evaluate various technologies and service strategies in order to familiarize themselves with the best industry practices. International co-ops are highly encouraged to develop global linkage for these student majors. Students have the opportunity to concentrate in one of two minor program areas. They can choose from food management or travel management as well as approved specialized areas.

Students develop communication skills through participation in the student chapters of organizations and are encouraged to attend the annual International Hotel/Motel and Restaurant shows in New York City and Chicago.

Hotel and resort management, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
Service Management Careers in Hospitality Ind.	0619-220	2	2
Hotel Operations	0621-200	4	4
Hospitality Industry Real Estate	0622-205	4	4
Hotel Marketing & Sales	0622-210	4	4
Basic Computer Application	0619-221	2	2
Algebra for Management Science	1016-225	4	4
Principles of Economics I	0511-301	4	4
Science Elective with Lab		8	8
Liberal Arts (Core) *		16	16
Wellness Education (3 quarters) †		0	0
Cooperative Education	0621-499	Co-op	Co-op
Second Year			
Resort Development & Management	0622-310	4	4
Financial Management for Hospitality Industry	0622-355	4	4
Minor Program Courses—Food or Travel (choose one)			
Food—Principles of Food	0621-225	4	4
Sanitation & Safety	0621-314	2	2
Purchasing & Inventory Control	0621-324	2	2
Travel—Distribution Systems	0623-206	4	4
Intro, to SABRE	0623-210	4	4
Data Analysis I, II, & Lab	1016-319,320, 379	10	10
Financial Accounting	0101-301	4	4
Managerial Accounting	0101-302	4	4
Liberal Arts (Core) *		12	12
Cooperative Education	0621-499	Co-op	Co-op
Third Year			
Principles of Marketing	0105-363	4	4
Assessment Service Quality	0619-410	4	4
Minor Program Courses—Food or Travel (choose one)			
Food—Restaurant Operations	0621-331	6	6
Food & Labor Cost Control	0621-424	4	4
Travel—Meeting Management	0623-410	4	4
Corporate Travel Planning	0623-420	4	4
Negotiations & Conflict	0623-522	2	2
Liberal Arts (Concentration & upper-division electives) *		16	16
HSM Electives		14	14
Free Elective		4	4
Cooperative Education	0621-499	Co-op	Co-op
Fourth Year			
Technology in Service Systems	0619-426	4	4
Leadership Management in Service Cultures	0619-470	4	4
Senior Project	0619-490	4	4
HSM Electives		12	12
Liberal Arts (Upper-division electives) *		8	8
Liberal Arts (Senior Seminar) *		2	2
Cooperative Education	0621-499	Co-op	Co-op
Total	Quarter	Credit	Hours
			180

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

Travel and Tourism Management

The growth of modern travel has created many technical challenges for the movement of individuals and groups in a global corporate environment and, with that, the need to consult highly qualified experts to plan, arrange and coordinate travel. Today, more than ever before, travelers are faced with many alternatives for transportation, accommodations, and other travel services and rely increasingly on the travel professional to guide them wisely and honestly. Travel agencies and corporate travel consultants have an important impact on the hospitality-travel economies, including foodservice, lodging and leisure, travel and transportation, meetings, and technology industries.

Travel management combines a study of specialized courses in travel management with a sound general education that includes courses in accounting, management principles, marketing, business law, and foreign languages. The program is structured to provide students with a balance of hands-on experience and management theory. This is necessary to further their understanding of why the travel industry operates as it does in its business environment. Students are also versed in the use of communication technologies that allow them to conduct research via the Internet. This career orientation provides both the four-year and transfer student with a balance of theoretical classroom instruction and experiential opportunities that are furnished by cooperative education.

Equipped with this program, students in travel management prepare for careers in corporate travel, consulting, and professional meeting management. Employment opportunities are also excellent with hotels, resorts, retail travel agencies, major corporations, and other businesses.

Travel and tourism management, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit Hours</i>
Service Management Careers in Hospitality	0619-220	2
Basic Computer Application	0619-221	2
Distribution Systems	0623-206	4
Introduction to AA SABRE	0623-210	4
Algebra for Management Science	1016-225	4
Science Elective with Lab		8
Liberal Arts (Core) *		24
Wellness Education (3 quarters) †		0
Cooperative Education	0621-499	Co-op
<i>Second Year</i>		
Resort Development & Management	0622-310	4
Financial Management Hospitality Industry	0622-355	4
Travel Reservation Procedures	0623-312	2
Salesmanship Techniques in Travel	0623-314	2
HSM Electives		10
Data Analysis I, II, & Lab	1016-319,320,379	10
Financial Accounting	0101-301	4
Managerial Accounting	0101-302	4
Principles of Economics I	0511-301	4
Liberal Arts (Core) *		4
Cooperative Education	0621-499	Co-op
<i>Third Year</i>		
Principles of Marketing	0105-363	4
Assessment of Service Quality	0619-410	4
Technology in Service Systems	0619-426	4
Corporate Travel Marketing & Sales	0623-413	4
Corporate Travel Planning	0623-420	4
HSM Electives		18
Liberal Arts (Concentration) *		12
Cooperative Education	0621-499	Co-op
<i>Fourth Year</i>		
Leadership Management in Service Cultures	0619-470	4
Senior Project	0619-490	4
Meeting Management	0623-410	4
Free Elective		4
HSM Electives		4
Liberal Arts (Senior Seminar) *		2
Liberal Arts (Upper-division elective) *		12
Cooperative Education	0621-499	Co-op
Total Quarter Credit Hours		180

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

Nutrition Management

People are increasingly interested in nutrition requirements for good health and long life. They are concerned about balanced menus away from home and about the availability of special diet menus for those with serious ailments. Physical fitness centers seek educated advice about meal planning.

Dietitians are involved with people of all ages, cultures, and economic means. They enjoy people and learn to understand them as individuals, thereby helping to solve their nutritional needs. Dietitians are health professionals who apply the science and art of human nutrition.

The nutrition management program offers a challenging curriculum that prepares students for diverse career opportunities. From their base of knowledge about nutrition, registered dietitians practice in many settings. Possible career paths may be developed in private practice; community nutrition and public health, wellness, and fitness programs for sports; education and corporations; clinical dietetics or food management in hospitals and long-term care facilities; research for clinical, educational, or food manufacturing operations; nutrition education; restaurant consulting; and writing.

The nutrition management program leads to a BS degree that meets the education requirements of the American Dietetic Association (ADA). Four-year students must complete three quarters of approved cooperative work experience. To become credentialed as a registered dietitian, students also need to complete an ADA-accredited, supervised practice after graduation from RIT and pass the National Registration Examination for Dietitians.

Nutrition management, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit Hours</i>
Survey of Service Management	0619-220	2
Contemporary Nutrition	0620-213	4
Principles of Food Production	0621-225	4
Sanitation & Safety	0621-314	2
Basic Computer Applications	0622-221	2
Survey of General Chemistry & Lab	1011-201, 205	6
Survey of Organic Chemistry & Lab	1011-202,206	5
Biochemistry	1011-203	4
Algebra for Management Science	1016-225	4
Liberal Arts (Core) *		12
Principles of Economics	0511-301	4
Wellness Education (3 quarters) †		0
Cooperative Education	0621-499	Co-op
<i>Second Year</i>		
Financial Accounting	0101-301	4
Principles of Marketing	0105-363	4
Food & Beverage Management	0621-318	4
Microbiology	1004-210	4
Physiology & Anatomy I	1001-305	5
Physiology & Anatomy II	1001-305	5
Data Analysis I	1016-319	4
Liberal Arts (Core) *		16
Cooperative Education	0621-499	Co-op
<i>Third Year</i>		
Assessment of Service Quality	0619-410	4
Technology in Service Systems	0619-426	4
Human Resources Management	0619-480	4
Dietetic Environment	0620-402	4
Nutrition Alternative Medicine	0620-510	2
Techniques of Dietetic Education	0620-519	4
Nutrition in Life Cycle	0621-554	5
Product Development	0621-416	4
Restaurant Operations	0621-331	6
Liberal Arts (Advanced Level) *		12
Cooperative Education	0621-499	Co-op

<i>Fourth Year</i>		
Leadership Management in Service Culture	0619-470	4
Senior Project	0619-490	4
Medicinal Nutrition Therapy I	0620-525	5
Medicinal Nutrition Therapy II	0620-526	4
Community Nutrition	0620-550	4
Free Electives		12
Liberal Arts (Advanced Level) *		12
Liberal Arts (Senior Seminar) *		2
<hr/>		
Total Quarter Credit Hours		191

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

Health Systems Administration

The health care industry has been transformed in recent years by advances in technology, new modalities of care, changes in financing and organization, greater demand for accountability and a general expansion as the population ages. These developments have led to increasing demand for administrators at all levels.

The concentration of courses in health systems administration is designed to equip students with the skills necessary to obtain entry-level positions in health administration. Such students are typically those with a clinical background in nursing or an allied profession desiring to change their professional emphasis. However, certain courses also may be of interest to administrators desiring to upgrade their skills in special areas.

The sequence of six courses consists of three survey courses (a systems overview, administration in the health care setting, and finance and budgeting), followed by three specialized courses (legal aspects of health care, quality assurance, and program planning and development). These courses are offered in the online learning format.

Health systems administration certificate

This program provides an overview of the essential elements of healthcare today and requires permission of the program chair to enroll. This is an upper-level concentration appropriate for students at a junior/senior level in undergraduate studies. Students may earn the certificate and/or apply the courses to the professional concentration requirements for degree requirements in applied arts and science. To be certified students must achieve a program GPS of at least 2.0. These courses are also appropriate for students seeking to enter the graduate degree program in Health systems Administration who have no prior health care background. For this purpose selected courses provide a knowledge foundation to assist the students in bridging into graduate studies. For further information regarding course content and admissions requirements, contact Linda Underhill at (585) 475-7359 or e-mail at Imuism@rit.edu.

Courses	Quarter Credit Hours
Survey of Health Care Systems	0635-310 4
Health Care Administration	0635-320 4
Health Care Economics & Finance	0635-351 4
Legal Aspects of Health Care Administration	0635-421 4
Health Care Quality	0635-431 4
Health Planning & Program Development	0635-441 4
<hr/>	
Certificate Total	24

Environmental Management and Technology

Maureen S. Valentine, Chair
www.rit.edu/~704www/

In its 1997 report, "Global Environment Outlook," the United Nations Environment Programme concludes that "during the last decade, the environment has continued to degrade, and significant problems still persist" and charges that "the pace at which the world is moving toward a sustainable future is simply too slow." Society is beginning to realize that environmental resources are finite, valuable and must not be used at a rate faster than that at which they can be replenished naturally. The question is, "How do we change our resource-intensive systems of production and consumption toward that end?"

Answering this question, in part, is the job of the environmental manager. It's a big job for sure, but while some of what we do to pursue a sustainable future will take significant time, involve research and require new knowledge, most of it involves caring about the environment, using common sense to prevent pollution from occurring in the first place and considering the environmental impacts of everything we do.

RIT's BS degree program in environmental management and technology prepares students to move the organizations in which they work toward a sustainable future. Activities range from simple tasks like keeping contaminated wastewater separated from clean water to helping determine how a product can be manufactured using less energy or without using toxic materials.

The most rewarding aspect of an environmental management and technology career is that you can start making a difference right away. There is so much that can be done at every level that you'll feel good about your contribution from the first day on the job.

Cooperative education

Environmental management and technology students start their first co-op jobs in the spring of their third year. Our co-op students are especially helpful to the organizations for which they work because they are qualified and ready to take on some of the many interesting environmental projects that organizations seem never to have the time to get done otherwise. Co-op jobs and employers range from field research to office work and from government to industry. Typically the jobs are located in the Rochester area or near a student's hometown, but some more adventurous individuals seek jobs across the continent or overseas.

Electives

The ample allowance of electives in the curriculum permits students to pursue various competency areas and other areas of interest in greater depth.

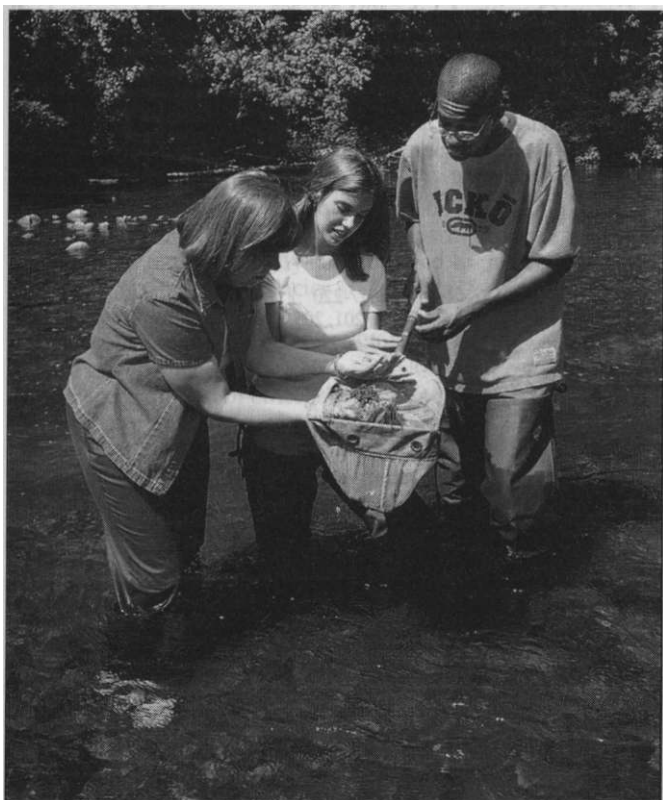
Environmental management and technology, BS degree, typical course sequence

First Year	Quarter Credit Hours
Chemistry Principles I/Lab	1011-211/205 4
Chemistry Principles II/Lab	1011-212/206 4
Algebra for Management Science	1016-225 4
Calculus for Management Science	1016-226 4
Environmental Mgmt. Health & Safety Seminar	0630-200 1
Principles of Environmental Management	0630-201 4
Survey of Computer Science	4002-200 4
Intro. to Organic Chemistry/Lab	1011-213/207 4
Field Biology	1005-210 4
Environmental Communication	0688-327 4
Writing & Literature I	0504-225 4
Writing & Literature II	0504-226 4
Liberal Arts Core*	4
Wellness Education †	0

<i>Second Year</i>		
General Biology/Lab 1001-201/205		4
Financial Accounting 0101-301		4
Data Analysis I 1016-319		4
Data Analysis II 1016-320		4
Quantitative Methods I 0630-220		4
College Physics I & Lab 1017-211,271		4
College Physics II & Lab 1017-212, 272		4
Environmental Geology/Lab 0630-370/372		4
Liberal Arts *		16
Wellness Education †		0
<i>Third Year</i>		
Occupational Health 0630-450		4
Intro, to Hydrology/Lab 0630-380/382		4
Solid & Hazardous Waste Management 0630-350		4
Co-op Preparation 0606-099		0
Organizational Behavior 0102-430		4
Air Emissions Management 0630-354		4
Industrial Wastewater Management 0630-352		4
Environmental Monitoring & Measurement/Lab 0630-360/362		4
Liberal Arts *		4
Cooperative Education (2 quarters)		0
<i>Fourth Year</i>		
Environmental Regulatory Law I 0630-480		4
Remedial Investigation & Corrective Action 0630-444		4
Project Management 0630-490		4
Environmental Permitting 0630-440		4
Professional Electives		4
Liberal Arts *		12
Cooperative Education (2 quarters)		0
<i>Fifth Year</i>		
Resource Reduction 0630-505		4
Corporate Environmental Management 0630-515		4
Senior Project Planning 0630-509		1
Senior Project 0630-511		3
Professional Electives		8
Liberal Arts Senior Seminar 0520-501 *		2
Liberal Arts *		8
Cooperative Education (1 quarter)		0
Total Quarter Credit Hours		191

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.



Hands-on field experience is a valuable component of the environmental management and technology program.

Environmental Management Science Certificate

Since so many of our environmental concerns and problems involve subsurface contamination and contaminant migration via surface and groundwater systems, understanding the principles of environmental geology and hydrology are key to sound environmental management. The environmental science certificate program provides this valuable knowledge plus practitioner-oriented instruction on how to design and implement a successful environmental monitoring and measurement program. Prerequisites for this program include general and organic chemistry, college algebra, and trigonometry.

Courses	Quarter Credit Hours
Environmental Monitoring & Measurement/Lab 0630-360/362 (prereq. 380)	4
Environmental Geology Lab 0630-370/372	4
Introduction to Hydrology/Lab 0630-380/382 (prereq. 370)	4
Certificate Total	12

Industrial Environmental Management Certificate

This certificate program was designed and developed with the active participation of RIT's Industrial Environmental Management Advisory Committee—all experienced, practicing environmental professionals from industry who have achieved the level of program manager or above. It covers all key elements of environmental management in industry. Waste minimization is emphasized as a major element of pollution control in each area of environmental management. Prerequisites include general and organic chemistry, college algebra, and trigonometry.

Courses	Quarter Credit Hours
Principles of Environmental Management 0630-201	4
Solid & Hazardous Waste Management 0630-350 (prereq. 201)	4
Industrial Wastewater Management 0630-352 (prereq. 201)	4
Air Emissions Management 0630-354 (prereq. 201)	4
Project Management 0630-490	4
Elective	4
Certificate Total	24

The industrial environmental management certificate is available in an online format for persons wishing to continue their education while working.

All the courses offered under these certificate programs can be applied to either full-time or part-time offerings of the bachelor of science in environmental management and technology or as part of a professional concentration in the BS degree for applied arts and science. Part-time tuition rates are charged for students who are matriculated in the part-time program. For more information regarding these certificates, contact the department at 585-475-7318. Students must achieve a program GPA of at least 2.5 in order to be certified for graduation.

Safety Technology

Maureen S. Valentine, Chair
Scott B. Wolcott, Undergraduate Coordinator
www.rit.edu/~704www/

Virtually every organization today depends on safety experts to ensure a safe, smooth, and effective operation. These professionals address their organizations' immediate safety needs, which range from creating physically safer work places and modifying employee behaviors to implementing voluntary protection programs that go beyond legal standards. Safety professionals protect resources such as workers, buildings, equipment, intellectual capital, and corporate reputations. They perform their functions in a variety of settings, including manufacturing, construction, engineering, insurance, risk management, consulting, corporate business, government, education, and health care.

The mission of the safety technology program is to provide an academically challenging program that prepares graduates with the skills and knowledge to address their organization's immediate and long term safety needs, including protection and preservation of workers, buildings, equipment and corporate reputations. This includes creating physically safer workplaces and modifying employee behaviors. This also may include implementing voluntary protection programs that go beyond legal and regulatory standards. This program will respond to the changing needs to society by being able to be completed through traditional or nontraditional (distance) means.

The program will prepare graduates that are:

1. Qualified to practice as safety professionals in industry, government, or other related areas of employment;
2. able to progress toward safety management (leadership) positions;
3. able to pursue appropriate advanced education or certification as safety professionals.

The curriculum is grounded in math science and liberal arts, with specialized courses in a wide range of subjects, including occupational safety, fire protection, construction safety, incident investigation, ergonomics and more. The safety technology curriculum emphasizes creative problem solving through challenging application-based courses, and you'll have the opportunity to solve actual safety problems provided by industry.

Transfer admission

The admission of transfer students at the third-year level is open to all students who have already received an appropriate associate degree or the equivalent of two years of college, which should include:

- Technical math (2 semesters of college-level math with an introduction to calculus)
- Technical physics
- Technical Sciences including chemistry, organic chemistry and biology
- Computer Applications/programming
- Liberal arts

Students lacking these courses may still be admitted but are required to take the missing courses concurrently within the program or in addition to the program requirements.

You may enter the upper-division safety technology BS program from a wide variety of associate degree programs or with the equivalent of two years of college, including appropriate courses in math, science, and liberal arts. In this program you will build on your foundation of science and math with specialized courses in a wide range of subjects, including occupational safety, fire protection, construction safety, incident investigation, ergonomics, and more. The safety technology curriculum emphasizes creative problem

solving through challenging application-based courses, and you'll have the opportunity to solve actual safety problems provided by industry.

The upper-division safety technology BS program is offered in an online format for persons wishing to continue their education while working. For further information, contact the department at (585) 475-7318.

Cooperative education

Today's employers are looking for ambitious graduates who have professional work experience in addition to a quality academic background. At RIT you'll get both. Because the upper-division safety technology program requires a minimum of three quarters of cooperative education, you'll get the chance to apply your skills in real-world situations before you graduate. Hundreds of employers recruit on campus each year because they know RIT graduates have professional abilities, technical skills, and work experience that are current with industry demands.

Certification

The hallmark of professional capability in the field of safety is the certified safety professional (CSP) designation. In order to sit for the two exams leading to the CSP, an individual must have academic preparation in addition to work experience in the safety field. All students completing the BS degree program in safety technology will be eligible to take the associate safety professional examination upon graduation. Eligibility for the CSP examination occurs once the graduate has acquired enough appropriate work experience (usually three additional years for students who have completed a full year of appropriate co-op assignments). RIT has structured the safety technology program to be at the leading edge of this field, providing you with high quality academic preparation and relevant work experience.

Safety technology, BS degree, typical course sequence

First Year

Environmental Health & Safety Seminar	0630-200	1
General Chemistry & Lab	1011-201,205	4
College Algebra and Trig	1016-204	4
Computer Application Course		4
Writing & Literature I & II	0502-225, 226	8
College Physics I & Lab	1017-211,271	4
Program Elective		8
Calculus for Engineering Technology I	1016-231	4
Occupational Safety	0630-454	4
Inro to Organic Chemistry & Lab	1011-213,207	4
Liberal Arts Core *		4
Wellness		0

Second Year

Manufacturing Processes	0617-220	4
General Biology & Lab	1001-201,205	4
College Physics II & Lab	1017-212,272	4
Data Analysis I	1016-319	4
Elements of Building Construction	0608-422	4
Construction Safety	0608-505	2
Construction Safety Laboratory	0603-506	1
Program Electives		12
Liberal Arts Core *		12

Third Year

Occupational Health & Lab	0630-450,451	5
Fire Protection	0630-401	4
Occupational Health II	0633-362	4
Instructional Design Principles	0688-362	4
Liberal Arts Core *		4
Liberal Arts Concentration *		4
Program Electives		8
Co-op Prep	0606-099	0
Cooperative Education (2 quarters) Co-op		0

<i>Fourth Year</i>		
Product Stewardship 0630-465		4
Project Management 0630-490		4
Program Electives		16
Liberal Arts Concentration *		8
Cooperative Education (2 quarters) Co-op		0
<i>Fifth Year</i>		
Mechanical & Electrical Controls 0633-4530		4
Man-made Hazards 0634-321		4
System Safety/Incident Investigation 0633-540		4
Senior Project Planning 0630-509		1s
Liberal Arts Senior Seminar		2
Ergonomics 0303-415		4
Safety & Health Program Management 0633-545		4
Senior Project 0630-511		3
Program Electives		8
<i>Total Quarter Credit Hours</i>		195

* See page 7 for liberal arts requirements.

^tTotal program with transfer credits applied is 187 quarter credit hours.

Safety and Health Technology Certificate

Designed for accessibility and convenience, this certificate program is offered in both campus-based and online learning formats and consists of the seven four-credit courses listed below. Transfer credits and course substitutions require the approval of the department chair. Upon approval, these courses also may be applied toward the BS program in safety technology. Prerequisites for this program include general chemistry, biology, college algebra, and trigonometry. Students must achieve a program GPA of at least 2.5 in order to be certified.

Courses	<i>Quarter Credit Hours</i>
Occupational Safety 0630-454	4
Fire Protection 0633-401	4
System Safety/Incident Investigation 0633-540 (prereq. 450,454)	4
Safety & Health Program Mgmt. 0633-545 (prereq. 540)	4
Risk Assessment, Mgmt. and Comm. 0630-500 (prereq. 450)	4
Professional Elective	4
<i>Certificate Total</i>	28

Disaster and Emergency Management

Heightened public and governmental awareness of the hazards associated with high technology has led to stringent new federal and state laws requiring communities to plan comprehensively for toxic chemical or radiation emergencies. In addition, there has always been a need to protect the public during natural emergencies such as floods, earthquakes, and tornadoes.

Emergency management practitioner organizations and the federal government are working to develop national standards for the accreditation of emergency managers. The center's certificate in emergency management is intended to upgrade the skills of public safety planners, emergency officials in industry, and existing or aspiring emergency managers in police, fire, and ambulance work. The certificate program is also an excellent capstone program for individuals with associate degrees in fire science, environmental health and safety, or other areas of emergency response.

The five-course sequence is designed to provide students with knowledge of the physical phenomena underlying emergency situations, such as elementary meteorology, earthquake phenomena, toxic chemicals, and radiation; the legal aspect of emergency planning and operations; the theory and methodology of emergency planning, including evacuation planning and management; and the theory and practice of operations at a disaster scene. Up to four credits may be awarded to emergency response agency personnel for appropriate training or experience.

Courses are scheduled so that the certificate may be completed in as little as one year. The courses in this upper-level program also may be applied toward professional requirements for the BS degree in applied arts and science. Students must achieve a program GPA of at least 2.0 in order to be certified. These courses are offered in the online learning format.

Certificate courses were developed with the assistance of local and state professionals in emergency management and are taught by such professionals. For advising and further information about this program, call 585-475-7318.

Emergency management	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Earth Science 0634-311			4
Manmade Hazards 0634-321			4
Emergency Preparedness Laws & Regulations 0634-401			4
Emergency Planning & Methodology 0634-471			4
Emergency Operations 0634-481			4
Counter-terrorism for the First Responder 0634-475			4
<i>Certificate Total</i>			24

Center for Multidisciplinary Studies

James Myers, Director
www.rit.edu/cms

The Center for Multidisciplinary Studies (CMS) offers students interested in more than one area of study the option of creating personalized undergraduate programs directly related to their interests and aspirations.

Today's business world values and looks for individuals with a diverse academic background. CMS offers students this valuable opportunity through its applied arts and science degree programs and specialized certificate programs. These programs focus on providing the student a multidisciplinary approach to learning that can be applied to the professional environment. The diverse nature of the applied arts and science program is an asset in any corporation looking to do more with less.

Like the center itself, CMS students are anything but typical. Some are adults with families and careers, attending classes online or at night, while others are full-time undergraduate students with non-traditional ideas about what they want from their college degree.

Through the center's flexible multidisciplinary programs, students follow plans of study tailored to their individual interests that incorporate courses or sets of courses from the center or other RIT departments. The center's flexible multidisciplinary programs include:

- applied arts and science undergraduate degree programs—a comprehensive undergraduate program with BS, AAS, and diploma options that allow students to pursue unique and customized plans of study that include several areas of concentration
- AAS degrees in business administration and human resources
- a management development program (certificate and diploma)
- specialized certificate programs

General Information

Enrollment policies

The Center for Multidisciplinary Studies allows a student to enroll in any course for which he or she has sufficient background. Many courses have prerequisites that students are expected to meet before enrolling. Prerequisites are listed in the course descriptions. Academic advisers are available throughout the year to answer questions regarding course or program choices.

In support of and in compliance with RIT's policy of assuring competency in written communication, all students matriculated in a BS degree program must satisfy a writing competency requirement. Information about this requirement and the various methods for satisfying it is available at the CMS office; it also may be obtained from an adviser or from the Communication Chair at 585-475-4936.

Students matriculated in the center's bachelor's degree programs are normally expected to complete their degrees within seven years.

Academic Advising

The Center for Multidisciplinary Studies provides academic advising for educational and career goals. This service is available at no charge to all undergraduate students who are interested in CMS degrees, diplomas, and certificate programs and to all students who are enrolled in one or more of the center's courses. The faculty and academic advisers are experienced and trained across academic disciplines. They will help match educational and career goals with an appropriate program of study. With an adviser, each program begins by taking into account what the student already knows and has accomplished. For example, college credits earned at RIT or other accredited institutions will be reviewed to see how they might be applied to the program of study; professional certifications and experiences will be evaluated for the possibility of receiving credit; and credits may be earned (by examination, portfolio reviews, or other documentation) for college-level learning that was gained on the job or through other educational experiences.

To schedule an advising session, please call 585-475-2234 or email webmail@cast-fc.rit.edu. The CMS office is located in Building 1 (George Eastman Building), room 2210.

Transfer credit

Degree programs in the center are structured to permit transfer of credit from other accredited institutions. When a student matriculates into a specific program, a complete evaluation is made of prior academic work. The student will know immediately how much transfer credit is awarded and what courses will be needed to earn a specific degree.

Transfer credit also may be awarded for courses included in the New York State Education Department publication *Guide to Educational Programs in Non-Collegiate Organizations*.

Assessment of prior learning and credit by experience

Students with substantial work experience in a specific field may receive academic credit for their life experience. Their adviser will assist them in identifying and preparing the appropriate documentation to prove that their experience is at least equivalent to the breadth and depth of a college level course. Materials presented in credit by experience portfolios are reviewed by faculty members within and outside of CMS.

Military experience

Students who have previously served in the armed forces and participated in any number of training programs may be eligible to receive credit for their responsibilities through the American Council of Education (ACE). Students should contact Veterans Enrollment Services at 585-475-6641 or efcvet@rit.edu for an evaluation and recommendation of college credit for their military experience. RIT is also an institutional member of the Servicemembers Opportunity Colleges (SOC), which is a consortium of more than 1,500 colleges and universities that provide educational opportunities for servicemembers and their families. SOC is funded by the Department of Defense and managed by the Defense Activity for Non-Traditional Education Support (DANTES).

Faculty

Most courses in the Center for Multidisciplinary Studies are conducted by part-time instructors who teach what they do professionally. Our faculty are selected for their professional competence, academic background, and teaching ability.

Online learning

CMS offers a variety of courses through online learning. Students can complete certificates, diplomas, AAS and BS degrees totally online through the Center for Multidisciplinary Studies. Online learning allows students flexibility in completing their courses while maintaining a class atmosphere through online discussions via chat and/or e-mail conferencing. Courses taught through online learning also use textbook readings, assignments, and exams to deliver coursework. Students have access to instructors by mail, computer, telephone, or individual appointments. For more information about these and other online learning programs, call 585-475-5089; for advising, call 585-475-2234.

Financial aid

Specially trained RIT financial aid counselors can provide students with information about the grants and loans available for full-time and part-time students. In addition to federal, state and private programs, RIT has special financial aid programs for part-time students and students who have recently been laid-off from their job. Many companies also offer employer education benefits that will pay for some or all tuition costs. Active U.S. Army Reserve and National Guard members are eligible for benefits that pay up to 90 percent of tuition.

To be eligible for financial aid, full-time students must be enrolled in at least twelve credit hours; part-time students at least six credit hours. Call 585-475-2958 for more information.

Center for Multidisciplinary Studies Scholarship

- Offered to matriculated students in CMS programs with a GPA of 3.0 or better
- Awards based upon merit and financial need

Students can find out more information about this scholarship from their academic adviser or by visiting <http://www.rit.edu/~801/financial.html>

Course scheduling options

CMS courses and programs are offered during the day, at night, on Saturdays, and in online learning format.

The center will also work with employers to design multidisciplinary programs that are specially suited to meet their employees' needs. Please visit the 'corporate' link on the center's Web site (www.rit.edu/cms) to learn more.

Applied Arts and Science Degrees

The Center for Multidisciplinary Studies offers students the opportunity to create individualized undergraduate programs of technical and professional study through its applied arts and science program. In this program, students work closely with faculty and advisers to design unique, multidisciplinary plans of study that combine several areas of professional knowledge.

The applied arts and science program is particularly appropriate for individuals who have prior college-level learning, are interested in changing majors, or who want to prepare themselves for a career that requires skills and expertise from several disciplines. There are three levels:

Bachelor of Science (BS) degree
180 quarter credit hours total; 90 core credits in general education plus 90 credits in 2 to 4 areas of concentration.

Associate of Applied Science (AAS) degree
90 quarter credit hours total; 52 core credits in general education plus 38 credits in 1 to 2 areas of concentration.

Diploma
36 quarter credits hours; 1 area of concentration.

The AAS and BS degrees are available to full-time day students, part-time evening students and online students. The day program for full-time students is very flexible, includes physical education requirements, and contains a special set of math and science course options.

Individualized concentrations

The associate and bachelor of science degrees allow you to study several different professional and technical areas of study, selected specifically to meet your career and personal goals.

For your professional concentrations, you can draw on a wealth of educational resources from across RIT colleges and departments. Examples of professional concentrations include:

Business/Management focus
Management
Quality Management
Reliability
Health Systems Administration
Print Management Studies
Disaster & Emergency Management
Industrial & Environmental Management
E-business
Public Relations

Computer/Technical focus
Applied Computing
Technical Communications
Computer Science studies
Engineering Technology Studies
Telecommunications
Computer Graphics
Structural Design
Safety & Health Technology
Mechanical Technology

Liberal Arts focus
Economics
Criminal Justice Studies
Psychology Studies
Creative Writing
Foreign Language

No two applied arts and science programs will be exactly alike because each takes into account the student's previous learning and brings together a special combination of courses that are right for his or her career and professional development. For example, one individualized program might lead to a bachelor's degree with concentrations in information technology, graphic arts, and management, while another could lead to a bachelor's degree that combines fields of technical communication and health systems administration.

As their career plans evolve and the demands of their technical and professional fields change, students meet regularly with advisers to review and update plans of study.

Course requirements, AAS and BS degrees in Applied Arts and Science

(See adviser for course options)

	Math/Computer/Science	Cr.	Liberal Arts	Cr.	Professional Concentration(s) 1 to 2	Cr.
^	Math Electives	8			To be developed by student with adviser	38
	Computer Literacy Electives	4	Writing & Literature I, II §	8		
	Science Electives	12	0504-225/226 Communication Elective Humanities Electives Behavioral Science Electives	4 8 8		
C in addi to AAS	Math/Science Math/Science or 0508 Elective	8	Liberal Arts General Education ‡ Liberal Arts Concentration Liberal Arts Electives #	4 12 16 2	Professional Concentration(s) 2 to 3 To be developed by student with adviser	48

* A concentration = 20 (or more) quarter hours in one subject area (e.g., applied computing, communication, business).

§ A Writing & Literature pretest is required; call 585-475-2234 for information, students completing BS degree must also pass a Writing Competency test.

‡ Cannot be in the same area as professional concentration

Students choosing a liberal arts area for a professional concentration must choose their "liberal arts concentration" and "liberal arts electives" in other disciplines or interdisciplinary areas in the College of Liberal Arts.

Common features

Every applied arts and science degree has certain features in common:

1. An approved program of study developed with faculty, an individual adviser, and the degree committee
2. General education courses in mathematics, computer literacy, science and liberal arts (52 credits for the AAS; 90 for the BS)
3. One or more professional concentrations that provide each student with the opportunity to develop a multidisciplinary program tailored to specific career and personal objectives
4. Students must achieve a program GPA of at least 2.0 in order to be certified for completion/graduation.

Business and Management AAS Degree Programs

The center offers associate degrees in business administration and human resources administration. All business and management degree programs include a core group of business courses in organization and management, accounting, management, and business law. Approximately half of the credits in degree programs are earned through these professional courses. In addition, all business and management degree programs include a broad spectrum of courses in communication, behavioral/social sciences, humanities, math, and science. Students must achieve a program GPA of at least 2.0 in order to be certified. The AAS degrees in business administration and human resources administration are fully transferable into the bachelor of science in applied arts and science.

Professional concentration requirements, business and management AAS programs

	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Business Administration			
History or Fine Arts Elective			4
Legal Environment of Business 0680-315			4
3 Business Electives			12
<i>Concentration Total</i>			20

	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Human Resource Administration			
Human Resource Administration 0622-48			4
Interviewing Techniques 0626-234			4
Business Law 10680-311 or Legal Env. of Business 0680-315			4
2 Business Electives			8
<i>Concentration Total</i>			20

The Management Development Program

The management development program has two components: the management certificate and the management diploma. The program is structured to first provide a broad foundation in applied general management and then tailor that foundation with a focused study in a specialized field.

Students may take one or both parts of the program, and both may be completed in one academic year. Credits earned in the program can be applied to various degree programs. Students must achieve a program GPA of at least 2.0 in order to be certified for completion/graduation.

Management Development Certificate

The management development certificate is earned by successfully completing a three-course sequence in management. The courses focus on:

- practical applications of management theory
- management problems, solutions and ideas
- personal development as an effective manager.

The management sequence offers a comprehensive, integrated study of supervisory management. Topics covered include effective motivation, decision making, team building, conflict resolution, problem solving, time and stress management, communication techniques and strategies, planning, organizing, staffing, performance appraisal, and leadership.

In this program students associate with others who have similar career aspirations, job responsibilities, and challenging problems on the job. Through case studies, role plays, simulations, and other instructional methods, students learn effective supervisory and management practices. Students must achieve a program GPA of at least 2.0 in order to be certified for completion/graduation.

	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Management Certificate			
Management Process I 0681-200			4
Management Process II 0681-201			4
Management Process III 0681-202			4
<i>Certificate Total</i>			12

Core Requirements, All Business and Management AAS Programs

Professional program requirements are added to these core requirements.

	Professional Courses		Qtr. Cr.	General Education		Qtr. Cr.	Math, Statistics & Science		Qtr. Cr.
Required Courses 92 Credits	Financial Accounting	0680-201	4	Writing & Literature I	0504-225		Science Electives †		8
	Managerial Accounting	0680-203	4	and			Math for Business	0692-211,212	8
	Organization & Mgmt.	0681-205	4	Writing & Literature II	0504-226	8	Statistics	0692-311,312	8
	Information Resources & Network Tools	0680-341	4	or					
	Principles of Marketing	0681-361	4	Comm. in Business	0688-325				
	Management Science	0680-353	4	and					
	Professional Concentration Courses (see above)		20	Writing & Literature I	0504-225	8			
			Economics	0511-301,401	8				
			Psychology	0514-210	4				
			Sociology	0515-210	4				
	Total		44	Total		24	Total		24

In sequentially numbered courses, the lower-number course is prerequisite.

† Science electives may include any of the following:

Contemporary Science/Biology	0692-231
Contemporary Science/Chemistry	0692-232
Contemporary Science/Physics	0692-233
Contemporary Science/Oceanus	0692-234
Sports Physiology & Life Fitness	1026-305

Fitness Prescription/Programming	1026-306
Exercise Prescription	1026-307
Earth Science	0634-311
Man-Made Hazards	0634-321

Management Diploma

In the management diploma program, students concentrate their studies in one of three specific areas of business and management that may be immediately relevant on the job.

Typically, the management diploma is earned by completing 16 quarter credits in addition to the management certificate. However the small business management certificate may also be taken as a component of the diploma.

Courses applied toward a management diploma may also be counted as professional courses in appropriate degree programs. Students must achieve A program GPA of at least 2.0 in order to be certified for completion/graduation.

General Management	<i>Quarter Credit Hours</i>
Management Process 0681-200, 201,202 or approved alternative	12
Financial Accounting 0680-201	4
Managerial Accounting 0680-203	4
Information Resources & Network Tools 0680-341	4
Marketing 0681-361 or Business Elective	4
Diploma Total	28

Marketing	<i>Quarter Credit Hours</i>
Management Process 0681-200,201,202 or approved alternative	12
Marketing 0681-361	4
Effective Selling 0681-261	4
Advertising Principles 0681-263	4
Business Elective	4
Diploma Total	28"

Human Resource Administration	<i>Quarter Credit Hours</i>
Management Process 0681-200,201,202 or approved alternative	12
Human Resource Administration 0622-480	4
Interviewing Techniques 0626-234	4
Business Law I 0680-311	4
Business Elective	4
Diploma Total	28"

Specialized Certificates

In these days of rapid change, meeting professional and educational goals can be a challenge. Many employers are looking for upgraded skills quickly while employees or students are looking to enhance their skills or take on a new direction professionally or personally. To help meet these challenges, programs are needed that can offer new skills or enhance current skills in a quick and efficient manner. The center provides this opportunity through its certificate programs in:

- Management Development
- Organizational Change and Leadership
- Small Business Management
- Computer Graphics
- Basic Technical Communication
- Advanced Technical Communication
- Public Relations-Writing Option
- Public Relations-Graphic Communication Option
- Quality Management
- Reliability Management
- e-Business

All certificate programs are applicable to the applied arts and science degree or diploma programs as professional concentrations.

Organizational Change and Leadership

Profound and ongoing changes are taking place in organizations and individuals need to be flexible and proactive in response to these changes. The organizational change and leadership certificate will help students understand corporate culture and develop skills necessary to manage organizational and individual change. Through the study of leadership, corporate culture, change management, organizational behavior, and teams, individuals will understand and obtain the skills necessary to proactively manage change.

Certificate in Organizational Change	<i>Quarter Credit Hours</i>
Survey of Organizational Change 0697-430	4
Managing Organizational Change 0697-432	4
Understanding Corporate Culture 0697-431	4
Global Forces & Trends 0697-435	4
Change and Leadership Project 0697-434	4
<u>Elective (0697-XXX)</u>	<u>4</u>
Certificate Total	24

Reliability Maintenance

In manufacturing, utility and service industries, equipment reliability means bottom line profitability. Unscheduled downtime costs businesses millions of dollars each year, taxing the patience of maintenance teams and management alike. The technician, engineer or manager who understands how to cost effectively avoid equipment failure through the science and techniques of reliability is worth his or her weight in gold.

The RIT reliability certificate program prepares individuals to implement a reliability based maintenance strategy within an organization. Emphasis is placed equally on understanding the theory underlying reliability and the application of tools and software that participants can use immediately on the job. Some topics of instruction include root cause analysis, failure mode and effects analysis, maintenance strategies, probability distributions, and spare parts forecasting. Students will learn to apply reliability techniques and use industry standard software through completing individual and group assignments. This certificate can be taken online.

Certificate in Reliability Maintenance	<i>Quarter Credit Hours</i>
Statistics for Total Quality 0684-340	4
Reliability I 0684-370	4
Problem Investigation, Isolation & Analysis 0684-375	4
Reliability II 0684-376	4
Reliability III 0684-377	4
Reliability IV 0684-378	4
Report Writing 0688-331	2
Certificate Total	26"

e-Business

The e-business certificate is designed to create professionals who understand how to do business on the Web. Graduates of the program will have a real grounding in the technologies, strategies, and tactics that make e-business initiatives successful. This certificate can be taken online.

Certificate in e-business	<i>Quarter Credit Hours</i>
Intro, to e-Business Technologies 0112-310	4
Business-to-Business e-Commerce 0105-445	4
Designing the e-Business Organization 0112-510	4
Internet Marketing 0105-440	4
Two Business Electives*	8
Certificate Total	24

*Business electives require approval from academic adviser.

Small Business Management

The certificate program in small business management is designed for enterprising individuals who want to launch a new venture or improve an existing small business. It is especially appropriate for entrepreneurs, members of family-owned businesses, and key employees in companies with sales under \$2 million.

The three courses in the program are tightly integrated, to provide a solid foundation in managing, marketing, and financing small businesses. The faculty includes academically qualified entrepreneurs who have managed their own small companies.

Certificate in			
Small Business Management		<i>Quarter Credit Hours</i>	
New Venture Development	0681-221		4
Small Business Management & Finance	0681-222		4
<u>Small Business Marketing & Planning</u>	<u>0681-223</u>		
<i>Certificate Total</i>			12

Quality Management

Poor quality in manufacturing and service can cost companies as much as 20 percent of revenue in rework, scrap, brand switching, and loss of goodwill. Organizations have begun to understand that prevention saves more time and money than the discovery of flaws after the fact.

The center's management-oriented certificate programs focus on quality as a priority. Developed in cooperation with industry, the courses can help you develop a Total Quality Management environment to combine the theory and practice of statistical quality control with leadership, teamwork, and problem-solving concepts and skills.

The certificate in basic quality teaches the "nuts and bolts" of a quality organization and prepares you to introduce quality concepts to your organization. The certificate in quality implementation teaches you how to put quality principles to work for you. Together, the certificate package can prepare you to work as a quality trainer, facilitator, team leader, or manager at various levels of an organization. Both certificates can be taken online.

Certificate in Basic Quality		<i>Quarter Credit Hours</i>	
Introduction to Quality	0684-310		4
Basic SQC Techniques	0684-320		4
<u>Leadership Skills for Quality</u>	<u>0684-330</u>		<u>4</u>
<i>Certificate Total</i>			12

Certificate in Quality Implementation		<i>Quarter Credit Hours</i>	
Statistics for Total Quality	0684-340		4
Costing for Quality	0684-410		4
<u>Implementing Total Quality</u>	<u>0684-430</u>		<u>4</u>
<i>Certificate Total</i>			12

Public Relations Communications

Public relations communications are vital to virtually every human endeavor. Almost every organization employs individuals, either in house or by contract through public relations agencies, who can prepare press releases, brochures, newsletters, annual reports, point-of-purchase promotions, and other persuasive, informative materials in a variety of media.

Underlying successful public relations communications are skills in two key areas: writing and graphic communication. The center offers a certificate program in each of these specialties. Both programs share a core of courses that provides an introduction to public relations and teaches widely used principles and techniques of advertising, project management and persuasion. The professional writing program provides specialized instruction in writing marketing materials, inbound and outbound publications, corporate-level

communications, and speeches and scripts. The graphic communication program (designed specifically to accommodate non-artists) focuses on understanding the components of the advertising process, the use of effective design principles in the preparation of layouts, and the combining of creative and technical skills to achieve design success.

These programs are intended for individuals who wish to enter the field of public relations or take on PR responsibilities, those who have been working in a particular aspect of public relations and wish to upgrade or broaden their skill, or those who have been performing PR tasks for which they have had little formal preparation.

Prerequisite for the core courses is demonstration (by examination, portfolio, or transcript) of a command of standard written English.

Courses are scheduled so that the core and one or both of the certificate options may be completed in four quarters of part-time study. Students may earn one or both certificates, and students not wishing to take an entire certificate program may take specific individual courses.

For advising and further information about this program, call Thomas Moran at 585-475-4936. The professional writing option can be completed online.

Core Courses		<i>Quarter Credit Hours</i>	
Introduction to Public Relations	0688-350		2
Strategic Communications	0688-356		2
Advertising Evaluation & Techniques	0681-264		4
<u>Managing the Project</u>	<u>0688-348</u>		<u>2</u>
<i>Core Total</i>			10

Certificate in Professional Writing		<i>Quarter Credit Hours</i>	
Core Courses			10
Writing for the Organization	0688-351		2
Media Relations	0688-357		2
Promotional Writing	0688-347		2
Scripting for A/V & Video Presentations	0688-353		2
<u>Speechwriting</u>	<u>0688-354</u>		<u>2</u>
<i>Certificate Total</i>			20

Certificate in Graphic Communication		<i>Quarter Credit Hours</i>	
Core Courses			10
Coordinating Publication Production	0688-355		2
and any three of the following courses*			
Designing with Computers I	0688-371		3
Designing with Computers II	0688-372		3
Electronic Presentation Design	0688-373		3
Photographic Imaging with Computers I	0688-381		3
Photographic Imaging with Computers II	0688-382		3
Introduction to Internet Design	0688-383		3
Designing with Corel	0688-374		3
<u>Designing with QuarkXPress</u>	<u>0688-384</u>		<u>3</u>
<i>Certificate Total</i>			27

*With adviser's approval

Technical Communication

In this age of rapidly expanding technologies, technical communication is an essential, challenging, and rewarding profession, one that can be practiced within an organization or outside, through independent contracting.

As the technologies grow, so does the need for communicators skilled in conveying many kinds of information in many different forms to many diverse audiences. Industrial, business, scientific, medical, and nonprofit sectors have recognized the importance of communication to their successes. The ability to present information effectively—in forms such as manuals, brochures, data sheets, promotional materials, systems documentation, reports, trade and professional journals, Web sites, and videos, among others—is a highly valued asset in the work place today.

The following sequence of courses, designed to be completed in three quarters of part-time study, provides a strong, practical foundation in technical communication skills for those wanting to work in the profession or those whose advancement in other careers is directly related to their ability to communicate clearly, correctly, and concisely.

Certificate in Basic Technical Communication	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Technical Writing & Editing	0688-333		4
Technical Document Design	0688-363		4
and either			
Research Techniques	0688-361		4
or			
Instructional Design Principles	0688-362		4
<i>Certificate Total</i>			12

Prerequisite for the basic sequence is demonstration (by examination, portfolio, or transcript) of a command of standard written English.

For those interested in further professional development and instruction in more specialized topics, the following sequence of courses, designed to be completed in three quarters of study, is offered. Students may take courses in the advanced sequence simultaneously with those in the basic sequence.

Certificate in Advanced Technical Communication	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Writing in the Sciences	0688-365		4
Managing Media Presentations	0688-366		4
Writing Software User Documentation	0688-367		4
<i>Certificate Total</i>			12

Technical Information Design (0688-510), Technical Proposals (0688-514), Technical Procedures (0688-512), and Document Usability (0688-511) may be substituted for one of the required advanced courses with the permission of the program chair. In addition, various special topics courses (0688-398) offered in areas such as technical journalism, usability, and communications management may be substituted for one of the required courses with permission of the program chair. A course used as a substitute may not have been used to fulfill the requirements of the certificate in basic technical communication. Students must achieve a program GPA of at least 2.0 to be certified for completion/graduation.

Courses in these sequences were developed with the assistance of working technical communicators and are taught by experienced professionals. For advising and further information about this program, call Thomas Moran at 585-475-4936. Both certificates can be completed online.

Computer Graphics

Today's graphic communicators rely on the computer for nearly every step of the creative process. The computer screen has replaced the sketch pad, the drawing table, the layout board, and other tools traditionally used to develop graphic artwork. With the ever-widening use of the Internet, graphics not only are created on the computer but also are distributed and displayed to huge on-line audiences via the computer.

The courses within this program develop and enhance the computer graphic skills of students who find that, with increased access to desktop publishing tools and corporate emphasis on multitasking, their job responsibilities have broadened to include aspects of graphic design. The program will benefit technical communicators, administrators, public relations practitioners, educators, sales and marketing staff, and technical and business professionals who are called upon to design and produce effective brochures, advertising materials, presentations, proposals, flyers, and other communications products. In addition, this program provides an excellent transition path for practicing graphic designers who need to upgrade their skills and move into the arena of computer design.

Students develop skill in the use of a number of popular graphic design, illustration, presentation, photo manipulation, and Internet software programs. They learn to combine typography, images, and graphic elements into striking designs for both printed and on-line use and can develop a portfolio of professional-quality computer design work.

Certificate in Computer Graphics	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Basic Computer Graphics	0688-271		2
Designing with Computers I	0688-371		3
Designing with Computers II	0688-372		3
Electronic Presentation Design	0688-373		3
Photo-imaging with Computers I	0688-381		3
Photo-imaging with Computers II	0688-382		3
Introduction to Internet Design	0688-383		3
<i>Certificate Total</i>			20~

Elective courses offered through the program, such as Designing with Quark (0688-384), Designing with Corel Draw (0688-374), and Advanced Internet Design (0688-410) along with special topics classes (0688-398) such as Advanced Photoshop Tech and Intro to XML also may be substituted with the permission of the program chair. For advising or further information about this program, call Thomas Moran at 585-475-4936.

Students may earn one or more of the certificates. Students not interested in taking an entire certificate program may take individual courses for which they have the proper prerequisites. Students must achieve a program GPA of at least 2.0 in order to be certified for completion/graduation.

Department of Military Science-Army

Reserve Officer Training Corps (ROTC)

LTC Donald Beattie, Professor of Military Science

The Army Reserve Officer Training Corps (ROTC) program prepares students for leadership in a civilian or military career. ROTC is a campus-based program that assists students in developing their full potential—intellectually, physically, and emotionally. The program consists of classroom instruction, physical training, and practical-application laboratories designed to enhance organizational leadership, decision making, and problem-solving skills.

ROTC classes are open to everyone, with no military obligations unless a student has received an ROTC scholarship or contract during the beginning of the junior year. Upon graduation from college and successful completion of Army ROTC, cadets are commissioned as second lieutenants and may serve in the active army, the Army Reserve, or Army National Guard. Veterans, members of the Army Reserve or National Guard, and junior ROTC graduates may be eligible for advanced placement in the program.

Those who join Army ROTC become cadets in a dynamic and challenging program. Throughout the year, we offer a variety of fun activities that reinforce leadership skills, teamwork, and confidence. Our cadets enjoy unique events such as the formal Military Ball and the formal yet light-hearted annual banquet called the "Dining-In." They also have the opportunity to participate in high-adventure training weekends on U.S. military installations, where they learn skills such as navigating with a map and compass or rappelling as part of mountaineering instruction. Our clubs and activities also include the Ranger Challenge Team, the ROTC varsity sport. This team competes in military skills and physical stamina competitions with other colleges throughout the Northeast. We also may sponsor a team to compete in the prestigious Sandhurst Competition, a military skills and endurance event at which teams from the U.S. Military Academy, the British Military Academy at Sandhurst, and select ROTC teams from across the nation gather at West Point to determine who is the best. No other program on campus offers the same level of adventure and practical leadership experience that we offer through our many and diverse activities. Our cadets receive hands-on training from skilled military professionals that aids them in opening up doors they never knew existed. The Army ROTC program builds skills that will last a lifetime.

Scholarship opportunities

Army ROTC awards four-, three-, and two-year scholarships. A four-year ROTC scholarship is presently valued at \$68,000. Students who have two or three years of college remaining are encouraged to compete for campus-based scholarships, which are worth \$17,000 per year. Tied to four- and three-year Advanced Designee scholarships are university incentives. In previous years, those scholarship winners received a room and board incentive, bringing the total value of their four-year scholarship to over \$100,000. Check with the Financial Aid Office for the latest incentive. In addition to the tuition award, the Army provides \$600 annually for books and a monthly cash stipend of \$250-400 for 10 months, which cadets may use as they like.

Scholarship competition is based on academic achievement coupled with an assessment of the applicant's leadership potential. Both enrolled students and non-enrolled students may compete for a scholarship. Students preparing to enter graduate studies also may be eligible to apply for a scholarship. Visit our office, 3161 Eastman Building, for more information

or visit the Cadet Command Web site at www-rote.monroe.army.mil/scholarships/. Using the online application, incoming freshmen should apply during the fall semester of their senior year in high school for four-year scholarships.

Financial benefits

A subsistence allowance of \$250-400 per month is provided, tax free, directly to each contracted ROTC cadet throughout the school year. This, plus pay for attending Advanced Camp (the required summer camp between the third and fourth year of the program), amounts to more than \$7,500 for the last two years of college. RIT also offers incentives to all Army ROTC scholarship winners, ranging from flat-rate monetary assistance to full room and board or the equivalent. To qualify for these incentives, file a Free Application for Federal Student Aid form by March 15 of each year (see pages 377-383). For additional information, please contact the Office of Financial Aid at 585-475-2186.

Basic Course

The Army ROTC program is normally a four-year program and is divided into two components, the Basic Course and the Advanced Course. The Basic Course consists of the first two years of the Army ROTC program. This would normally be the freshman and sophomore years of college. During the Basic Course, *non-scholarship students have absolutely no military obligation*. Basic Course classes emphasize the development of academic and life skills necessary to ensure that cadets become better students and to increase their potential as future Army officers or leaders in tomorrow's dynamic business environment. During the Basic Course students learn time management and study skills, basic military organization, military history, small-unit leadership, and problem solving. Students in the Basic Course register for a class and lab, and if they also register for the Army Conditioning Drills, they will receive physical education credit from RIT while meeting the ROTC physical fitness requirements. Students may enroll in Basic Course classes at any time during their first two years of college. Upon completion of the Basic Course, eligible students can progress to the Advanced Course (the last two years of the program). Eligible Basic Course cadets also can compete to attend off-campus Army training opportunities such as the Army Airborne school or Air Assault school.

Leader Training Camp

Leader Training Camp (LTC) is the two-year option for students who are considering Army ROTC but who have not completed the Basic Course requirements and are entering their last two academic years (co-op excluded). At this paid 28-day summer camp, students obtain the necessary skills and training to qualify for entry into the last two years of the Army ROTC program. LTC teaches basic military skills while emphasizing leadership development. Participants who successfully complete the camp are offered the opportunity to formally contract into the Advanced Course for their last two years of college (co-op excluded). Interested students should contact the Army ROTC office as soon as possible but not later than the spring quarter.

Veterans

Qualified students with prior military service and members of the Army National Guard and Army Reserve who have attended Basic Training may enroll directly into the Advanced Course. However, they must be academically aligned (i.e., must have two years of academic work remaining). Those who have more than two years of academic work remaining but wish to participate in the Army ROTC program are encouraged to enroll in any of the Basic Course classes. Interested students should visit the department for more information.



Rappel training is held on campus.

Advanced Course

The Advanced Course is for students entering their last two academic years (co-op excluded) in college. The Advanced Course is similar to the Basic Course in organization and style, but the course content focuses more heavily on organizational leadership, decision making, and professional skills. Although instruction in military tactics is an integral part of the Advanced Course, it is designed to serve as a vehicle for enabling cadets to apply the full range of leadership skills they are learning in the classroom. Planning, organizing, and leading others through various training activities is the focus. Upon entering their last year in the program, Advanced Course cadets are ranked against their peers in academics, Advanced Camp performance, and general on-campus performance. Based on these factors, the Army makes duty placement and job selections. Advanced Course cadets also have the opportunity to participate in a myriad of off-campus Army training opportunities such as Airborne, Air Assault, Northern Warfare, and Mountain Warfare training courses. After completing Advanced Camp, cadets also may participate in the Cadet Troop Leadership Training Program, a paid, practical leadership experience where they are assigned for up to three weeks to serve as a leader in an Active Army unit in the United States or elsewhere around the world.

National Advanced Leaders Camp

The Advanced Course includes attendance at the ROTC National Advanced Leaders Camp (NALC) at Fort Lewis, Washington, which normally occurs between the third and fourth years of college. At NALC, Army ROTC cadets from across the nation gather for five weeks to demonstrate their leadership skills and potential. They are repeatedly placed in leadership positions and face problem-solving challenges that bring together all of the classroom and practical instruction they received on campus. Participants might be assigned to lead a 120-person cadet company as they prepare for training or to plan and lead a 10-person squad on a tactical night patrol. Regardless of the task, participants have the opportunity to demonstrate their leadership potential to their Army evaluators. Attendees are paid travel expenses and a salary for participating in this challenging and greatly rewarding experience.

For more information

To learn more about career opportunities through Army ROTC, visit or call the department of military science, room 3161, Eastman Building. You also may contact us by e-mail at mmharm@ritvax.isc.rit.edu or by telephone at 585-475-2881. Visit our Web site at www.rit.edu/~armyrotc.

Department of military science four-year program, typical course sequence

First Year, MS I	Quarter	Credit	Hours
Introduction to Military Science 0640-201 *			2
Applied Military Dynamics 0640-202 *			2
Military Heritage 0640-203 *			2
Second Year, MS II			
Military Geography 0640-301 *			2
Psychology & Leadership 0640-302 *			2
The Military & American Society 0640-303 *			2
Third Year, MS III			
Military Tactics 0640-401 *			3
Military Communications 0640-402 *			3
Military Operations 0640-403 *			3
Fourth Year, MS IV			
Army Training Systems 0640-501 *			3
Military Administration & Logistics Management 0640-502 *			3
Military Law & Ethics 0640-503 *			3
Total Quarter Credit Hours			30

* A Leadership Lab, which is conducted on a weekly basis for two hours, is an integral part of each course offered throughout the year. Class 1, Lab 1 = Credit 2, or Class 2, Lab 1 = Credit 3.

Department of military science two-year program, basic camp completion/advanced placement/summer compression, typical course sequence

Third Year, MS III	Quarter	Credit	Hours
Military Tactics 0640-401 *			3
Military Communications 0640-402 *			3
Military Operations 0640-403 *			3
Fourth Year, MS IV			
Army Training Systems 0640-501 *			3
Military Administration & Logistics Management 0640-502 *			3
Military Law & Ethics 0640-503 *			3
Total Quarter Credit Hours			18

* A Leadership Lab, which is conducted on a weekly basis for two hours, is an integral part of each course offered throughout the year. Class 1, Lab 1 = Credit 2, or Class 2, Lab 1 = Credit 3.

Department of Aerospace Studies—Air Force

Reserve Officer Training Corps (AFROTC)

Col. Lansing E. Dickinson, Professor of Aerospace Studies

Air Force Reserve Officer Training Corps (AFROTC) began at RIT in September 1985. Participation in ROTC allows college students a firsthand view of the Air Force while attending the college of their choice. Activities are extremely varied and enriching, encompassing classroom instruction, leadership experiences, visits to Air Force bases, summer field training, and physical fitness.

Characteristics

The department of aerospace studies at RIT has designed, an approach to its curriculum totally compatible with the four-year curriculum and the five-year cooperative education program within the Institute. RIT and the department of aerospace studies believe the program will develop well-rounded individuals fully prepared to enter into their chosen career fields and become future leaders in our society.

Four-year program

This program has three distinct parts: the General Military Course (GMC), the Professional Officer Course (POC), and Summer Field Training.

Cadets normally enter the four-year program directly from high school. The GMC is taken by freshmen and sophomores, who study Air Force Doctrine, Mission, Organization, the Nature of Conflict, Air Power Development, and the Evolution of Air Power.

The POC is the advanced Aerospace Studies curriculum and is conducted during the junior and senior years at RIT. The curriculum prepares cadets for entry into the Air Force as second lieutenants. Students study fundamentals of leadership and management, ethics, staffing, planning, coordinating, national security, and foreign policy.

Every cadet must complete a Summer Field Training encampment, normally between the sophomore and junior years. In the four-year program, the summer exercise is four weeks long. The curriculum and activities at summer field training educate and evaluate a student's leadership potential and qualify the cadet for entry into the POC. The training program includes leadership evaluation exercises, orientation, survival training, officer training, confidence courses, aircraft and aircrew orientation, and physical training.

Leadership and management experience is gained in the Air Force ROTC curriculum through a series of Leadership Laboratories, conducted in the fall, winter, and spring quarters throughout the four- and five-year college curricula. The lab is managed by the cadet corps staff with a detachment officer overseeing all activities. Practical command and staff leadership experience, drill and ceremonies, customs and courtesies, and career decision making are all part of the Leadership Laboratory.

Two-year program

This program allows students to join the cadet corps with as little as two years remaining at college. Cadets receive all GMC curriculum and laboratory experience in a six-week summer field training exercise, usually conducted between their sophomore and junior years. Successful completion of the summer camp qualifies cadets for entry into the POC (see "Four-year program").

Other programs

Several other programs and activities are afforded to cadets in both the two- and four-year Air Force ROTC programs. They are offered to highly competitive cadets to further develop the officer "whole person" concept. These programs include airborne training with the U.S. Army, Advanced Training Program (an on-the-job training program at selected air bases), base visitations, and Arnold Air Society.

Physical education graduation requirements

Physical education institute requirements can be satisfied by completion of the department of aerospace studies leadership laboratories. Students must be enrolled in Air Force ROTC (the two- or four-year program) to enroll in the leadership laboratories.

Qualifications and selection procedure

To become a member of the Air Force ROTC requires students take the Air Force Officer Qualifying Test, a physical, interview, and then meet a selection board. Please contact the Air Force ROTC office at (585) 475-5197 for complete details and learn how you may qualify.

Scholarships

Air Force ROTC offers a variety of scholarships to qualified students in many academic disciplines. Four-year, three-year and two-year scholarships are available in technical and non-technical fields. The needs of the Air Force dictate which scholarships will be offered on a yearly basis. Competition is very keen. High-school students must complete their applications for a four-year scholarship very early in their senior year.

Financial assistance

Every scholarship cadet and all POC cadets receive an allowance between \$250-400 monthly. RIT augments high school three- and four-year ROTC scholarships with free room and board. In order to receive RIT's room scholarship and tuition supplement, students must file a Free Application for Federal Student Aid form by March 15 (see pages 375-381). Contact the Office of Financial Aid for further information.

For more AFROTC information

Call the department at 585-475-5196 or visit us on campus, 3211 Eastman Building.

Department of aerospace studies—AFROTC, typical course sequence *

First Year	Quarter	Credit Hours
Air Force Today I, II, III	0650-210,211,212	3
Leadership Lab I	0650-201,202,203	3
Second Year		
History of Air Power I, II, III	0519-201,202,203	4
Leadership Lab II	0650-301,302,303	3
Third Year		
Air Force Leadership & Mgmt. I, II	0102-310,311	10
Leadership Lab III	0650-401,402,403	3
Fourth Year		
National Security Forces I, II	0513-401,402	9
Leadership Lab IV	0650-404,405,406	3
Fifth Year		
Leadership Lab V	0650-501,502, 503	3
Total Quarter Credit Hours		41

* NOTE:

- This is a typical flow. Certain degree programs require the Air Force junior- and senior-level courses to be taken in any one of the following combinations: years 3 and 5, or years 4 and 5.
- Five year students enrolled at RIT but not taking Air Force junior- or senior-level courses, must be enrolled in Leadership Lab.

College of Business

Thomas D. Hopkins, Dean

Success in today's business environment requires leadership and management attuned to rapid changes in technology and increasingly vigorous global competition. The mission of the College of Business is to produce leaders who excel at managing people, technology and quality in a global context. We will equip a diverse array of talented students with capabilities for strategic and critical thinking needed for effective leadership in a global economy where creative management of both people and technology is vital.

The College of Business offers a benchmarked portfolio of comprehensive, rigorous programs of study, including both degree and certificate programs. Our innovative, multi-disciplinary curriculum—embedding the latest technology, quality principles and a global perspective throughout—produces graduates able to convert managerial learning into pragmatic business applications.

The College of Business is accredited by the AACSB International (Association to Advance Collegiate Schools of Business), which is the premier accrediting organization for business schools. Our programs operate at the highest international standards of excellence while still providing the applied focus for which RIT is famous.

Plan of education

To achieve the educational aims described above, the college program includes four components: the liberal arts, the business core, the major, and cooperative work experience.

Representing 50 percent of the total program, the liberal arts component includes courses in humanities, math, science and social science. The student is also expected to display proficiency in both oral and written forms of communication and to choose a humanities or social science concentration or minor. The capstone course of the liberal arts program is a senior seminar in which a subject is explored in depth.

Integrated throughout the business core are themes of global competitiveness, technology management, quality management, customer satisfaction, ethics, diversity, and problem solving. Courses in economics, mathematics, data analysis, computers, and organizational behavior provide the fundamental knowledge and interpersonal analytical skills necessary for the pursuit of advanced study in a major. They also provide the foundation to consider career alternatives.

In the third component, the major, students concentrate their study in a specific business career field.

Majors offered by the college are as follows:

Accounting

Public accounting option (CPA)

Management accounting option (CMA)

Finance

International business

(Dual major, offered daytime only)

Management

Management information systems

Marketing

Graphic Media Marketing

(Major offered daytime only)

Undeclared business option (first two years)

By building on the liberal arts and business core components, the major will provide mastery of marketable skills.

Students also can pursue an additional business focus area by completing three to five courses in any of the business majors listed. College of Business advisers are available to assist students in choosing these courses.

The final component, cooperative work experience, offers the chance to apply and question what has been learned in the classroom. These hands-on, paid work opportunities occur in the last two years so that a student will have prerequisite academic preparation to contribute to the work place.

The exciting and challenging programs in the college provide a unique level of competence as well as a foundation for continuous intellectual and career growth.

Cooperative education

Cooperative education is an integral part of the program. Students obtain practical work experience in an area related to their chosen field of interest. This work experience is part of the student's career exploration and provides practical experience related to the student's course work. This experience should help the student develop a greater insight into his or her chosen field and provide a record of practical experience that may increase the student's opportunities for placement and more rapid career advancement upon graduation.

All College of Business students are required to complete two successful cooperative work experiences. These "work blocks" take place during the junior or senior year. While RIT and the College of Business cannot guarantee anyone cooperative employment, RIT's Office of Cooperative Education and Career Services is available to assist students in their job search efforts.

Year	Fall	Winter	Spring	Summer
1	RIT	RIT	RIT	-
2	RIT	RIT	RIT	-
3	RIT	RIT	RIT	Co-op
4	Co-op	RIT	RIT	-

Typical cooperative education plan—College of Business *

* Co-op quarters will vary depending on major and educational preparation

Advising

The College of Business is committed to providing advising services throughout a student's academic program. In its Student Services Office, all students are assured administrative support to effectively deal with registration, records and scheduling. In addition, the administrative staff is prepared to provide students with information about other support areas within RIT such as career and personal counseling. Students also are assigned an individual faculty adviser. Faculty advisers are an integral part of the student's advising network and are available for questions about courses and scheduling, as well as for cooperative education assessment and placement.

Transfer programs

The College of Business has, for many years, integrated transfer students into its baccalaureate degree programs. Students who have earned an associate degree in a business program prior to enrollment at RIT may normally expect to complete the requirements for the BS degree in two years, which includes six academic quarters and two required quarters of cooperative work experience.

In every instance, it is the policy of the college to recognize as fully as possible the past academic accomplishments of each student.

Part-time studies

The college offers evening classes for students who wish to pursue a baccalaureate degree in accounting, finance, management, management information systems and marketing.

RIT's Center for Multidisciplinary Studies offers lower-division business courses for those students who are just beginning their college studies and who are interested in pursuing an associate degree. Upon successful completion of the associate degree, students may transfer to the College of Business.

Students who wish to pursue part-time studies during the day have the option of selecting one of the following baccalaureate degree programs: accounting, finance, international business, management, management information systems, marketing, and graphic media marketing.

MIS Certificate

The College of Business offers an upper division certificate in management information systems entitled Web systems development. This certificate program is seven courses in length and is designed to give students an understanding of the hardware, software, and programming "behind the scenes" of an Internet or Intranet system. This certificate can be completed on a day or evening basis and the courses can be completed in one year. The certificate is ideal for those students wishing to pursue a new or secondary interest area.

Resources

The College of Business is housed in the Max Lowenthal Building. In addition to modern classrooms, facilities include time-sharing terminals on line with RIT's extensive computer systems and excellent software support. The college has two state-of-the-art personal computer labs.

The College of Business study area, affectionately called the "pit," is now wireless, allowing students to conduct meetings, do homework, or peruse the Internet with the convenience of wireless access.

Business students especially benefit from RIT's Wallace Library and its extensive collection of business texts, periodicals and references.



Accreditation

RIT is accredited by the nationally recognized Middle States Association of Colleges and Schools and by the Association to Advance Collegiate Schools of Business (AACSB International), a professional accreditation held by approximately 359 of the 1,400 undergraduate business programs in the United States.

Professional affiliations

The public accounting curriculum of the College of Business is registered with the New York State Education Department, and graduates meet the educational requirements for candidacy for the Certified Public Accountant (CPA) examination.

The college's Center for Production and Inventory Management is affiliated with the American Production and Inventory Control Society (APICS) and operates an international information service for APICS.

Membership in professional organizations contributes to the quality of the college's programs.

Graduate programs

The College of Business offers the master of business administration degree, the master of science degree in finance, and the master of science degree in international business. These programs are available on a full- or part-time basis. The programs are professional in nature and prepare the student in all aspects of business management as well as offering a concentration in a field of specialization. Details are contained in the *Graduate Bulletin*, available from the Graduate Enrollment Services Office. An executive master of business administration is also offered.

Undergraduate business students may want to consider the 4+1 program or the dual admit program, which allow completion of both a BS and MBA in five years. For more information, contact the College of Business graduate programs at 585-475-6221.

Honors Program

Students who demonstrate a high level of achievement at the high school level may be invited to join the College of Business Honors Program. These students will have the opportunity to participate in honors coursework throughout their program of study and experiential learning activities under the guidance of a faculty mentor. Honors students will be selected during the admissions process.

Minors

To broaden a student's experiences and professional opportunities, the College of Business now offers minors. Students may complete a minor by taking a sequence of five courses in one of the following areas: accounting, finance, international business, management, management information systems or marketing. This option is available to business students as well as to students from other colleges. For further information, contact a College of Business adviser.

Study abroad

To prepare students for success in an increasingly interdependent world, the College of Business sponsors a study abroad program with the University of Strathclyde in Glasgow, Scotland. RIT's Study Abroad Office has additional information about RIT-sponsored programs in Japan, Croatia, and other countries. Through affiliated programs, there are opportunities in Hong Kong, China, and Australia, among others.

The core curriculum

All students in the College of Business are required to take the business core courses described below (and later displayed in the sample four-year program charts). These courses provide students an understanding of all facets of business and serve as a foundation for advanced study in a specific area of interest.

Business core courses*

Algebra for Management Science
 Calculus for Management Science
 Business Software Applications
 Economics I (Macro)
 Economics II (Micro)
 Financial Accounting
 Managerial Accounting
 Data Analysis
 Management Science
 Global Business: An Introduction
 Principles of Marketing
 Organizational Behavior
 Corporate Finance
 Operations Management
 Strategy and Policy
 The World of Business
 Business Information Systems Processes
 Other Business Core Courses

* Core varies by major. See program outlines on following pages.

Additional requirements

2 laboratory science courses
 7 lower-division liberal arts courses
 6 upper-division liberal arts courses (combination of electives, concentration or minor)
 Senior Seminar
 2 quarters cooperative education
 Proof of writing competency
 Physical education and a wellness course
 First-Year Experience Accounting

Accounting

The accounting major provides fundamental theory and practice in the required accounting core. Beyond this core, students choose an option that best fits their career interests.

Students wishing to become certified public accountants must choose the public accounting option and complete each course prescribed in this program. The program is registered by the New York State Board for Public Accountancy, and the prescribed course work satisfies the state's CPA examination educational requirements. Candidates must have earned at least a "C" grade point average in their accounting courses to be admitted to the CPA exam.

The management accounting option allows more flexibility in choice of courses. This flexibility permits students to tailor their program to meet the diverse opportunities for accounting graduates in industrial, commercial and municipal organizations. Completion of studies in this program prepares students to sit for the Certified Management Accountant examination, administered by the Institute of Management Accountants. Students should consult with an adviser before choosing electives in this option.

Accounting, BS degree, typical course sequence (CPA option)

First Year	Quarter	Credit	Hours
First-Year Experience 1105-048			0
The World of Business 0102-250			4
Principles of Economics I & II 0511-301,401			8
Calculus for Management Science 1016-226			4
Data Analysis I 1016-319			4
Effective Communications 0102-225			2
Liberal Arts (lower-level core) *			16
Laboratory Science			8
Wellness Education †			0
Second Year			
Business Software Applications 0112-270			2
Business Information Systems Processes 0112-315			4
Data Analysis II 1016-320			4
Data Analysis Lab 1016-379			2
Financial Accounting 0101-301			4
Legal Environment of Business 0101-319			4
Business Law 0101-320			4
Global Business: An Introduction 0102-360			4
Principles of Marketing 0105-363			4
Management Science 0106-334			4
Liberal Arts (lower-division core) *			12
Accounting Information Systems 0101-345			4
Completion of College Writing Competency Requirement			
Third Year			
Organizational Behavior 0102-430			4
Financial Reporting & Analysis I, II 0101-408,409			8
Cost & Managerial Accounting 0101-335			4
Tax Accounting I, II 0101-522, 523			8
Corporate Finance 0104-350			4
Managing Corporate Assets & Liabilities 0104-452			4
Operations Management 0106-401			4
Liberal Arts (upper-division concentration elective or minor) *			12
Cooperative Education (2 quarters required; must complete within third and fourth years)			0
Fourth Year			
Strategy & Policy 0102-551			4
Auditing 0101-530			4
Advanced Accounting 0101-540			4
Financial Accounting & Reporting Issues 0101-550			4
Liberal Arts/Science Elective			4
Liberal Arts (upper-division concentration, elective or minor) *			12
Senior Seminar 0520-501"			2
Total Quarter Credit Hours			184

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

Accounting Core
 Financial Reporting and Analysis I and II
 Cost and Managerial Accounting
 Business Law
 Advanced Accounting
 Accounting Information Systems
 Financial Accounting and Reporting Issues
 Managing Corporate Assets and Liabilities
 Tax Accounting I
Management Accounting Option
 Free Electives, 8 credits
 Liberal Arts/Science Elective, 4 credits
Public Accounting Option
 Tax Accounting II
 Auditing
 Liberal Arts/Science Elective, 4 credits

Finance

The finance major prepares students for management positions in financial, commercial, industrial and governmental organizations. Students are taught the principles of financial decision making and given an understanding of the economic, legal and financial environment in which they must operate.

Finance, BS degree, typical course sequence

First Year	Quarter	Credit Hours
First-Year Experience	1105-048	0
The World of Business	0102-250	4
Principles of Economics I & II	0511-301,401	8
Calculus for Management Science	1016-226	4
Data Analysis I	1016-319	4
Effective Communications	0102-225	2
Liberal Arts (lower-level core) *		16
Laboratory Science		8
Wellness Education †		0
Second Year		
Business Software Applications	0112-270	2
Business Information Systems Processes	0112-315	4
Data Analysis II	1016-320	4
Data Analysis Lab	1016-379	2
Financial & Managerial Accounting	0101-301, 302	8
Legal Environment of Business	0101-319	4
Global Business: An Introduction	0102-360	4
Corporate Finance	0104-350	4
Principles of Marketing	0105-363	4
Liberal Arts (lower-division core) *		12
Liberal Arts (upper-division concentration, elective or minor) *		4
Completion of College Writing Competency Requirement		
Third Year		
Organizational Behavior	0102-430	4
Managing Corporate Assets & Liabilities	0104-452	4
Intermediate Investments	0104-453	4
Financial Analysis & Modeling	0104-460	4
Finance in the Global Environment	0104-504	4
Operations Management	0106-401	4
Liberal Arts (upper-division concentration, elective or minor) *		12
Free Electives		12
Cooperative Education (2 quarters required; must complete within third and fourth years)		0
Fourth Year		
Strategy & Policy	0102-551	4
Finance Electives		8
Free Electives		8
Liberal Arts/Science Elective		4
Liberal Arts (upper-division concentration, elective or minor) *		8
Senior Seminar	0520-501*	2
Total Quarter Credit Hours		180

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

International Business

Students in the international business major develop the business and liberal arts foundations necessary to understand business and political and cultural diversity. Proficiency in a foreign language is an integral part of the program. A complementary co-major is chosen in one of the following functional areas: accounting, finance, management, management information systems or marketing.

"Today's successful business executives think globally. Marketing, manufacturing and finance managers must be well educated in international business, bolstered by a fluency in a second language, to compete in both domestic and international environments" says Harvey Falk, Vice Chairman and President, Liz Claiborne, Inc.

International positions include substantial personal and professional benefits. Today's overseas assignments typically bring long hours and hard work. Yet the reward of upward mobility within the corporate world continues to lure young executives to global assignments.

International business, BS degree, typical course sequence*

First Year	Quarter	Credit Hours
First-Year Experience	1105-048	C
The World of Business	0102-250	4
Principles of Economics I & II	0511-301,401	E
Algebra, Calculus for Management Science	1016-225,226	J
Effective Communications	0102-225	2
Liberal Arts (lower-division core) *		4
Laboratory Science		E
Language Levels I, II, III †		12
Wellness Education ‡		C
Second Year		
Business Software Applications	0112-270	1
Business Information Systems Processes	0112-315	4
Financial & Managerial Accounting	0101-301,302	E
Data Analysis I	1016-319	4
Data Analysis I Lab	1016-379	2
Global Business: An Introduction	0102-360	4
Management Science	0106-334	4
Legal Environment of Business	0101-319	4
Liberal Arts (lower-division core) *		8
Language Levels IV, V, VI		12
Completion of College Writing Competency Requirement		
Third Year		
Organizational Behavior	0102-430	4
Principles of Marketing	0105-363	4
Operations Management	0106-401	4
Corporate Finance	0104-350	4
International Business course		8
Co-major course		8
Liberal Arts (lower-division core) *		16
Cooperative Education (2 quarters required; must fall within third and fourth years)		C
Fourth Year		
Strategy & Policy	0102-551	4
International Business course		4
Strategy in the Global Environment	0102-465	4
Co-major course		8
Liberal Arts (upper-division concentration or elective) *		12
Senior Seminar	0520-501*	2
Total Quarter Credit Hours		18C

* See page 7 for liberal arts requirements.

† Language credit may be used as liberal arts upper-division credit.

‡ See page 9 for wellness education requirements.

International business co-major

Strategy in a Global Environment

Choose 3 from the following:

International Marketing, International Finance, International Management, International Seminar

Functional business co-major

Four required courses in one of the following areas:
Accounting, Finance, Management, Management
Information Systems, or Marketing

Language courses through level VI

Foreign language courses offered by College of Liberal Arts

Management

The management major prepares students for management and specialist careers in a variety of enterprises and organizations. Management students are guided to develop the skills and concepts needed for success as managers. Through this focused area of study, students learn to become effective leaders, ethical decision-makers and creative initiators of new ventures. The management curriculum provides both depth and flexibility in its offerings so that students can maximize their educational experience.

Business managers formulate the policies and direct the operations of companies, nonprofit institutions, and government agencies. General managers, middle managers, supervisors and team leaders hold over three million jobs in the U.S. Employment of general managers and top executives is expected to grow about as fast as average for all occupations through the next decade as new companies start up and established companies seek managers who can help them maintain a competitive edge in domestic and world markets.

Management, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
First-Year Experience	1105-048		0
The World of Business	0102-250		4
Principles of Economics I & II	0511-301,401		8
Algebra, Calculus for Management Science	1016-225, 226		8
Effective Communications	0102-225		2
Liberal Arts (lower-division core) *			16
Laboratory Science			8
Wellness Education †			0
<i>Second Year</i>			
Business Software Applications	0112-270		2
Business Information Systems Processes	0112-315		4
Financial & Managerial Accounting	0101-301, 302		8
Data Analysis I	1016-319		4
Data Analysis I Lab	1016-379		2
Global Business: An Introduction	0102-360		4
Principles of Marketing	0105-363		4
Management Science	0106-334		4
Liberal Arts (lower-division core) *			12
Liberal Arts (upper-division concentration, elective or minor) *			8
Completion of College Writing Competency Requirement			
<i>Third Year</i>			
Organizational Behavior	0102-430		4
Human Resources Management	0102-455		4
Operations Management	0106-401		4
Corporate Finance	0104-350		4
Leadership in Organizations	0102-460		4
Entrepreneurship	0102-490		4
Management Elective			4
Free Electives			12
Liberal Arts (upper-division concentration, elective or minor)			8
Cooperative Education (2 quarters required; must complete within third and fourth years)			0
<i>Fourth Year</i>			
Free Electives			8
Management Elective			4
Liberal Arts/Science Elective			4
Business, Government & Society	0102-507		4
Strategy & Policy	0102-551		4
Liberal Arts (upper-division concentration, elective or minor) *			8
Senior Seminar	0520-501		2
Total Quarter Credit Hours			180

* See page 7 for liberal arts requirements,

† See page 9 for wellness education requirements.

Management Information Systems

The Management Information Systems major prepares students for careers involving leading-edge enterprise technologies and the analysis, design and management of computer-based information systems. The curriculum provides students with a thorough understanding of business processes, leading enterprise system technologies, and the tools for analysis, design, and implementation of computer information systems.

After completing the core MIS courses, students have a choice of two paths: enterprise systems path or systems analysis path. In the enterprise systems path, students gain valuable experience by learning to use modern enterprise system technologies such as SAP, Oracle and IBM WebSphere. In the systems analysis path, students develop an expertise in integrated systems including analysis, design, programming and testing of various computer information systems.

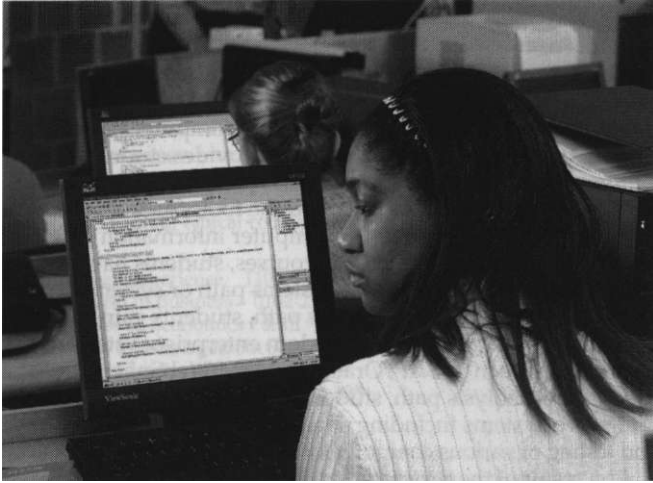
As a result of the program, students are able to apply the concepts of Enterprise Resource Planning (ERP) and work with sophisticated enterprise systems to help companies achieve their goals. Students are also able to design systems that are usable, practical and cost-effective. Major career directions for graduates include business analysis, ERP analysis, ERP consulting, database application development and administration, network design and administration, Web site development and administration, and the management of information systems projects.

Management information systems, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
First-Year Experience	1105-048		0
Effective Communication	0102-225		2
Business Software Applications	0112-270		2
Calculus for Management Science	1016-226		4
Principles of Economics I	0511-301		4
The World of Business	0102-250		4
Data Analysis I	1016-319		4
Principles of Economics II	0511-401		4
Legal Environment of Business	0101-319		4
Data Analysis II	1016-320		4
Data Analysis Lab	1016-379		2
Business Programming	0112-330		4
Laboratory Science			4
Liberal Arts (lower-division core) *			8
Wellness Education †			0
<i>Second Year</i>			
Financial Accounting	0101-301		4
Database Management Systems	0112-340		4
Business Information Systems Processes	0112-315		4
Managerial Accounting	0101-302		4
Principles of Marketing	0105-363		4
Systems Analysis & Design	0112-370		4
Corporate Finance	0104-350		4
Global Business: An Introduction	0102-360		4
Network Technologies	0112-380		4
Liberal Arts (lower division core) *			12
Wellness Education †			0
Completion of College Writing Competency Requirement			
<i>Third Year</i>			
MIS Electives			8
Organizational Behavior	0102-430		4
Laboratory Science			4
Non-business Electives			8
Liberal Arts (lower-division core)			8
Liberal Arts (upper-division concentration, elective or minor) *			4
Cooperative Education (2 quarters required; must complete within third and fourth years)			0
<i>Fourth Year</i>			
Operations Management	0106-401		4
Strategy & Policy	0102-551		4
Project Management and Practice	0112-520		4
Liberal Arts (upper-division concentration, elective or minor) *			20
Free Electives			12
Senior Seminar	0520-501		2
Total Quarter Credit Hours			180

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.



The College of Business provides students with access to the latest computer technologies and same business and productivity software used at Fortune 500 companies worldwide. ©2004 Photo by Jan Regan

Management Information Systems Certificate Program

The College of Business offers an upper division certificate in Web systems development. This certificate program is seven courses in length and is designed to give students an understanding of the hardware, software, and programming "behind the scenes" of an Internet or Intranet system. This certificate can be completed on a day or part-time, evening basis and the courses can be completed in one year. The certificate is ideal for those students wishing to pursue a new or secondary interest area. Job possibilities include Web site manager/developer, or network applications specialist.

MIS Certificate Program	Quarter	Credit	Hours
Business Computer Applications 0112-300		4	
Business Information Systems Processes 0112-315		4	
Business Programming 0112-330		4	
Database Management Systems 0112-340		4	
Network Technologies 0112-380		4	
Object Oriented Business Programming 0112-405		4	
Web Systems Development 0112-430		4	
Certificate Total			28

Marketing

Marketing is the key to success in any business today. The overall process of entering markets, creating value for customers and developing profit for the firm are the fundamental challenges for today's marketing manager. Marketing professionals need to understand the customer's problems that lead to wants and needs. The organization is then able to offer the desired products and services at acceptable prices, using effective promotions, and delivering the product to the customer in a timely fashion. Overall, effective marketing must consider the target audience, along with the changing business environment and competitive pressures. These marketing basics apply to governmental agencies, not-for-profit organizations, as well as profit making firms.

RIT's marketing major offers a rigorous and highly relevant education that explicitly considers the changing technological and international world of the 21st Century. Students will learn to use theory and examples in creating practical marketing plans. Through projects, they will learn to work independently and in teams to achieve organizational objectives. RIT marketing majors develop leadership and communications skills from classroom experiences and from working on real and/or simulated business challenges. They develop confidence in their competence. Upon completing their program, all marketing majors will have demonstrated proficiency in analyzing and understanding buyers, developing and delivering professional sales presentations, designing and implementing marketing research projects, and creating an overall strategic marketing plan.

Marketing, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
First-Year Experience 1105-048			0
The World of Business 0102-250			4
Effective Communications 0102-225			2
Principles of Economics I & II 0511-301,401			8
Algebra, Calculus for Management Science 1016-225,226			8
Data Analysis I 1016-319			4
Data Analysis Lab 1016-379			2
Liberal Arts (lower-division core) *			16
Laboratory Science			8
Wellness Education †			0
Second Year			
Business Software Applications 0112-270			2
Financial & Managerial Accounting 0101-301, 302			8
Business Information Systems Processes 0112-315			4
Global Business: An Introduction 0102-360			4
Principles of Marketing 0105-363			4
Management Science 0106-334			4
Liberal Arts (lower-division core) *			12
Liberal Arts (upper-division concentration, elective or minor) *			8
Free Elective			4
Completion of College Writing Competency Requirement			
Third Year			
Organizational Behavior 0102-430			4
Buyer Behavior 0105-505			4
Operations Management 0106-401			4
Corporate Finance 0104-350			4
Professional Selling 0105-559			4
Marketing Electives			8
Liberal Arts (upper-division concentration, elective or minor) *			16
Liberal Arts/Science Elective			4
Cooperative Education (2 quarters required; must complete within third and fourth years)			
Fourth Year			
Business, Government & Society 0102-507			4
Strategy & Policy 0102-551			4
Marketing Research 0105-551			4
Marketing Management 0105-550			4
Free Electives			12
Senior Seminar 0520-501*			2
Total Quarter Credit Hours			180

* See page 7 for liberal arts requirements,

† See page 9 for wellness education requirements.

Graphic Media Marketing

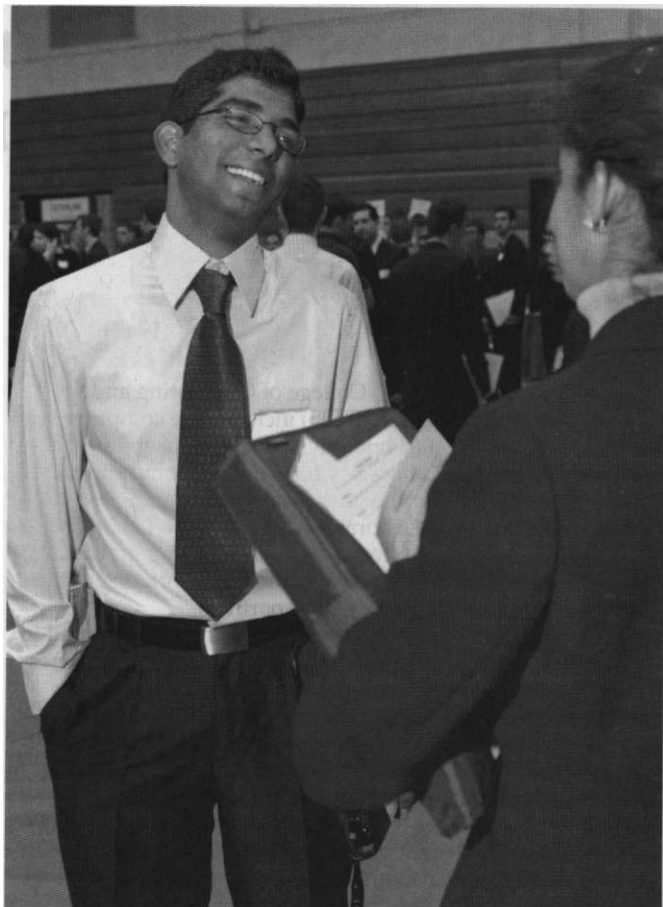
The program in graphic media marketing is an interdisciplinary major with requirements in marketing, imaging, graphic arts, information systems, and management. The program provides an overall assessment of the current and future state of the graphic communications industry. Students will focus on basic skills such as: image conversion from analog to digital, digital output in all forms, basic skills of photography, and basic understanding of digital output using ink, toner, and light on paper as well as the interaction of substrates and various printing technologies. This program is designed to meet the graphic imaging industry need for broadly educated marketing and management positions. This joint program between the College of Business and the College of Imaging Arts and Science is unique to RIT.

Graphic media marketing, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
First-Year Experience 1105-048	0
The World of Business 0102-250	4
Effective Communications 0102-225	2
Principles of Economics I & II 0511-301,401	8
Algebra, Calculus for Management Science 1016-225, 226	8
Data Analysis I 1016-319	4
Data Analysis Lab 1016-379	2
Liberal Arts (lower-division core) *	16
Laboratory Science	8
Wellness Education †	0
<i>Second Year</i>	
Business Software Applications 0112-270	2
Financial & Managerial Accounting 0101-301, 302	8
Business Information Systems Processes 0112-315	4
Global Business: An Introduction 0102-360	4
Principles of Marketing 0105-363	4
Management Science 0106-334	4
Graphic Media Perspectives 2082-201	3
Digital Printing & Publishing 2082-401	4
Digital Image Capture 2082-221	4
Liberal Arts (lower-division core) *	12
Completion of College Writing Competency Requirement	
<i>Third Year</i>	
Organizational Behavior 0102-430	4
Marketing Research 0105-551	4
Professional Selling 0105-559	4
Operations Management 0106-401	4
Corporate Finance 0104-350	4
Internet Marketing 0105-440	4
Liberal Arts (upper-division concentration, elective or minor) *	20
Cooperative Education (2 quarters required; must fall within third and fourth years)	Co-op
<i>Fourth Year</i>	
Business, Government & Society 0102-507	4
Strategy & Policy 0102-551	4
Web Design Using Photography 2061-361	4
Choose two of the following:	8
Digital Workflow 2082-208	
Applied Typography & Design 2082-211	
Introduction to Photography for Non-photo Majors 2067-264	
Industry Issues & Trends 2082-501	
Technical Elective	1
Marketing Management Problems 0105-550	4
Marketing/Management Elective	4
Liberal Arts (upper-division concentration, elective or minor) *	4
Senior Seminar 0520-501*	2
<hr/>	
Total Quarter Credit Hours	180

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.



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B. Thomas Golisano College of Computing and Information Sciences

Jorge L. Diaz-Herrera, Dean

The B. Thomas Golisano College of Computing and Information Sciences (GCCIS) includes the computer science, information technology, and software engineering departments and the Laboratory for Applied Computing. These departments offer the most current computing technology as well as extensive laboratory facilities. The Laboratory for Applied Computing offers a common meeting ground where students from various disciplines can work on cutting-edge projects supplied by industrial partners.

GCCIS is the newest college at RIT, having been formed in the summer of 2001. It focuses on the computing disciplines in the broadest sense. Interdepartmental and inter-college cooperation are basic to its function. The college has more than 90 faculty, 3,000 students, more than 40 technical and support staff, and extensive facilities dedicated to teaching and research and development.

The computer science (CS) and information technology (IT) departments have degree programs at the associate, baccalaureate, and master's levels. Both offer evening courses that allow these degrees to be earned full- or part-time. The software engineering (SE) department offers the bachelor of science degree. All departments require an extensive cooperative education experience.

Faculty

Any academic department or program can be only as strong as its faculty. In GCCIS, the faculty is dedicated to teaching, applied research, and professional development, with an emphasis on student involvement and career preparation. Most have significant industrial experience in addition to outstanding academic credentials. Faculty members provide leadership in implementing innovative teaching techniques and in anticipating and meeting the needs of students and industrial partners.

Resources

The highly technical nature of our GCCIS programs demand excellent facilities and equipment. Each department has extensive laboratories dedicated to undergraduate education. These contain powerful PCs and workstations and appropriate, up-to-date software. The labs are available to students 16-18 hours per day except when being used for designated course sections. Dial-up, network, and Web access is also provided, insuring that our students have the tools necessary to complete their assignments and projects.

To provide space for students and equipment, a new 126,500 square foot wireless building was completed in January 2003 and is now the new home of GCCIS. This building allows for general use as well as specialized labs, such as home networking and computer vision. The close proximity of GCCIS departments encourages joint projects as well as interaction among students in different programs.

Advising

GCCIS is committed to providing academic advising and career counseling. Students have access to the department chair of the program they are enrolled in, a faculty adviser, a professional adviser, the academic advising office in the College of Liberal Arts, and program coordinators from the Office of Cooperative Education and Career Services. In addition, the department office staff will provide support for registration and help with records and scheduling. Part-time and evening students can arrange these services at night by appointment.

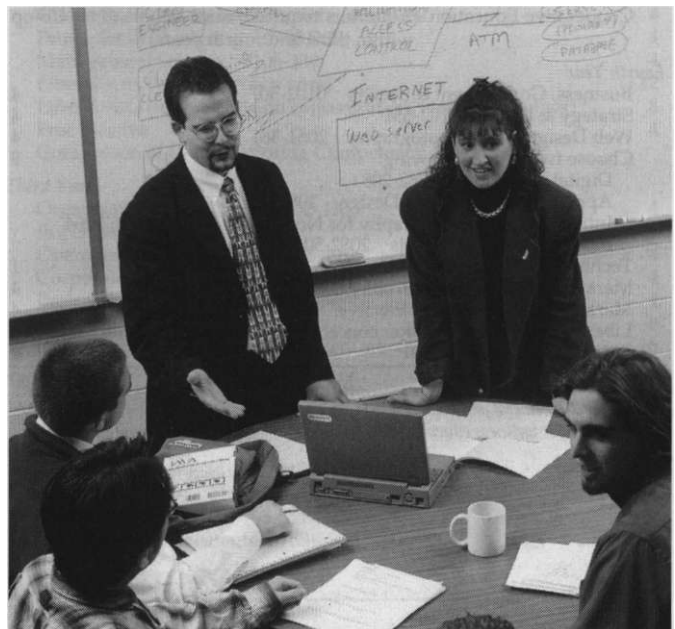
Cooperative education

All programs in the GCCIS have an extensive cooperative education requirement. Co-op generally starts after completing two years of the program and ends so that the last quarter attended is in residence. Co-ops may be one or two quarters in length and at any company that satisfies certain basic requirements.

Transfer and part-time students

All departments encourage transfer students. Students with an approved associate degree will obtain full junior standing and are eligible to graduate from RIT in two years plus the required co-op. Students with a less appropriate academic background may have to complete additional course work. Each transfer student (with or without a degree) is considered individually, and an appropriate course of study is designed for him or her.

The AS/AAS and BS degrees in CS and IT may be taken part time in the evening.



In the College of Computing and Information Sciences, students often work on teams to create technology solutions to industry-style problems.

Computer Science

Walter A. Wolf, Chair

The department of computer science offers programs leading to associate, bachelor and master of science degrees in computer science.

At the undergraduate level, the program is offered to high school and two-year college graduates, as first-year and upper-division students, respectively. In addition, the computer science program is offered to part-time students in an evening format.

The demands of industry and government require college graduates to have a mastery of both the fundamentals and the applied aspects of their profession. To meet this requirement, two applied educational experiences are woven into the program. Each student is required to complete a well-defined cooperative educational experience as well as an extensive set of "hands-on" laboratory experiences, many as members of a team. The laboratories that support these experiences are limited to 16 students each and provide an effective means of student-faculty interaction.

Facilities dedicated exclusively to the support of undergraduate computer science (in addition to those provided by Information and Technology Services, listed in the Counseling and Academic Services section of this catalog) include:

- **Five teaching laboratories**, each with 16 SUN UltraIO and Blade 150 workstations to support formal, closed laboratory instruction, emphasized in the first two years of the curriculum;
- **Open computing laboratory** with 26 SUN UltraIO and Blade 150 workstations to support open computing and occasional formal, closed laboratory instruction for large groups;
- **Two networking and distributing systems laboratory** focusing on the study of data communications and networking strategies utilizing workstations and file servers as networking tools;
- **Four specialized labs** (artificial intelligence/vision, robotics, security, honors) contain appropriate equipment and networking.
- **One lab** with 16 high end PCs for team and individual projects.

Undergraduate computer science has focused on the use of the UNIX operating system because of its applicability to software development. All of the above facilities except the PC labs support UNIX. Computer science students also have access to the high-end PC and Macintosh machines in the information technology labs. All computer science and information technology facilities are connected by a high-speed Ethernet network through which students also may access the Internet. Students have remote access to our computers and networks through direct network connections from the residence halls and through the Internet.

Bachelor of science degree program

The bachelor of science program, which is fully accredited by the Computing Accreditation Commission of ABET, attracts students who are interested in both the mathematical theory and technical applications of computer science. Most employers look for students who not only are good computer scientists, but also understand the tools and techniques of mathematics, science and industry and are able to communicate effectively. The BS program, then, is for the mathematically adept student who wishes to become a computing professional with knowledge of relevant applications areas. The program also is attractive to students transferring to RIT with an associate degree in computer science including significant course work in mathematics and science.



Presentation by computer science graduate student, Joe Binder, in the Golisano Auditorium. ©2004 Photo by John Myers

Computer science covers a wide spectrum of the field of computing. A computer scientist can specialize in areas such as data communications and networking, security, mini robotics, software engineering, parallel computation, digital systems design and computer architecture, systems software, computing theory, computer graphics, vision, and artificial intelligence. It is important to note that programming is a necessary tool but is only a part of the vast field of computer science.

An undergraduate computer science student takes a core of computer science courses that provides a solid foundation for advanced work. Building on this base, students can explore a variety of specializations in their junior and senior years. In addition, students have the opportunity to develop a broad appreciation of computer applications and the effects of computers on society via computer science electives, liberal arts courses and a non-computer science concentration in another discipline.

Cooperative education

All students in undergraduate computer science are required to obtain credit for one year (four quarters) of cooperative education prior to graduation. To help ensure that the goals of integrated academic and experiential education are attained, students must attend classes at RIT for at least one quarter after their final co-op block.

Combined BS/MS degree program

Computer science also offers a combined BS/MS program, which gives students the opportunity to receive both degrees in six years, including a year of co-op. A student accepted into this program will be able to take three graduate courses (12 credits) and apply them to both the BS and MS, reducing the total course work required for the two degrees. To be accepted into this program, a student must be actively pursuing a BS degree in computer science at RIT, be eligible for co-op, and have a grade point average of at least 3.3 overall and in the major.

Evening programs

The AS and BS programs may be taken on a part-time basis during the evening hours. The typical evening student requires approximately 13 quarters to complete all the course requirements for an associate-level degree and approximately 25 quarters for a BS degree (this assumes no previous course work).

Students with a strong associate degree in computer science can complete the BS degree requirements in 13 quarters.

Computer science, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Computer Science 1,2,3 4003-231,232,233	12
Calculus I, II, III 1016-251,252,253	12
University Physics I, II & Lab 1017-311,312,375,376 or Chemical Principles I, II & Lab 1011-211,212,205,206	8-10
Writing & Literature I, II 0504-225,226	8
Liberal Arts * [1]	4-12
Wellness Education Electives †	0

<i>Second Year</i>	
Computer Science 4 4003-334	4
Software Engineering 4010-361	4
Computer Organization 4003-345	4
Ethics in the Information Age 0509-217	4
Professional Communication 4003-341	4
University Physics III & Lab 1017-313,377 or Organic Chemistry & Lab 1011-213,207 or General Biology & Lab 1001-201,202,203,205, 206,207	4-12
Discrete Mathematics I, II 1016-265, 366	8
Probability & Statistics 1016-351	4
Liberal Arts * [1]	0-8
Free Elective [5]	4
Wellness Education Electives †	0

<i>Third, Fourth, Fifth Years</i>	
Introduction to Computer Science Theory 4003-380	4
Operating Systems I 4003-440	4
Data Communications & Networks I 4003-420	4
Programming Language Concepts 4003-450	4
Computer Science Related Electives [2]	8
Computer Science Electives [4]	16
Non-CS Concentration [4]	16
Liberal Arts *	26
Science Electives	8
Free Elective [5]	4
<u>Cooperative Education (4 quarters required)</u>	<u>Co-op</u>
Total Quarter Credit Hours	190-193

- [1] Students electing physics or chemistry should take 12 credits of liberal arts the first year and 8 the second. Those choosing biology should take 20 credits of liberal arts the first year and none the second year.
- [2] The computer science related electives requirement requires that at least two courses are related according to department definitions. The general areas from which related electives may be selected are: systems programming, data communications b networks, parallel computing, digital systems design, computer science theory, software engineering, computer graphics, and artificial intelligence. The computer science undergraduate advising handbook has a complete list.
- [3] Computer science and software engineering courses may be taken as computer science electives except as noted in the Course Descriptions portion of this bulletin.
- [4] A non-CS concentration consists of a set of coherent courses giving the student significant expertise in an area other than computer science. Typical concentrations include mathematics, engineering technology, and business.
- [5] Any course open to computer science majors may be taken as a free elective.
- * See page 7 for liberal arts requirements.
- † See page 9 for wellness education requirements.

Computer science, AS degree, evening program, typical course work

<i>Computer Science</i>	<i>Quarter Credit Hours</i>
Computer Science 1,2,3,4 4003-231,232,233,334	16
Professional Communication 4003-341	4
Software Engineering 4010-361	4
Computer Organization 4003-345	4
<i>Mathematics & Science</i>	
Calculus I, II, III 1016-251,252,253	12
Probability and Statistics 1016-351	4
Discrete Mathematics 1016-265, 366	8
Physics I, II, III 1017-311, 312,313, 375,376, 377	15
or	
Chemistry I, II, III 1011-211,212,213,205,206,207	12
or	
Biology I, II, III 1001-201, 202,203, 205, 206,207	12
<i>Liberal Arts</i>	
Writing & Literature I, II 0504-225,226	8
Humanities Electives	12
Social Science Electives	8
Total Quarter Credit Hours	92-95

Computer science, BS degree, evening program, typical course work

<i>Computer Science</i>	<i>Quarter Credit Hours</i>
Computer Science 1,2,3,4 4003-231,232,233,334	16
Professional Communication 4003-341	4
Software Engineering 4010-361	4
Computer Organization 4003-345	4
Intro, to CS Theory 4003-380	4
Programming Language Concepts 4003-450	4
Data Communications & Networks I 4003-420	4
Operating Systems I 4003-440	4
Computer Science Related Electives [2]	8
Computer Science Electives [4]	16

<i>Liberal Arts</i>	
Writing & Literature I, II 0504-225,226	8
Humanities Electives	8
Ethics in the Information Age 0509-217	4
Social Science Electives	8
Liberal Arts Electives *	12
Liberal Arts Concentration *	12
Senior Seminar *	2

<i>Mathematics & Science</i>	
Calculus I, II, III 1016-251, 252,253	12
Probability and Statistics 1016-351	4
Discrete Mathematics 1016-265,366	8
Science Electives	8
Physics I, II, III 1017-311, 312,313,375,376,377	15
or	
Chemistry I, n, III 1011-211,212,213,205,206,207	12
or	
Biology I, II, III 1001-201, 202,203,205,206,207	12
<i>Other</i>	
Free Electives	8
Non-CS Concentration [4]	16
Co-op Work Experience (4 quarters)	Co-op
Total Quarter Credit Hours	190-193

* See page 7 for liberal arts requirements.

Software Engineering

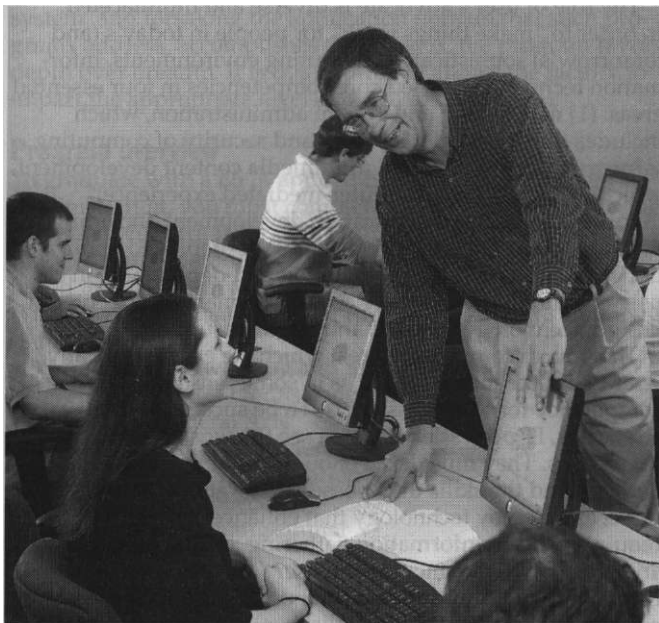
Dr. J. Fernando Naveda, Chair

As software becomes ever more common in everything from airplanes to appliances, there has been increasing demand for engineering professionals who can develop high-quality, cost-effective software systems. RIT has created a unique program that combines traditional computer science and engineering with specialized course work in software engineering. Graduates of this program receive a bachelor of science degree in software engineering.

Students learn principles, methods, and techniques for the construction of complex and evolving software systems. The program encompasses both technical issues affecting software architecture, design, and implementation, as well as process issues that address project management, planning, quality assurance, and product maintenance. Students are prepared upon graduation for immediate employment and long-term professional growth in software development organizations.

An important component of the curriculum is complementary course work in related disciplines. As with other engineering fields, mathematics and natural science are fundamental. In addition, students must complete four courses in related fields of engineering. Three computer-engineering courses expose students to basic hardware design and computer architecture. A human factors course from industrial engineering introduces students to experimental and analytical techniques for evaluating computer-human interactions. Finally, a three-course sequence in an application domain helps connect software engineering principles to an area in which they are applied.

The liberal arts component of the software engineering program consists of six core courses, a three-course concentration and Senior Seminar. In the third year, all students must demonstrate writing competency in the English language by successfully completing a departmental writing exercise evaluated by faculty from the Institute Writing Committee. For some students this may require work with the Learning Development Center or additional coursework in the College of Liberal Arts.



Thomas Reichlmayr, assistant professor, software engineering, reviews fundamentals of software requirements. ©2004 Photo by John Myers

Senior Projects in Software Engineering

One of the hallmarks of RIT's engineering programs is a senior project sequence that each student completes before graduation. Software engineering students take this two-course sequence during the winter and spring quarter just prior to graduation. The goal of the course is to have seniors synthesize and apply the knowledge and experience they have gained at RIT and on co-op assignments.

Companies and other organizations with challenging technical problems frequently contact software engineering faculty, and in many cases these problems are appropriate for assignment to a senior project team. The following section describes activities that are commonly performed as part of the course.

Winter Quarter: At the start of the winter term, students enrolled in the senior projects course organize themselves into teams based on the number and complexity of the projects available. Assignment of teams to projects is handled in many ways, one of the most popular being "contract bidding." In this approach, each team bids on one or more projects by outlining the project's requirement, sketching a conceptual design for the solution, and assessing the risks involved in pursuing the project. On the basis of this work, teams are awarded "contracts" by the project sponsors.

The bulk of the winter quarter is primarily devoted to requirements elicitation and architectural design, but may also include detailed design, prototyping, and even production, depending on the nature of the project. In addition, teams are responsible for organizing their efforts and assigning specific roles to team members, as well as developing a project plan (including scheduled, concrete milestones). Typically the plan evolves along with the project, as teams learn more about the problem and aspects of the solution.

Spring Quarter: While the winter quarter typically addresses strategic issues of requirements, specification, design, and planning, most of spring is devoted to tactical issues of development and deployment. It is during this quarter that the careful planning and disciplined design from the winter quarter bear fruit in the construction, integration, testing, and demonstration of a complete system.

Sponsors: Companies and organizations that have sponsored senior projects include Nortel Networks, IBM Thomas Watson Research, PaeTec Communications, Alstom Signaling Inc., RIT's Information and Technology Services, RIT Laboratory for Applied Computing, Harris Corporation, RF Communications Division, Air Force Research Laboratory, Excellus Blue Cross Blue Shield, and Videk.

Laboratories

Students in software engineering have access to specialized facilities in the department as well as campus-wide facilities. Equipped with the latest technology, the department's facilities include two student instructional studio labs, a specialized embedded systems lab, and a general users lab. In addition, our freshmen are encouraged to take advantage of the department's mentoring lab. Staffed by advanced software engineering students, the mentoring lab offers our newest students an environment where they can learn from those who have successfully fulfilled most of the program's academic requirements. Students enrolled in software engineering courses can use any of the department's 11 team rooms. Equipped with Ethernet connections, a meeting table, comfortable seating for six, and generous whiteboard space, these rooms support our department's commitment to teamwork, both inside and outside the classroom. Six of the team rooms are furnished with state-of-the-art projection equipment. Senior software engineering students have unrestricted access to the department's senior projects lab for the duration of their senior projects. All of these facilities are connected to the campus network and to the Internet.

Cooperative education

All students in the software engineering program must complete four quarters of cooperative education prior to graduation. Students typically begin co-op in their third year of study, alternating academic quarters and co-op blocks. To ensure that co-op is integrated with the academic program, students must complete their final co-op block prior to taking Software Engineering Project I.

Software engineering, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
Freshman Seminar 4010-101			1
Computer Science 1,2,3 4003-231,232,233			12
Calculus I, n, III 1016-251,252,253			12
Math/Science Elective**			4
University Physics I, II 1017-311,312			10
Writing & Literature I 0504-255			4
Writing & Literature II 0504-226			4
Liberal Arts *			4
Wellness Education Electives †			0
Second Year			
Engineering of Software Subsystems 4010-362			4
Computer Science 4 4003-334			4
Professional Communications 4003-341			4
Software Engineering 4010-361			4
Assembly Language Programming 0306-250			4
Introduction to Digital Systems 0306-341			4
Differential Equations 1016-306			4
Discrete Mathematics I, II 1016-265,366			8
University Physics III 1017-313			5
Liberal Arts *			8
Wellness Education Electives †			0
Third, Fourth, Fifth Years			
Principles of Software Architecture 4010-540			4
Formal Methods of Specification & Design 4010-420			4
Software Requirements & Specification 4010-555			4
Software Engineering Project 1,2 4010-561,562			8
Software Engineering Electives ‡			20
Intro, to Computer Science Theory 4003-380			4
Programming Language Concepts 4003-450			4
Computer Organization 0306-550			4
Human Factors 0303-516			4
Probability & Statistics 1016-351			4
Application Domain Electives §			12
Free Elective			4
Liberal Arts *			18
Cooperative Education (4 quarters required)			Co-op
Total	Quarter	Credit	Hours
			194

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Students must choose five of the following six courses:

Principles of Concurrent Software Systems 4010-441

Principles of Distributed Software Systems 4010-442

Principles of Information Systems Design 4010-443

Software Process & Product Metrics 4010-450

Software Verification & Validation 4010-452

Software Engineering Process 4010-456

§ Each student must complete a three-course sequence in an application domain related to software engineering. Current domains include industrial and systems engineering, mechanical engineering, computer graphics, computer engineering, artificial intelligence, scientific and engineering computing, communications and networking, commercial applications, computer gaming, and imaging and publishing technology.

"Software engineering majors are required to take one 4-credit math/science elective from the following list. The elected course must be taken during or after th year given in parenthesis.

- 1011-208 College chemistry (1st year)
- 1011-201 General biology (1st year)
- 1016-331 Matrix algebra (2nd year)
- 1016-365 Combinatorial mathematics (2nd year)
- 1016-467 Theory of graphs and networks (3rd year)



Information Technology students are able to utilize the Open Computing Lab to complete projects and assignments. This lab is equipped with over 100 computers and offers extensive open hours to accommodate daytime and evening students.

Information Technology

James Leone, Chair

We are in the Information Age, but the supply of technically competent professionals is not meeting the demand. The explosive growth of the World Wide Web and its universal acceptance by society has irrevocably changed the computing landscape. Today the typical computer user neither knows, nor needs to know, very much about how a computer works in order to use it. What these users desperately need, however, is a "user's advocate" to help them decide which technology is appropriate for their needs and to help them deploy and use that technology.

To effectively address this situation, a new professional has emerged. The information technologist is the user's advocate. From Web site designers, to network administrators, to game developers, to user support professionals, information technologists are in increasingly high demand.

The role of user's advocate is diverse and multifaceted. In order to "make things work" for people in today's (and tomorrow's) sophisticated computing environments, information technologists need core competencies in four essential areas: (1) networking and system administration, which includes the design, deployment and security of computing infrastructure; (2) Web and multimedia content development, which we refer to as "computer-mediated experience;" (3) programming and application development, including database management systems and Web-deployed applications; and (4) technology integration and deployment in a user community, including needs assessment, user-centered design, technology transfer, and ongoing support.

This fourth competency area, which we euphemistically refer to as "the human stuff," is in some sense the defining competency for IT professionals. To be successful users advocates, IT professionals must see the world through the user's eyes. They must learn enough about the tasks users perform and the skills they possess to be able to select, integrate, and deploy technology that enhances users' lives. This requires skills in information gathering, user-centered design, and effective deployment in the users' environment or culture. These skills, in turn, are built on a foundation of strong communication and people skills.

The core competencies that every IT professional must possess also provide a foundation on which to build greater depth in selected areas. Many IT students choose to focus on one or two technical aspects of IT to prepare for careers as specialists in a variety of market niches such as network administration, game development or Web-database integration, to name a very few of the many possibilities. Other students choose a broader path to prepare for "general practitioner" or "Jack of all trades" jobs, which are prevalent in virtually every enterprise in society. In short, RIT's IT program offers the opportunity to specialize but does not require that a student specialize.

Applied Networking and System Administration

Networking is the technology of interconnecting multiple computers so that information can flow between them. As the number of computers in the network scales up, the task becomes more difficult, involving design tradeoffs, performance considerations, and cost issues. Applied networking refers to the design, construction, and operation of computer networks using "off the shelf" components.

System administration refers to the installation, configuration, and operation of a computer system. This includes the specification and implementation of server hardware and software. System administration is also concerned with system security and the privacy of the information that the server maintains. In today's information-rich environment, servers exist in a network and often work together to perform a common function.

The BS degree program in applied networking and system administration is designed to teach students how to be the designers, implementers, and operators of computing networks and networked systems (both clients and servers). Graduates of the program will be able to evaluate existing networks and computing systems, suggest improvements, monitor such systems for faults, and plan for growth. They will work in small- to large-scale companies. Any place that computers and networks are employed will need graduates of this program.

An important goal of the program is to provide students with a level of specialization in this area beyond that provided by information systems or information technology programs. Focusing specifically on the network or the computing system, and forsaking the application domain that such programs address, accomplishes this. That is, the program favors depth over breadth. It is this depth that allows the faculty to impart the appropriate level of detail to the student.

Program overview

To graduate with a BS in applied networking and system administration, you must complete 183 credit hours. Entering freshmen will earn most (if not all) of those credits here at RIT. For transfer students, some of those credits will be transferred into RIT from another previous school.

The 183 credits that you need to graduate are broken down as follows:

- 80 credits of Networking and System Administration (56 credits core, 24 credits concentration)
- 54 credits of Liberal Arts
- 24 credits of Math and Science
- 12 credits of General Education Electives
- 12 credits of Free Electives
- 1 credit for Freshman Seminar

The networking and system administration courses are of two types: required core courses and the advanced track. The core includes a programming sequence, a competency course in multimedia, a competency course in database and a sequence in user-centered deployment. These are in addition to fundamental courses in computer networking and system administration. In addition to 56 credits of core courses, you will select one 24-credit advanced track.

Cooperative education

The BS in applied networking and system administration requires that the student complete three quarters of co-op. Typically, one of these is during the summer following the second year, and the other is in the spring and summer of the third year.

Part-time study

The BS in applied networking and system administration is available on a part-time basis. Courses are available both during the day and in the evening to accommodate those who work, regardless of their work schedules. The typical evening student requires 25 quarters to complete the BS degree.

Applied networking and system administration, BS degree, full time, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 4002-201	1
Programming for Info. Technology I, II, & III 4002-217,218,219	12
Computer Concepts and Software Systems 4002-340	4
Introduction to Multimedia: The Internet and the Web 4002-320	4
Algebra and Trigonometry 1016-204	4
Discrete Math for Technologists I & II 1016-205,206	8
Liberal Arts*	16
First-Year Enrichment	0
Second Year	
Data Communications and Computer Networks 4002-341	4
OS Scripting 4002-402	4
Internetworking Lab 4002-342	4
Introduction to Routing and Switching 4002-515	4
Introduction to Network Administration 4002-516	4
Computer Crime 0501-507	4
Introduction to Database and Data Modeling 4002-360	4
Data Analysis 1016-319	4
Lab Science Electives	8
Liberal Arts*	8
Third/Fourth/Fifth Years	
Cooperative Education (3 quarters required after year 2)	Coop
Needs Assessment 4002-455	4
Technology Transfer 4002-460	4
Advanced Track Courses †	24
Liberal Arts *	30
Professional Electives 1	12
General Education Electives	12
Total Quarter Credit Hours	183~

* See page 7 for liberal arts requirements.

† A six-course advanced work track is required. Current tracks are network administrator, system administrator, database system administrator, Web system administrator, and information assurance.



The System Administration Lab allows students from information technology and applied networking and system administration degree programs to gain hands-on experience in installing, configuring, and securing both client and server machines.

Information Technology

The program of study in information technology consists of a core of computing courses, followed by advanced study in two concentration areas chosen by the student and approved by his or her academic advisor. The concentrations are intended to educate the student in areas in which he or she intends to work. Predefined concentration areas include Web site development, interactive multimedia development, game development, network administration, system administration, wireless data networking, database, Web-database integration, learning and performance technology, and windows application development. In addition, students can elect to create a special topics sequence for one of their two concentrations. A special topics concentration can include a mix of upper-division IT courses and/or courses outside the IT department in areas like graphic arts, computer animation, telecommunications or computer science.

All of the components of this program, including cooperative education, are uniquely designed to produce an individual of value to industry in the Information Age.

Cooperative education

The BS in information technology requires that students complete three quarters of cooperative education prior to graduation. Students may schedule cooperative education after completion of second-year academic requirements.

A typical schedule might include cooperative education in the summer quarter following the second year and in spring and summer quarters of the third year.

Part-time study

The AAS and the BS in information technology are available on a part-time basis.

Courses in these programs are available both during the day and in the evening to accommodate those who work, regardless of their work schedules. The typical evening student requires approximately 12 quarters to complete all the course requirements for an associate-level degree and approximately 23 quarters for a BS degree (this assumes no previous course work). Students with a strong associate degree may be able to complete the BS degree requirements in 12 quarters.

Information technology, BS degree, full time, typical course sequence

First Year	Quarter	Credit Hours
Freshman Seminar	4002-201	1
Introduction to Multimedia: The Internet and the Web	4002-320	4
Programming for Info. Technology I, II, & III	4002-217, 218, 219	12
Interactive Digital Media	4002-330	4
Computer Concepts and Software Systems	4002-340	4
Algebra and Trigonometry	1016-204	4
Discrete Math for Technologists I & II	1016-205, 206	8
Liberal Arts *		12
Lab Science Elective		4
Second Year		
Data Communications and Computer Networks	4002-341	4
Internetworking Lab	4002-342	4
Introduction to Database and Data Modeling	4002-360	4
HCI1: Human Factors	4002-425	4
Data Analysis	1016-319	4
Liberal Arts *		16
Lab Science Elective		4
Professional Elective		4
Third/Fourth Year		
Cooperative Education (3 quarters required after year 2)		Co-op
HCI2: Interface Design and Development	4002-426	4
Technology Transfer	4002-460	4
Needs Assessment	4002-455	4
IT Concentration Courses †		24
Liberal Arts *		26
Professional Electives		8
General Education Electives		12
IT Senior Seminar	4002-595	1
Total Quarter Credit Hours		180

* See page 7 for liberal arts requirements.

† Two three-course concentrations are required. Concentrations are available in interactive multimedia development, game development, network administration, system administration, database, Windows application development, learning and performance technology, Web site development, wireless data networking, and special topics. A six-course Web-database integration track is also available.

Information technology, AAS degree

Introduction to Multimedia: The Internet and the Web	4002-320	4
Programming for Info. Technology I, II, & III	4002-217, 218, 219	12
Interactive Digital Media	4002-330	4
Computer Concepts and Software Systems	4002-340	4
Data Communications and Computer Networks	4002-341	4
Internetworking Lab	4002-342	4
Introduction to Database and Data Modeling	4002-360	4
Technology Transfer	4002-460	4
IT Elective		4
<i>Mathematics and Science</i>		
Algebra and Trigonometry	1016-204	4
Discrete Math for Technologists I & II	1016-205, 206	8
Lab Science Electives		8
<i>Liberal Arts *</i>		
Writing and Literature I & II	0504-225, 226	8
Social Science Electives	0510/0511/0513/0514/0515	8
Fine Arts	0505	4
History	0507	4
Philosophy	0508/0509	4
Total Quarter Credit Hours		92

* See page 7 for liberal arts requirements.

Information Technology, New Media Option

Since the mid 1990s, we have witnessed the emergence of a major new communications medium built upon the foundations of computing and the Internet. For many years, the Internet was the semi-private domain of academics and researchers who exchanged text-based messages and software without fanfare or commercial interest. These pioneers of the Internet could not have realized that the simple addition of a graphical user interface to the Internet would launch a major communications revolution. In the years following the creation of the World Wide Web, millions of ordinary people all over the world have become regular users of the Internet, and Internet-based business has become a significant economic force in the marketplace.

The term "new media" encompasses Internet-based media, interactive television and non-network-based digital media such as CD-ROM and DVD. New media technologies are used by publishers, manufacturers, direct marketers, and information service providers to reach targeted audiences for purposes of teaching, advertising, marketing, information gathering, transacting business, and expressing creative ideas.

The successful deployment of new media requires the close collaboration of designers, information technologists, and business planners. Even more so than with traditional media, collaboration between professionals with these different skill sets has become the norm. To successfully navigate the waters of the new media marketplace, practitioners must have the ability to work and understand the needs of professionals from other disciplines.

Program overview

The BS in information technology/new media option (IT/new media) is one of three closely related programs at RIT that together offer a unique approach to new media education:

- BS in IT/new media
- BFA in new media design (from the College of Imaging Arts and Sciences)
- BS in new media publishing (from the College of Imaging Arts and Sciences)

This trio of programs enables students to learn and practice their respective disciplines in close collaboration with one another. Although each program has a unique emphasis, all of them share a common core of courses that introduce our new media students to technical, aesthetic, and business issues relevant across a broad range of professional career paths. The curriculum of the common core includes course work in graphic design, photographic imaging, video, publishing, programming, and information technology.

Students in the IT/new media program will complete most of their advanced course work in information technology, where they have the opportunity to pursue cutting-edge skills in multimedia and Web technologies.

As the new media environments become richer and more complex, the industry is moving away from displaying "one-size-fits-all" Web pages and CD-ROMS to new media that must:

- reformat themselves for display on computers, television sets, PDAs, and cell phones
- configure themselves to the interests of the individual viewer/subscriber
- mix broadcast media information with computer-based media
- allow multiple users to view and/or work on the same material at the same time
- create interactive entertainment spaces able to support thousands of simultaneous users
- drive the economy of information age with financial and product databases

- support the computer-based, network-backed training and education programs just emerging
- create a new marketplace of ideas

It is the IT/new media student who will create and program the database-backed, networked information spaces to support the content created by his or her peers in the imaging arts disciplines.

In their senior year, the IT/new media student will rejoin those from the other two programs to complete a two-quarter, eight-credit new media team project that will tackle real-world new media projects. This culminating experience provides an opportunity for each student to hone his or her skills in collaboration with students from different disciplines in a setting much like that found in industry.

Cooperative education

In addition to the senior project, IT/new media students will complete three quarters of cooperative education. IT co-op students have found work in Web design, electronic commerce, human factors labs and other related businesses both in and outside of Rochester. These experiences have given our students a "real-world experience" edge when applying for jobs after graduation.

The design of this program had considerable input from new media industry leaders. They want employees who can work in interdisciplinary teams, and they were very excited about the senior project and cooperative education portions of the program.

Information technology/new media option, BS degree, full time, typical course sequence

First Year	Quarter	Credit Hours
Freshman Seminar 4002-201		1
2D Design 2013-231		3
Imaging for New Media 2083-206		4
New Media Perspectives 2083-201		3
Introduction to Multimedia: The Internet and the Web 4002-320		4
Time-Based Imaging 2009-411		4
Typography for New Media 2009-311		3
Elements of Graphic Design 2009-213		3
Digital Video for Multimedia 2065-217		4
Intro, to Programming for New Media 4002-230		4
Liberal Arts *		12
First-Year Enrichment		0
<i>Second Year</i>		
Programming II for New Media 4002-231.		4
New Media Publishing 2083-211		3
Intro, to Digital Animation 2065-382		4
Web Site Design and Implementation 4002-409		4
Design of Graphical User Interface 2009-323		4
Programming for Information Technology I 4002-217		4
Algebra and Trigonometry 1016-204		4
Discrete Math for Technologists I & II 1016-204,205		8
Liberal Arts *		12
<i>Third/Fourth Years</i>		
Cooperative Education (3 quarters required after year 2)	Co-op	
Data Analysis 1016-319		4
Lab Science Electives		8
Introduction to Database and Data Modeling 4002-360		4
Computer Concepts and Software Systems 4002-340		4
Data Communications and Computer Networks 4002-341		4
HCI2: Interface Design 4002-426		4
Technology Transfer 4002-460		4
New Media IT Concentration Courses †		12
New Media Team Project I & II 4002-560, 565		8
Liberal Arts *		30
Professional Electives		7
Total Quarter Credit Hours		181~

* See page 7 for liberal arts requirements.

† One three-course concentration is required. Concentrations are available in Web programming, content development, and virtual worlds.



The B. Thomas Golisano College of Computing and Information Sciences is housed in a three-story, 177,000-square-foot building that includes dozens of classrooms, labs, conference rooms, student lounges, and a 150-seat auditorium. And as you might expect from one of the nation's leading colleges for computer-related studies, it's a wireless facility.

E Kate Gleason College of Engineering

Harvey J. Palmer, Dean

The programs offered by the Kate Gleason College of Engineering prepare students for careers in industry or for graduate study in engineering or related fields. The curricula emphasize fundamentals and, in the fourth and fifth years, provide courses that allow students to specialize in their chosen fields of study. Students develop a strong intellectual foundation for lifelong learning through a balance of humanistic-social subjects, the physical sciences and professional studies. For more information visit www.rit.edu/eng.

Goals

The overarching goals of the engineering program are:

- to educate students to be engineering professionals who are highly marketable and who will make an immediate impact in the workplace
- to provide graduates with the educational foundation needed to succeed in selective graduate programs across the nation.

The college accomplishes these goals by:

- integrating cooperative education into the program for all students,
- providing a strong foundation in mathematics and science as well as an appropriate balance between liberal studies and technical courses,
- establishing an appropriate balance between the engineering design and engineering science components of the program,
- incorporating a strong laboratory component in the program with outstanding laboratory facilities,
- having a diverse faculty committed to engineering education.

The career orientation of all programs recognizes the changes in technology and engineering and strives to develop in all students an appreciation and desire for lifelong learning.

Resources

The departments of computer, electrical, industrial and systems, mechanical, and microelectronic engineering occupy the James E. Gleason Building and the Center for Microelectronic and Computer Engineering, an adjoining building with more than 10,000 square feet of clean-room laboratory space for the fabrication of integrated circuits plus an integrated circuit design center. Additional lab space is located in the Center for Integrated Manufacturing Studies. All departments have laboratories with excellent facilities that include state-of-the-art computer workstations for discipline-specific engineering design. In addition, two general-purpose computer user centers housed in the engineering buildings are available to all engineering students. The laboratories are used for both instruction and research and are available to students at all levels of the program. The faculty pride themselves on having integrated engineering practice into the academic program. The overall program incorporates classroom and laboratory instruction, engineering research projects and special student projects to prepare students for their industrial work assignments or for advanced study in graduate school.

Five-year programs

The college offers programs leading to the bachelor of science degree in electrical, computer, industrial, mechanical, and microelectronic engineering. All students participate in a five-year program that integrates the college's comprehensive four-year academic program with five quarters of cooperative work experience.

The cooperative education plan

Students typically begin co-op in their third year of study, at a time when their educational background qualifies them for jobs that require meaningful engineering expertise. Among several possibilities, two particular schedules (A or B) are shown below. In any given quarter, students in one block are on their co-op assignments, while those in the other block attend classes.

Employment arrangements are made by each student through his or her co-op coordinator in the Office of Cooperative Education and Career Services.

Year		Fall	Winter	Spring	Summer
1 and 2		RIT	RIT	RIT	-
3 and 4	A	RIT	Co-op	RIT	Co-op
	B	Co-op	RIT	Co-op	RIT
5	A	RIT	Co-op	RIT	-
	B	Co-op	RIT	RIT	-

Cooperative education plan—College of Engineering

Transfer programs

The college admits graduates from two-year community colleges in engineering science and engineering technology. Significant numbers of transfer students join the regular undergraduate program and give RIT's engineering programs a unique academic atmosphere.

The AS graduate in engineering science with above-average scholastic achievement can usually enter one of the five BS programs as a regular third-year student. It may be necessary to adjust a few courses to accommodate program differences in the first two years. Transfer credits are granted based on course-by-course evaluation.

The AAS graduate in technology who has demonstrated outstanding achievement should consider transfer to a BS program in engineering as one alternative for continuing formal education. The exact number of transfer credits for which he or she may qualify varies widely, and the student should contact the department head of his or her chosen discipline for transfer credit evaluation.

Writing competency

All College of Engineering students are required to be proficient in writing the English language. This is accomplished through required courses in the liberal arts and through writing requirements established and monitored by the individual departments.

Academic advising

Upon entry into the college, each student is assigned an adviser. The adviser is available for both academic advising and career counseling. In addition, the college's Office of Student Services supports student success with a variety of specialized co-curricular programs, as well as individual counseling to meet students' needs.

Women and minorities in engineering

Special programs led by the assistant dean for student services are in place to support female and minority engineering students. Student chapters of professional organizations such as the Society of Women Engineers, the National Society of Black Engineers and the Society of Hispanic Professional Engineers offer students opportunities for personal and professional growth as well.

Orientation

Our engineering programs are strongly oriented toward mathematics and the physical sciences. Emphasis is placed on these subjects in the first two years to provide a foundation for the applied sciences and engineering subjects that follow later in the programs.

Honors Program

The Honors Program is designed to enhance the academic and professional experiences of qualifying students. In addition to participating in the Honors general education curriculum, students have access to special courses, seminars, projects and advising in the College of Engineering. A curriculum focused on product innovation for a global economy stimulates and challenges students to achieve their greatest potential. Extensive travel, domestic and international, to key industrial sites allow students to observe best practices in engineering new products and to better understand the international dimensions of engineering professions. Students visit domestic companies in their second year. This prepares them for an international trip in the third year. In the fourth and fifth years, students have the opportunity to have a significant international educational experience with co-op placement outside the U.S., study abroad, or a design project partnership with students in an international university. Seminars and social events with engineering faculty and advisors round out the program.

Careers

Graduates qualify for professional work in many aspects of engineering design and product development, systems engineering, research and development, supervision of technical projects, and managerial positions in large, medium, and small industries. In addition, an engineering education can provide a foundation for continued study in business, law, medicine, etc. Many graduates continue their education for the master of science or the doctor of philosophy degree.

Entrance requirements (BS)

Applicants for the engineering program must be high school graduates and must have completed four years of high school math, including elementary and intermediate algebra, plane geometry, trigonometry, and both physics and chemistry in high school. Advanced algebra, solid geometry, and calculus, while not required, are highly desirable. The applicant should demonstrate proficiency in the required entrance subjects since these provide the basis for the more advanced courses in engineering and science.

Accreditation

All of the college's programs of study leading to the bachelor of science degree are accredited by the Accreditation Board for Engineering and Technology (ABET). The college is a member of the American Society for Engineering Education. All graduating seniors are eligible and encouraged to sit for the intern engineer portion of the New York State Professional Engineering examination during their final quarter.



Kevin Kochersberger, associate professor of mechanical engineering, was chosen to fly a reproduction of Orville and Wilbur Wright's airplane to mark the 100th anniversary of powered flight.

Graduate degrees

Programs leading to the master of science degree are offered in computer, electrical, industrial, mechanical and microelectronic engineering, and applied and mathematical statistics. The programs may be pursued part time or full time, since most courses are offered in the late afternoon and early evening.

In addition, the college offers post-baccalaureate professional programs leading to the master of engineering degree. Study may be pursued in such areas as manufacturing, industrial and mechanical engineering; engineering management; microelectronic manufacturing engineering; and systems engineering. The program is unique in that it extends the undergraduate cooperative work concept to the graduate level in an industrial internship for which academic credit is granted.

Designed as a full-time program, the master of engineering degree also may be pursued on a part-time basis by engineers employed locally.

The College of Engineering offers jointly with the College of Science a program leading to the master of science degree in materials science and engineering.

The college also offers two programs leading to the master of science degree that incorporate course work from the College of Business; one in manufacturing management and leadership and the other in product development.

Engineering science and part-time study

An increasing number of students desire to pursue engineering degrees part time while maintaining full-time employment. In response to their needs, the college offers several options. Those lacking the normal mathematics and science background to meet engineering program admission requirements are encouraged to seek the recommendation of the Learning Development Center relative to additional preparation. For those meeting the normal requirements, an associate degree in engineering science (AS) may be earned entirely through part-time evening study. The mathematics, science, liberal arts, and core engineering science courses included in this program prepare graduates for transfer into most ABET-accredited engineering programs at the third-year level.

Engineering science graduates with appropriate professional elective courses will be accepted as third-year students in either the mechanical or electrical engineering departments. They will generally be required to take upper-division courses during the normal day schedule. For transfer to other engineering departments, students are advised to contact the respective department head and arrange the appropriate course schedule before they complete 45 credits of the engineering science program.

As with full-time students, part-time students are required to complete the equivalent of five quarters of approved cooperative work experience. Arrangements can be made for part-time students to use approved portions of their regular employment to satisfy some or all of the co-op requirements. Those wishing further information on part-time study in engineering should contact the College of Engineering Office of Student Services at 585-475-7994.

Engineering science, AS degree, typical course work *

<i>Liberal Arts</i>	<i>Quarter Credit Hours</i>
Writing & Literature I 0502-225	4
Writing & Literature II 0502-226	4
Two of four social sciences choices:	8
Introduction to Psychology 0514-210	
Principles of Economics I 0511-301	
American Politics 0513-211	
or	
Political Ideologies 0513-215	
Foundations of Sociology 0515-210	
or	
Cultural Anthropology 0510-210	
One humanities course: i.e., History; Fine Arts; Philosophy; or Science, Technology & Values	4
<i>Math and Science, Electrical Option</i>	
Calculus I, II, III 1016-251,252,253	12
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Matrix Algebra 1016-331	4
College Chemistry 1011-208	3
Chemical Principles I Lab 1011-205	1
<i>Math and Science, Mechanical Option</i>	
Calculus I, II, UI 1016-251,252,253	12
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Matrices & Boundary Value Problems 1016-318	4
Chemistry of Materials 1011-273	3
Chemistry of Materials Lab 1011-277	1
<i>Physics, Electrical Option</i>	
University Physics I, II, III 1017-311,312,313	15
Introduction to Modern Physics 1017-314	4
<i>Physics, Mechanical Option</i>	
University Physics I, II, III 1017-311,312,313	15
Science Elective	4

<i>Professional, Electrical Option</i>	
Statics 0304-336	4
Dynamics 0304-359	5
Digital Systems 0301-240	4
Advanced Programming for Engineers 0301-346	4
Scientific Applications 4003-319	4
Microcomputer Systems 0301-365	4
Circuits I with Lab 0301-381	5
<i>Professional, Mechanical Option</i>	
Statics 0304-336	4
Dynamics 0305-359	5
Engineering Design Graphics 0304-214	4
Problem Solving with Computers 0304-342	3
Mechanics of Materials 0304-347	4
Mechanics of Materials Laboratory 0304-348	1
<u>Circuit Analysis I with Lab 0301-381</u>	<u>5</u>
<i>Total Quarter Credit Hours</i>	<i>97</i>

* For suggested quarterly schedule, consult with your academic adviser.

Engineering Exploration

The engineering exploration program is an option for students who prefer additional time in which to decide their major in engineering. Students may choose a major at the end of fall, winter, or spring quarter of their first year.

During their first year students take the foundation courses required by all the engineering disciplines. Course work taken as an engineering exploration student will transfer into all engineering programs without any loss of credits toward graduation.

During the fall quarter, engineering exploration students take a one-credit course, Introduction to Engineering, which provides an overview of all five programs, the opportunity to learn about the course of study in each program, career opportunities in each of the engineering disciplines, and an introduction to the faculty and students of each program. Other career-oriented activities available during the freshman year include participating in small group discussions with faculty and other students, observing classroom presentations of senior engineering design projects, exploring engineering laboratory facilities and consulting with an academic adviser one-on-one about engineering courses.

Engineering exploration program, typical first-year schedule *

<i>Fall</i>	<i>Quarter Credit Hours</i>
Calculus I 1016-251	4
Chemical Principles I 1011-211	3
Chemical Principles Lab I 1011-205	1
Computing for Engineers 0303-302 †	4
Introduction to Engineering 0302-210	1
Liberal Arts ‡	4/8
Wellness Education §	0
<i>Winter</i>	
Calculus II 1016-252	4
Introduction to Chemical Materials 1011-273	3
Chemical Materials Lab 1011-277	1
University Physics I 1017-311	5
Liberal Arts ‡	4
Wellness Education §	0
<i>Spring</i>	
Calculus III 1016-253	4
Calculus IV 1016-305	4
University Physics II 1017-312	5
Liberal Arts ‡	4
Wellness Education §	0
<i>Total Quarter Credit Hours</i>	<i>51</i>

* For suggested quarterly schedule, consult with your academic adviser, † Students who choose to take Computing for Engineers in the fall quarter will take 4 liberal arts credits rather than eight.

‡ See page 7 for liberal arts requirements.

§ See page 9 for wellness education requirements.

Computer Engineering

Andreas E. Savakis, Head

Educational Objectives

The computer engineering program has established the following educational objectives:

- **Career focus**—Graduates are prepared to contribute to the professional workforce, after having established fundamental knowledge in computer engineering, which includes mathematical, scientific and computing principles, modern tools, engineering analysis and design, and experiential learning.
- **Scope**—Graduates are prepared to be effective integrators of hardware and software in the design and development of digital and computer systems and can apply these skills in their chosen careers.
- **Depth and graduate study**—Graduates have gained further understanding of specialized elective areas such as software engineering, architectures, networking and VLSI design, and many are prepared to pursue graduate study in computer engineering or a related discipline.
- **Independent learning**—Graduates have the foundation necessary for independent learning, which is necessary in order to continuously update their skills and have the ability for career renewal in a changing workplace and economy.
- **Professionalism**—Graduates are acquainted with the practices and responsibilities required in a professional environment, including professional and ethical responsibility and awareness of socioeconomic and contemporary issues.

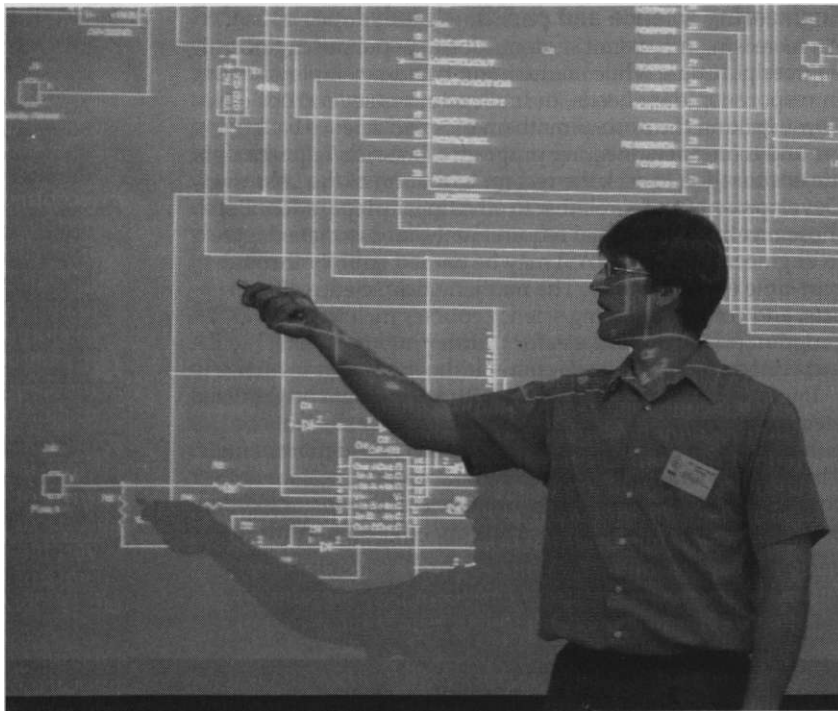
Program

The computer engineering program focuses on the design and development of computer systems and computer-integrated systems, with due consideration to such engineering factors as function, performance, and cost. Computer engineers design and build these systems to meet application requirements with attention to the hardware/software interaction. The program strives to interweave and span the topics from formal specifications to heuristic algorithm development; from systems architecture to computer design; from interface electronics to software development, especially real-time applications; and from computer networking to VLSI implementation.

As an engineering discipline, computer engineering emphasizes the careful adoption of design methodology and the application of sophisticated engineering tools. The intensive laboratory work requirements ensure the graduate of significant experience with modern facilities and up-to-date design tools.

The cooperative education program enables students to apply the principles and techniques of computer engineering to real industrial problems and provides them with a stronger framework on which to build their academic courses. These co-op work periods alternate with academic quarters throughout the last three years of the program.

The faculty of the computer engineering department are committed to quality engineering education.



Combined BS/MS degree sequence

The department of computer engineering offers a combined bachelor of science and master of science degree course sequence over five calendar years. This accelerated degree sequence provides an excellent opportunity for outstanding undergraduate students to pursue a graduate degree in a cohesive program. Applications to this special sequence will be accepted from matriculated undergraduate computer engineering students who have completed all the courses in the first two years of the baccalaureate program with a cumulative grade point average of at least 3.4 out of 4.0. At least 55 of these credits must have been earned at RIT. Continuance in this program also requires the maintenance of at least a 3.0 overall grade point average and at least 3.0 in the 45 quarter credits directly applicable to the master of science degree portion.

Bachelor of science degree in computer engineering with a concentration in software engineering

The department also offers a BS degree in computer engineering with a concentration in software engineering. This concentration allows the graduate to develop capabilities for the design of complex software systems. The curriculum is identical to that in the first four years of the regular BS degree program in computer engineering. In the fifth year, a cohesive pair of specified professional electives in software engineering (0306-661 and 0306-662) complements the material already presented to round out this concentration under the umbrella of an ABET-accredited computer engineering degree program.

Principal field of study

For students matriculated in the interdisciplinary computer engineering program, the principal field of study is defined to be all courses taken in the College of Engineering and the departments of computer science and software engineering.

Computer engineering, BS degree, typical course sequence *

<i>First Year</i>	<i>Quarter Credit Hours</i>
Introduction to Computer Engineering 0306-200	1
Freshman Seminar 0306-201	1
Intro to Digital Systems for Computer Engineers 0306-341	4
Computer Science I 4003-231,232,233	12
Calculus I, II, III 1016-251,252,253	12
University Physics I 1017-311	5
Liberal Arts †	16
Wellness Education ‡	0
<i>Second Year</i>	
Assembly Language Programming 0306-250	5
Hardware Description Languages 0306-351	4
Circuits I with Lab 0301-381	4
Computer Science IV 4003-351	4
Software Engineering 4010-361	4
Foundations of Discrete Math 1016-265	4
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Matrix Algebra 1016-331	4
University Physics II, III 1017-312,313	10
Selective Elective	4
Wellness Education ‡	0
<i>Third Year</i>	
Computer Organization 0306-550	4
Digital Systems Design 0306-561	4
Circuits II 0301-382	4
Electronics I, II with Labs 0301-481,482	8
Applied Programming 0306-381	4
Operating Systems 4003-440	4
Liberal Arts †	4
Cooperative Education (2 quarters)	Co-op
<i>Fourth Year</i>	
Digital Signal Processing 0306-453	4
Digital Control Systems Design 0306-553	4
Interface & Digital Electronics 0306-560	4
Introduction to VLSI Design 0306-630	4
Data & Computer Communications 0306-694	4
Probability & Statistics I 1016-351	4
Computer Engineering Design Projects I 0306-654	2
Liberal Arts †	4
Cooperative Education (2 quarters)	Co-op
<i>Fifth Year</i>	
Computer Architecture 0306-551	4
Computer Engineering Design Projects II 0306-657	4
Professional Electives §	8
Free Elective	4
Liberal Arts †	12
Liberal Arts (Senior Seminar)	2
<u>Cooperative Education (1 quarter)</u>	<u>Co-op</u>
Total Quarter Credit Hours	198

* For suggested quarterly schedule, consult with your academic adviser.
 † See page 7 for liberal arts requirements.
 ‡ See page 9 for wellness education requirements.
 § Professional electives must have at least a 25-percent engineering design component.

Professional electives (partial list)

Design Automation of Digital Systems	0306-620
Advanced VLSI Design	0306-631
Engineering Design of Software Concurrent and Embedded Software Design	0306-662
Embedded Real Time Systems	0306-663
Special Topics in Computer Engineering	0306-672
Robotics	0306-675
Digital Image Processing Algorithms	0306-684
Computer Vision	0306-685
Independent Study	0306-699
Introduction to Computer Graphics	0603-570

Electrical Engineering

Robert J. Bowman, Head

Educational Objectives

The electrical engineering faculty in conjunction with its constituents has established the following program educational objectives for each of its students:

- A strong foundation in the core electrical engineering fundamentals—The BSEE curriculum provides all students with the fundamental knowledge and abilities necessary for specialization in all areas of electrical engineering.
- A firm foundation in mathematics and the basic sciences—A firm foundation in mathematics and the basic sciences is necessary for the understanding, application, and development of engineering principles.
- Knowledge of relevant technologies—The student needs to be well informed about current technologies important to electrical engineering, as well as probable future technological advances.
- Problem solving and design capability—The student needs to develop skills for devising and evaluating solutions to both closed-end (simple solution) and open ended (multiple solution) problems. This includes the design of components, systems, and experiments.
- Creativity and enthusiasm for life-long learning—The program will foster an environment that encourages creativity and an excitement-driven outlook among its students and faculty.
- Schooling in professional attributes—Professional attributes include communication skills, the art of self-learning, teamwork, ethics, and the essentials of quality management.
- Breadth of knowledge—In addition to a breadth of knowledge within electrical engineering, the well-rounded student must have an appreciation for other disciplines, both technical and non-technical, in order to deal with the impact of technology in a global and societal context.

Program

Electrical engineering at RIT is addressing high-technology needs of business and industry by offering a rich academic program that includes integrated circuits, digital signal processing, microwave electronics, optical electronics, bioelectronics, radiation and propagation, power electronics, control systems, communications and information theory, circuit theory, computer-aided design, solid-state devices, microelectromechanical systems (MEMS), robotics, and pattern recognition. Our nationally recognized program combines the rigor of theory with the reality of engineering practice and prepares students for exciting careers within the varied electrical engineering and allied disciplines and for positions in business management. Our graduates also have the foundation to pursue advanced study at the most prestigious graduate schools. A degree in electrical engineering from RIT is your stepping stone to entering and changing the future.

The electrical engineering department curriculum, co-op program, and facilities are carefully designed to accomplish these objectives. Since the ability to design is an essential part of electrical engineering, the student is presented with challenging problems of design in a number of courses beginning with the first hands-on course, Electrical Engineering Practicum, in the freshman year.

To strengthen students' applied knowledge in electrical engineering, the laboratory is an integral part of many courses. The department offers a number of classes in studio-style lecture labs where the instructor presents the lecture in a fully



instrumented room that allows immediate observation and implementation of important engineering ideas by the student. Many of our alumni report that the College of Engineering facilities are comparable to the best in the industry.

The highlight of the applied engineering experience is the Senior Project. Students work on a challenging project under the tutelage of an experienced faculty adviser. While experiencing the satisfaction of completing an interesting project and exploring the latest in technology they develop engineering management and project organization skills. They learn to communicate their ideas effectively within a multidisciplinary team and to present their project and ideas to a diverse audience of students, faculty, and industrial partners.

RIT's co-op requirement enhances knowledge acquired in the classroom and the laboratory with on-the-job experience. The exposure acquaints students with the constraints imposed by the industrial environment on the solution to engineering problems. The co-op experience also helps the student decide which career path would be most rewarding. It produces a mature engineering graduate with well-developed academic and industrial perspectives.

In modern society, engineering decisions are rarely made without considering the ethical and socio-economic impacts. Because the ability to communicate clearly and effectively with others is indispensable to the engineer, a significant portion of the curriculum is devoted to the study of liberal arts throughout the five years of the program. These courses are aimed at sensitizing students to the factors that surround most decision-making situations, improving their ability to communicate with others, making their professional lives more meaningful, and encouraging their positive impact on society.

The first two years of the curriculum are devoted to establishing a foundation in mathematics and physical science essential to the study of electrical engineering. Courses involving electrical engineering principles and hands-on instrument and CAD tool experience introduce students to electrical engineering practice and tools that are used throughout the five-year program.

The third and fourth years build on this foundation and focus on the subjects that form the core of electrical engineering. Courses in circuits, electronics, linear systems, electromagnetic fields, physics of semiconductor devices, communication systems, control systems, and energy conversion are taught in these two years.

During the fifth year students specialize in an area of his or her professional interest. Professional elective courses provide an opportunity to concentrate in an area of interest. Students are also expected to complete their capstone engineering project, the senior design project, as part of the graduation requirements.

Electrical engineering, BS degree, typical course sequence*

	<i>Quarter Credit Hours</i>
First Year	
Electrical Engineering Practicum 0301-205	1
Digital Systems 0301-240	4
College Chemistry I 1011-208	4
Calculus I, H, III 1016-251,252,253	12
University Physics I & II 1017-311,312	10
Liberal Arts (Core) †	20
Wellness Education ‡	0
Second Year	
Electrical Engineering Sophomore Practicum 0301-305	1
Semiconductor Devices 0305-360	4
Microcomputer Systems 0301-365	4
Circuits I with Lab 0301-381	4
Statics & Dynamics 0304-330	5
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Engineering Mathematics 1016-328	4
University Physics III 1017-313	5
Modern Physics I 1017-314	4
Scientific Applications 4003-319	4
Liberal Arts (Core) †	4
Wellness Education ‡	0
Third Year	
Computer Architecture 0301-347	4
Circuits II 0301-382	4
Linear Systems I 0301-453	4
Electromagnetic Fields I 0301-473	4
Electronics I, II with Lab 0301-481,482	8
Probability & Statistics 1016-351	4
Complex Variables 1016-420	4
Cooperative Education (2 quarters)	Co-op
Fourth Year	
Electromagnetic Fields II 0301-474	5
Control Systems Design 0301-514	5
Communication Systems 0301-534	4
Digital Electronics 0301-545	4
Linear Systems II 0301-554	4
Professional Elective	8
Liberal Arts (Concentration)†	4
Cooperative Education (2 quarters)	Co-op
Fifth Year	
Mechatronics 0301-531	4
Semiconductor Electronics 0301-544	4
Professional Electives	8
Senior Design Project Part I & II 0301-697,698	8
Liberal Arts (Concentration)!	4
Liberal Arts (Senior Seminar)†	2
Cooperative Education (1 quarter)	Co-op
Total Quarter Credit Hours	194

* For suggested quarterly schedule, consult with your academic adviser,

† See page 7 for liberal arts requirements.

‡ See page 9 for wellness education requirements.

Each of the listed professional electives includes significant design experience. For convenience the courses have been grouped by interest areas. Some courses apply to more than one area.

Professional electives

Electromagnetic Fields and Optics

Microwave Engineering	0301-621
Antenna Design	0301-622
Fiber Optics: Theory and Applications	0301-674
Electro-Optics	0301-776

Control Systems

Robotic Vision	0301-605
State Space Control	0301-615
Power Electronics	0301-646
Design of Digital Systems	0301-650
Embedded Microcontroller System Design	0301-664

<i>Communications</i>	
Digital Filters and Signal Processing	0301-677
Communication Networks	0301-692
Digital Data Communications	0301-693
Information Theory and Coding	0301-694
<i>Signal Processing</i>	
Robotic Vision	0301-605
Digital Filters and Signal Processing	0301-677
Analog Filter Design	0301-679
Digital Image Processing	0301-779
<i>Digital and Computers Systems</i>	
Design of Digital Systems	0301-650
Physical Implementation	0301-651
Microcomputer Software I	0301-655
Embedded Microcontroller Systems	0301-664
DSP Architecture	0301-666
<i>Devices and Integrated Circuits</i>	
Analog Electronic Design	0301-610
Design of Digital Systems	0301-650
Physics of Bipolar Devices	0301-711
Physics and Scaling of CMOS Devices	0301-712
Solid State Physics	0301-713
Analog IC Circuits	0301-726
<i>Biomedical</i>	
Biomedical Instrumentation	0301-630
Biomedical Sensors and Transducers I	0301-631
Fundamental Electrophysiology	0301-632
Biomedical Signal Processing	0301-633
Biorobotics/Cybernetics	0301-636
<i>MEMS</i>	
Microelectromechanical Devices	0301-686
<i>Senior Design Project</i>	
	0301-697,698

BSEE with computer engineering option

The department of electrical engineering offers a BSEE degree with a computer engineering concentration. This is ideal for those who want to be educated within the framework of the traditional electrical engineering program but would also like to incorporate the skills required in designing modern computing systems. Students in this option meet all the requirements for the BSEE degree and receive instruction in areas ranging from C programming, object-oriented programming, assembly language, microprocessor interfacing, and logic design to data structures and computer operating systems.

BS Electrical engineering with biomedical engineering option

Biomedical engineering has and will continue to play a crucial role in understanding the fundamental principles of human life sciences, especially those related to health care and clinical medicine. The real advances in actually incorporating these findings and principles into practical medical systems and devices will require the expertise of professionals trained in the core engineering disciplines such as electrical engineering. The biomedical engineering option in electrical engineering at RIT is designed to provide students with the necessary expertise in the analysis and design of devices and systems used in sensing, control, and analysis of electrical signals within human biological processes. Biomedical engineering is now expanding into the nano level of tissue, cell, molecule and gene studies and nanotechnology research at RIT provides the environment to address these studies. The focus of the option is the application of the principles of electrical engineering and related disciplines to the fields of both biology and medicine in clinical and research settings.

The biomedical engineering option augments the foundation of the electrical engineering curriculum with three courses from the College of Science and three option-specific

electrical engineering courses. The College of Science courses include biology and a two quarter sequence of physiology and anatomy. Electrical engineering core courses are Bio-medical Instrumentation and Fundamental Electrophysiology and at least one of the following professional electives: Biomedical Sensors and Transducers I, Biomedical Sensors and Transducers II, Biomedical Signal Processing, and Biorobotics/Cybernetics.

All courses in the biomedical engineering option have a strong design emphasis and incorporate project-oriented assignments to allow the student an opportunity to investigate and demonstrate concepts discussed in class. Students pursuing this option will culminate their design experience in a biomedical, multidisciplinary, capstone senior design project. Examples of such projects include integrated bio-sensor design and fabrication, clinical and laboratory instrumentation design, telemedicine and telemetry applications and equipment including Internet enabled monitoring and health-care delivery systems. These projects typically involve university-wide interaction with departments in the colleges of Engineering, Science, Imaging Science, and Computing as well as close affiliation with Rochester area hospitals.

Combined five-year BS/MS degree program

In addition to the bachelor of science and master of science degree programs, a combined BS/MS degree program is also available for the electrical engineering student. Enrollment in this program requires successful completion of at least 234 quarter credit hours. After completing this requirement, the student is awarded the BS and MS degrees simultaneously. A student may apply to this program in the second quarter of his or her second year, providing that a minimum cumulative grade point average of 3.4 has been obtained at the end of the previous quarter. Although admission requirements are stricter for this program, graduation requirements are consistent with Institute policies.

The first three years of the program are identical for the BSEE and the combined BS/MS program with the exception of the work period between the second and third years being used to earn early co-op credit. Further information can be obtained from the department of electrical engineering at 585-475-2165. A typical fourth- and fifth-year program sequence follows.

Students pursuing a BSEE program with computer engineering option must meet all the requirements of the BSEE degree with certain specifications.

<p>The BSEE program includes the following computer-specific courses:</p> <ul style="list-style-type: none"> • 0301-240 Digital Systems • 0301-365 Microcomputer Systems • 0301-346 Advanced Programming for Engineers • 0301-347 Computer Architecture
<p>0603-703 Operating Systems (or equivalent) is required in place of the Free Elective</p>
<p>Two of the three required Professional Electives must be chosen from the following:</p> <ul style="list-style-type: none"> • 0301-650 Design of Digital Systems • 0301-665 Embedded Systems • 0301-666 DSP Architecture • 0301-651 Physical Implementation

Electrical engineering, combined BS/MS degree, typical course sequence

First Year	Quarter Credit Hours
Same as BSEE	51
Second Year	
Same as BSEE	47
Third Year	
Same as BSEE	32
Fourth Year	
Electromagnetic Fields II 0301-474	5
Liberal Artst	8
Communication Systems 0301-534	4
Matrix Methods in Electrical Engineering 0301-703	4
Linear Systems II 0301-554	4
Control Systems Design 0301-514	5
Digital Electronics 0301-545	4
Random Signals & Noise 0301-702	4
Professional Electives	12
Thesis	1
Cooperative Education (1 quarter)	Co-op
Fifth Year	
Graduate Courses	16-20
Mechatronics 0301-531	4
Professional Electives	4
Senior Design I & I 0301-697,698	8
Liberal Artst	4
Thesis	8
Senior Seminar	2
Cooperative Education (1 quarter)	Co-op
Total Quarter Credit Hours	231

Note: Two of the professional electives will be counted twice – once toward the BS and once toward the MS. The free elective will be replaced by a graduate course for the BSEE.

* For suggested quarterly schedule, consult with your academic adviser, † See page 7 for liberal arts requirements.

Part-time students

Part-time students must fulfill the same academic requirements for graduation as regular full-time students. In order to be accepted, they must have third-year status. Those who enter these programs must be employed full time in a technical position. Such work assignment will satisfy the co-op requirements in the department. Students should plan to take two courses each quarter during the day.

Industrial and Systems Engineering

Jacqueline R. Mozrall, Head

Educational Objectives

The industrial and systems engineering faculty in conjunction with its constituents has established the following program educational objectives for its students:

- **Systems knowledge**—Produce graduates who are able to design, develop, optimize, implement and manage systems that integrate people, materials, information, equipment, and energy.
- **Immediate contributors**—Produce graduates, with at least one year of experiential education, who are able to immediately contribute to industrial, service, and/or government organizations.
- **Graduate preparation**—Produce graduates who are prepared for graduate education.
- **Life-long learners**—Produce graduates who value professional development through life-long learning.
- **Broad knowledge**—Produce graduates who have broad knowledge to draw upon in providing engineering solutions within the appropriate global, societal, and organizational context.

Program

Industrial engineering differs from other branches of engineering in at least two ways. First, industrial engineering education is relevant to most types of industry and commercial activity. Second, it is the major branch of engineering concerned not only with machines, but also with people.

Specifically, industrial engineering is concerned with the design, improvement, and installation of integrated systems of people, materials, and equipment. It draws upon specialized knowledge and skills in the mathematical and physical sciences, together with the principles and methods of engineering analysis and design.

Because of the flexible nature of the program, the industrial and systems engineering student can gain breadth in many different areas of industrial engineering—information systems, manufacturing, safety, etc. Students may choose free and professional electives for this purpose. The industrial and systems engineering faculty are committed to high-quality engineering education and the goals enumerated in the introduction to the Kate Gleason College of Engineering in this bulletin.

The industrial engineering curriculum covers the principal concepts of human performance, mathematical modeling, applied statistics and quality, information management systems, and contemporary manufacturing processes. The curriculum stresses the application of computers in solving the engineering problems of today. For example:

1. The undergraduate industrial engineering student at RIT uses computer graphics to design the layout of manufacturing plants and to develop dynamic, animated computer simulation models.
2. He or she also designs systems to control flexible manufacturing systems involving robots, machines, conveyors, and people.
3. The industrial engineering student uses cognitive, physiological, biomechanical, and anthropometric modeling of human performance in the analysis and design of human/machine systems.

Combined five-year BS/master's degree program

The ISE department offers honors-accelerated BS/MS and BS/MEng. degree programs within the department where select students may complete a BS and an MS or MEng in industrial engineering in five years plus an additional quarter. An arrangement with the College of Business allows for an accelerated BS/MBA option. For more information, contact the ISE department at 585-475-2598 (www.rit.edu/ise).



Industrial and systems engineering students work to integrate tools, equipment, materials, and people within the flexible manufacturing cell in the Brinkman Machine Tools and Manufacturing Lab.

Facilities

The ISE department is located in the James E. Gleason building, within the Kate Gleason College of Engineering. The department houses several state-of-the-art laboratories to support their programs, including the Brinkman Machine Tools and Manufacturing Lab, the Human Performance Lab, the Advanced Systems Integration Lab, the Product and Process Development Lab, and a general computer lab. These labs are fully accessible to all ISE students.

There are ample computing facilities within these specialized labs as well as a dedicated computer PC lab. These labs offer an extensive library of software to support industrial engineering research and project work; including, conventional word processing, spreadsheet, and presentation applications (e.g., Office), database management (e.g., ACCESS, FoxPro), data acquisition (e.g., Lab View) statistical analysis (e.g., Minitab, SAS), facilities layout (e.g., AutoCAD, Factory Flow, Factory Plan), systems simulation applications (e.g., ProModel, Arena), and manufacturing software (e.g., MasterCam, material selection software).

Careers

Some of the activities of industrial engineers include work measurement, operations research, applied statistics, human factors, plant layout, materials handling, production planning and control, manufacturing, management information systems, and management consulting. Our students work for a wide array of companies, including IBM, GM, Kodak, Xerox, Intel, General Mills, Walt Disney World, and Ortho-McNeil Pharmaceutical.

Balance, as well as specialization, has allowed our graduates to pursue varied paths. Examples of the diversity, along with the roles in which an industrial engineer might function, are reflected in the following partial listing of industrial engineering co-op assignments.

In manufacturing industries:

- perform product life studies
- lay out optimum new and improve existing work areas
- design and implement an information system
- investigate production processes involved in cleaning carbide dies
- investigate and analyze the costs of purchasing new vs. repairing existing equipment
- investigate waiting lines in connection with a micro-electronic fabrication facility
- investigate delivery service, including scheduling, route modification and material handling
- assist in setting up a production control monitoring board
- create computer programs for pricing policies, blending problems and truck scheduling
- perform downtime studies of various operations using time study and work sampling
- develop and computerize a forecasting model
- perform ergonomic studies and evaluations of workstations and product designs
- participate in design process of new products and processes to ensure ease of manufacture, maintenance, and remanufacture or recycling

In service industries:

- evaluate the ergonomics of workstation designs
- design information systems
- monitor safety and health programs
- manage hazardous and toxic materials storage and disposal programs
- conduct cost analyses of procedures
- schedule operations, information flow
- design supply-ordering systems
- manage operations services at hospitals
- evaluate waiting time and space utilization in amusement parks

Industrial engineering, BS degree, typical course sequence *

First Year	Quarter	Credit	Hours
Introduction to Industrial Engineering	0303-201		4
Computer Tools for Increased Productivity	0303-204		2
Freshman Seminar	0303-203		1
Chemistry I	1011-208		4
Chemistry of Materials, Lab	1011-273,277		4
Calculus I, II, III	1016-251,252,253		12
University Physics I	1017-311		5
Materials Processing	0304-343		4
Liberal Arts (Core) †			m,
Wellness Education ‡			0
Second Year			
Mechanics I	0304-331		4
Mechanics II	0304-332		4
Calculus IV	1016-305		4
Computing for Industrial Engineers	0303-302		4
Differential Equations	1016-306		4
Matrix Algebra	1016-331		4
University Physics II, III	1017-312,313		10
Materials Science	0304-344		4
Free Elective			3
Liberal Arts (Core) †			8
Third Year			
Manufacturing Engineering	0303-525		4
Engineering Economics	0303-520		4
Introduction to Operations Research	0303-401		4
Probability & Statistics I, II	1016-351,352		8
Ergonomics	0303-415		4
Management Theory & Practice	0303-481		4
Systems & Facilities Planning	0303-422		4
Cooperative Education (2 quarters)			Co-op
Fourth Year			
Applied Statistical Quality Control	0303-510		4
Applied Linear Regression Analysis	0303-511		4
Production Control	0303-402		4
Simulation	0303-503		4
Human Factors	0303-516		4
Advanced Systems Integration	0303-630		4
Engineering Design	0303-530		4
Liberal Arts (Concentration) †			4
Cooperative Education (2 quarters)			Co-op
Fifth Year			
Multidisciplinary Senior Design I, II	0303-560,561		8
Professional Electives (see list below)			16
Liberal Arts (Concentration)			8
Liberal Arts (Senior Seminar)			2
Cooperative Education (1 quarter)			Co-op
Total Quarter Credit Hours			199

* For suggested quarterly schedule, consult with your academic adviser.

† See page 7 for liberal arts requirements.

‡ See page 9 for wellness education requirements.

Professional Electives (partial list)

Safety Engineering	0303-734
Database Management	0303-765
Manufacturing Systems	0303-766
Systems and Project Management	0303-784
Fundamentals of Sustainable Design	0303-790

Graduate-level courses from ISE as well as the other engineering disciplines may be used as professional electives with the permission of the adviser and course instructor (see *Graduate Bulletin* for descriptions).

Mechanical Engineering

Edward C. Hensel, Head

Educational Objectives

The objectives of the bachelor of science degree program in mechanical engineering at Rochester Institute of Technology are to prepare all of our graduates to:

- Apply fundamental knowledge, skills, and tools of mechanical engineering.
- Practice mechanical engineering in support of the design of engineered systems.
- Accept the professional and ethical responsibilities to function as an engineer.
- Contribute and communicate effectively within and across teams.
- Continue their development as lifelong learners.
- Possess a broad education and knowledge of contemporary issues.

And, to prepare some of our graduates to

- Work as engineers in aerospace and automotive industries.
- Enter graduate programs and succeed in obtaining graduate degrees at the master's and/or Ph.D. level.

Program

Mechanical engineering is perhaps the most comprehensive of the engineering disciplines. The mechanical engineer's interests encompass the design of such diverse systems as missiles, power plants, robots, machine tools, and microelectromechanical devices. The spectrum of professional activity for the mechanical engineering graduate runs from research through design and development to manufacturing and sales. Because of their comprehensive training and education, mechanical engineers are often called upon to assume management positions.

The mechanical engineering department offers professional courses in the areas of thermal systems, applied mechanics, manufacturing, materials science, systems analysis, computer-aided graphics and design, robotics, automotive and aerospace engineering. The department's laboratories are equipped to provide extensive experimentation in these areas. For instance, they include a well-instrumented wind tunnel, copper-vapor laser system for flow visualization, advanced heat transfer systems, robotics, state-of-the-art studio laboratory, x-ray diffractometer, atomic force microscope, dynamic system simulators, a spectrum analyzer, and a machine shop.

Students have an opportunity to participate in regional and national design competitions such as the Formula SAE car, the SAE Aerodesign, and the ASME Moonbuggy. They are also encouraged to participate in the student chapters of professional societies such as the American Society of Mechanical Engineers, the Society of Women Engineers, the American Institute of Aeronautics and Astronautics, and the Society of Automotive Engineers.

The 197-quarter-credit-hour program provides students with a broad academic base complemented by hands-on laboratory activities and cooperative work experience. Students devote the first two years to the study of mathematics, physics, chemistry, and engineering mechanics, while the third and fourth years emphasize engineering science in solid body mechanics, thermal fluid sciences, and electrical engineering. A student may then specialize by choosing appropriate technical and free elective courses in his or her area of interest. Each of the listed technical electives includes one significant design project. In the fifth year, each student is required to complete the capstone design courses, Senior Design I and II. The liberal arts component of the mechanical engineering program consists of six core courses, a three-

course concentration and Senior Seminar. In the third year, all students must demonstrate writing competency in the English language by successfully completing a departmental writing exercise evaluated by faculty from the Institute Writing Committee. For some students, this may require work with the Learning Development Center or additional course work in the College of Liberal Arts.

The faculty in the mechanical engineering department are committed to providing high quality and state-of-the-art engineering education. The goals of this program are stated in the introduction to the Kate Gleason College of Engineering in this bulletin.

Aerospace engineering option

The mechanical engineering department offers a concentration in aerospace engineering for students majoring in mechanical engineering. This option is offered to extend aerospace career opportunities to our graduates.

The aerospace engineering option allows for specialized study in the upper-level undergraduate curriculum focusing on engineering aspects of air- and space-borne vehicles. The option starts with a course introducing students to the aerospace field. Then, building on the courses completed by all mechanical engineering students, a balanced exposure to the aerospace area is gained through a sequence of four technical electives in the areas of aerodynamics, aerospace structures, propulsion, and flight dynamics. In addition, students choosing this option are expected to work on an aerospace engineering design project in Senior Design I and II.

Automotive engineering option

The mechanical engineering department offers an automotive engineering concentration for students majoring in mechanical engineering. This concentration is intended to increase the opportunities for students who want to work for the automotive industry both in co-op and upon graduation.

The concentration builds upon course work all mechanical engineering students take in mechanics, thermodynamics, heat transfer and system dynamics by offering a series of specialized technical and free elective courses during the fourth and fifth years. These specialized courses provide an introduction to vehicle power plants, dynamics and control systems. The sequence starts in the fourth year with an introductory course acquainting the student with the general field of automotive design and manufacturing. This is followed in the fourth and fifth years with advanced technical electives in vehicle dynamics, internal combustion engines and automotive control applications. In addition, all students choosing this concentration are expected to work on an approved automotive senior design project in Senior Design I and II.

Combined BS/MS degree program

In addition to the bachelor of science and master of science degree programs, two dual degree programs are available to exemplary mechanical engineering students. These programs offer outstanding students an opportunity to earn both a bachelor's and a master's degree within approximately five years of entry to the BS program. Two dual degree programs are available—one leading to a bachelor of science and a master of engineering degree (BS/MEng), and one leading to a bachelor of science and a master of science degree (BS/MS). The BS/MEng program has a strong career-oriented focus, and is primarily directed towards students not considering continued graduate study at the doctoral level. The BS/MS program has a strong research-oriented focus, and is primarily directed towards students planning on completing a doctoral degree. All students enrolled in the BS/MS program are required to complete a graduate thesis and conduct scholarly research.

Students enrolled in the dual degree program are required to successfully complete 230-235 quarter credit hours, after which he or she is awarded the BS and master's degrees simultaneously. A student may apply for admission to this program in the winter quarter of the second year. A transfer student may apply after completing one quarter at RIT. Admission is based on the student's cumulative grade point average, which must be at least 3.2; three letters of recommendation from the faculty; and a letter of application from the student. Students are admitted first to the BS/MEng program, and may change to the BS/MS program upon approval of a thesis proposal. All students in the program are required to maintain a cumulative grade point average of at least 3.2.

Mechanical engineering, BS degree, typical course sequence *

	Quarter	Credit	Hours
<i>First Year</i>			
Freshman Seminar	0304-203		2
Calculus I, II, III	1016-251,252,253		12
Chemistry I	1011-208		4
Chemistry of Materials, Lab	1011-273,277		4
Engineering Design Graphics	0304-214		3
Materials Processing	0304-343		4
University Physics I	1017-311		5
Problem Solving with Computers	0304-342		3
Liberal Arts (Core) 1,2,3 †			12
Wellness Education ‡			0
<i>Second Year</i>			
Calculus IV	1016-305		4
Differential Equations	1016-306		4
Matrices & Boundary Value Problems	1016-318		4
University Physics II, III	1017-312,313		10
Engineering Statistics	1016-314		4
Statics	0304-336		4
Mechanics of Materials	0304-347		4
Mechanics of Materials Lab	0304-348		1
Materials Science	0304-344		4
Geometric Dimensioning & Tolerancing	0304-312		3
Dynamics	0304-359		5
Liberal Arts (Core) 4 †			4
Wellness Education ‡			0
<i>Third Year</i>			
Design of Machine Elements	0304-437		4
Numerical Methods	0304-440		4
Thermodynamics	0304-413		4
Science Elective			4
Fluid Mechanics	0304-415		4
Thermal Fluids Lab I	0304-416		1
Advanced Computational Techniques	0304-518		4
Introduction to Electrical Engineering	0301-362		4
Liberal Arts (Core) 5 †			4
Cooperative Education (2 quarters)		Co-op	
<i>Fourth Year</i>			
Heat Transfer	0304-514		4
Systems Dynamics	0304-543		5
Transport Phenomena	0304-550		4
Liberal Arts (Core) 6 †			4
Thermal Fluids Lab II	0304-551		1
Technical Elective 1,2, 3			12
Liberal Arts (Concentration) 1			4
Cooperative Education (2 quarters)		Co-op	
<i>Fifth Year</i>			
Senior Design I & II	0304-630,631		8
Technical Elective 4			4
Free Elective 1,2			8
Liberal Arts (Concentration) 2, 3 †			8
Liberal Arts (Senior Seminar) †			2
Cooperative Education (1 quarter)		Co-op	
Total Quarter Credit Hours			197

Elective courses

Technical/Graduate Electives for Dual Degree Students

<i>Research Methods</i>	
(Primarily for BS/MS Students)	0304-701
Design Project Management	
(Primarily for BS/MSEng Students)	0304-730
<i>Mechanics and Design Technical Courses</i>	
Design for Manufacture	0304-604
Topics in Mechanical Engineering Design	0304-610
Robotics	0304-615
Computer-Aided Engineering	0304-618
Optimal Design	0304-620
Design of Machine Systems	0304-638
Introduction to Composite Materials	0304-644
Dynamics of Machinery	0304-672
Stress Analysis	0304-694
Control Systems	0304-743
Fundamentals of Tribology and Lubrication	0304-752
Fundamentals of Fatigue and Fracture Mechanics	0304-754
Engineering Vibrations	0304-758
<i>Thermal Fluid Science Technical Electives</i>	
Heat Transfer II	0304-635
Turbomachinery	0304-652
Refrigeration and Air Conditioning	0304-660
Fuel Cell Technology	0304-710
Fundamentals of Aerosol Mechanics in Biological Systems	0304-756
<i>Aerospace Technical Electives</i>	
Aerospace Structures	0304-671
Aerodynamics	0304-675
Propulsion	0304-678
Flight Dynamics	0304-682
<i>Automotive Technical Electives</i>	
Vehicle Dynamics	0304-624
Automotive Control Applications	0304-626
Internal Combustion Engines	0304-640
<i>Free Electives—These courses may NOT be used as technical electives, but may be used as free electives</i>	
Engineering Economy	0303-520
Introduction to Automotive Design and Manufacturing	0304-540
Introduction to Aerospace Engineering	0304-560
<i>Out of Department Technical Electives—Students must insure that they meet the pre-requisites for the courses listed here</i>	
Biomechanics	0303-732
MEMS (Micro-Electro-Mechanical Systems) Designs	0301-686
MEMS (Micro-Electro-Mechanical Systems) Fabrication	0305-TBD
MEMS (Micro-Electro-Mechanical Systems) System Evaluation	0305-TBD
Plastics Product Design & Materials Selection	0610-516

Additional technical electives are available outside of the department. Students wishing to complete external technical courses may request departmental approval. As of press time for this bulletin, a sequence of technical electives in micro-electromechanical systems is under development.

* For suggested quarterly schedule, consult with your academic adviser.

† See page 7 for liberal arts requirements.

‡ See page 9 for wellness education requirements.



Students learn with hands-on experience in the design, fabrication and testing of modern integrated circuits.

Program

With the dawn of the new millennium, semiconductor technology has advanced into the deep submicron era (entering nanoscale regime) with new challenges and there is a critical need for an engineering workforce to meet these challenges. The Kate Gleason College of Engineering is proud to offer a bachelor of science degree program in microelectronic engineering, the first program of its type in the United States and one that continues to provide highly educated and skilled engineers, current in knowledge for the semiconductor industry.

The integrated circuit (IC) technology makes use of many diverse fields of science and engineering. The physics and operation of semiconductor devices involve understanding of band theory of solids, statistical distribution of electrons and holes in semiconductors, and fundamentals of electrostatics fields.

The design of microelectronic circuits requires a sound knowledge of electronics and circuit analysis. The optical lithography tools, which print microscopic patterns on wafers, represent one of the most advanced applications of the principles of Fourier optics. Plasma etching involves some of the most complex chemistries used in manufacturing today. Ion implantation draws upon understanding from research in high-energy physics. Thin films on semiconductor surfaces exhibit complex mechanical and electrical behavior that stretches our understanding of basic materials properties. Computing skills are necessary to design, model, simulate and predict processes and device behavior, extremely vital to manufacturing. A comprehensive knowledge of statistics is required to manipulate data and process control. As the devices are shrinking in size approaching nanoscale regime where molecular and atomic scale phenomena come into play, elements of quantum mechanics become important.

One of the great challenges in integrated circuit manufacturing is the need to draw on scientific principles and engineering developments from such an extraordinary wide range of disciplines. Scientists and engineers, who work in this field need broad understanding and the ability to seek out, integrate and use ideas from many fields. This ABET-accredited, five-year program provides this broad interdisciplinary background in electrical and computer engineering, solid-state electronics, physics, chemistry, materials science, optics, applied math and statistics necessary for entry into the semiconductor industry.

The curriculum begins with introductory courses in microelectronic engineering and microlithography (micropatterning) for integrated circuits. The first two years of the program build a solid foundation in mathematics, physics and chemistry. The fundamentals of statistics and their applications in design of experiments, semiconductor device physics and operation and IC technology are covered in the second year preparing students for their first co-op experience. The third year constitutes the electrical engineering coursework necessary for understanding of semiconductor devices and integrated circuits. The fourth and fifth years are dedicated to VLSI design, optics, microlithography systems and materials, semiconductor processing, professional electives,

Microelectronic Engineering

Santosh K. Kurinec, Head

Educational Objectives

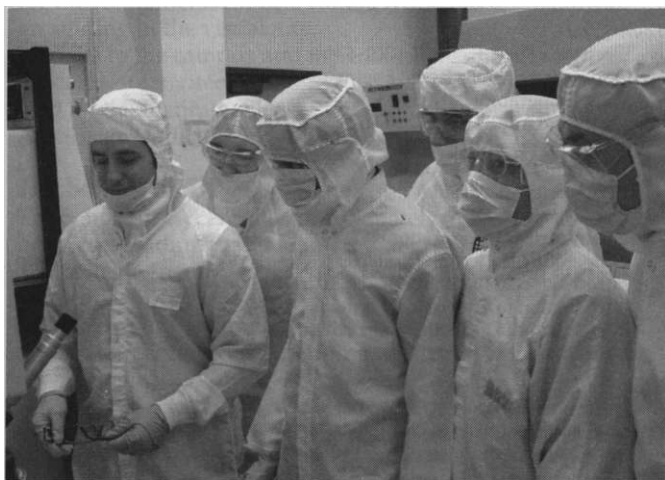
The microelectronic engineering program has established the following educational objectives:

- A firm foundation in the fundamentals – A sound knowledge of the scientific principles involved in the operation, design, and fabrication of integrated circuits.
- A knowledge of relevant technologies – A comprehensive understanding of integrated circuit process integration and manufacturing, including microlithography and the application of engineering principles to the design and development of current and future semiconductor technologies.
- A professional approach to problem solving – An ability to use one's analytical, academic, and communication skills effectively, with special emphasis on working in teams.
- An enthusiasm for learning – An interest in continuous improvement of skills throughout one's career by learning about emerging technologies and adapting to and accepting change. A desire to achieve leadership positions in industry or academia.
- A breadth of knowledge – A knowledge of the "larger picture" of engineering, including the multidisciplinary nature of microelectronic engineering, as well as the broad social, ethical, safety, and environmental issues within which engineering is practiced.

and a two-quarter capstone senior project known as Seminar/Research. In this course, students propose and conduct individual research/design projects and present their work at the Annual Microelectronic Engineering Conference organized by the department that is well attended by industrial representatives. The choices of professional electives and the senior project offer students an opportunity to build a concentration within this unique interdisciplinary program such as advanced CMOS, VLSI chip design, analog circuit design, electronic materials science, micro electro mechanical (MEM) devices and nanotechnology.

Important issues such as technology roadmap, ethics, societal impact and global perspectives are built into the program beginning with the freshmen courses in the first year. The program is laid out in a way that keeps students connected with their home department throughout the course of study. The liberal arts component of the program consists of six core courses, a three-core concentration and a Senior Seminar.

Students gain hands-on experience in the design, fabrication and testing of integrated circuits (microchips), the vital component in almost every advanced electronic product



Students in their "bunny suits" participate in a cleanroom laboratory demonstration.

manufactured today. The undergraduate microelectronic engineering laboratories at RIT are the best in the nation that include modern IC fabrication (cleanroom) and test facilities. At present, the program is supported by a complete 4 and 6 inch CMOS line equipped with diffusion, ion implantation, plasma and CVD processes, chemical mechanical planarization (CMP) and device design, modeling and test laboratories. The microlithography facilities include ASML deep UV, Canon i-line, GCA g-line wafer steppers, and Perkin Elmer MEBES III electron beam mask writer. The teamwork emphasized in laboratories and technical presentation opportunities in seminars prepare students for building team spirit and effective communication skills.

Students participate in the required co-op portion of the program after completion of their second year of school. Microelectronic engineering co-op students work for most of the major manufacturers of integrated circuits across the United States. Upon graduation students are well prepared to enter the industry immediately or to go on to advanced work in graduate school. This program also prepares students to work in emerging technologies such as nanotechnology, microelectromechanical (MEM) devices and microsystms.

With the worldwide semiconductor industry growing at an astounding pace, RIT graduates will continue to be a valuable resource to the industry. For the students, this program offers an unparalleled opportunity to prepare for professional challenge and success in one of the leading and modern areas of engineering of our time. The microelectronic engineering department has a highly accomplished and dedicated faculty that is committed to quality engineering education providing a sound foundation, creative and analytical thinking, state-of-the-art laboratory experience, with vision to the semiconductor roadmap and beyond. The availability of state-of-the-art laboratories taught by experienced faculty, strong industrial support, double quarter alternating co-op blocks with nationwide co-op opportunities and smaller class sizes make this one of the most value added programs in the nation.

Microelectronic engineering, BS degree, typical course sequence *

First Year	Quarter Credit Hours
Introduction to Microelectronics 0305-201	4
Introduction to Microlithography 0305-221	4
College Chemistry I 1011-208	4
Chemistry of Materials, Lab 1011-273,277	4
Calculus I, II, III 1016-251,252,253	12
University Physics I, II 1017-311,312	10
Computing for Engineers 0303-302	4
Liberal Arts (Core) †	8
Wellness Education ‡	0
Second Year	
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Engineering Mathematics 1016-328	4
University Physics III 1017-313	5
Modern Physics 1017-314	4
Semiconductor Devices I 0305-460	4
Digital Systems 0301-240	4
Statistics for Engineers 0307-315	4
Design of Experiments 0305-320	4
IC Technology 0305-350	4
Circuits I with Lab 0301-381	4
Liberal Arts (Core) †	4
Wellness Education ‡	0
Third Year	
Circuits II 0301-382	4
Electromagnetic Fields I 0301-473	4
Linear Systems I 0301-455	4
Electronics I, II with Labs 0301-481,482	8
Semiconductor Devices II 0305-560	4
Liberal Arts (Core) †	8
Cooperative Education (2 quarters)	Co-op
Fourth Year	
Electromagnetic Fields II 0301-474	5
Optics for Microelectronic Engineering 0305-525	4
Microlithography I 0305-563	3
Microlithography II 0305-573	1
Silicon Processes 0305-632	4
Thin Film Processes 0305-643	4
VLSI Design 0305-520	4
Liberal Arts (Core) †	4
Liberal Arts (Concentration) †	4
Cooperative Education (2 quarters)	Co-op
Fifth Year	
I.C. Processing Lab 0305-650	4
Microelectronic Technologies 0305-655	4
Microlithography Materials & Processes 0305-666	3
Microlithography Materials & Processes Lab 0305-676	1
Seminar/Research 0305-680	2
Seminar/Research 0305-690	2
Two Professional Electives	8
Liberal Arts (Concentration) †	8
Liberal Arts (Senior Seminar) †	2
Cooperative Education (1 quarter)	Co-op
Total Quarter Credit Hours	198

* For suggested quarterly schedule, consult with your academic adviser.

† See page 7 for liberal arts requirements.

‡ See page 9 for wellness education requirements.

Year	Fall	Winter	Spring	Summer
1	RIT	RIT	RIT	-
2	RIT	RIT	RIT	Vacation
3	Co-op	RIT	RIT	Co-op
4	Co-op	RIT	RIT	Co-op
5	Co-op	RIT	RIT	-

Year	Fall	Winter	Spring	Summer
1	RIT	RIT	RIT	-
2	RIT	RIT	RIT	Vacation
3	RIT	Co-op	Co-op	RIT
4	RIT	Co-op	Co-op	RIT
5	Co-op/RIT	RIT	RIT	-

Two alternative cooperative education plans for the Microelectronic Engineering program

Professional electives (partial list)

Semiconductor Process and Device Modeling	0305-704
Advanced Bipolar Devices & Integrated Circuit Fabrication Technology	0301-711
Advanced Field Effect Devices	0301-712
Solid State Physics	0301-713
Microelectronics Manufacturing II	0305-732
Defect Reduction, Yield Enhancement, and Reliability of ICs	0305-830
Advanced CMOS Processing	0305-850
Digital System Design	0306-561
Advanced VLSI Design	0306-631
Mixed Signal IC Design	0301-726
Advanced Analog IC Design	0301-730
Experimental Techniques: Microscopy & Spectroscopy	1028-707

Graduate level courses from other related engineering, mathematics, or science disciplines may be used as professional electives with the permission of the academic advisor and course instructor (see Graduate Bulletin for descriptions).

Combined BS/MS degree program

A cross-disciplinary combined BS/MS degree program between two colleges is available for the microelectronic engineering students; a BS in microelectronic engineering from the College of Engineering and a MS in material science and engineering from the College of Science. This unique program has been envisioned based on trends involving convergence of advanced materials with nanofabrication and microelectronics in modern micro devices and systems. This five-year program consists of completion of 227 credits with a minimum of 45 graduate course credits and a graduate thesis. One co-op quarter is substituted for the graduate coursework to make it an accelerated five-year program requiring a minimum of thirteen quarters of academic coursework. A student may apply for admission to this program in the fall quarter of the third year with a grade point average of at least 3.0 at the end of the previous quarter

Microelectronic engineering and material science and engineering, BS/MS degree, typical course sequence *

Year	Quarter	Credit	Hours
First Year			
	Same as BS (Microelectronic Engineering)		50
Second Year			
	Same as BS (Microelectronic Engineering)		49
Third Year			
	Same as BS (Microelectronic Engineering)		32
Fourth Year			
	Electromagnetic Fields II 0301-474		5
	Optics for Microelectronic Engineering 0305-525		4
	Microolithography I 0305-563		3
	Microolithography I Lab 0305-573		1
	Silicon Processes 0305-632		4
	Thin Film Processes 0305-643		4
	VLSI Design 0305-520		4
	Liberal Arts (Core)t		4
	Liberal Arts (Concentration)t		4
	Cooperative Education (1 quarter)		Co-op
	Introduction to Material Science 1028-701		4
	Introduction to Theoretical Methods 1028-704		4
	Introduction to Experimental Techniques 1028-705		4
	MSE Graduate elective		4
Fifth Year			
	I.C. Processing Lab 0305-650		4
	Microelectronic Technologies 0305-655		4
	Microolithography Materials & Processes 0305-666		3
	Microolithography Materials & Processes Lab 0305-676		1
	Seminar/Research 0305-680		2
	Seminar/Research 0305-690		2
	Liberal Arts (Concentration)t		8
	Liberal Arts (Senior Seminar)t		2
	Solid State Science 1028-703		4
	Introduction to Polymer Science 1028-702		4
	MSE Graduate Elective		4
	MSE-Research & Thesis Guidance 1028-879		8
	MSE-Seminar/Defense 1028-890		1
	Total Quarter Credit Hours		227

f See page 7 for liberal arts requirements.

College of Imaging Arts and Sciences

Joan Stone, Dean

The College of Imaging Arts and Sciences encompasses the School of Art, the School of Design, the School for American Crafts, the School of Film and Animation, the School of Photographic Arts and Sciences, and the School of Print Media. Students from nearly every state and many foreign countries are enrolled in the six schools. Students in most of the BFA and MFA programs, with the exception of The School of Film and Animation, pass through Foundations for the fundamental studio course work and art historical grounding in the visual arts.

Visits to the campus and the college are encouraged. Students are invited to attend the frequent open houses held by the Institute. Please contact the Undergraduate Admissions Office at 585-475-6631 or <http://admissions.rit.edu>.

The School of Art

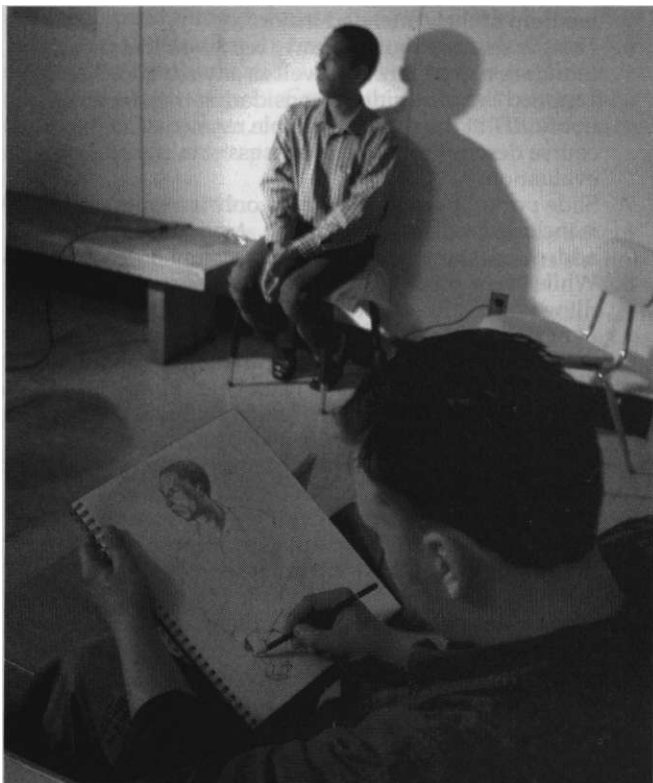
The School of Art enrolls approximately 250 students in programs leading to the following degrees.

Associate in applied science (AAS): illustration and fine arts studio

Bachelor of fine arts (BFA): illustration, medical illustration and fine arts studio (painting, printmaking, sculpture, new forms)

Master of science for teachers (MST): art education and fine arts studio (painting, printmaking, sculpture, new forms)

Master of fine arts (MFA): medical illustration and fine arts studio (painting, printmaking, sculpture, new forms)



The School of Design

The School of Design enrolls more than 650 students in programs leading to the following degrees.

Associate in applied science (AAS): graphic design, interior design and industrial design

Bachelor of fine arts (BFA): graphic design, interior design, industrial design and new media design and imaging

Master of science for teachers (MST): industrial design

Master of fine arts (MFA): computer graphics design, graphic design and industrial design

The School for American Crafts

The School for American Crafts offers crafts programs leading to the following degrees.

Associate in applied science (AAS): ceramics, glass, metals, wood

Associate in occupational studies (AOS): wood

Bachelor of fine arts (BFA): ceramics, glass, metals, wood

Master of fine arts (MFA): ceramics, glass, metals, wood

The School of Film and Animation

About 250 students are enrolled in this school's programs.

Bachelor of fine arts (BFA): film/video production, animation, scriptwriting, film/video craft, and performance/stagecraft

Master of fine arts (MFA): imaging arts with concentrations in animation and film/video production

The School of Photographic Arts and Sciences

More than 800 students are enrolled in the School of Photographic Arts and Sciences, which offers programs leading to the following degrees.

Bachelor of science (BS): biomedical photographic communications, imaging systems management, imaging and photographic technology

Bachelor of fine arts (BFA): advertising photography, photojournalism, and fine art photography

Master of fine arts (MFA): imaging arts with concentrations in photography and museum studies

The School of Print Media

The School of Print Media has approximately 300 students enrolled in the following degree programs.

Bachelor of science (BS): graphic media, new media publishing

Master of science (MS): printing technology, graphic arts systems, graphic arts publishing

College resources

The college's specialized laboratories, studios, advanced computer facilities, and wide range of equipment make it one of the most complete of any degree-granting institution in the fields of photography, printing, art, design, and crafts.

Photographic archives and a comprehensive art library are available for reference; instructional films and other aids are utilized. Exhibitions regularly feature the work of contemporary

painters, designers, photographers, illustrators, and graphic artists, as well as faculty and student work. Opening receptions provide students with the opportunity to meet the artists and photographers.

Major resources available to students include:

- More than 100 fully ventilated darkrooms
- 50 studios
- More than \$50 million worth of printing and publishing equipment in 17 laboratories
- Wallace Library, rich in photography, graphic arts publications and contemporary periodicals in design, arts and crafts for study and research; the Amico Library of online image collections; electronic reserve course material
- Cooperative efforts with the International Museum of Photography at the George Eastman House
- Library of the Kodak Research Laboratories
- The Melbert B. Cary Jr. Graphic Arts Collection, which contains more than 20,000 volumes of rare books illustrating fine printing as well as other materials detailing the history of printing, book design and illustrations, paper-making, binding and other aspects of the graphic arts
- Bevier Gallery
- Gallery r, RIT's student managed metro showcase
- Graphic design archives
- Numerous computer labs

Cooperative education

Students in the college may participate in cooperative education experiences or internships. Part of the student's career exploration, this work experience provides an opportunity to observe and perform work directly related to the student's major. Although there is no required co-op in art and design or crafts, many students co-op during summer quarter.

Co-op is required in the School of Print Media and in the BS programs in the School of Photographic Arts and Sciences. Co-op is optional in the BFA programs in the School of Art, School of Design, the School for American Crafts and the School of Photographic Arts and Sciences. Students are responsible for finding their co-op positions and for performing productively. RIT's Office of Cooperative Education and Career Services offers many services to assist students, from one-on-one job search advisement to a Web-based jobs database. Co-op students have the opportunity to evaluate career goals before making employment decisions, develop insight into their chosen fields, gain professional experience for their resumes and increase their potential for placement and rapid career advancement after graduation.

Policy regarding student work

RIT assumes the right to make a record of student work for use in the classroom or for promotion. This may entail photography, slides or a variety of electronic imaging/recording.

Accreditation

The programs offered in the college are fully accredited and approved by the New York State Department of Education and the Middle States Association of Colleges and Secondary Schools. In addition, the School of Art, the School of Design, School of Photographic Arts and Sciences BFA and MFA programs, the School for American Crafts are accredited by the National Association of Schools of Art and Design. The School of Design's interior design program is accredited by FIDER (Foundation for Interior Design Education Research).

Attendance regulations

Some of the programs in the college utilize experiential learning as an essential part of the educational program. Therefore, it is imperative that the student regularly attend all classes unless specifically excused for special projects or activities by the instructor. Failure to attend classes or to complete assignments will be taken into consideration in grading.

Guidelines for portfolio submission

Acceptance into RIT's School of Art, School of Design, or School for American Crafts requires a combination of academic and creative visual skills. The submission of a portfolio is required for admission. Faculty will review the work to evaluate creative visual skills as well as potential for likely success in the major of choice.

The following guidelines should be used in submitting freshman and transfer portfolios:

1. Portfolio work for acceptance is submitted as 35 mm slides. Submit 10 to 20 slides of your best work in an 8.5" x 11" pocketed vinyl/plastic slide protector page. There should be a minimum of five samples of drawings made from direct observations (not copied from photographs, comics, or "fantasy"). Other work could include painting, photography, page layout, computer images, two-dimensional design, three-dimensional design, sculpture, models, mechanical drawings, and marker renderings.
2. All slides and documents submitted should be clearly labeled. Each slide should be numbered in order in the slide page; this page must be accompanied by a separate sheet of paper with a correspondingly numbered, clear, typed description of the slides. Include information such as title, size, media, assignment or theme, if any, and any exhibition or awards received.
3. Portfolios will be evaluated on the basis of drawing and design ability, original ideas, and craftsmanship. The clarity of the slide images is of utmost importance.
4. *Medical illustration* applicants should include at least six samples of natural forms, such as shells, figures, or animals rendered in a single medium.
5. *School for American Crafts* applicants are encouraged, where possible, to include samples of work done in the medium of their intended major.
6. *Transfer students* should clearly represent their basic foundation experience, as well as any advanced or "applied" work. Students considering transfer should notify RIT at the earliest possible moment. Catalog course descriptions will always assist in transfer credit evaluation.
7. Slide portfolios can be returned only if proper postage is included with the application. A padded, self-addressed, stamped envelope is recommended.
8. While every precaution is taken to ensure proper handling, the Institute assumes no responsibility for loss of or damage to slides.
9. We recommend that you attend an RIT Open House. If you plan to visit campus or need Open House information, please call the Office of Undergraduate Admissions at 585-475-6631. The office can also provide general information about the Institute and its offerings.
10. Original work is reviewed at Open Houses and selected National Portfolio Days. If you wish to have your original work reviewed for acceptance purposes at these events, please call the individual school office to make arrangements.

Send your slide portfolio and completed application to:
Rochester Institute of Technology
Office of Undergraduate Admissions
60 Lomb Memorial Drive
Rochester, N.Y. 14623-5604
585-475-6631

School of Art

The mission of the School of Art, through its nationally recognized programs, is to educate students to be fine artists and illustrators who contribute to their professions, communicate effectively within their disciplines, have a lifelong attitude of inquiry and make a positive impact on society. To this end, we promote an innovative educational community that balances expression, imaginative problem solving, aesthetic understanding, critical thinking and creativity within a studio environment. Gallery r, an art gallery in downtown Rochester operated by School of Art students, helps solidify the learning experience by bringing the work of our students to the greater Rochester community.

The educational objectives of the School of Art are to encourage imagination, creative ability and artistic discrimination; to develop the skills essential for professional competence; to relate the various arts and to help students find the means to enjoy them; and to incorporate studies in the College of Liberal Arts for social and cultural growth, inspiring students to make their maximum contributions as creative artists and citizens.

Programs

Major studies are offered in illustration, medical illustration and fine arts studio. Electives may be pursued, beginning in the second year, in painting, printmaking, sculpture, illustration, computer applications, industrial design, interior design, graphic design, and the crafts. The first year forms the foundation preparation for the major concentration with courses required in drawing, two- and three-dimensional design, and creative sources.

Illustration majors solve communication problems by translating concepts and ideas into images. They study traditional and electronic media and design to prepare themselves for their professional goals.

Fine arts studio serves the student who is interested in careers in the fine arts across a variety of two- and three-dimensional disciplines and media, both traditional and technological. While painting, printmaking, and sculpture are the areas of greatest emphasis, new forms of expression are encouraged through course discipline work.

Medical illustration students learn to provide visual support for communications and instruction in medicine and allied health sciences. Graduating students rely on their course work in biology, anatomy, and art in their professional roles (see course chart, page 78).

Credit requirements

The credit requirements for students admitted in the School of Art (medical illustration, illustration, and fine arts studio) programs are as follows:

	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Required Major			93-94
Professional Electives			18
Open Electives			9
Liberal Arts			50
<u>Art History</u>			<u>18</u>
<i>Total Quarter Credit Hours</i>			188-189

A Freshman Kit is suggested for art, design, and craft students; it costs approximately \$400. Students are generally responsible for the cost of additional supplies.



A student's interior design project is critiqued by classmates.

Electives*

Graphic Design
 Illustration (all sophomore-level courses)
 Graphic Visualization
 Industrial Design Elective
 Interior Design Elective
 Fine Arts Studio (all sophomore-level courses)
 Environmental Design Elective
 Ceramics Elective
 Glass Elective
 Metals Elective
 Textiles Elective
 Woodworking Elective
 Introduction to Filmmaking
 Still Photography I, II, III
 Information Formatting
 Imaging Technology

Art History (select two)	
History of Architecture, Furniture and Interiors †	2039-XXX
History of Design	2039-300
History of Crafts	2039-310
History of Art Criticism	2039-320
15th Century Art & Architecture in Florence and Rome	2039-335
Symbols and Symbol Making	2039-340
16th Century Art & Architecture in Florence and Rome	2039-345
18th and 19th Century Art	2039-360
20th Century Art	2039-370
Renaissance Painting in Flanders	2039-376
Native American Art & Culture	2039-390
Conceptual Art	2039-440

* Electives prerequisite: Completion of foundation program or permission of instructor. Additional selections offered as special topics.
 † Required for interior design majors, 3 qtrs. replaces history elective and Contemporary Art.

**Illustration, medical illustration, fine arts studio, BFA degree,
typical course sequences**

<i>First Year</i> (Foundation Studies)	<i>Quarter Credit Hours</i>
Foundation Raster Imaging 2013-XXX	1
Foundation Vector Imaging 2013-XXX	1
Freshman Elective	4
Two-Dimensional Design 2013-231,232, 233	9
Three-Dimensional Design 2013-241,242, 243	9
Creative Sources 2013-205,206, 207	3
Drawing 2013-211,212, 213	9
Liberal Arts *	12
First-Year Enrichment 1105-051,1105-052	0
Wellness Education Elective †	0
<i>Second Year ‡</i>	
Survey of Western Art & Architecture 2039-225, 226, 227	9
Liberal Arts *	12
Wellness Education Elective †	0
Major (one) (prerequisite: completion of foundation studies)	
Illustration majors must take the following courses (prerequisite: completion of foundation studies):	
Illustration I; Digital Illustration I;	15
Head, Hands, Facial Expressions; Dimensional Illustration; Illustration Techniques I and 3 studio electives	9
Fine arts studio majors must take the following courses (prerequisite: completion of foundation studies):	
Introduction to Fine Arts Drawing; Introduction to Painting; Figure in Motion; Introduction to Non-toxic Printmaking; Basic Sculptural Forms and 3 studio electives	9
Medical illustration majors must take (prerequisite: completion of foundation studies) four of the following:	
Illustration I; Digital Illustration I;	15
Head, Hands, Facial Expressions; Figure in Motion; Zoological and Botanical Illustration	
2 human biology	8
1 general biology	4
<i>Third Year</i>	
Contemporary Art 2039-380 (one quarter required)	3
Art History Electives #	6
Liberal Arts *	12
Major (one) (prerequisite: sophomore core)	
Illustration majors must take	
6 junior-level courses from major concentration and 3 studio electives	18
Fine arts studio majors must take eight junior-level studio courses:	9
4 junior-level courses from major concentration	12
Sculpture Ideation & Series; Figure Studies and 3 studio electives	6
Medical illustration majors must take	9
6 junior-level courses from major concentration and Human Gross Anatomy 2020-431,432 and 3 studio electives	18
<i>Fourth Year</i>	
Open Electives (one per quarter) §	9
Liberal Arts *	14
Major (one) (prerequisite: junior core)	
Illustration majors must take	
7 senior-level courses from major concentration and 3 open electives	21
Fine arts studio majors must take	9
6 senior-level courses from major concentration and 3 open electives	18
Medical illustration majors must take	9
6 senior-level courses from major concentration and 3 open electives	18
	9
Total Quarter Credit Hours	185-191

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Upon completion of the second year, the associate in applied science degree is awarded.

§ Additional intercollege studio courses are available by recommendation of the academic adviser and administrator. Electives are registered on a space-available basis and subject to change without prior notice. Consult the adviser when planning programs.

Art electives listed on page 77.

School of Design

The mission of the School of Design is to provide quality design education and preparation for professional practice.

Our internationally recognized programs educate students to be designers who make valuable contributions to their professions, communicate effectively, maintain a lifelong attitude of inquiry, and make a positive impact on society.

Within the School of Design programs, faculty and students form an inquisitive and dynamic educational community in which creativity, critical thinking, innovative problem solving, aesthetic understanding, cross-disciplinary study, professionalism, and social responsibility are explored, cultivated, and promoted.

Programs

The School of Design offers BFA degree programs in graphic design, interior design, industrial design, and new media design and imaging. All of these programs integrate major courses, studio and open electives, liberal arts, and art/design history. Computer skills, design perspectives, career preparation, and exposure to the related areas of publishing, photography, engineering, and information technology are integrated into the curriculum.

Our faculty offer a variety of experiences and expertise to the curriculum. Students have the opportunity to supplement their academic experience with participation in internships, guest speaker presentations, seminars, field trips, and student chapters of professional organizations.

The school maintains memberships in a variety of professional organizations, including Industrial Designers Society of America, ACM Siggraph, Society of Environmental Graphic Designers, American Society of Interior Designers, American Institute of Architects, ICOGRADA, American Institute of Graphic Arts, and International Interior Design Association (IIDA).

Internet address

Additional information can be requested through the Internet.

E-mail: design@rit.edu

Site: www.rit.edu/design

Phone: 585-475-2668

Transfer admission

Transfer credits from accredited institutions are evaluated on a course-by-course basis. These are awarded on the basis of a required portfolio review and courses related to the major with a grade of C or better. (See portfolio guidelines on page 76.) A summer transfer program or series of summer courses and workshops may be required.

Electives

Students can take a variety of electives at the Institute. Studio/professional electives are offered within the college. Open electives are Institute wide, including this college.

Graphic Design

Graphic design is the study and practice of communicating ideas and information through printed, environmental, and digital presentations. Typography and images are integrated to express messages that interest, inform, and persuade intended audiences. With the addition of visual movement, navigation and sound, digital presentations are also developed. Using research, critical thinking, creativity, and a range of problem-solving principles, graphic designers solve complex visual communication problems within the constraints of time, space, budget, and technology. Areas of study include publication design, signage and environmental design, corporate identity, interactive media, packaging, and information design.

Industrial Design

Industrial design involves the integration of form and function as products are designed and created by combining materials, process, computer aided design, and human factors. Blending technical instruction with studio assignments, studies also include package, exhibit, and furniture design. Aesthetic sensitivity, technical competence, and analytical thought are developed and applied to meet the challenge of designing products for human needs.

Interior Design

Interior design is the creative integration of form, materials, function, and aesthetics within interior space. Students develop an understanding of—and sensitivity to—history, future technology, environment, economics, architecture, and societal needs by exploring projects that develop aesthetic understanding, technical proficiencies, and preparation for professional certification and licensing. (*Accredited by the Foundation for Interior Design Education Research*)

The mission of the interior design program is "to educate students to be designers who contribute to their professions, communicate effectively within their discipline, have a life-long attitude of inquiry, and make a positive impact on society. To this end, we promote an innovative educational community that balances expression, imaginative problem solving, aesthetic understanding, professional responsibility, and creativity."

Credit requirements

The credit requirements for students admitted to the School of Design programs are as follows:

	<i>Quarter Credit Hour</i>
Graphic Design	
Major (including freshman core)	90
Professional Electives	18
Open Electives	9
Liberal Arts	50
Design and Art History	18
<hr/>	
<i>Total Quarter Credit Hours</i>	185
Industrial Design	
Major (including freshman core)	90
Professional Electives	18
Open Electives	9
Liberal Arts	50
Design and Art History	18
<hr/>	
<i>Total Quarter Credit Hours</i>	185
Interior Design	
Major (including freshman core)	93
Professional Electives	18
Open Electives	9
Liberal Arts	50
Design and Art History	18
<hr/>	
<i>Total Quarter Credit Hours</i>	188
New Media Design & Imaging	
Major (including freshman core)	112
Professional Electives	3
Open Electives	9
Liberal Arts	50
Design and Art History	18
<hr/>	
<i>Total Quarter Credit Hours</i>	192

A freshman kit is suggested for art, design, and craft students; it costs approximately \$400. Students are generally responsible for the cost of additional supplies.

Graphic design, BFA degree, typical course sequence

	<i>Quarter Credit Hours</i>
<i>First Year</i>	
Freshman Electives	6
<i>Freshman offerings of Computer Skills: Vector Imaging, and Computer Skills: Raster Imaging are required for graphic design freshmen; 2 credits each</i>	
Design Survey 2015-222	2
Creative Sources 2013-205	1
Drawing 2013-211,212,213	9
Two-Dimensional Design 2013-231,232	6
Three-Dimensional Design 2013-241,242,243	9
Elements of Graphic Design (for freshmen) 2010-301	3
Liberal Arts *	12
First-Year Enrichment 1105-051,1105-052	0
Wellness Education Elective †	0
<i>Second Year ‡</i>	
Survey of Western Art & Architecture 2039-225,226,227	9
Liberal Arts *	12
Wellness Education Elective †	0
Majors must take each of the following courses in sequence to complete sophomore year: for current students	
Typography I 2010-302	3
Type & Image 2010-303	3
Introduction to Time-Based Design 2010-313	3
Studio electives (one each quarter) §	9-12
<i>Third Year</i>	
History of Graphic Design 2010-471	3
Art/Design History Electives	6
Liberal Arts *	12
Majors must take each of these or approved Special Topics courses in sequence to complete junior year in graphic design (prerequisite: completion of sophomore year in graphic design)	
Typography II 2010-401	3
Imagery in Design 2010-402	3
Symbol & Icon Design 2010-403	3
Publication Design 2010 404	3
Environmental Design 2010-406	3
Information Design 2010-405	3
Studio electives (average of one per quarter) §	9
<i>Fourth Year</i>	
Liberal Arts *	14
Majors must take nine of these senior-level courses or approved	
Special Topics for seniors (prerequisite: completion of junior year):	
Career Skills & Professional Practices 2010-501	3
Corporate Design 2010-502	3
Design Systems 2010-504	3
Senior Project 2010-513	3
Advertising Design 2010-505	3
Concept & Symbolism 2010-506	3
Design for Marketing 2010-507	3
Design Specifications 2010-509	3
Advanced Information Design 2010-511	3
Intro, to Interactive Media Design 2010-512	3
Editorial Design 2010-514	3
Public & Social Service Design 2010-518	3
Senior Internship 2010-523	3
Portfolio Development & Presentation 2010-524	3
Intro, to Web Design 2010-561	3
Advanced Web Design 2010-562	3
Advanced Interactive Media 2010-567	3
Open electives (one per quarter) §	9
<hr/>	
<i>Total Quarter Credit Hours</i>	185-188

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Upon completion of the second year, the associate in applied science degree is awarded.

§ Additional intercollege studio courses are available by recommendation of the academic adviser and administrator. Electives are registered on a space-available basis and subject to change without prior notice. Consult the adviser when planning programs.

Interior design, BFA degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Electives (Elective offerings of Design Survey and one of the Computer Skills courses at 2 credits each are required for interior design freshmen)	6
Design Survey 2015-222	2
Creative Sources 2013-205	1
Drawing 2013-211,212,213	9
Two-Dimensional Design 2013-231,232,233	9
Three-Dimensional Design 2013-241,242,243	9
Liberal Arts *	12
First-Year Enrichment 1105-051,1105-052	0
Wellness Education Elective †	0
<i>Second Year ‡</i>	
Survey of Western Art & Architecture 2039-225, 226,227	9
Liberal Arts *	12
Wellness Education Elective †	0
Majors must complete each of the following courses to complete sophomore year (prerequisite: completion of foundation studies):	
Architectural Drawing 2015-305	3
Perspective Rendering 2015-306	3
Introduction to Interior Design 2015-307	3
Computer-Aided Design Applications 2015-308	3
Model Building & Human Dimension 2015-311	3
Studio elective (one each quarter) §	9-12
<i>Third Year</i>	
Art History 2039-XXX (History of Architecture, Furniture & Interiors I, II, III)	9
Liberal Arts *	12
Majors must take each of these courses to complete junior year (prerequisite: completion of sophomore year):	
Hospitality Design 2015-404	3
Applications of Color & Light 2015-405	3
Retail Design 2015-406	3
Building Construction Systems 2015-407	3
Office Design & Planning 2015-408	3
Interior Specifications 2015-409	3
Studio Electives (one per quarter) §	9
<i>Fourth Year</i>	
Liberal Arts*	14
Majors must take each of these courses to complete senior year (prerequisite: senior standing in interior design):	
Multipurpose, Multistory Design 2015-504	4
Building Codes & Regulations 2015-505	2
Environmental Control Applications 2015-506	3
Healthcare Design 2015-507	4
Interior Design Business Practices 2015-508	2
Career Planning 2015-509	2
Working Drawings 2015-510	4
Special Projects 2015-511	3
Electives (one per quarter)	9
Total Quarter Credit Hours	188-191

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Upon completion of the second year, the associate in applied science degree is awarded.

§ Additional intercollege studio courses are available by recommendation of the academic adviser and administrator. Electives are registered on a space-available basis and subject to change without prior notice. Consult the adviser when planning programs.

Industrial design, BFA degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Electives (Elective offerings of Design Survey and one of the Computer Skills courses at 2 credits each are required for industrial design freshmen)	6
Design Survey 2015-222	2
Creative Sources 2013-205	1
Drawing 2013-211, 212,213	9
Two-Dimensional Design 2013-231,232,233	9
Three-Dimensional Design 2013-241, 242,243	9
Liberal Arts *	12
First-Year Enrichment 1105-051,1105-052	0
Wellness Education Elective †	0
<i>Second Year ‡</i>	
Survey of Western Art & Architecture 2039-225,226, 227	9
Liberal Arts *	12
Wellness Education Elective †	0
Majors must take each of these courses to complete sophomore year (prerequisite: completion of foundation studies):	
Layout Systems 2035-305	3
Technical Drawing 2035-306	3
Graphic Visualization 2035-307	3
Computer-Aided Design Applications I 2035-310	3
Model Making 2035-311	3
Concept Design Sketching 2035-312	3
Studio electives (one each quarter) §	9-12
<i>Third Year</i>	
Contemporary Art 2039-380 (one quarter required)	3
Art History Electives #	3
Liberal Arts *	12
Majors must take each of these courses to complete junior year (prerequisite: completion of sophomore industrial design):	
Materials & Processes Applications 2035-405	3
Consumer Product Design I 2035-406	3
Human Factors Applications 2035-407	3
Equipment Design 2035 408	3
Consumer Product Design II 2035-410	3
History of Industrial Design 2035-442	3
CAD Applications II 2035-418	3
Studio electives (one each quarter) §	9
<i>Fourth Year</i>	
Liberal Arts*	14
As of fall 2000, majors must take 6 of the following courses to complete senior year (prerequisite: senior standing in industrial design):	
Design Collaborative 2035-506	3
Furniture Design 2035-508	3
Professional Practice 2035-510	3
Advanced Product Design 2035-512	3
Career Planning 2035-513	3
Toy Design 2035-522	3
Package Design 2035-527	3
Exhibit Design 2035-533	3
Open electives (one each quarter) §	9
Total Quarter Credit Hours	185-188

* See page 7 for liberal arts requirements.

f See page 9 for wellness education requirements.

‡ Upon completion of the second year, the associate in applied science degree is awarded.

§ Additional intercollege studio courses are available by recommendation of the academic adviser and administrator. Electives are registered on a space-available basis and subject to change without prior notice. Consult the adviser when planning programs.

#Art history electives listed on page 77.

New Media Design and Imaging

This bachelor of fine arts degree was created in response to a growing demand for college graduates with strong digital imaging skills, highly refined design sensitivities, and the ability to visualize concepts. These students explore all forms of digital media as well as traditional imaging techniques to become creative and skilled multimedia designers. Students gain experience in concept development, design development, digital sound, animation, interactivity, programming, digital photography and video, multimedia project development, and digital imaging. They also explore gaming, entertainment multimedia, virtual reality, and other facets of new media. Students prepare and deliver projects executed in all of the major media, including CD-ROM, DVD, and the Web. This program shares courses with the BS in new media publishing, and the BS new media option in information technology. This is an exciting, dynamic interdisciplinary curriculum in step with cutting edge technology and ready to grow with it.

New media design and imaging, BFA degree, Quarter Credit Hours
typical course sequence

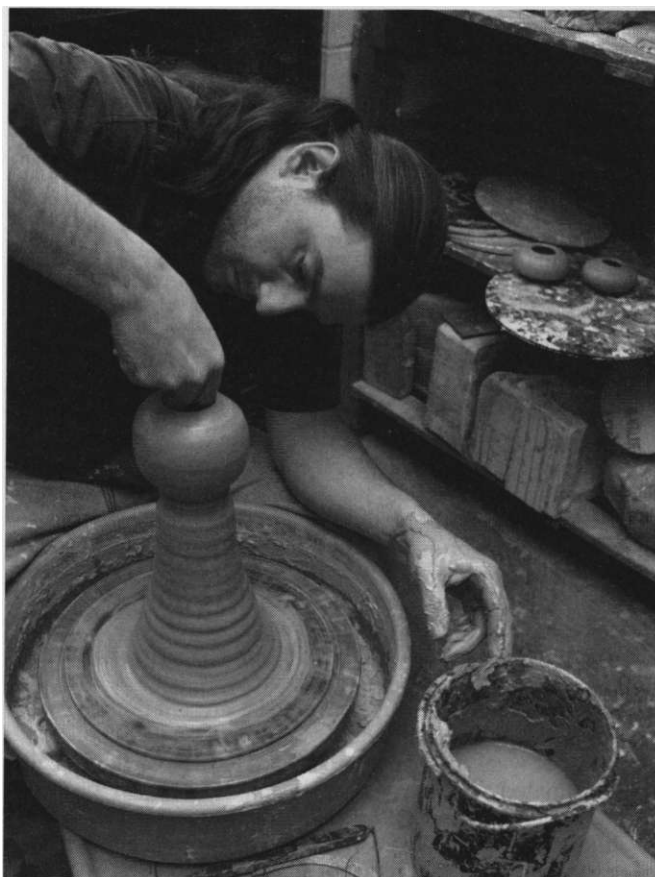
<i>First Year</i>	
Drawing 2013-211,213	6
2-D Design 2013-231,232	6
New Media Perspectives 2083-201	3
Imaging for New Media 2083-206	3
Time-Based Imaging 2009-411	4
Intro, to Programming for Digital Media 4002-230	4
Elements of Graphic Design for New Media 2009-213	3
Digital Video for Multimedia 2065-217	4
Introduction to Multimedia 4002-320	4
Liberal Arts *	12
First-Year Enrichment 1105-051,1105-052	0
Wellness Education Elective †	0
<i>Second Year</i>	
Survey of Western Art & Architecture 2039-225,226,227	9
3-D Form & Space 2009-212	3
Typography 2009-311	3
New Media Publishing 2083-211	3
Web Site Design & Implementation 4002-409	4
Intro, to Digital Animation 2065-382	4
Information Design 2009-312	3
Elective	3
Design of Graphic User Interface 2009-323	4
Programming for New Media II 4002-231	4
Web Programming 4002-539	4
Intro, to Computer Imaging 2009-313	3
Liberal Arts *	12
Wellness Education Elective †	0
<i>Third Year</i>	
Design/Photography/or Art History elective	6/8
Advanced Design for Networking 2009-401	3
Writing Elective ‡	3
History of Computer Graphics 2009-422	3
Emerging Multimedia Design & Imaging Tools 2009-402	3
Dynamic Typography 2009-412	3
Dynamic Information Design 2009-403	3
Advanced 3-D Techniques 2009-413	3
Studio Elective	3
Open Elective	3/4
Liberal Arts *	12
<i>Fourth Year</i>	
Dynamic Persuasion Design 2009-501	3
Career Skills 2010-501	3
QTVR & Multimedia Design 2009-511	3
New Media Team Project 1 2009-542	4
New Media Team Project 2 2009-543	4
Virtual Entertainment 2009-502	3
Open Elective	3/4
Liberal Arts	12
Senior Seminar (Liberal Arts)	2
Total Quarter Credit Hours	183-187

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Writing elective can be taken from various departments. Consult with your faculty adviser.

§ Team Project 1 and 2 are taken for a total of 8 credits over two quarters, or all 8 credits can be taken in spring quarter.



School for American Crafts

As an internationally recognized school that merges art with craft, the School for American Crafts is a leader in crafts education. The School for American Crafts will provide an educational experience that balances technical expertise with aesthetic expression in the creative and technical understanding of wood, metal, clay, and glass.

Our educational objectives seek to stimulate creative imagination and technical invention, develop knowledge of process and command of skills, and foster appreciation, not only of the crafts, but also the related arts. The programs strive to inspire the student to seek continual improvement through analysis and self-evaluation.

Programs of study

The School for American Crafts offers a full-time program of study with opportunity to major in one of four craft fields: ceramics and ceramic sculpture, glass and glass sculpture, metals and jewelry design, and woodworking and furniture design. After satisfactory completion of two years of study, the associate in applied science is granted. After successful completion of the four-year program, the bachelor of fine arts is awarded.

The credit requirements for the bachelor of fine arts are:

	Quarter	Credit	Hours
Required Craft Major Studio			90
Required Electives			9
Business Practices			9
Liberal Arts*			50
Art History			18
Creative Sources			3
Freshman Elective			6
Total Quarter Credit Hours			185

* See page 7 for liberal arts requirements.

A two-year associate in occupational studies also is offered in woodworking and furniture design. The credit requirements are:

	<i>Quarter Credit Hours</i>
Required Wood Major	36
Creative Sources	3
Drawing	9
Two-Dimensional Design	9
Three-Dimensional Design	9
Advanced Drawing	9
Art History Elective †	9
<u>Professional Business Practices</u>	<u>9</u>
<i>Total Quarter Credit Hours</i>	<i>93</i>

* See page 7 for liberal arts requirement
 † Art electives listed on page 75.

The School for American Crafts offers a crafts residence program. Participants will be accepted in the ceramics, glass, metals, and wood studios.

Residence positions are limited and will be awarded on the basis of the submission of a portfolio, transcripts and references, etc. An interview is required. Accepted studio residents are required to register for at least two (2) credits of independent study during every quarter of residence. These two credits can be taken as an audit, thus reducing the tuition cost to the resident.

Accepted residents are expected to be present in their major studio during class hours and to contribute up to 10 hours of work per week in the major studio. These work hours will be coordinated and overseen by the major faculty in the area. In exchange the school will provide workspace, access to the facilities and supportive instruction. The resident is invited to participate in the full range of studio activities.

Participants may be people seeking additional studio experience prior to undergraduate or graduate study, early career professionals, or teachers on leave who wish to work again in an academic studio environment, etc. The major faculty in the area will make decisions concerning appropriate candidates.

Course descriptions

For a complete outline of courses, please refer to the course description section of this bulletin.

Extended Studies for the School of Art and School of Design

Fine and Applied Arts

Zerbe Sodervick, Chairperson

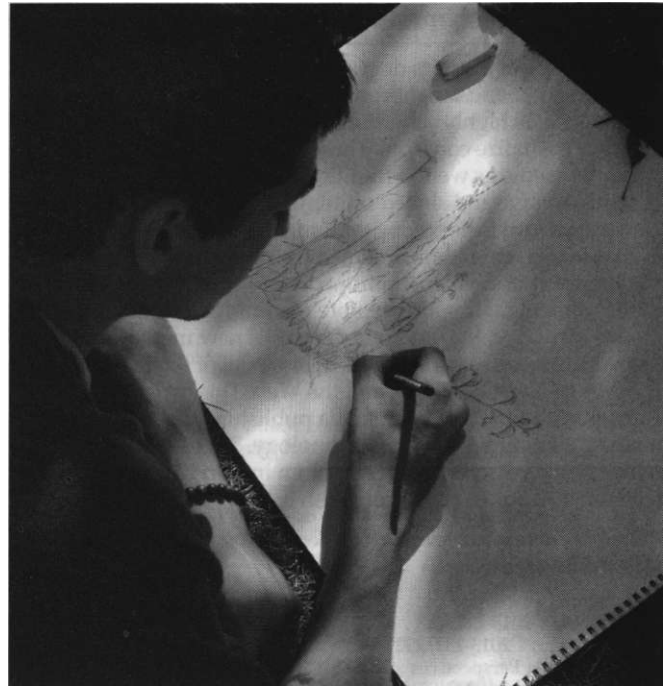
Fine and applied arts courses are designed to fulfill two overriding objectives—personal growth and cultural enrichment. A menu of individual courses as well as diploma programs are offered.

Options begin with introductory courses that provide a basic exploration of the creative process and help students develop visual organization skills. After taking these courses, the student will be able to earn a fine and applied arts diploma in any of three areas. Some courses are only offered in alternate years.

Students should consult with an adviser to plan their course of study and to clarify goals. The chairperson can be consulted for course substitution. Students must achieve a program GPA of at least 2.0 in order to be certified.

Fall 2004 extended studies will offer new special topics courses in Art Gallery/Museum Studies; Business Skills for the Artists; and Electronic Tools and Concepts for Teaching Junior/Senior High Art.

For more information on evening electives, call the chairperson at 585-475-4977.



	<i>Quarter Credit Hours</i>
Core requirements	
Basic Drawing & Media 2012-211,212,213	6
Basic Design 2012-201,202,203	6
Fine Arts: Visual Arts 0505-213	4
<i>Core Total</i>	<i>16</i>
Fine arts	
Core requirements *	16
Introduction to Painting 2012-286	2
or	
Painting 2012-288	
or	
Watercolor 2012-293	2
Introduction to Non-toxic Printmaking 2012-296	2
or	
Printmaking Workshop 2012-396	
Sculpture 2012-398	2
Basic Figure Drawing 2012-215	2
Figure Drawing 2012-225	2
Rendering Techniques I 2012-266	2
Rendering Techniques II 2012-267	2
<i>Diploma Total</i>	<i>48</i>
Advertising design	
Core requirements *	16
Display Design 2012-256, 257,258	6
Advanced Design & Typography 2012-246, 247,248	6
Graphic Design 2012-231,232,233	6
Advertising Design 2012-241, 242,243	6
Basic Figure Drawing 2012-215	2
Electives with adviser's approval	6
<i>Diploma Total</i>	<i>48</i>
Interior design	
Core requirements *	16
Display Design 2012-256, 257,258	6
Marketing 0681-361	4
Interior Design 2012-251,252	4
History of Interior Design 2012-254	2
Environmental Design, 2012-261,262,263	6
Electives with adviser's approval	10
<i>Diploma Total</i>	<i>48</i>

* Core requirements are prerequisite for all diploma programs.

For more information on evening electives offered by the School for American Crafts, call 585-475-6114.

School of Film and Animation

Howard Lester, Chair

The degree program in film/video production and animation is for students who recognize the moving image as an expressive force uniquely important to modern life. It will acquaint students with film, video, and animation as creative media and develop their production skills.

The curriculum emphasizes production. Freshmen begin working in 16mm film and animation their very first quarter, continue with actual production every quarter until they graduate and may specialize in motion pictures, video, or traditional or computer animation. Our goal is that all our graduates be able to produce, creatively and practically, their own independent work or to fulfill any production responsibility in any medium suitable to their interests and abilities.

Through lectures and laboratories students develop individual skills in moving-image communications and learn the aesthetic principles governing the art. Technology and technique are never taught as an end in themselves but in terms of learning to use the tools necessary to achieve a creative goal in relation to the audience. The curriculum also recognizes the increasing interrelationship between the technologies of film, video, animation, and computers. Other RIT students may enroll in film/video courses with the permission of the instructor. There are foreign-exchange opportunities.

Students produce several short films or animations, working through all phases of production: scripting, production planning, budgeting, shooting, sound editing, and working with a laboratory. Students combine their learning of visual and sound artistry through hands-on experience with camera and sound equipment. Because film, video, and animation projects are designed by individual students, a wide variety of styles and intentions is expressed in the department's work.

Graduate programs

The School of Film and Animation offers the MFA in imaging arts with two areas of concentration: film/video production and animation. The MFA degree is described in the *Graduate Bulletin*, available from the Office of Graduate Enrollment Services.

Summer session

The School of Film and Animation offers a limited selection of courses in the summer session. These range from beginning courses to those requiring a substantial background. For detailed information, write the school.

Internet address

Additional information can be requested via e-mail to sofa@rit.edu.

Memberships

The school maintains memberships in a number of professional organizations: Animation World Network, College Art Association, RAVA (Rochester Audio Visual Association), Society of Motion Picture and Television Engineers, University Film and Video Association, SIGGRAPH, BEA.

Transfer admission

Transfer credits from accredited institutions are evaluated on a course-by-course basis. Transfer credits for film animation courses are awarded on the basis of a portfolio in addition to course work with a grade of C or better. The portfolio will be reviewed by the department chair.

Writing policy

The School of Film and Animation has a minimum requirement within each of its degree programs. A copy of the school's official writing competency policy may be obtained from the department or from the Office of Academic Student Services.

Film/video/animation, BFA degree,
typical course sequence

Quarter Credit Hours

First Year

Film/Video Production I, II, III	2065-201,202,203	12
Film Language	2065-222	4
Introduction to Animation	2065-331	4
Story and Structure	2065-206	2
Scriptwriting I	2065-342	3
Foundations: Computer Imaging	2076-XXX	3
Liberal Arts (Core) *		16
First-Year Enrichment	1105-051,052	0
Wellness Education †		0
Animation Emphasis		
Single Frame Motion	2065-263	2
Intro, to 3D Modeling for Animation	2065-457	4

Second Year

Scriptwriting II	2065-343	3
Film/Video Electives		9-12
Production Emphasis		
Video Tools & Technology	2065-311	5
Intro, to 16mm Sync. Sound	2065-431	5
Film/Video History & Aesthetics		12
Film/Video Production Workshop		4
Animation Emphasis		
Video Tools & Technology	2065-311	5
Animation Pre-production	2065-352	4
Advanced Animation Tools	2065-332	4
or		
Introduction to 2D Computer Animation	2065-427	5
Introduction to 3D Computer Animation	2065-361	3
Animation Production Workshop	2065-333	4
or		
Experimental Animation Workshop	2065-447	4
Foundation Drawing	2013-211,212	6
Sculpture	2021-XXX	3
Design Elective		3
Liberal Arts Core *		12
Wellness Education †		0

Third Year

Film/Video History & Aesthetics		6-8
Senior Project Seminar	2065-413	1
Production Emphasis		
Film/Video Production Workshops		8
Film/Video Electives		9-12
Advanced Scriptwriting	2065-444	4
Animation Emphasis		
Advanced Animation Tools	2065-332	4
or		
Introduction to 2D Computer Animation	2065-427	5
or		
Introduction to 3D Computer Animation	2065-361	4
Intro 3D Computer Animation		4
or		
Video Tools & Technologies	2065-311	5
Advanced Animation Workshop I	2065-437	
or		
Experimental Animation Workshop	2065-447	4
Advanced Animation Workshop II	2065-438	4
Scriptwriting for Animation	2065-XXX	4
Liberal Arts (Concentration) *		12
Film/Video Electives		6-8

Fourth Year

Senior Project I, II	2065-507,508	10
Senior Project III	2065-509	2
Senior Forum II, III	2065-512,513	4
Film/Animation Electives		12
Film/Animation History & Aesthetics		6-8
Liberal Arts (Electives) *		12
Liberal Arts Seminar *		2

Total Quarter Credit Hours

179-189

* See page 7 for liberal arts requirements,

† See page 9 for wellness education requirements.

School of Photographic Arts and Sciences

William W. DuBois, Administrative Chair

The programs of the School of Photographic Arts and Sciences are designed to prepare students for a wide range of careers in photographic and other imaging fields. Studies in photographic arts involve both technical and creative experiences for visual problem solving. The science and technology division of the school emphasizes the physical principles of imaging through studies in image evaluation, unconventional imaging applications and computer applications, as well as other high-technology areas. All first-year BFA students in photography and students in biomedical photographic communications and technical photography are required to have their own handheld small- or medium-format camera and a professional light meter.

Students have the opportunity to supplement their course work with participation in internships, field trips, presentations by guest speakers, departmental student organizations and related activities.

We urge students to take advantage of Rochester's historic connection with photography. A comprehensive schedule of programs, including exhibitions, lectures and seminars, is offered by the city's array of cultural institutions.

Degrees offered

BFA degree in advertising photography – Douglas Manchee, program chair;

BFA degree in fine art photography – Ken White, program chair;

BFA degree in photojournalism – Douglas Ford Rea, program chair;

BFA degree in visual media – William Dubois, program chair;

BS degree in imaging and photographic technology – Andrew Davidhazy, administrative chair;

BS degree in biomedical photographic communications – Michael Peres, program chair;

BS degree in imaging systems management – Nitin Sampat, James E. McGhee Professor; program chair

Graduate programs

The School of Photographic Arts and Sciences offers the MFA in imaging arts. We also offer graduate-level courses of study in photographic preservation and archival practice. The MFA degree is described in the *Graduate Bulletin*, available from the Office of Graduate Enrollment Services.

Summer session

The School of Photographic Arts and Sciences offers a wide selection of photographic courses in the Summer Session. These range from beginning photography courses to those requiring a substantial photographic background. For detailed information, write the appropriate department of the school.

Internet address

Additional information can be requested through the Web site of the School of Photographic Arts and Sciences: photography.rit.edu.

Memberships

The school maintains memberships in a number of professional organizations: American Management Association, American Society of Training and Development, Photomarketing Association, Photo Imaging Educators Association, Association of Professional Color Laboratories, College Art Association, Bio Communications Association, National Microfilm Association, National Press Photographer Association Student Chapter, Ophthalmic Photographers Society, Society for Imaging Science and Technology, Society for Photographic Education, International Society for Optical Engineering, International Panoramic Photographers Association, and American Society of Media Photography.

Transfer admission

Transfer credits from accredited institutions are evaluated on a course-by-course basis. Transfer credits for photography courses are awarded on the basis of a portfolio in addition to course work with a grade of C or better. The portfolio will be reviewed by the program chair. (Portfolio guidelines are available from the Undergraduate Admissions Office.)



Oct. 28, 1999, New York City: The World War II aircraft carrier *Intrepid* became the subject of the School of Photographic Arts and Sciences' 14th annual Big Shot. Using only handheld camera flashes, flashlights, and even lighters, more than 1,200 people—including RIT students and alumni, as well as the general public and 200 high school students from the New York City area—lined the flight deck, Pier 84, and 12th Avenue to light the night scene.

Writing Policy

The School of Photographic Arts and Sciences has a minimum requirement within each of its degree programs. A copy of the school's official writing competency policy may be obtained from the department or from the Office of Academic Student Services.

Summer transfer programs

Students who meet the requirements for course work and portfolio work may be accepted into one of several summer transfer programs. These 10-week sessions of intensive study bring students to a second- or third-year technical and aesthetic level in their photography programs. Descriptions of the requirements for each program and year level follow.

Second-year transfer credit requirements

Imaging and photographic technology – To become a fall transfer into the sophomore year, candidates must complete a Summer Transfer Program and should have previously completed the following college-level course work: at least one year of mathematics, including an introductory calculus course; at least four liberal arts courses; and two courses in B&W photography. Additional photography courses may exempt a student from Photography I. Credit for this is evaluated by transcript and submission of a portfolio. Other credits earned also may be accepted for transfer to upper years. These include college physics, liberal arts, technical writing, computer programming, chemistry, and additional mathematics.

Biomedical photographic communications – To become a fall transfer into the sophomore year, it is suggested that candidates previously complete the following college-level course work: 12 credit hours of liberal arts, 8 of science and 12 of photography.

Applicants may submit a transcript of college courses completed and request a transfer credit audit. Transfer credit for Photography I is based on acceptable comprehensive portfolio review, satisfactory completion of an appropriate college photography course and/or evidence of appropriate work experience.

Advertising photography, fine art photography, or photojournalism – Normally a minimum of 30 quarter credits, of which there are 9 credits in design; 12 in liberal arts; and 18 in photography, photography and studio art, or an accepted equivalent. The student may be required to complete the 10-week intensive summer course Photography I.

Third-year transfer credit requirements

Advertising photography, fine art photography, or photojournalism – Normally an applicant must have completed an associate degree or equivalent of two years of college with a major in photography (a minimum of 25 quarter credits of photography) plus studio art courses for a minimum of 9 quarter credits, liberal arts for 24 quarter credits, and art history for 9 quarter credits. The student also must complete the 10-week intensive summer course BFA Photography II and must make up the courses Materials and Processes of Photography and History and Aesthetics of Photography. Portfolio required.

Advanced entry into advertising photography, fine art photography, or photojournalism requires a portfolio review as well as evaluation of transfer credit.

If a student has completed two or more years of intensive study in photography at an accredited school, he or she may submit a portfolio for evaluation by the BFA faculty. A list of the requirements for submission of the portfolio may be obtained from the Undergraduate Admissions Office, Bausch & Lomb Center, 60 Lomb Memorial Drive, Rochester, N.Y. 14623-5604.

Biomedical Photographic Communications

Michael Peres, Program Chair

RIT has the only program in the nation that grants a bachelor of science degree in this exciting area of visual communications that combines photography and biology. The program prepares students for photographic and imaging careers in various science institutions, such as forensic labs, pharmaceutical companies, and military bases as well as in the area of ophthalmic photography, which is the only form of photography that is diagnostic. In addition, because of the unique blend of courses, recent graduates have been very successful finding positions in the electronic imaging field as technical service representatives or producers of multimedia and Web publishing.

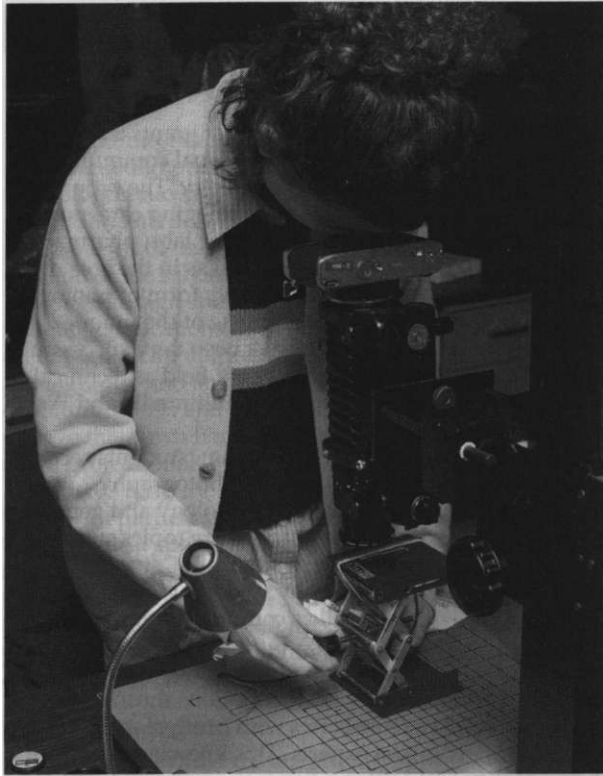
During the first two years of the program, students receive a solid foundation in analog and digital photography, desktop, and Web publishing as well as biology and general science courses. Included in these classes are topics such as close-up and high-magnification photography, studio lighting, ethics, ophthalmic photography, and imaging technologies. Desktop publishing as well as computer graphics will be explored.

By the end of their second year, students will have been introduced to a wide variety of career options through the program's interactive lecture series with professional biomedical and new media experts. This knowledge will help them identify and secure a summer co-op position. At least one co-op or internship is required for graduation. Co-ops are an opportunity for students to gain experience in their field and are generally undertaken between their second and third academic years. Most co-ops are paid positions and are typically 8 to 10 weeks long for 20 to 40 hours per week.

In the junior and senior years, the curriculum becomes very flexible, allowing students to choose elective courses and build a photographic concentration from a wide variety of courses taught in the College of Imaging Arts and Sciences, the College of Science or the College of Computing and Information Sciences. This flexibility coupled with the personal attention of faculty advising allows students to focus on their career and educational goals. It is not uncommon for graduates to continue their studies in graduate school programs in imaging, medicine, or information technology.

Since 1968 most of the nearly 500 graduates of the BPC program have been actively recruited by various companies that produce visual communications materials. Many of these graduates have become directors and leaders in their respective institutions and companies. Today the biomedical photographic communications program boasts a placement rate of well over 85 percent.

For more information, visit the department Web page at www.rit.edu/-biomed.



Biomedical photographic communications, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
First-Year Enrichment 1105-051,1105-052			0
Biomedical Photography I 2061-201,202,203			18
Materials & Processes of Photography 2076-211,212, 213			9
Survey of Biomedical Photography 2061-213			1
Preparation of Biomedical Visuals I 2061-311			3
Human Biology I, II 1004-211,212			6
Human Biology Lab I, II 1004-231,232			2
Liberal Arts (Core) *			12
Wellness Education †			0
Second Year			
Biomedical Photography II 2061-301, 302,303			15
Web Publishing 2061-361			4
Preparation of Biomedical Visuals III 2061-313			3
Digital Photography I, II 2061-316,318			8
Medical Terminology 1026-301			3
Liberal Arts (Core) *			16
Wellness Education †			0
Summer Quarter Co-op (10 weeks in a medical setting) ‡			
Third Year			
AV Production I 2061-401			4
Advanced Photography in Bio. Comm. 2061-402,403			8
Professional Electives §			9-12
Science Electives #			5-8
Liberal Arts (Concentration) *			12
Co-op (Optional)			
Mathematics			8
Fourth Year			
Photographic Concentration 2061-501, 502, 503			12
Business Electives "			8
Professional Electives §			9-12
Liberal Arts (Elective) *			12
Liberal Arts (Senior Seminar) *			2
Total Quarter Credit Hours			189-198

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Associate degree awarded upon successful completion of second year and the internship.

§ Possible professional electives: ophthalmic photography, portable video, holography. Selected professional courses may be substituted for 4, 8 or 12 credits with written permission of adviser.

Options include electron microscopy, computer courses, advanced courses in the biological sciences, printing & electronic prepress, multimedia, computer animation, ophthalmic photography.

Imaging and Photographic Technology

Andrew Davidhazy, Administrative Chair

The curriculum blends a contemporary professional photography program with specialized education in technical, industrial and scientific imaging applications.

It prepares students for entry into any of a variety of picture-making and non-picture-making positions by providing them with a background adaptable to a variety of fields. Students' technical skills are complemented by academic course work in mathematics, computers, science and liberal arts, including technical writing.

At the same time, however, students develop expertise in a professional or technical field of their choice by taking at least six self-selected elective courses in any one of several available areas of concentration.

The picture-making aspects of photography are included in all four years of the program, with a transition from a comprehensive course in black-and-white photography through color photography and color printing and architectural or nature photography. The required technical courses include Photographic Sensitometry, Optics and Chemistry, Color Measurement and High-Speed Photography. Also available are a variety of technical and photographic electives such as Holography, Photonics, Scanning Electron Microscopy and Photoinstrumentation Applications. Computing and electronic imaging are emphasized from the first year in such courses as C++ Programming, Digital Image Processing and Introduction to Multimedia.

In their last two years, students may choose a field of concentration (see footnote **, next page). While every student's core program is similar, each graduate's background varies with his or her choice of concentration area.

Another unique feature of the program is that graduates complete at least two required cooperative education work blocks before graduation. Co-op is a definite asset to graduates of any program.

An employment survey conducted by the School of Photographic Arts and Sciences shows the need for graduates with imaging and photographic technology backgrounds well into the future. Recent graduates of this program are employed as photographic technicians, technologists or research associates in various industrial, scientific or business enterprises; as photographic engineers or junior engineers in a number of imaging-related disciplines; as technical and sales representatives; technical illustrators; high-speed photographers; and as corporate, industrial, advertising and commercial photographers. The department chairperson has a comprehensive list of graduates' careers available.

The Technical Photography Student Association promotes professionalism among students and interaction with the imaging and photographic technology industry. The association regularly invites professionals to campus for lectures and demonstrations.

If you would like specific information, a personal interview, tour or an opportunity to visit classes and talk with some of our students, call the administrative chair, Andrew Davidhazy, at 585-475-2592 or contact by e-mail at andpph@rit.edu.

For additional information including portfolio requirements for this program, visit the department's home page at www.phototech.rit.edu.

Imaging and photographic technology, BS degree,
typical course sequence

First Year	Quarter	Credit	Hours
Photography I	2076-201,202,203		12
Materials & Processes of Photography	2076-211,212,213		9
Intro, to Programming *	4002-208		4
Programming with Classes	4002-210		4
System Design/Graphic Presentations	2076-401		3
Elementary Calculus I, II	1016-214,215 †		6
Liberal Arts (Core) ‡			12
First-Year Enrichment	1105-051,1105-052		0
Wellness Education §			0
Second Year			
Photographic Sensitometry	2076-301		4
Technical Photographic Chemistry	2076-302		4
Photographic Optics	2076-303		4
Color Printing Theory	2076-312		4
Color Measurement	2076-313		4
College Physics	1017-211,212,213 #		9
College Physics Lab	1017-271,272,273		3
Liberal Arts (Core) †			16
Wellness Education ‡			0
Cooperative Education (Summer)		Co-op	
Third Year			
Concentration Electives 1			12
Color Photo/Design	2076-311		4
Nature Photography	2076-471		
or			
Architectural Photography	2067-478		4
Intro, to Digital Image Processing	2076-491		4
Electronic Sensitometry	2076-552		4
Intro, to Portable Video	2065-243		
or			
Intro, to Multimedia	3001-201		4
Technical Writing	0502-444		4
Liberal Arts †			12
Cooperative Education (Summer)		Co-op	
Fourth Year			
Concentration Electives			12
High-Speed/Time-Lapse	2076-511		3
Intro, to Research	2076-501		3
Survey of Nonconventional Imaging	2076-503		3
Organizational Behavior	0102-430		
or			
Statistics Elective			4
Business or Statistics Elective			4
Departmental Elective		3-4	
Liberal Arts (Concentration/Elective) †			12
Liberal Arts (Senior Seminar) †			2
Total Quarter Credit Hours			Not less than 190

*Although the department recommends that IPT students take the C++ courses above, students may take 1 or 2 Programming in Visual Basics courses instead (two programming courses or 8 credits are required)

† Can substitute Engineering Calculus or Calculus for Technologists; consult adviser.

‡ See page 7 for liberal arts requirements.

§ See page 9 for wellness education requirements.

¶ Co-op experiences may be scheduled during the school year as well, but this may disrupt normal course schedule.

Students may substitute University Physics for College Physics. University Physics may not be taken towards program credits once College Physics has been completed; consult adviser.

**Concentration course credits may vary from 3 to 5, but should total approximately 24. A minimum of 190 quarter credit hours are required for the BS degree. Any deficiency must be made up with elective credits.

Concentration electives (third and fourth years): Students may pursue one of the following areas of concentration: photographic instrumentation, multimedia, business, graphic arts, photo systems management, digital and electronic imaging, still photography and color printing, science and engineering, desktop publishing, etc. Other concentration areas may be designed by individual students in consultation with an adviser. Concentration lists are provided by advisers and are intended as planning guides. At least three courses from any one concentration are suggested to constitute a major concentration area.

NOTE: Some courses are offered more than once during the school year.

Imaging Systems Management

Nitin Sampat, Program Chair

This program is currently being reviewed and no new applications are being accepted.

The imaging systems management major at RIT is an upper-division interdisciplinary program with a curriculum that prepares students for management careers in imaging services businesses, imaging technology marketing in equipment and materials manufacturing companies, technical imaging systems specialists, or as imaging industry entrepreneurs.

Students may enroll in the program as transfers from programs in the liberal arts, business (marketing, international business), photography, computer science, information technology, and telecommunications technology. Opportunities for international students and students with international business interests are strong.

The intent of the curriculum is to produce the imaging leaders of the future. The core curriculum stresses knowledge and skill development in the photographic and digital image production systems and quality control, management for quality, and information technology and imaging. Exceptionally well qualified and highly motivated students will best be able to take advantage of the unique interdisciplinary strengths of this curriculum. The imaging industry is among the most important global businesses.

Imaging systems management, BS degree,
typical course sequence

Third Year	Quarter	Credit	Hours
Photographic Image Production Systems	2068-401		4
Digital Image Production Systems	2068-402		4
Color Measurement	2076-313		4
Photographic Systems Process Control	2068-421		4
Operations Management Imaging Services	2068-513		4
Image Capture & Analysis	2081-401		3
Materials & Processes of Photography	2076-211, 212,213		9
Principles of Marketing	0105-463		4
Business Computer Applications	0106-320		4
Organizational Behavior	0102-430		4
Intro, to Multimedia Production	3001-201		4
Liberal Arts *			8
Fourth Year			
Finance for Imaging Management	2068-501		4
Image Marketing Production Project	2068-502		4
Imaging Technology Systems	2068-511		2
Financial Accounting	0101-301		4
Managerial Accounting	0101-302		4
Fundamentals of Information Systems	0106-325		4
Network Technology	0106-375		4
Color Separation Systems	2081-409		4
Managing Multimedia	3001-310		4
Liberal Arts			8
Total Quarter Credit Hours			184~

* See page 7 for liberal arts requirements.

Students not meeting the program requirements for two courses in mathematics and two courses in laboratory science should strongly consider summer quarter enrollment in the following courses: 4 credits of chemistry or physics with laboratory preferred and 4 credits of college algebra or, if that has been completed, statistics for business. Any student not meeting the mathematics and science requirements may need to complete a second summer quarter to complete the program in two years. All incoming transfer students should contact the program chair for advisement on course selection.

Advertising Photography

Douglas Manchee, Program Chair

RIT's advertising photography program prepares students to utilize their skill and creativity in the challenging world of commercial photography. Whether creating images for advertising agencies, editorial magazines, or designer's projects; students learn the technical and artistic skills necessary to create a successful photograph. Graduates receive a bachelor of fine arts degree in professional photographic illustration.

The advertising photography program is flexible enough to develop each student's particular talents with the ultimate goal of providing art for commerce. During their junior and senior years students can choose from courses that include editorial, food, fashion, portrait, architectural, and digital photography. Additional courses include advanced studio and location photography, publication design and production, and collaborative courses with graphic design students. All advertising photography courses emphasize visual communications and professional business practices.

Professional photographic illustration, advertising photography option, BFA degree, typical course sequence

First Year	Quarter	Credit	Hours
Applied Photo I	2067-201, 202		12
Applied Photo I	2067-XXX		6
Survey of Western Art & Architecture	2039-225,226, 227		9
2-D Design	2013-231,232		6
Drawing	2013-211		3
Liberal Arts (Core) *			12
First-Year Enrichment	1105-051,052		0
Wellness Education †			0
Second Year			
Applied Photo II	2067-301,302		10
Applied Photo II	2067-XXX		5
History & Aesthetics of Photography	2060-301,302,303		9
Materials & Processes of Photography	2076-211,212,213		9
Career Seminar	2060-XXX		1
Liberal Arts (Core) *			12
Wellness Education †			0
Third Year			
Advertising Photography I, II	2067-411,412		10
Advertising Core			5
Electives			8
Photo Electives (minimum) ‡			12
Liberal Arts (Concentration) *			12
Fourth Year			
Advertising Core			15
Portfolio Development	2067-473		5
Photo Bus Management	2067-431		3
Electives			8
Liberal Arts (Electives) *			12
Photo Electives (minimum) ‡			3
Liberal Arts (Senior Seminar) *			2
Total Quarter Credit Hours			183-186

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ 20 total elective credits required; may be any CIAS course (photo, art, printing, etc.)

Fine Art Photography

Ken White, Program Chair

This program is designed to encourage and facilitate a student's artistic development, sensitivity and uniqueness as a visual artist. The department's objective is not to train students for a specific job in photography, but rather to provide each individual with a rich potential for growth and change and for a lifetime of interesting and challenging work in creative imaging and related fields. Students majoring in fine art photography receive the BFA degree in professional photographic illustration.

Career opportunities

Graduates of the program find careers in a variety of areas: exhibiting artists, teachers, picture editors, art directors, photographer's representatives, photographic archivists, museum and gallery staff, audiovisual specialists, self-employed photographers, custom image printers, and film/video artists or animators. Many students choose to pursue graduate work and earn an MFA degree in the arts.

Transfer students

College students who wish to transfer to the program can do so if they are studying photography or related imaging arts areas such as painting, graphic design, communication arts, audiovisual, film, or television.

Professional photographic illustration, fine art photography option, BFA degree, typical course sequence

First Year	Quarter	Credit	Hours
Applied Photo I	2067-201,202		12
Applied Photo I	2067-XXX		6
Survey of Western Art & Architecture	2039-225,226,227		9
2-D Design	2013-231,232		6
Drawing	2013-211		3
Liberal Arts (Core) *			12
First-Year Enrichment	1105-051,052		0
Wellness Education †			0
Second Year			
Applied Photo II	2067-301,302		10
Applied Photo II	2067-XXX		5
History & Aesthetics of Photography	2060-301,302,303		9
Career Seminar	2060-XXX		1
Materials & Processes of Photography	2076-211, 212, 213		9
Liberal Arts (Core) *			12
Wellness Education †			0
Third Year			
Photography as a Fine Art I	2060-401,402,403		12
Contemporary Issues	2060-411,412,413		12
Modern Art History Elective			3
Studio Elective			3-4
Art History/Criticism Elective			3-4
Liberal Arts (Concentration) *			12
Fourth Year			
Photography as a Fine Art II	2060-501, 502, 503		12
Studio Elective ‡			12
Art History/Criticism ‡			6
Liberal Arts (Electives) *			12
Liberal Arts (Senior Seminar) *			2
Total Quarter Credit Hours			183-185

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Visual imaging electives may be any CIAS course (photo, art, printing, etc.)

Photojournalism

Douglas Ford Rea, Program Chair

World events today are often etched not by words but by photographs. RIT's photojournalism program, which leads to a bachelor of fine arts degree in professional photographic illustration, provides the education both in photographic techniques and the artistry of capturing events on film or digitally for magazines, newspapers and independent projects. RIT graduates of this program are well respected: alumni have won ten Pulitzer Prizes in visual journalism since 1979. Students have the opportunity to explore related disciplines, such as electronic publishing, video documentary, multimedia, newspaper production and other related topics within the College of Imaging Arts and Sciences.

Professional photographic illustration, photojournalism option, BFA degree, typical course sequence

First Year	Quarter	Credit	Hours
Applied Photo I 2067-201,202			12
Applied Photo I 2067-XXX			6
Survey of Western Art & Architecture	2039-225,226,227		9
2-D Design 2013-231,232			6
Drawing 2013-211			3
Liberal Arts (Core) *			12
First-Year Enrichment 1105-051, 052			0
Wellness Education †			0
Second Year			
Applied Photo II 2067-301, 302			10
Applied Photo II 2067-XXX			5
History & Aesthetics of Photography	2060-301,302, 303		9
Career Seminar 2060-XXX			1
Materials & Processes of Photography	2076-211,212,213		9
Liberal Arts (Core) *			12
Wellness Education †			0
Third Year			
Photojournalism I 2067-401,402,403			15
Photo Electives ‡			6-10
Photojournalism Ethics			4
Professional Writing for Photojournalism	2067-XXX		4
Liberal Arts (Concentration) *			12
Professional Writing 0535-532			4
Fourth Year			
Photojournalism II 2067-XXX			15
Photojournalism Core			12-15
Elective			3-4
Liberal Arts (Electives) *			12
Liberal Arts (Senior Seminar) *			2
Total	Quarter	Credit	Hours
			184-188

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Minimum of 12 total elective credits required; may be any CIAS course (photo, art, printing, etc.)

Visual Media

William DuBois, Program Chair

The computer has brought the industries of photography, graphic design and print media into the same arena. All three of these career files are using the same tools for communication and production. As a result of the blending of these three career paths, employers are searching for graduates with a strong base in photography and the ability to work efficiently with graphic designers, print media specialists, and multi-media specialists.

The Visual Media program prepares students in photography to broaden their skill base to include graphic design or print media, if not both. On the job the graduate will be working with these three areas of visualization and production efficiently. They will coordinate, drive, and direct the production of visual projects.

The student will choose a focus in either graphic design or print media to enhance their skills. The flexibility of the electives and management courses allow an even broader skill set in the areas of opportunity. They will be prepare for careers in the industries of photographic studio management, graphic design production management and printing management.

Visual Media, BFA degree, typical course sequence

First Year	Quarter	Credit	Hours
Applied Photo I 2067-201,202			12
Applied Photo I 2067-XXX			6
Survey of Western Art & Architecture	2039-225,226,227		9
2-D Design 2013-231,232			6
Drawing 2013-211			3
Liberal Arts (Core) *			12
First-Year Enrichment 1105-051,052			0
Wellness Education †			0

Second Year	Quarter	Credit	Hours
Applied Photo II 2067-301,302			10
Applied Photo II 2067-XXX			5
History & Aesthetics of Photography	2060-301,302,303		9
Career Seminar 2060-XXX			1
Materials & Processes of Photography	2076-211,212,213		9
Liberal Arts (Core) *			12
Wellness Education †			0
Third Year			
Visual Media Focus 2067-401,402, 403			
(Graphic Design or Print Media)			12
Management Processes I, II, III	0681-200,201, 203		12
Electives ‡			9-15
Liberal Arts (Concentration/Minor) *			12
Third Year			
Visual Media Capstone Project 2067-512-01			4
Photo Electives			16-20
Electives ‡			9-14
Liberal Arts Senior Seminar			2
Liberal Arts (Mirtor/Electives) *			12
Total	Quarter	Credit	Hours
			182-197

* See page 7 for liberal arts requirements,

† See page 9 for wellness education requirements.

‡ Minimum of 16 Photo Electives credits

§ Minimum of 18 Elective credits, may be CIAS course (photo, art, printing, etc)

School of Print Media

Barbara Pellow, Administrative Chair

The rapid deployment of digital technology has blurred the roles that traditionally distinguished printers, publishers, advertising agencies, graphic designers, Web site developers, mail and fulfillment houses. The School of Print Media offers graphic and new media programs based on the concepts required for both traditional and digital media industry jobs. The programs encourage customized study in other courses to develop individual talents and interests. The comprehensiveness of a student's professional education in the School of Print Media differentiates RIT's programs from those at other colleges.

The school's facilities are unsurpassed: students learn with more than \$50 million worth of up-to-date equipment in 17 laboratories and 35,000 square feet of facilities.

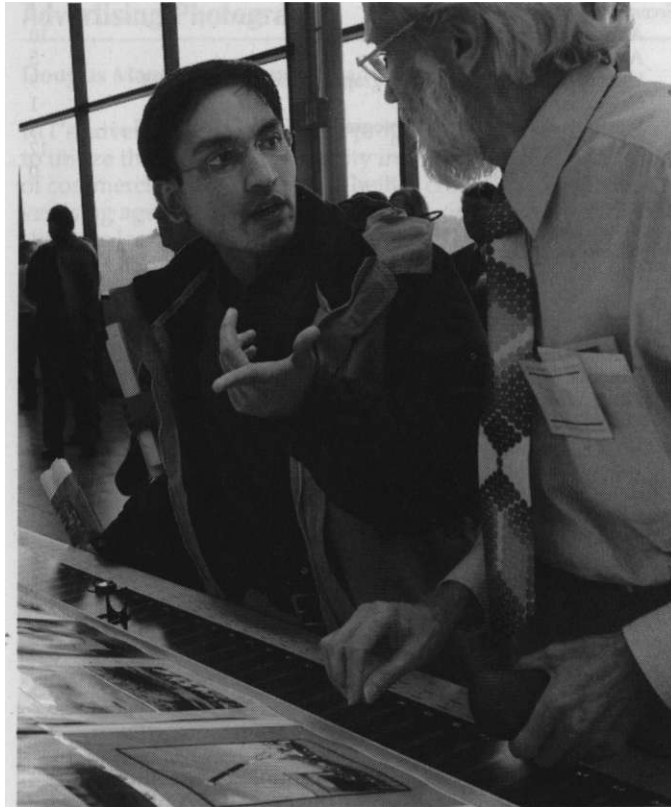
Scholarships and financial aid

Our large number of successful graduates testifies to the value of RIT's new media and graphic media programs. No student interested in attending the School of Print Media should consider another school without first discussing financial questions with an expert in either the Financial Aid or Admissions office.

The school enjoys substantial scholarship support from alumni and industry. More than 65 scholarships are available to School of Print Media students through the Financial Aid Office, and the school itself administers a number of other scholarships that are awarded to entering freshmen and upperclassmen on the basis of merit.

The Education Council of the Graphic Arts Industry also offers scholarships. Application should be made by high school students early in their senior year, because the scholarships involve competitive exams. If information is not available from the high school, candidates may write to:

National Scholarship Trust Fund
200 Deer Run Rd.
Sewickly, PA 15143



In addition to scholarships and other financial aid, students frequently find part-time employment in various positions on campus. The school employs students as laboratory assistants. These positions are filled on the basis of merit, but many of them are restricted to students needing financial aid. Also, part-time work may be available in the Rochester area in private printing firms and in such RIT-affiliated organizations as the Printing Applications Lab. Finally, in addition to its educational benefits, cooperative education gives many students the ability to pay part of their college costs with money earned at work.

Cooperative education

The cooperative work/study program (co-op) is an important educational feature required in all programs. Co-op work/study enlarges and improves a college education by combining formal classroom learning with practical work experience. Its main purpose is educational, but in many cases students also use it to help pay the cost of college. The Office of Cooperative Education and Career Services helps students find co-op and permanent placements with a large number of firms.

A wide range of opportunities are available. Students have been employed by advertising agencies, Web design firms, federal agencies, industrial organizations, commercial printers, the publishing industry and service industries for the printing trade in all areas of production, customer service, and plant operations. There are no restrictions on geographic location as long as the position is related to graphics or new media and approved by the school. Students have been employed all over the United States and in foreign countries. Several students each year co-op as printing specialists on the Queen Elizabeth II and Queen Mary cruise ships.

Transfer credits

RIT encourages transfer students from other colleges and programs by granting the maximum possible transfer credit. Call the school at 585-475-7029 for up-to-date information, transfer recommendations and other details about transfer credit.

Graphic Media

Michael Riordan, Program Chair

The graphic media program marks the evolution of RIT's graphic communications curriculum. It expands students' education to encompass all forms of media, including print and electronic communications. It allows students excellent flexibility in customizing their programs for the careers they seek.

This program is based on a solid foundation in technical areas important to the various disciplines that make up the graphic media industry. In addition, it makes available a wide selection of electives in both traditional and emerging media.

Program of study

The curriculum includes a broad base of 15 core graphic media courses in the first two years plus a combination of nine required and a minimum of 18 credit hours of elective graphic media courses in the third and fourth years.

First-year graphic media courses include introductions to graphic media, new media and multimedia publishing, typography and design, image capture, document publishing software, digital publishing workflow, and a first course in leadership and group communication skills. These are supplemented by a two-quarter sequence of a laboratory science and liberal arts courses. The science courses specified in the curriculum are minimum requirements. Students with good backgrounds in science are encouraged to take higher-level courses to enhance their overall education. The professional work is enhanced by two math courses and four additional liberal arts courses. Students with extensive math backgrounds are encouraged to take engineering-level math courses to enhance their quantitative skills. The liberal arts program is described in greater detail on pages 7 and 8.

In the sophomore year, the technology base established in the first year is extended by courses in digital media programming and in-depth exposure to materials and process for reproduction, publishing, and the distribution methods encountered in graphic media. A vigorous course in technical writing leads to a required professional-level research report.

During the third year, the student encounters digital printing and publishing technologies, including an introduction to customizing and personalizing graphic media messages and to database publishing as another means to provide added value. The theory and practice of color management is explored to provide the student with the necessary tools to insure predictable and consistent color across the whole spectrum of graphic media production. A course in digital video allows students to explore dynamic media capture and editing. A course in digital media business management focuses on the skills needed in e-commerce. Three professional electives from a broad range of technical and management courses are augmented by two math courses in data analysis and four liberal arts courses.

In the senior year the students are required to participate in a significant capstone project with a group of their peers. In the fall quarter project management course, students interact with a client to develop a graphic media product that meets the client's specific needs. In the winter and spring quarters the group designs, schedules, and produces that product to the client's satisfaction. In addition, students meet with a series of industry leaders to discuss the latest issues and trends. The student also selects additional professional electives that will help to meet his or her career goals. Five liberal arts courses round out the senior year.

Graphic media, BS degree, typical course sequence^{1m}

First Year	Quarter Credit	Hours
Graphic Media Perspectives 2082-201		3
Applied Typography & Design 2082-211		4
Digital Image Capture 2082-221		4
Design Parameters for Graphic Media 2082-207		4
Graphic Media Publishing 2082-217		3
Document Publishing Languages 2082-227		4
Digital Workflow 2082-208		4
Leadership & Interpersonal Communications 2082-218		3
Multimedia Publishing 2082-228		3
Algebra for Management Science 1016-225		4
Calculus for Management Science 1016-226		4
Liberal Arts (Core) *		4
First-Year Enrichment 1105-051,052		0
Wellness Education †		0
Second Year		
Digital Media Programming Concepts 2082-301		4
Materials & Processes I & II 2082-321,322		8
Web Site Design & Graphic Media 2082-317		4
Professional & Technical Writing 2082-303 ‡		4
Writing & Literature I 0504-225		4
Writing & Literature II 0504-226		4
Graphic Media & Distribution 2082-313		4
Lab Science I and II 10XX-XXX, 10XX-XXX		8
Liberal Arts (Core) *		8
Cooperative Education	Co-op	
Third Year		
Digital Printing & Publishing 2082-401		4
Color Management Systems 2082-407		4
Digital Video for Graphic Media 2082-412		4
Database Publishing 2082-417		3
Graphic Media Business Management 2082-408		4
Professional Electives		9-10
Data Analysis 1016-319		4
Data Analysis Lab 1016-379		2
Liberal Arts (Upper level) *		16
Cooperative Education	Co-op	
Fourth Year		
Industry Issues & Trends 2082-501		4
Graphic Media Project Management 2082-513		4
Group Production Workshop I, II 2082-518,523		6
Professional Electives		9-10
Liberal Arts (Upper level) *		16
Liberal Arts (Senior Seminar) *		2
Total Quarter Credit Hours		185-187

¹Program is under curriculum revision; changes are in process.

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Students must satisfy the Writing Competency requirement prior to graduation, either by a grade of B or higher in Professional & Technical Writing or by passing the Writing Competency test given each quarter.

Graphic media—AAS transfer option

This option allows students who have earned an associate degree from an accredited two- or four-year college to enter the School of Print Media with junior standing. Although these students will be given 90 quarter credit hours of transfer credit, they must still meet the math, science, and liberal arts requirements of the four-year program.

Accelerated BS/MBA in Graphic Media

Dual Degree Program

Twyla Cummings, Coordinator

This is a joint program made available by the faculties of the School of Print Media and the College of Business that enables students to receive a BS in graphic media and a master of business administration in five years. Students who qualify for this joint program receive a waiver for up to six MBA core courses for specific undergraduate management courses completed with a grade of B or better.

Students interested in this two-degree program should notify their faculty advisers as early as possible during their undergraduate program. Detailed information on selecting courses that meet the program requirements will be provided at that time. Students should apply for admission to the MBA program near the end of their undergraduate program. They must meet the admission requirements for the College of Business MBA degree. Part of that requirement includes meeting minimum Graduate Management Admission Test (GMAT) scores and undergraduate grade standards. Student must satisfy all of the requirements for the BS in graphic media to be awarded that degree and all requirements of the MBA degree to receive that degree. Each degree will be awarded to the student as soon as all requirements for that degree have been satisfied.

New Media Publishing

Mark J. Watts, Program Chair

New media publishing is a multidisciplinary program where students acquire knowledge from the School of Print Media, the School of Design and the Department of Information Technology. This model of convergence allows content to be created and shared via printed material, computer-based publications, on-line services, and all other forms of interactive multimedia, as well as emerging technologies, this approach requires students to build skills in both traditional publishing as well a data base management, new media production, networking and telecommunications. The new media publishing program is designed to provide students with the ability to use the same content across multiple output media.

During the typical quarter, new media students may take classes in design, programming, and publishing simultaneously. This provides an overall vision of the project, while obtaining the necessary skills to build a new media product.

New media publishing, BS degree, typical course sequence

First Year	Quarter Credit	Hours
2D Design 2013-231		3
Elements of Graphic Design for New Media 2009-213		3
Typography for New Media 2009-311		3
Time-Based Imaging 2009-411		4
Digital Video for Multimedia 2065-217		4
New Media Perspectives 2083-201		3
Imaging for New Media 2083-206		4
Intro to Programming for New Media 4002-230		4
Introduction to Multimedia 4002-320		4
Algebra for Management Science 1016-225		4
Calculus for Management Science 1016-226		4
Liberal Arts Core*		4
First-Year Enrichment I & II 1105-051,052		0
Wellness Education †		0
Second Year		
Mandatory Co-op Orientation 2080-010		0
Technical Writing 0502-444		4
Digital Workflow Fundamentals 2082-208		4
Multimedia Publishing 2082-228		3
New Media Publishing 2083-211		3
Programming II for New Media 4002-231		4
Financial Accounting 0101-301		4
Writing & Literature I & II 0504-225,226		8
Laboratory Science I & II		8
Liberal Arts Core*		8
Wellness Education †		0

**Publishing Concentration (choose one of the following tracks:
digital media, management, print media, or news media)**

Digital Media

Third Year

Multimedia Law 2083-402	3
Electronic Communication Print/Publish 2080-319	4
Marketing Choice (choose <i>one</i> of the following):	4
Principles of Marketing 0105-363	4
Marketing in the Graphic Arts 2080-592	4
Multimedia Strategies 2083-323	4
Digital Media Concentration (courses listed below)	8-10
Organizational Behavior 0102-430	4
Principles of Economics I 0511-301	4
Data Analysis I 1016-319	4
Data Analysis I Lab 1016-379	2
Liberal Arts*	8

Fourth Year

New Media Project Management 2083-541	3
New Media Team Project I & II 2083-542, 543	8
Corporate Finance 0104-441	4
Professional Electives	8-10
Digital Media Concentration (courses listed below):	6-8
Senior Seminar* 0520-501	2
Liberal Arts*	20
Concentration Courses	
Digital Printing & Publishing 2082-401	4
Database Pub. Fundamentals 2082-417	3
Advanced Multimedia Publishing 2082-428	3
Introduction to Interface Design 2083-332	3
Digital Asset Management 2082-337	3

Management

Third Year

Organizational Behavior 0102-430	4
Multimedia Law 2083-402	3
Electronic Communication Print/Publish 2080-319	4
Marketing Choice (choose <i>one</i> of the following):	
Principles of Marketing 0105-363	4
Marketing in the Graphic Arts 2080-592	4
Multimedia Strategies 2083-323	4
Management Concentration (courses listed below)	8-10
Professional Electives	8
Data Analysis I 1016-319	4
Data Analysis I Lab 1016-379	2
Principles of Economics I 0511-301	4
Liberal Arts*	8

Fourth Year

New Media Project Management 2083-541	3
New Media Team Project I & II 2083-542, 543	8
Management Concentration (courses listed below)	8-10
Senior Seminar* 0520-501	2
Liberal Arts*	16
Concentration Courses	
Entrepreneurship 0102-490	4
Economics of Production Management 2080-383	4
Marketing in the Graphic Arts 2080-592	4
Industry Issues & Trends 2082-501	4
Multimedia Strategies 2083-323	4

Print Media

Third Year

Organizational Behavior 0102-430	4
Electronic Comm. in Printing & Publishing 2080-319	4
Multimedia Law 2083-402	3
Marketing Choice (choose <i>one</i> of the following):	
Principles of Marketing 0105-363	4
Marketing in the Graphic Arts 2080-592	4
Multimedia Strategies 2083-323	4
Principles of Economics I 0511-301	4
Data Analysis I 1016-319	4
Data Analysis I Lab 1016-379	2
Print Media Concentration (courses listed below)	9-12
Liberal Arts*	8

Fourth Year

Print Media Concentration (courses listed below)	9-12
New Media Project Management 2083-541	3
New Media Team Project I & II 2083-542,543	8
Corporate Finance 0104-441	4
Professional Electives 2XXX-XXX	6-8
Senior Seminar* 0520-501	2
Liberal Arts*	16
Concentration Courses	
Print Finishing Fundamentals 2081-454	3
Color Perception & Analysis 2081-562	4
Materials & Processes I 2082-321	4
Materials & Processes II 2082-322	4
Digital Printing & Publishing 2082-401	4

News Media

Third Year

Electronic Communication Print/Publish 2083-319	4
Multimedia Law 2083-402	3
Organizational Behavior 0102-430	4
Principles of Economics I 0511-301	4
Data Analysis I 1016-319	4
Data Analysis Lab 1016-379	2
Marketing Choice (choose <i>one</i> of the following):	4
Principles of Marketing 0105-363	4
Marketing in the Graphic Arts 2080-592	4
Multimedia Strategies 2083-323	4
News Media Concentration (courses listed below)	9-12
Liberal Arts*	8

Fourth Year

New Media Project Management 2083-541	3
New Media Team Project I & II 2083-542, 543	8
Corporate Finance 0104-441	4
Professional Electives	6-8
News Media Concentration (courses listed below)	9-12
Senior Seminar* 0520-501	2
Liberal Arts*	20
Concentration Courses	
Systems Planning 2080-502	4
Materials & Processes I 2082-321	4
News Production Management 2083-317	3
Digital News System Management 2083-412	4
Materials & Process II 2082-322	4
or	
News Media Delivery System 2083-XXX	3

Total Quarter Credit Hours

180-188

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

College of Liberal Arts

Andrew M. T. Moore, Dean

The College of Liberal Arts serves RIT in three ways. First, the college provides a required curriculum in general education for all candidates for baccalaureate and associate degrees; second, the college offers several undergraduate degree programs and graduate degree programs; and third, the college provides opportunities for RIT students and the RIT community to participate in cultural experiences of theater, music, creative writing, public speaking, and special lecture series.

Recognizing that future leaders in business, government, science, and technology work in an increasingly interconnected and complex world, RIT provides students with a rigorous curriculum in the liberal arts. General education

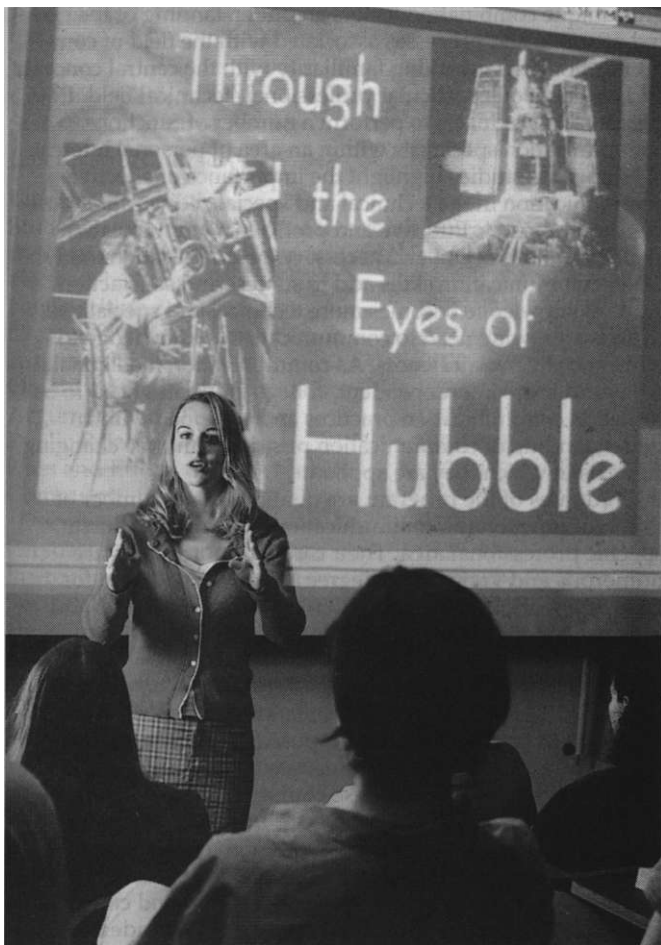
requirements for undergraduate students include introductory and upper-level courses in the humanities and social and behavioral sciences designed to provide educational opportunities for comprehensive links between career education, leadership, professional ethics, intercultural understanding, citizenship, and culture.

RIT degree programs are further distinguished by the requirement that students must select one of two options for advanced study in the liberal arts. Most students can choose to pursue either a *minor* or a *concentration* of advanced course work from many disciplinary and interdisciplinary options (see page 7 for details). Departments offering advanced work include communication, criminal justice, economics, fine arts, foreign language, history, language and literature, philosophy, political science, psychology, public policy, science, technology and society, social work, and sociology/anthropology. Four endowed professorships in communication, economics, humanities, and philosophy enrich the college by encouraging a wider variety of activities.

The required interdisciplinary Senior Seminar in the Liberal Arts is a capstone course that provides students with an opportunity to engage in service learning as part of the changing topic of study.

The College of Liberal Arts curriculum seeks to develop in students specific kinds of knowledge, understanding, and critical awareness:

- Understanding the connections among humanistic, professional and technological studies;
- Critical awareness of the interactions among society, culture, science, and technology;
- Understanding and appreciation of diverse social and cultural perspectives;
- Understanding local, national, international, and global forms of citizenship and community;
- Knowledge and critical understanding of the responsibilities and rights of living in a participatory democracy;
- Understanding human development and behavior;
- Critical awareness of the interactions between society and the environment;
- Ability to create, interpret, and evaluate artistic expression and to understand the aesthetic dimension of other forms of expression and experience;
- Understanding the nature and implications of work and career;
- Ability to reason critically and creatively;
- Ability to reason about ethical and value issues and to relate that reasoning to the student's judgments and practice;
- Understanding and proficiency in written, oral, visual, and nonverbal forms of communication;
- Proficiency in the analysis and interpretation of quantitative and qualitative data.



The professional and technical communication program gives students both concepts and practical skills.

The College of Liberal Arts offers undergraduate degree programs in communication, criminal justice, economics, psychology, public policy, and social work and master of science degrees in communication and media technologies, school psychology, and public policy. The degree programs are described in the following pages. The college also houses a one-year RIT Exploration program for students who are undecided about their choice of major at RIT.

The College of Liberal Arts provides opportunities for students to engage in creative activities and classes in theater, music, and creative writing. Faculty offer extracurricular leadership for student groups, recitals, productions, and for *Signatures*, the student literary magazine. In addition, the college sponsors special lecture series that bring speakers, poets, writers, and civic leaders to campus.

Faculty

The faculty of the college is selected nationally from candidates with advanced degrees in the social sciences and humanities. These men and women are dedicated to providing their students with rich and meaningful teaching and learning experiences and to continuing their engagement in their scholarly fields.

Liberal arts degree program advising

The College of Liberal Arts is committed to providing faculty academic advisers for students in the RIT Exploration program, communication, criminal justice, economics, psychology, public policy, and social work throughout their academic program. Upon arrival at RIT, each student is assigned a faculty adviser who helps formulate career goals in the related field of study and who offers support in dealing with registration and scheduling. In addition the administrative staff of the college can provide referrals to other support areas within RIT.

Liberal education advising

The advising staff in the Office of Student Services within the College of Liberal Arts offers support to all RIT students in the selection of the liberal education courses required for their degrees. The advising staff, located in rooms 2210-2222 in the Liberal Arts Building, provides advising that is consistent with the general education policies of the College of Liberal Arts (see page 7). Students are served on a walk-in basis Monday through Thursday, 8 a.m. to 5 p.m., and Friday, 8 a.m. to 4:30 p.m. The office also evaluates liberal arts courses for transfer credits for all RIT students.

Part-time and evening programs

The College of Liberal Arts offers in the evening many of the upper-division humanities and social science courses, as well as the core courses, required in the baccalaureate programs of part-time evening students. These courses are part of the liberal arts curriculum expected of all RIT students pursuing a bachelor's degree.

Courses are scheduled one or two nights a week, Monday through Thursday, or on Saturday. Each course is four academic quarter credits, except the Senior Seminar, which is two credits. Part-time students are welcome to register for liberal arts courses offered during daytime hours if their schedules permit. Diploma or certificate courses will not normally be used toward completion of liberal arts requirements.

It is not necessary to be enrolled in an RIT degree program to register for liberal arts courses on a part-time basis. Part-time and evening students are strongly encouraged to contact the Liberal Arts Office of Student Services (585-475-2444) for assistance in selecting and registering for courses. The office is located on the second floor of the Liberal Arts Building.

Summer courses

The College of Liberal Arts offers a number of courses each summer in language and literature, science and humanities, and social sciences, as well as degree program courses in communication, criminal justice, economics, psychology, public policy, and social work.

Information concerning summer courses can be obtained by contacting the college scheduling officer or by requesting the Summer Bulletin from the Office of Part-time Enrollment Services (585-475-2229), located in the Bausch & Lomb Center on campus.

Advertising and Public Relations

Note: The College of Liberal Arts has submitted a proposal to the New York State Education Department seeking approval to offer a new BS degree program in advertising and public relations. Please contact the Undergraduate Admissions Office or visit www.rit.edu/admissions for additional details.

Communication

Bruce A. Austin, Department Chairperson
www.rit.edu/ptc

The BS in professional and technical communication (PTC) unites advanced education in the theory and practice of spoken, written, and visual communication with extensive instruction in one of RIT's professional or technical programs. This unique combination fosters an understanding of the central concepts and processes associated with the field of communication and a working familiarity with the central concepts and practices of a particular professional/technical field. PTC prepares its graduates to perform a number of functions as communication specialists within an area of personal interest.

Numerous studies highlight the importance of effective communication in the technical and specialized world of business and industry. Effective and proficient communication skills are an important and necessary job qualification today. Good communication skills add to success and satisfaction. And, as knowledge becomes more technical and specialized, there is a growing need to communicate this knowledge to wide and diverse audiences. As communication media make the world more interdependent, college graduates need to be skilled in communication practices and equipped with an understanding of communication principles and the changing contexts in which they are applied.

Graduates of the program are qualified for a number of different functions as communication specialists within a specific professional area. Their career opportunities are numerous and varied. The degree also prepares them for graduate work in communication (www.rit.edu/cmt) and related academic disciplines.

The professional core

As part of their degree requirements, students enroll in a professional core—normally composed of six courses (for a total of 24 credit hours)—that focuses on a professional or technical area of interest. These courses may be taken from the College of Science, the College of Imaging Arts and Sciences, the College of Business, or another RIT program.

Alternatively, an individually designed professional core—one tailored to students with specific study and career interests—is available with the approval of an academic adviser and the program chairperson.

Curriculum

PTC's challenging curriculum, including its exciting co-op and professional core opportunities, provides students with a superior level of professional competence and the foundation of lifelong intellectual and career growth.

The following list displays the PTC course distribution by academic area. The accompanying chart provides a suggested plan of study.

Required communication courses
(60 total credit hours)

- Computer Applications in Communication
- Foundations of Communication
- Interpersonal Communication
- Effective Speaking
- Written Argument
- Mass Communications
- Rhetoric and Public Discourse
- Persuasion
- Theories of Communication
- Visual Communication
- Technical Writing
- Professional Writing
- Qualitative Research Methods
- Quantitative Research Methods
- Senior Thesis in Communication

Communication electives (20 total credit hours)

Other required courses

	<i>Quarter Credit Hours</i>
Professional Core	24
Science	8
Math	8
Computer Science	4
Statistics or Math or Science	4
Liberal Arts Courses	54

Communication electives

Students are required to take five communication electives. Of these, at least one must be a writing elective. Communication electives include:

Newswriting	0535-332
Creative Writing—Prose Fiction	0502-452
Advanced Creative Writing	0502-453
Organizational Communication	0535-415
Argument and Discourse	0535-420
Public Relations	0535-421
Uses and Effects of Mass Media	0535-452
Communication and	
Documentary Film	0535-524
Persuasion and Social Change	0535-490
Intercultural Communication	0535-520
Special Topics in Communication	
(e.g., political communication, archival research, international media, mediation)	0535-525
Ethics in Technical Communication	0535-422
Writing Technical Manuals	0535-446
Film and Society	0535-550
Small Group Communication	0535-483
Speechwriting	0535-502
Writing for the Self and Others	0502-455

Professional and technical communication, BS degree, typical course sequence

	<i>Quarter Credit</i>	<i>Hours</i>
<i>First Year</i>		
Liberal Arts Core *		16
Foundations of Communication 0535-200		4
Computer Science Requirement 4002-320		4
Math Requirement		4
Interpersonal Communication 0535-210		4
Math Requirement		4
Written Argument 0535-230		4
Rhetoric & Public Discourse 0535-311		4
Wellness Education †		0
<i>Second Year</i>		
Liberal Arts Core *		12
Persuasion 0535-481		4
Technical Writing 0502-444		4
Science Requirement 1004-XXX		4
Professional Core		4
Effective Speaking 0535-501		4
Computer Applications in Communication 0535-221		4
Science Requirement 1004-XXX		4
Visual Communication 0535-450		4
Mass Communications 0535-482		4
Math or Science Requirement		4
Wellness Education †		0
<i>Third Year</i>		
Liberal Arts Concentration or Minor *		12
Theories of Communication 0535-445		4
Professional Core (2)		8
Qualitative Research Methods		4
Professional Writing 0535-532		4
PTC Elective 0535-0502-XXX		4
Cooperative Education (2 quarters)		Co-op
<i>Fourth Year</i>		
Quantitative Research Methods 0535-315		4
Liberal Arts Concentration or Minor *		12
PTC Elective		4
Professional Core		4
PTC Electives (2)		8
Professional Core		4
Liberal Arts Senior Seminar *		2
Senior Thesis in Communication 0535-595		4
PTC Writing Elective		4
Professional Core		4
Total Quarter Credit Hours		182"

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

Cooperative education

PTC students take two quarters of cooperative education (co-op). Co-op gives students an opportunity to apply classroom knowledge to a professional work environment while acquiring practical experience applicable to their RIT education. Although co-op's main purpose is educational, many students also find that it helps pay the cost of college.

RIT's considerable experience with cooperative education— it is one of the oldest and largest programs in the country— demonstrates that it deepens students' knowledge of their academic fields, allows them to determine their suitability for a particular professional position and increases their chances for advantageous placement upon graduation.

A broad range of co-op opportunities is available. There is no restriction on geographic location as long as the co-op position is related to communication. RIT's Office of Cooperative Education and Career Services helps students find co-op and permanent placements with a large and diverse number of employers. PTC students have held co-ops across the United States at such organizations as Greenpeace, Bausch & Lomb, the Memorial Art Gallery, Eastman Kodak Company, and the U.S. House of Representatives.

Students

The size of the PTC program, averaging about 100 students, ensures close contact with the program's faculty and other students. So that others can stay in touch with them, every PTC student has a mail folder and an e-mail account.

PTC attracts energetic students who are actively involved in numerous on-campus extracurricular activities directly related to communication, including the FM radio station, RIT's weekly magazine, and the college's newsletter, *Liberal Smarts*. Many PTC students have served as residence hall advisers as well as representatives to, and leaders of the student government organization.

Advisers

Every PTC student is assigned a faculty adviser, who is available for both academic advising and career counseling. Students report that frequent consultation with their adviser is helpful in planning course scheduling, co-ops, professional core areas, and post-graduation work. In addition to their faculty adviser, PTC students are assigned a co-op and placement adviser who is located in the Office of Cooperative Education and Career Services.

Faculty

Of the full-time PTC faculty, nine hold the Ph.D. in communication and one holds a Ph.D. in English. All have proven teaching ability and are committed to professional growth in their areas of expertise. In addition to their teaching, research, and other professional responsibilities, the faculty act as academic advisers for every PTC student. The department also is home to the William A. Kern Professor in Communications, an endowed chair, offering students an opportunity to participate in specialized course work and research.

Transfer admission

Many students transfer to PTC from other colleges and universities, and transferring is easy. PTC attracts transfer students from diverse liberal arts degree programs as well as other professional programs such as business, science, and computer science. Transfer students from most associate degree programs may normally expect to complete their requirements for the BS degree in PTC in two years.

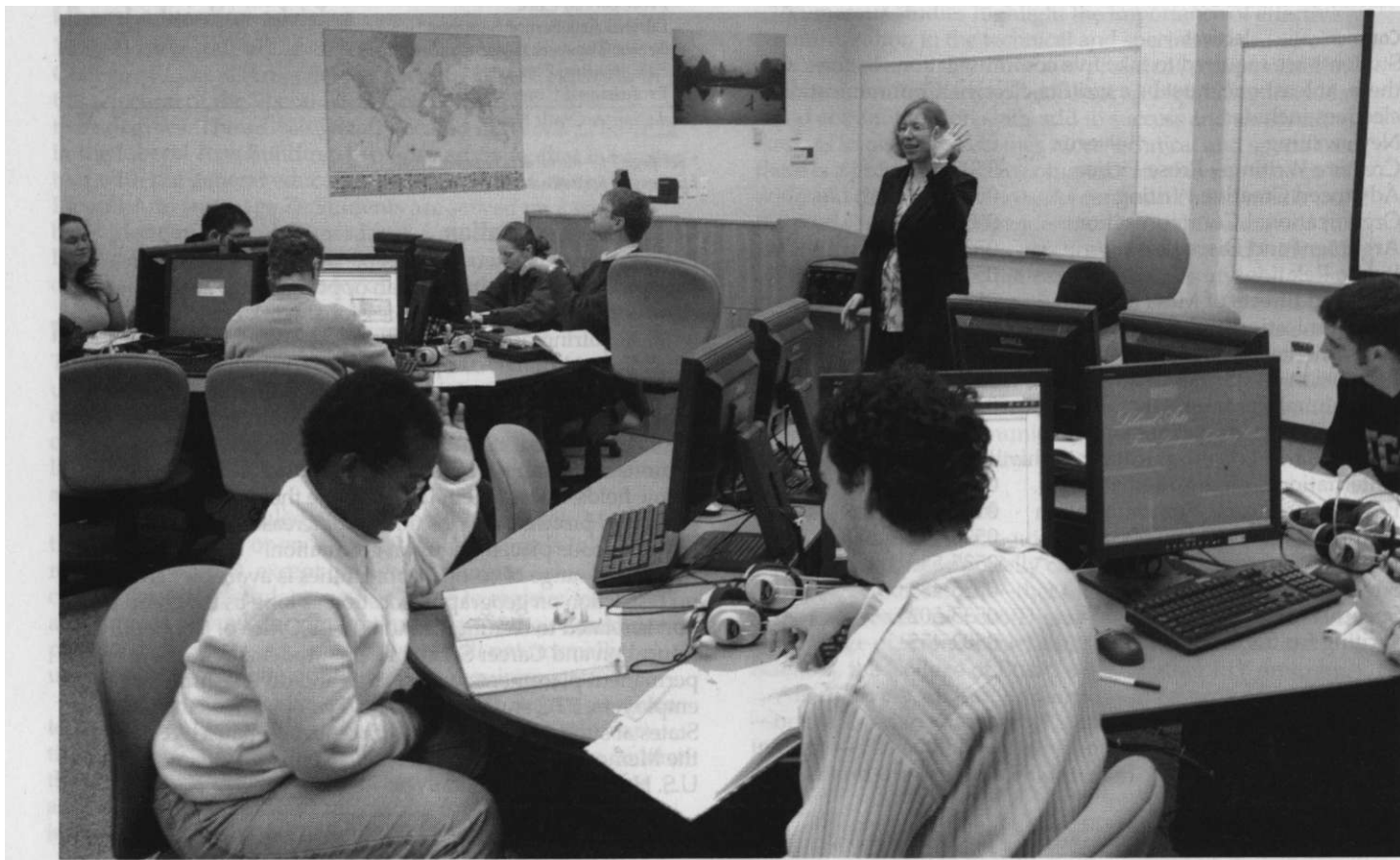
Transfer credit is evaluated on a course-by-course basis; that is, each course completed as part of a previous degree program is compared to a specific PTC program requirement. Transfer credit is assigned where most appropriate.

Careers

PTC students are prepared upon graduation for immediate employment and long-term professional growth within the broad field of communication. Graduates qualify for positions in business, government, and the not-for-profit sector. PTC graduates are currently employed as technical editors and writers, sales and marketing coordinators, document specialists, broadcast news and segment researchers, public relations practitioners, and staff members for various federal and state government officials.

Some PTC graduates have earned graduate degrees. The program prepares students for graduate study in law, public relations, communication, health services, and management.

In September 2001, the department of communication launched its master of science degree program in communication and media technologies. CMT is an interdisciplinary advanced program of study combining courses in communication with course work in an applied or professional program. Visit the Web site, www.rit.edu/cmt, or consult the *RIT Graduate Bulletin*.



The College of Liberal Art's Foreign Language Technology Center is among the finest facilities of its kind in the nation and is transforming the instruction of foreign languages at RIT. ©2004 Photo by Ken Huth

Criminal Justice

Thomas C. Castellano, Department Chairperson

The bachelor of science degree program in criminal justice offers students a broad education with a curriculum designed to prepare them for a wide range of careers in criminal justice, to provide continuing education for those professionals already employed in criminal justice and to offer a strong academic foundation for graduate school or law school.

RIT's approach to the study of criminal justice combines theoretical perspectives with practical experience. As students study in the areas of crime, criminal behavior, social control mechanisms, administration, planning, and management, the emphasis is on problem-solving techniques based on the rapidly growing body of research in the field, as well as students' own guided research.

The program is unique in its broad core curriculum, the scope of professional course offerings, and an intensive field experience, where students blend knowledge gained in required and elective courses with a career-oriented internship.

Career planning

Upon acceptance into the criminal justice program, each student is assigned a faculty adviser who assists in formulating career goals and planning a field of study in accordance with those goals.

Through core courses, students are exposed to the widest possible range of perspectives from which to view crime and the nature of criminal justice administration, thus broadening their career options.

During the junior and senior years, with faculty guidance, students select professional electives in a specific area of interest from courses offered within the program, within the college or in any of RIT's other seven colleges. Criminal justice faculty offer concentrations in criminology, law enforcement, law corrections, and security. Other concentrations, planned according to individual career goals, may include courses in computer science, management, photography, liberal studies, and social work.

Career opportunities

Program alumni have entered a variety of careers in the criminal justice system directly following graduation or after completing graduate studies. Many graduates are engaged in law enforcement careers in agencies at all levels of government. A substantial number are employed by the Rochester Police Department, the Monroe County Sheriff's Department, and suburban departments throughout the area. At the state and federal level, graduates are pursuing careers in such agencies as the Federal Bureau of Investigation, Secret Service, Marshall's Service, Naval Intelligence Service, Customs, Border Patrol, Immigration and Naturalization Service, Centers for Disease Control, Department of the Interior, and National Park Service, among others. A number have advanced in rank to positions of command, including several chiefs and deputy chiefs.

Other alumni work as correctional officers, counselors, probation officers, and parole officers, and some have advanced to administrative positions. A significant number have completed law school and entered the legal profession as prosecutors, public defenders, in private practice, or in the state or the U.S. attorney generals' offices. Others serve the legal profession as investigators or paralegals.

Consistent with the liberal arts/social science nature of the program, some graduates have attained advanced degrees in related areas and entered teaching careers at the secondary and college levels. Others have become psychologists, social workers, drug and alcoholism counselors, youth service specialists, and victim assistance and rape crisis counselors. Some have completed advanced degrees in business, public policy, public administration, criminology, and criminal justice.

Technology information and computer crime

This program of study prepares students for employment in the emerging field of criminal justice technology development and administration, and for numerous generalist and specialty positions within the criminal justice system, the managed security industry, and the federal intelligence community for which a background in information technology is preferred. Courses completed by students in this concentration include criminal justice technology, computer crime, and investigative techniques. And because theories of crime and management—as well as independent research, critical thinking, and scholarly writing—are emphasized, students are also prepared upon graduation to undertake graduate study in a variety of fields including but not limited to information technology, criminology, public policy, and public or business administration.

Prelaw study

The criminal justice curriculum prepares students for law school by combining a broad liberal arts background with intensive study in criminal justice. Students work closely with a faculty adviser in selecting appropriate professional and liberal arts electives. During their senior year, prelaw students spend 10 weeks, 30 hours per week, as interns working with attorneys in the office of the district attorney, public defender or state attorney general; private law firms; or in any number of public or private organizations dealing with litigation. The Prelaw Association, comprising interested RIT students, publishes student research papers each year in *Legal Research at RIT*.

Field experience

During the senior year, students have the opportunity to choose an internship from a number of agencies and organizations in the areas of law, law enforcement, institutional and noninstitutional corrections, courts, juvenile advocacy and counseling programs, and security. For one quarter (10 weeks), 30 hours per week, students work under an agency field supervisor and meet regularly with an adviser and also with peers who are doing field placements in other agencies. Placements are individualized to fit a student's career objectives.

Cooperative education

Students have the opportunity to participate in co-op as part of their undergraduate program. In general, they may apply for co-op employment after three quarters of full-time study in criminal justice at RIT. Cooperative education provides a working experience in a criminal justice-related field, but does not carry academic credit hours.

Departmental Honors Program

Students with a 3.0 grade point average at the end of their junior year may apply for admission to the Departmental Honors Program. The program requires completing Honors Research, which involves original research or problem solving under the direction of a faculty member. The program provides excellent experience and evidence of independent work for potential employers or for graduate or law schools.

The faculty

The seven full-time faculty in the criminal justice program hold advanced degrees, have had professional experience in criminal justice, have proven teaching ability, and are committed to continuing professional growth in their areas of expertise. Their offices are conveniently located, and they spend many nonteaching hours in their offices with an open-door policy in order to assist students with academic or personal concerns and questions.

Professional elective options

One of the strengths of the program is that students may elect to take professional electives from other designated colleges in the Institute and are thus able to develop a concentration in a professional area related to their career goals.

The following courses illustrate those offered periodically within the program. A student selects professional elective courses with the advice of his or her faculty adviser.

Corrections
 Constitutional Law
 Legal Rights of Convicted Offenders
 Correctional Administration
 Social Control of Deviant Behavior
 Counseling in the Criminal Justice System
 Alternatives to Incarceration
 Sentencing Process

Criminology
 Organized Crime
 Social Control of Deviant Behavior
 White-Collar Crime
 Victimless Crime
 Computer Crime
 Women and Crime
 Victimology

Law
 Fundamentals of Legal Research
 Constitutional Law
 Legal Rights of Convicted Offenders
 Social Control of Deviant Behavior
 Evidence
 Court Administration
 Comparative Criminal Law
 Sentencing Process
 Victimless Crime
 Seminar in Law

Law Enforcement
 Administrative Concepts of Law Enforcement
 Organized Crime
 Investigative Techniques
 Constitutional Law
 Civil Disobedience and Criminal Justice
 White-Collar Crime
 Evidence
 Police Community Relations
 Victimless Crime
 Hostage Taking and Terrorism
 Substance Abuse
 Management in Criminal Justice
 Computer Crime

Security
 Organized Crime
 Investigative Techniques
 Physical Security and Safety
 Computer Crime
 Seminar in Security

Related professional areas

With the approval of the faculty adviser, a student may select an additional professional elective concentration from courses offered within the College of Liberal Arts or in any of the other colleges of the Institute. Many students develop special concentrations in accounting, computer science, management, or social work.

Criminal justice, BS degree, typical course sequence

	Quarter Credit	Hours
<i>First Year</i>		
Criminology 0501-400		4
Seminar in Criminal Justice 0501-201		4
Liberal Arts Core *		16
Technology in Criminal Justice 0501-406		4
Courts 0501-456		4
Corrections 0501-441		4
Law Enforcement in Society 0501-443		4
Mathematics/Science †		8
Current Issues in Criminal Justice 0501-460		2
Wellness Education ‡		0
Cooperative Education (Optional)		Co-op
<i>Second Year</i>		
Juvenile Justice 0501-440		4
Approved Electives (e.g., Liberal Arts: Social Science)		8
Concepts in Criminal Law 0501-444		4
Professional Elective (e.g., Investigative Techniques)		4
Liberal Arts Core *		12
Mathematics/Science †		12
Current Issues in Criminal Justice 0501-460		2
Wellness Education ‡		0
Cooperative Education (Optional)		Co-op
<i>Third Year</i>		
Theories of Crime & Criminality 0501-528		4
Management in Criminal Justice 0501-410		4
Research Methods I, II 0501-401,541		8
Professional Elective (e.g., Terrorism)		4
Approved Elective (e.g., Photography)		4
Approved Elective (e.g., Technical Writing)		4
Approved Elective (e.g., Spanish)		4
Liberal Arts Electives/Concentration/Minor *		12
Mathematics/Science †		4
Cooperative Education (Optional)		Co-op
<i>Fourth Year</i>		
Field Experience (See C. J. Handbook) 0501-403		8
Interviewing & Counseling in Criminal Justice 0501-510		4
Professional Elective (e.g., Seminar in Law)		4
Professional Elective (e.g., Computer-Related Crime)		4
Professional Elective (e.g., Seminar in Law)		4
Seminar in CJ & Public Policy 0501-526		4
Liberal Arts Senior Seminar 0520-501 *		2
<u>Liberal Arts Electives/Concentration/Minor *</u>		<u>12</u>
Total Quarter Credit Hours		186

* See page 7 for liberal arts requirements.

† See page 8 for mathematics/science requirements.

‡ See page 9 for wellness education requirements.



Professional and technical communication students prepare for challenging careers in a field that connects mass media to audiences.

Economics

Michael J. Vernarelli, Department Chairperson

The BS in economics emphasizes the quantitative analytical approach to dealing with economic problems in both the public and private sectors. This emphasis provides students with marketable skills and the intellectual foundation for career growth. The main feature that distinguishes RIT's BS in economics from traditional economics degrees is that our curriculum prepares students for the world of work by developing communication, computer and management skills in addition to economic reasoning and quantitative abilities. Students in the program are involved in a wide variety of management and analytical positions both in co-op and after graduation.

Curriculum

Students take rigorous and challenging required courses specifically designed to develop the ability to apply economic analysis to real world problems. Communication courses enhance the student's oral and written communication skills. Business courses include accounting and finance. Quantitative analytical skills are developed by a course sequence that includes computer science, mathematics, and statistics.

Professional electives allow students to pursue advanced study in their individual areas of interest. Along with finance, marketing, mathematics, statistics, or computer science are many other possibilities, limited only by the student's creativity in designing a personalized program of study. The faculty adviser helps the student develop professional options that will assist him or her in attaining career goals.

Study environment

The economics faculty serve as mentors and are readily available to enhance students' personal and professional growth. There are many special opportunities for students in the economics program. They may work as teaching assistants for professors in Principles of Economics courses. They also have the opportunity to learn about research techniques through work as research assistants for the faculty. For both of these activities, economics students receive a stipend. Finally, students can engage in independent research of their own, receiving academic credit and obtaining funding for their research needs.

Cooperative education

Students in the economics program have the option of participating in co-op at RIT and may be placed with financial and brokerage institutions, government offices and large corporations. Co-op can be taken during any quarter after the sophomore year, including summer.

Opportunities for graduates

Graduates with a BS degree in economics are prepared for a wide variety of entry-level positions in management and quantitative analysis. Students are further prepared for graduate study in economics, business, or law. Students can take advantage of a 4+1 program for the MBA in the College of Business and a 4 + 1 program in public policy in the

College of Liberal Arts. Students who follow one of these programs will receive a bachelors degree in economics and a masters degree in either public policy or business administration in five years.

Economics, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
Foundational Seminar in Economics 0511-200			1
Principles of Economics I, II 0511-301,401			8
Managerial Economics 0511-459			4
Algebra & Calculus for Management Science 1016-225, 226			
or			
Calculus I, II 1016-251,252			8
Financial & Managerial Accounting 0101-301,302			8
Survey of Computer Science 4002-200			4
Liberal Arts Core *			16
Wellness Education †			0
<i>Second Year</i>			
Monetary Analysis & Policy 0511-452			4
Applied Econometrics 0511-457			4
Economic Forecasting 0511-458			4
Introduction to Data Analysis/Statistics 0106-330			4
Math Elective			4
Professional Elective			4
Liberal Arts Core *			12
Laboratory Science			8
Wellness Education †			0
<i>Third Year</i>			
Intermediate Microeconomic Theory 0511-453			4
Intermediate Macroeconomic Theory 0511-455			4
Mathematical Methods for Economics 0511-460			4
Corporate Finance 0104-441			4
Professional Electives			12
Computer Science Elective			4
Liberal Arts Concentration or Minor *			12
Programming Elective			4
<i>Fourth Year</i>			
International Trade & Finance 0511-454			4
Industrial Organization 0511-456			4
Benefit Cost Analysis 0511-450			4
Professional Electives			15
Liberal Arts Electives & Senior Seminar *			14
Total Quarter Credit Hours			182

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

International Studies*

Murli M. Sinha, Department Chairperson

The bachelor of science degree in international studies (IS) is designed for those whose careers demand an understanding of global issues, how they play out in different regions of the world, and how we can promote equitable and sustainable development in the future. This program has been established with one overriding conceptual notion: the need for cross-disciplinary approaches to the challenges of global problems. It focuses especially on issues of scientific and technological change worldwide. The international studies program tries to bridge the gaps between disciplines, and brings RIT's faculty together to explain the sources and remedies for global problems and the social, economic, and environmental circumstances that surround them.

Curriculum

The international studies program permits students to choose a field of specialization that is organized either in terms of region or in terms of function. The regional fields are:

- East Asia
- Latin America
- Europe

and the two functional fields are:

- International Business
- Science, Technology and Society

It is expected that students with a regional specialization will study Chinese or Japanese in the East Asia field, Portuguese or Spanish in the Latin American field, and one language from French, German, Portuguese, Russian, and Spanish in the European field.

The international business field offers—in cooperation with the College of Business—an accelerated and competitive 4+1 BS/MBA option that permits qualified students to obtain a BS degree in IS in four years and the MBA degree after one additional year of study. Similarly, in cooperation with the public policy program, the science, technology and society studies field offers an accelerated and competitive 4+1 BS/MS option that allows qualified students to obtain a BS degree in IS in four years and the MS degree in public policy after one additional year of study.

Cooperative Education

The program requires students to participate in an international experience. Such experience includes, but is not limited to, approved study abroad programs, cooperative education in foreign countries, internships in foreign countries, employment in international organizations, or employment in the international division of U.S. firms with foreign operations.

Career Opportunities

Graduates with a BS degree in international studies are prepared for a range of careers in the private, governmental, and nonprofit sectors of the economy. There is increased demand by companies with foreign operations in East Asia, Latin America, and Europe for graduates who comprehend science and technology policy issues, are cognizant of the international dimensions of business operations, and who are able to communicate in the language commonly spoken in these three important regions of the world. In addition, the international studies program prepares students for graduate study in public and international affairs, business, law, and science, technology and society studies.

+Pending approval by the New York State Education Department.

International studies, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Liberal Arts Core	12
Math & Science General Education Requirement	9-12
International Studies Language Requirement	12
International Studies Requirement:	
Introduction to International Studies	4
Data Analysis I 1016-319	4
Data Analysis II 1016-320	4
Wellness Education †	0
<i>Second Year</i>	
Liberal Arts Core	12
Math & Science General Education Requirement	9-12
International Studies Language Requirement	12
Survey of Computer Science 4002-200	4
Minor or Concentration	8
Wellness Education †	0
<i>Third Year</i>	
Liberal Arts Core	4
International Studies Language Requirement	12
International Studies Requirement:	
Introduction to International Relations 0513-214	4
International Studies Requirement:	
20th Century American Diplomatic History 0507-441	4
Minor or Concentration	12
International Study Field Course (either Geographic area or Functional area)	12
<i>Fourth Year</i>	
International Studies Requirement:	
International Trade and Finance 0511-454	4
International Studies Requirement:	
Cultures and Globalization 0510-440	4
International Study Field Course (either Geographic area or Functional area)	4
Minor or Concentration	4
Liberal Arts Senior Seminar	2
International Studies Capstone Seminar	4
Free Elective	20
<i>Total Quarter Credit Hours</i>	180-186

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

Psychology

Kathleen C. Chen, Department Chairperson

The bachelor of science degree program in psychology provides students with a strong grounding in the discipline of psychology integrated with a technological focus. Upon entry, each student is assigned a faculty adviser to mentor his or her progress throughout the entire duration of the program. Students also are provided with academic advising, discipline awareness, curriculum planning strategies and career counseling through the program's Freshman Seminar.

The curriculum

The BS degree program in psychology is unique due to the following key elements: 1) the technical/professional concentration requirement, 2) a choice of four interdisciplinary tracks, and 3) a cooperative education requirement.

Technical/professional concentration requirement

The program seeks students with an aptitude for technical and quantitative reasoning as well as an interest in psychology. Students are required to complete a technical concentration and may choose from the following areas: 1) science, 2) mathematics and statistics, 3) information technology, 4) imaging science, 5) business, 6) criminal justice, or 7) an individualized concentration developed with the adviser's assistance.

Four interdisciplinary tracks

Students choose one of the following interdisciplinary tracks: 1) visual perception, 2) information processing, 3) biopsychology, or 4) clinical psychology. Technology is integrated with psychology in these tracks to produce a nontraditional and career-oriented psychology major.

The visual perception track focuses on the human perceptual systems. Vision is presented as an integration of anatomy, physiology, and psychophysics. The track covers rapidly developing topics such as the retinal mosaic and the sensory system's amazing plasticity. It stresses the most recent work showing that visual perception is a living and growing field.

The information processing track uses an interdisciplinary approach to study cognitive processes such as judgment and decision making, memory, learning, language and problem solving, attention, and perception. The track explores the interaction of human factors, psychology, and technology.

The biopsychology track studies the brain as the biological basis of behavior. It focuses on topics such as the right and left brain with their specific functions, brain injury, and neuropsychological testing. Students perform laboratory work or quantify brain waves and their relationship to attention, memory, language, perception, and psychological disorders.

The clinical psychology track emphasizes the scientific and empirical foundations of clinical and applied work. Empirically based methods are introduced to understand and modify human problems. It prepares students for future graduate programs in mental health.

Co-op requirement

The program requires that students complete a cooperative education experience between the sophomore and senior years of course work. The co-op experience is in a psychology-related field and does not carry academic credit.

Transferability

The psychology program provides excellent transfer opportunities for students from other institutions since it requires a core of psychology courses for which transfer students may receive credit. The point of entry into the program is highly flexible since there is only one fixed sequence: a three-course sequence of Introduction to Psychology, Statistics, and Experimental Psychology. The technical concentration component shares a number of common courses with other programs and provides internal flexibility for students from other RIT programs who may retain credits from some of the technical courses they have completed previously.

Career opportunities

The unique requirements of this program ensure that each student should be well prepared for advanced study in psychology, employment in industry, or employment in a human service agency or other career opportunities.

Psychology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0514-201	1
Introduction to Psychology 0514-210	4
Liberal Arts Core *	16
Mathematics Requirement †	8
Survey of Computer Science 4002-200	4
Tech./Professional Concentration ‡	4
Statistics	4
Childhood & Adolescence 0514-440	4
<i>Second Year</i>	
Experimental Psychology 0514-400	4
Liberal Arts Core *	12
Tech./Professional Concentration ‡	8
Science Sequence Requirement	8
Math/Science/Statistics †	4
Interdisciplinary Course §	4
Technical Writing 0502-444	4
Social Psychology 0514-444	4

<i>Third Year</i>	
Abnormal Psychology 0514-447	4
Ind./Organizational Psych. 0514-448	4
Liberal Arts Concentration/Minor *	12
Tech./Professional Concentration ‡	8
Interdisciplinary Course §	4
Psychology of Personality 0514-446	4
Institute Electives	9

<i>Fourth Year</i>	
Interdisciplinary course §	8
Liberal Arts Concentration/Minor/Elective *	12
Tech./Professional Concentration ‡	4
Senior Seminar *	2
Senior Project 0514-597	4
Institute Electives	15
Total Quarter Credit Hours	183

Students are expected to fulfill the co-op requirement between their second and fourth year.

* See page 7 for liberal arts requirements.

† Math/statistics courses are suggested by the mathematics department.

‡ Students are required to take 24-48 credit hours within one of the following options:

- 1) information technology
- 2) mathematics and statistics
- 3) science
- 4) imaging science
- 5) business
- 6) criminal justice
- 7) individualized

§ Students are required to take 16 credit hours within one of the following tracks:

- 1) visual perception
- 2) information processing
- 3) biopsychology
- 4) clinical psychology

Public Policy

James J. Winebrake, Department Chairperson

The public policy program at RIT explores the intersection of public policy, technology, and our natural world. In doing so, the program provides students an opportunity to integrate their interests in science, technology, government, economics, and other social science fields. The BS degree combines an understanding of these fields with the analytical tools needed to study the impacts of public policy on society. Through the program, students acquire policy analysis skills, with particular attention placed on analyzing policies that emerge in a technology-based society.

The program has many key features, including:

Science and technology—Graduates are trained in the vernacular, methodologies, and problem-solving approaches of the sciences and technologies relevant to their chosen policy study track, and they possess a well-grounded concentration (familiarity) in that area. Policy tracks include environmental policy, information and communications policy and others designed to meet the student's interests.

Interdisciplinarity—To ensure interdisciplinarity, the program provides integration of diverse disciplines through a sequence of eight public policy courses. This sequence makes up the core of the curriculum and enables students to integrate diverse subjects and apply them to the analysis of public policy.

Integrated qualitative and quantitative skills—The program balances both quantitative and qualitative approaches to the analysis of public policy so that students are able to achieve a full systems-level grasp of policy issues.

Solid grounding in liberal arts—Good policy decision makers and analysts should not be narrow specialists who reduce the process and analysis to purely quantitative computations or to purely political processes. Rather, a solid grounding in the traditions of liberal arts will develop a vital intellectual dimension in the graduate. Thus, while our graduates will have quantitative and qualitative theoretical and methodological training, by the end of their academic career they will have taken liberal arts courses with a broad disciplinary range. It is this grounding in humanistic values

combined with technology and science that makes our program both balanced and unique.

The combination of these various dimensions into a fully integrated educational experience will produce the capacity in our graduates to engage in a holistic *systems* approach to policy decision making and analysis and to become innovative problem solvers in a variety of policy areas.

The strategy of the curriculum design is to train students to think and to analyze policy in terms of complex interconnected systems. This training is in high demand in the public, private, and non-profit sectors.

Accelerated degree options

Students can choose a four-year BS degree or an accelerated five-year program leading to both a bachelor of science and a master of science degree. The five-year BS/MS option provides students a considerable advantage since a master's degree is considered the terminal degree for many policy analyst positions.

Cooperative education

After the third year and before the completion of the BS degree, students complete a co-op or internship within the private, public, or nonprofit sector. By this time in their academic career students will have completed the third-year analysis sequence. The co-op experience makes our students attractive to a wide range of agencies, businesses, and organizations.

Track courses

Six track courses demand that students apply those skills acquired in public policy courses to specific policy areas. Students can concentrate in areas such as environmental policy, information and communications policy, energy policy, and biotechnology policy, among others. Many track courses are offered through other programs and colleges of the Institute and include courses that provide a firm grounding in the science and technology aspects of the chosen track. This gives students an opportunity to interact and study with researchers and faculty from a broad range of disciplines.

Public Policy Colloquium

This required non-credit-bearing colloquium meets twice per quarter. The colloquium helps build and sustain a sense of community among the policy majors by providing a context in which current research by faculty and students is presented and case studies explored.

Employment opportunities

Exciting career opportunities await public policy professionals who can balance an understanding of science and technology with social and humanistic considerations. RIT graduates will be uniquely positioned to take advantage of the growing job market in public policy, with career options in a range of fields within the private, government, and nonprofit sectors.

The faculty

In addition to dedicated program faculty, other faculty from several departments in the College of Liberal Arts contribute to the public policy program in teaching and student advising. The participating departments include economics, history, political science, philosophy, professional and technical communication, science, technology and society, and sociology. All participating faculty have advanced degrees and have professional experience in public policy and administration positions.

Public policy, BS degree, typical course sequence

	Quarter	Credit	Hours
<i>First Year</i>			
Public Policy Core			
Foundations in Public Policy	0521-400		4
Science, Technology, and Policy	0508-441		4
Foundations			
Principles of Economics I	0511-301		4
Principles of Economics II	0511-401		4
Human Communication	0535-480		4
Introduction to Environmental Studies	0508-481		4
Math Requirements*			8
Science Requirements*			12
Liberal Arts Coret			4
Policy Colloquium			0
Wellness Education!			0
<i>Second Year</i>			
Public Policy Core			
Values in Public Policy	521-301		4
Qualitative Analysis in Public Policy	521-406		4
Foundations			
Benefit-Cost Analysis	0511-450		4
Data Analysis I	1016-319		4
Applied Econometrics	0511-457 or Data Analysis II	1016-320	4
American Political Thought	0513-458		4
Foundation Elective			4
Liberal Arts Coret			20
Policy Colloquium			0
Wellness Education!			0
<i>Third Year</i>			
Public Policy Core			
Policy Analysis I	0521-402		4
Policy Analysis II	0521-403		4
Policy Analysis III	0521-404		4
Public Policy Track Courses			12
Liberal Arts Concentration/Minort			12
Liberal Arts Coret			4
Free Electives			8
Cooperative Education (Summer)			0
Policy Colloquium			0
<i>Fourth Year</i>			
Public Policy Core			
The Senior Project I	0521-405		4
Public Policy Track Courses			12
Free Electives			12
Liberal Arts Concentration/Minor/Electivest			12
Senior Seminar			2
Total Quarter Credit Hours			186

* See page 7 for liberal arts requirements.

† See page 8 for mathematics/science requirements.

‡ See page 9 for wellness education requirements.

Note: Students may take up to 12 quarter credit hours of MS classes in their fourth year if they are enrolled in the BS/MS program. This increases total quarter credit hours to 202 (or 198 if 521-407 Senior Project II is not selected).

Social Work

Roy W. Rodenhiser, Department Chairperson

RIT's social work program, established in 1971, provides excellent educational and practical preparation for professional social work practice at one of the most technologically current educational institutions in the country, with a state-of-the-art computer network available to all students.

Accredited by the Council on Social Work Education, the mission of the baccalaureate social work program is the provision of quality educational preparation to a uniquely diverse student population in a highly technological environment for entry into generalist social work practice and graduate study. This is accomplished with special emphases on extensive field instruction, culturally integrated experiences between deaf and hearing cultures, the application of technology to practice, and enriched research practice evaluation.

The social work profession is dedicated to the improvement of the human condition. The curriculum emphasizes integration of practice and research skills; self-awareness; social welfare policy and services; practice with minority subcultures; knowledge of human development; and understanding individual families, groups, organizations, and communities. Infused throughout these major content areas are six additional themes: social work values and ethics, diversity, populations at risk, social and economic justice, deafness, and technology in a social work setting.

RIT's social work program is known for an unusually wide selection of professional courses and a full-time intensive field instruction internship. Each social work student is assigned a faculty adviser to assist with academic planning and career guidance throughout the course of study.

We believe that social workers have a dual role in the process of social change: they directly serve the needs of individuals, families, groups, and communities, and they work on behalf of clients to effect change in policies, legislation, and society.

Personal growth

The social work curriculum encourages personal growth as an essential aspect of professional growth. In various courses students learn to increase their own self-awareness, to define their values, to understand and respect the values of others, and to develop the personal and professional strengths necessary for social work practice.

Curriculum

The social work curriculum aims to develop an understanding of society and people's needs. Students learn how the institutions of society contribute toward resolving problems and may sometimes aggravate them.

Students become well grounded in human behavior and the social environment from psychological, sociological and biological perspectives. The understanding they gain of how people develop and interact with their environment gives them a base for their social work practice.

Students take courses that introduce them to the concepts of social work practice and teach fundamental skills needed to work successfully with individuals, families, groups, and the community to solve problems and resolve conflict. RIT's program has a strong focus on research skills and the appropriate use of computers in analyzing data from social work practice.

Social work program and deafness: a unique opportunity

The National Technical Institute for the Deaf (NTID) at RIT provides a special opportunity for students and faculty in the social work program. Because of the close relationship with NTID, RIT's social work program offers an unsurpassed education in working with the deaf community; preparing deaf students for social work careers; increasing sensitization and responsiveness of future professionals, hearing and deaf, to the needs of disabled persons; and offering deaf and hearing students the opportunity to study the applications of social work to the needs of deaf persons.

Professional electives

Elective courses offer social work students knowledge about and preparation for work in the areas of family violence; services for children, families, and deaf individuals; and the professional use of the Internet.

Career and placement focus

Like all programs at RIT, our focus is on careers. We prepare students to enter directly into meaningful and rewarding positions in governmental and voluntary social agencies.

Because program graduates receive advanced standing at most graduate schools of social work in the country, they can complete a two-year MSW program in only one year.

Graduates have found their RIT field placement experiences to be extremely helpful in making career decisions and in obtaining jobs. In addition, the resources of RIT's Office of Cooperative Education and Career Services are available to all of our students.

Transfer students

Transfer students are evaluated and given credit for previous education wherever it is most appropriate. Transfer students with two-year degrees in human services or related programs are given credit for their studies and can expect to complete the social work program in two years.

Field instruction

Field instruction is an important part of the curriculum. During the senior year, students complete an internship in a social agency. Supervised by a professional social worker and supported with integrated academic courses, they learn to apply the knowledge and skills acquired in the classroom.

During two academic quarters, students spend 30 hours per week in a social agency or community program.

RIT social work students have an opportunity to provide direct services to clients during their field placements. Some have become involved in family support counseling, advising pregnant adolescents, helping children with emotional problems, intervening on behalf of clients in Family Court, and working with people who abuse alcohol and other substances.

As an alternative, some students have preferred to work in the planning and funding of social programs, evaluating program effectiveness and measuring the quality of services, organizing communities to bring about change in local problems, educating the public on a broad social issue, or researching a carefully coordinated social work effort.

In field placement, each student is taught by a social worker in the agency and is supervised by a faculty member. Each week students in field placement meet on campus to evaluate experiences and assess development of their professional skills.

Bilingual opportunities

The social work curriculum offers students the flexibility of acquiring skills in a second language, if they choose. The most popular and easiest to acquire is sign language with deaf individuals, since students participate in the living laboratory of integrated education during the entire time they are at RIT. Spanish is increasingly valuable as a second language for social workers. Students can acquire proficiency in Spanish through an appropriate liberal arts concentration or electives.

Social work, BS degree, typical course sequence

RIT Exploration Program

Andrea C. Walter, Program Director

Students often are attracted to RIT because of the opportunity to specialize in a career-oriented or technical program, but many freshmen and transfer students have not chosen a career area by the time they have been accepted for admission. They want an opportunity to explore different fields before making a decision. The RIT Exploration program gives these students a chance to formulate an educational and career plan during their first quarters at RIT.

RIT Exploration program students enroll for liberal arts courses in the humanities and social sciences as well as courses in mathematics, science, and computer science. More important, they also take a one-credit Career Exploration Seminar in which they explore their own abilities and interests and the array of programs offered at RIT.

As students identify a major suitable to their backgrounds, abilities, and interests, they take introductory courses in that area to ensure that the major is appropriate for them. They may take courses in most major areas represented by RIT departments. Once they have identified a major in their first year, RIT Exploration program students apply for a transfer to the new department.

Students who select the RIT Exploration program must meet the standards and requirements of the RIT schools and colleges to which they eventually apply. Occasionally, some additional time may be necessary to complete degree requirements because the RIT Exploration program student has spent time in preliminary exploration.

Each student is assisted by a faculty adviser in choosing courses and in selecting a career path and degree program.

After one to four quarters in the RIT Exploration program, each student may reasonably anticipate:

- A clearer basis for making a decision regarding long-range career plans
- Credit for courses that would apply to RIT degree programs or to programs at other colleges
- Assistance in matriculating in the curriculum of the student's choice at RIT, provided that relevant standards and requirements are met and that space in the program is available.

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

College of Science

Ian Gatley, Dean

Undergraduates in the College of Science receive a unique education, one that emphasizes the applications of science and mathematics in the professional world while providing a comprehensive liberal arts education in the humanities and social sciences. The College of Science curricula, under the direction of our faculty members, reflect modern trends in the application of science and mathematics while preparing students for graduate study, as well as immediate employment in business, industry, government, and the medical science professions.

Our emphasis is on the practical aspects of science and mathematics as found in science and computer laboratories; we are career oriented. At the same time we recognize the value of the social sciences, English composition, literature, history, philosophy, and fine arts for the intellectual enrichment of our students. In addition to technical competence, many of the skills acquired through the study of these liberal arts subjects are required by employers for promotion and career advancement.

Faculty and research

The College of Science has an ideal size and philosophy to provide a quality education. We have more than 100 faculty members in the sciences, health professions, and mathematics. All are committed to the education of undergraduate students; most hold the Ph.D. degree. They provide a variety of faculty expertise, so a student is likely to find a faculty member with similar interests to act as mentor.

Our faculty members are dedicated teachers who also practice their professions outside of the classroom in research and other professional activities. Our undergraduates are encouraged to work with faculty members as they pursue their research. Many joint student-faculty research projects have resulted in publication in professional literature.

Facilities and resources

College of Science programs are delivered in two major facilities on campus: the Gosnell Building and the Chester F. Carlson Center for Imaging Science. The Gosnell Building houses nine classrooms, 22 teaching laboratories, and 16 research laboratories that provide space for laboratory course work and student research projects. Some of the facilities within the science building have specialized purposes. For example, we have a thin films laboratory, an animal care facility, a diagnostic medical imaging laboratory, a plasma etching laboratory, an electronics laboratory, and a nuclear magnetic resonance laboratory. The Bates Science Study Center provides a comfortable environment for study groups and individual tutoring sessions with faculty. The study center is equipped for wireless computing. The 60,000-square-foot addition to the Gosnell Building—the Center for Excellence in Mathematics, Science and Technology—houses an additional nine media-supported classrooms, three computer laboratories, two statistical computing laboratories, five science laboratories, a laser light scattering laboratory, a greenhouse, and community areas, including the Bruce and Nora James Atrium, where students, faculty, and staff can gather informally. The Chester F.

Carlson Center for Imaging Science houses research facilities and laboratories for visual perception, digital imaging, astronomical imaging, microdensitometry, optics, remote sensing, and color science. The College of Science also operates an observatory on campus. All of these facilities are used by our undergraduate students.

State-of-the-art computer facilities are available in the college as well as in labs throughout the Institute. Such facilities are a valuable resource for College of Science programs that use the computer as a tool in the applications of mathematics, health-related work, and science.

Academic advising

Each College of Science student is assigned an academic adviser who provides counsel on course selection, advice about careers, and information about RIT services. It is common for a science major to have several friends among the faculty who help with academic, career, and personal questions.

Our graduates

The best way to evaluate college programs is to look at the success of the graduates. In recent surveys of our graduates, more than 90 percent responded that they are employed in a field related to their degree, and the same percentage expressed satisfaction with their work.

Employers report that our graduates have good preparation for employment in business and industry and, because of their work experience, immediately fit into their jobs with a high degree of initiative and purpose.

About one-fourth of our graduates enter graduate or professional school directly after graduation. More will return for further education at the graduate level as part of their career development. We have found that they do exceedingly well. Many find that, because of their laboratory and co-op experience, they can move into their graduate research projects more easily than their classmates.

The cooperative education plan

In our cooperative education plan (co-op), a student alternates quarters of paid work with quarters on campus in academic study for two to four years. Co-op employment experience in a student's field of study has many advantages.

Through co-op, students often gain insights that help them with classroom work. Co-op gives them a chance to find out what working in their field is really like, and acquiring practical experience that is valuable in getting a job or into graduate school is another benefit. Income from this work-study program enables students to obtain a high-quality education at a cost often comparable to that of a public education.

Although co-op is not required in most of our programs, many students elect this five-year plan, which works as follows: RIT's school year is divided into four 11-week quarters: fall, winter, spring, summer. Students in the five-year co-op programs in biology, biotechnology, applied mathematics, applied statistics, computational mathematics, biomedical computing, and physics attend classes during the fall, winter,

and spring of their first two years. During the last half of the second year, they work with the Office of Cooperative Education and Career Services to obtain a co-op position, possibly starting as early as the coming summer. At the beginning of the third year, students begin alternating quarters of work and study, as shown in the charts below. Students in the five-year chemistry, chemistry (environmental option), biochemistry, and polymer chemistry co-op plans follow the same kind of schedule, except that their co-op experience could start as early as the summer of the first year.

Cooperative education schedule for five-year programs in biology, biotechnology, computational and applied mathematics, applied statistics, biomedical computing (A and B block), and physics (C block)

Year		Fall	Winter	Spring	Summer
1 and 2		RIT	RIT	RIT	Vacation
3 and 4	A	RIT	Work	RIT	Work
	B	Work	RIT	Work	RIT
	C	RIT	RIT	Work	Work
5	A	RIT	Work	RIT	-
	B	Work	RIT	RIT	-
	C	RIT	RIT	Work	-

Cooperative education schedule for five-year chemistry, chemistry (environmental option), biochemistry, and polymer chemistry programs*

Year		Fall	Winter	Spring	Summer
1		RIT	RIT	RIT	Vac/Work
2,3 and 4	A	RIT	Work/RTF	RIT	Work
	B	Work	RIT	Work	RIT
5	A	RIT	Work	RIT	-
	B	Work	RIT	RIT	-

*Some students may elect to co-op for a double block (i.e., winter and spring).

Students in the environmental science and imaging science programs are encouraged to participate in optional co-op blocks beginning the summer of the second year of their program. Students in the bioinformatics program are required to complete one cooperative education experience.

The internship plan

Students in the medical technology, nuclear medicine technology, diagnostic medical sonography (ultrasound), and physician assistant programs do not participate in co-op. Instead they spend three years on campus in academic work and then gain invaluable clinical experience during the fourth year at a clinical training site.

Minors

In addition to offering a variety of majors, the College of Science offers minors in astronomy, imaging science, mathematics, and statistics. A minor provides a student with a secondary area of expertise to complement their major program of study. Students interested in pursuing a minor are advised to consult with their faculty adviser as well as the College of Science department offering the minor. For more information see www.science.rit.edu.

Transfer admission

Students with associate degrees in a comparable program from other educational institutions normally can expect to transfer at the third-year level. Transfer credit is granted for studies that parallel Institute courses in the curriculum for which admission is sought.

Graduate degrees

The College of Science offers master of science degrees in bioinformatics, environmental science, chemistry, clinical chemistry, industrial and applied mathematics, imaging science, and color science. A master of science degree in materials science and engineering is offered jointly by the College of Science and the College of Engineering, and the nation's only doctoral (Ph.D.) program in imaging science is offered through the college's Center for Imaging Science.

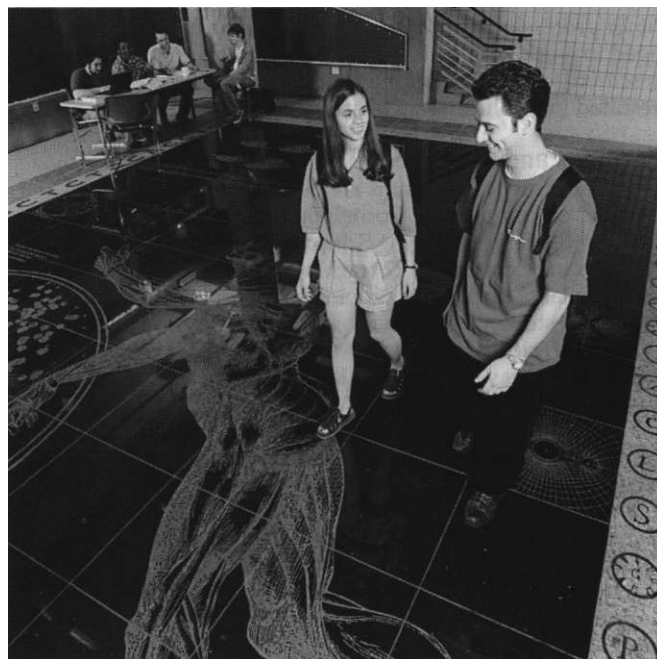
Premedical Studies Advisory Program

Kay G. Turner, Director

Premedical studies in the College of Science is an advisory program designed to provide guidance and assistance to all RIT students who want to become physicians, dentists, optometrists, podiatrists, and veterinarians. Faculty who participate in this program provide personalized advice on course selection, health-related experiences, and extracurricular activities, and they provide assistance with the application process. Although admission to medical school is a highly competitive process, 85 percent of our graduates have been admitted in the past decade, some into the most prestigious schools in the United States.

Enrollment in premedical studies

Students cannot apply directly to the premedical studies advisory program because it exists only to assist students who have been admitted to any one of the degree-granting programs offered at RIT or who are enrolled as nonmatriculated students to take the premedical core courses (see next page). To enroll in the program, students must visit the premedical studies office, room 2102, in the College of Science or call 585-475-7105 for an appointment.



The four-story Bruce and Norm James Atrium is the focal point of the Center for Excellence in Mathematics, Science and Technology, which houses state-of-the-art laboratories and classrooms.

Premedical core courses and academic programs

To complete the academic requirements necessary to gain admission to doctoral programs in the health professions, a student may enroll in any BS program in the College of Science and combine that program's course requirements with the premedical "core courses." The way in which program requirements are combined with the premedical core courses varies according to the program in which the student is enrolled. The curricula of certain programs include all of the premedical core courses (see below). Others require few, if any, so students in these programs will require additional time, perhaps summers, to complete all required courses. It is important that these courses be completed by the end of the third year or before the student expects to take the MCAT, DAT, OAT, GRE, or other standardized tests required for admission to medical school. Clearly, careful planning and scheduling, with the guidance of the premedical studies advisers, are crucial to success.

Premedical core

Note: In addition to these core courses, which are required by virtually all medical schools, courses in mathematics, psychology/behavioral sciences, or biology electives may be required by specific schools. The admissions requirements of each medical school are published and may be obtained from the premedical advising committee. Some medical schools refuse to accept Advanced Placement credit for these core courses.

Biology	1 year	With laboratory
Chemistry	2 years	General chemistry, 1 year Organic chemistry, 1 year (both years with laboratory)
Physics	1 year	With laboratory
English	1 year	

Combining your program's requirements with the premedical core courses*

If you major in:	You will need to take the courses required for your major, plus:
Applied mathematics	†
Applied statistics	†
Biochemistry	None
Bioinformatics	Elect one year of physics and one year of organic chemistry
Biology	None
Biomedical computing	Elect one year of organic chemistry
Biotechnology	Elect one year of physics
Chemistry	Elect one year of biology
Computational mathematics	†
Diagnostic medical sonography	Elect one year of general chemistry and one year of organic chemistry
Environmental science	None
Imaging science	†
Physician assistant	Elect one year of physics and one year of organic chemistry laboratory
Physics	Elect one year of biology and one year of organic chemistry
Polymer chemistry	Elect one year of biology

* Some rearrangement of the typical pattern of course work within a program may be necessary.

† Course credits beyond the usual 12 quarters needed to complete degree requirements may be necessary.

Note: Students enrolled in other RIT programs should consult with premedical advisers for assistance in planning a curriculum that includes the premedical core courses.

Health-related experience

All students interested in the health professions should obtain as much experience as possible in their chosen field of medicine. This may take the form of volunteer activities, shadowing practitioners in the field, or actual employment in a health care setting. To help, RIT's outstanding co-op program provides students with a host of employment opportunities, including an exclusive nursing assistant position at a local hospital for those who want direct patient care experience.

We believe very strongly that all premedical students should commit themselves to developing the greatest competency possible in the discipline in which they are enrolled. It is important, therefore, that students interested in premedical studies realize that, while their career objectives may include a professional school after graduation, they should select an academic program to which they are prepared to make a sincere and major commitment as an undergraduate. This approach will increase their career options after graduation.

More information about premedical studies at RIT can be found at www.rit.edu/~premdwww/.

General Science Exploration Option

Eileen D. Marron, Director

Many high school students do not know which major they prefer. We encourage such students to come to RIT if they have a strong interest in science, mathematics and statistics, or medical sciences careers.

A student with multiple interests may apply to the college's general science exploration program without designating a specific major. The program encourages students to explore their options before deciding which degree to pursue.

A customized schedule of courses in science and mathematics is developed for each student based on the student's ability, interests, and goals. A team of academic advisers, representing each department in the college, assists the student in selecting courses and identifying a major in which to enroll. In addition to the traditional science options of biology, chemistry, physics, and math, a student may explore courses in environmental science, imaging science, or the medical sciences.

Before the end of the first year, most students are ready to choose a major. Some students find the decision is easily made after only a quarter of course work. Others are still deciding in their second year and may find that choosing a major and a minor is the best path for them. With proper advising, students are able to delay their choice of a major without losing time toward completion of a degree.

General science exploration option, typical course sequence

First Year	Quarter	Credit Hours
Freshman Seminar		2
Mathematics or calculus sequence		10-12
Choice of two laboratory science sequences:		
Biology		12
Chemistry		12-16
Physics		10-15
Imaging Science		4
Additional course choices:		
Computer Science		4-8
Liberal Arts*		4-12
First-Year Enrichment		0
Wellness Education!		0
Total Quarter Credit Hours		16-18 Credits Per Quarter

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

Biological Sciences

G. Thomas Frederick, Interim Department Head

Biology

The department of biological sciences offers programs leading to the AS and BS degrees in biology. Graduates receiving the BS degree find rewarding positions in occupations related to the life sciences, including:

biomedical research
scientific management
science journalism
forensic science
ecology and environmental science
agriculture
genetic counseling
education

The program also includes all of the course work and support services to prepare students to enter schools of medicine, dentistry, veterinary medicine, optometry, podiatry, and chiropractic medicine.

With proper scheduling of courses, biology majors also can earn a master of business administration degree in as little as one year after receiving their degree in biology. This combination (biology BS + MBA) prepares graduates to enter exciting and rewarding management positions in a wide range of scientific organizations.

Graduates are also well-prepared to pursue a master's or Ph.D. in a wide variety of fields in the life sciences.

Requirements for the BS degree in biology

The student must meet the minimum graduation requirements of the Institute as described on pages 7 to 9 of this bulletin. In addition, the program requires successful completion of all of the courses listed in the typical course schedule.

Co-op program

The biology degree curriculum provides opportunities for students to participate in our optional cooperative education program. More than 65 organizations in private industry, government and academia employ our students in short-term (10 to 20 weeks) full-time, *paid* positions directly related to the students' academic areas of interest. Co-op positions can be held during the summer and/or during the regular academic year. No tuition is charged for any co-op participation. If a student elects to hold a co-op position during the regular academic year, he or she will take the same number of academic class terms, but may need to extend the date of graduation beyond the normal four years.

Biology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Symposium 1001-200, 259	2
Introduction to Biology I, II, ffl 1001-251,252, 253	12
General & Analytical Chemistry I, II, III 1011-215,216,217	10
Chemical Principles Lab I, II 1011-205,206	2
General & Analytical Chemistry Lab 1011-227	2
Elementary Calculus I & II 1016-214,215	6
Liberal Arts (Core) *	12
First-Year Enrichment	0
Wellness Education Courses †	0
 <i>Second Year</i>	
Cell Biology 1001-311	4
Molecular Biology 1001-350	4
Evolutionary Biology 1001-365	4
Organic Chemistry I, II, III 1013-231,232,233	9
Organic Chemistry Lab I, II, III 1013-235,236,237	3
Data Analysis I 1016-319	4
Biology Elective ‡	4
Liberal Arts (Core) *	16

Third/Fourth Years §

General Ecology 1001-340	4
Comparative Physiology 1001-413	4
Genetics 1001-421	4
Developmental Biology 1001-422	4
Biology Seminar 1001-550	2
College Physics I, II, III 1017-211,212,213	9
College Physics Lab I, II, III 1017-271,272,273	3
Biology Electives ‡	20
Liberal Arts (Concentration) *	12
Liberal Arts (Advanced Electives) *	12
Liberal Arts (Senior Seminar) •• 0520-501	2
Free Electives	10
<u>Cooperative Education 1001-499 (Optional)</u>	<u>Co-op</u>
Total Quarter Credit Hours	180

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Biology electives: minimum of 12 credits must be 400 level or above

§ If a student elects to participate in our optional co-op program, she or he may be scheduling courses in a fifth year but will be using the same number of academic quarters of classes to complete the degree.

Biotechnology

The department of biological sciences BS in biotechnology program is the most widely recognized four-year college degree program in genetic engineering in the United States.

A graduate who earns this degree is prepared to immediately assume challenging positions in research, development and management activities in:

biomedical research
human genetics
agriculture
food products
pharmaceuticals and vaccine development
environment and energy
forensic science
genetic counseling

The advanced nature of the senior-year courses and the opportunity to participate in faculty-sponsored undergraduate research during the entire four years also give a very sound foundation to those graduates wishing to pursue a master's or Ph.D. degree.

With proper scheduling of courses, biotechnology majors also can earn a master of business administration degree in as little as one year after receiving their degree in biotechnology. This combination (biotechnology BS + MBA) prepares graduates to enter exciting and rewarding management positions in a wide range of biotechnology organizations.

The program can also be designed to include the education necessary for the pursuit of a career in a medical field.

Specialized areas of emphasis include recombinant DNA, genetic engineering, mammalian and plant tissue culture, monoclonal antibody production and purification, large-scale fermentation techniques (bacterial and mammalian cell), and methods for characterization and separation of proteins and nucleic acids.

Requirements for the BS degree in biotechnology

The student must meet the minimum graduation requirements of the Institute as described on pages 7 to 9 of this bulletin. In addition, the program requires successful completion of all of the courses listed in the following typical course schedule.

Co-op program

The biotechnology degree provides opportunities for students to participate in our optional cooperative education program. More than 65 organizations in industry, government and academia employ our students in short-term (10 to 20 weeks), full-time *paid* positions directly related to students' academic areas of interest. Co-op positions can be held during the

summer and/or during the regular academic year. Tuition is not charged while a student is on co-op. If a student elects to hold a co-op position during the regular academic year, he or she will take the same number of academic class terms but may need to extend the date of graduation beyond the normal four years.

Biotechnology, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
Freshman Symposium 1001-200,259			2
Introduction to Biology I, II, III 1001-251,252,253			12
General & Analytical Chemistry I, II, III 1011-215,216,217			10
Chemical Principles Lab I, II 1011-205,206			2
General & Analytical Chemistry Lab 1011-227			2
Elementary Calculus I & II 1016-214, 215			6
Liberal Arts (Core) *			12
First-Year Enrichment			0
Wellness Education Courses †			0
Second Year			
Cell Biology 1001-311			4
Immunology 1001-312			3
Tissue Culture 1001-314			4
Molecular Biology 1001-350			4
Organic Chemistry I, II, III 1013-231,232,233			9
Organic Chemistry Lab I, II, III 1013-235, 236,237			3
Data Analysis I 1016-319			4
Liberal Arts (Core) *			16
Third/Fourth ‡			
Introductory Microbiology 1001-404			5
Genetics 1001-421			4
Analytical Chemistry: Separations 1008-312			3
Analytical Chemistry: Separations Lab 1008-319			1
Biochemistry: Conformation & Dynamics 1009-502			3
Biochemistry: Metabolism 1009-503			3
Biotechnology Electives §			24
Liberal Arts (Concentration) *			12
Liberal Arts (Advanced Electives) *			12
Liberal Arts (Senior Seminar) * 0520-501			2
Free Electives			18
<u>Cooperative Education 1001-499 (Optional) †</u>			<u>Co-op</u>
Total Quarter Credit Hours			180

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ If a student elects to participate in our optional co-op program, she or he may be scheduling courses in a fifth year but will be using the same number of academic quarters of classes to complete the degree.

§ Biotechnology electives (must take a minimum of 24 credits from course list below)

Hybridoma Techniques 1001-315	2
Cell Physiology 1001-403	4
Plant Biotechnology 1001-416	5
Industrial Microbiology 1001-417	4
Microbial & Viral Genetics 1001-427	4
Genetic Engineering 1001-450	5
Microbial Pathogenesis 1001-451	4
Advanced Microbial Fermentation 1001-467	4
Genomics 1001-492	4
Bioinformatics 1001-493	4
Advanced Immunology 1001-502	4
Advanced Biology Research 1001-541,542,543	1-6
Environmental Microbiology 1001-567	4
Virology	4
Managing Industrial Laboratory	2
Independent Study 1001-599	1-3

Biotechnology, bioinformatics option, BS degree,

typical course sequence

First Year	Quarter	Credit	Hours
Freshman Symposium 1001-200,259			2
Introduction to Biology I, II, III 1001-251, 252, 253			12
General & Analytical Chemistry I, II, III 1011-215,216,217			10
Chemical Principles Lab I, II 1011-205,206			2
General & Analytical Chemistry Lab 1011-227			2
Computer Science I, II 4003-231,232			8
Elementary Calculus I & II 1016-214, 215			6
Liberal Arts (Core) *			16
First-Year Enrichment			0
Wellness Education Courses †			0

Second Year

Introduction to Bioinformatics 1001-260	2
Cell Biology 1001-311	4
Molecular Biology 1001-350	4
Immunology 1001-312	3
Tissue Culture 1001-314	4
Computer Science III 4003-233	4
Organic Chemistry Lecture I, II, III 1013-231,232,233	9
Organic Chemistry Lab I, II, III 1013-235,236,237	3
Liberal Arts (Core) *	8

Third/Fourth Year ‡

Introduction to Microbiology 1001-404	5
Genetics 1001-421	4
Genomics 1001-492	4
Bioinformatics 1001-493	4
Genetic Engineering 1001-450	5
Biotechnology Electives	12
Analytical Chemical Separations 1008-312,319	4
Biochemistry: Confirmation & Dynamics 1009-502	3
Biochemistry: Metabolism 1009-503	3
Introduction to Databases & Data Modeling 4002-360	4
Programming Language Concepts 4003-450	4
Data Analysis 1016-319	4
Liberal Arts (Core)*	4
Liberal Arts (Concentration) *	12
Liberal Arts (Advanced Electives) *	12
Liberal Arts Senior Seminar * 0520-501	2
<u>Cooperative Education 1001-499 (Optional) †</u>	<u>0</u>

Total Quarter Credit Hours 185

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Students participating in our optional co-op program may be scheduling courses in a fifth year but will be using the same number of academic quarters of classes to complete the degree.

Bioinformatics

Gary Skuse, Program Director

The BS program in bioinformatics represents a truly interdisciplinary degree: the curriculum was developed by faculty in the departments of biological sciences, chemistry, computer science, mathematics and statistics, and information technology with the guidance of individuals in the bioinformatics and biotechnology industries throughout the country. This curriculum was designed with the needs of the prospective employer in mind, specifically for this challenging and rapidly changing field.

Bioinformatics represents the wedding of biotechnology and the computing sciences. Bioinformaticists use computers to analyze, organize, and visualize biological data in ways that increase our understanding of those data and lead to new discoveries. Graduates receiving the BS degree will be well qualified for many rewarding careers including those in:

- bioinformatics software development*
- biomedical research*
- biotechnology*
- comparative genomics*
- genomics*
- molecular imaging*
- pharmaceutical research and development*
- proteomics*
- vaccine development*

Requirements for the BS degree in bioinformatics

The student must meet the minimum graduation requirements of the Institute as described on pages 7 to 9 of this bulletin. In addition, the program requires successful completion of all of the courses listed in the typical course schedule plus one co-op experience.

Co-op program

The bioinformatics degree curriculum requires the completion of one cooperative education experience. This experience permits the student to witness the state-of-the-art in bioinformatics from a practical perspective. More than 65 organizations in industry, government and academia employ our students in short-term (10-20 weeks) full-time, paid positions. Co-op positions can be held during the summer and/or the regular academic year. No tuition is charged for any co-op participation. If a student elects to pursue a co-op during the regular academic year, he or she will take the same number of academic class terms, but may need to extend the date of graduation beyond the normal four years.

Combined BS/MS program

The existing BS program may be combined with the MS program in bioinformatics, allowing undergraduate majors to acquire both degrees in as few as five years. Undergraduate students with an overall GPA of 3.2 and a GPA in their professional field of study of 3.4 may apply to the bioinformatics committee for entry before the completion of their third year of study. Students in the combined program will be required to take graduate level courses during their fourth year and complete an approved MS thesis during their final year of study. Those who select this program will complete the undergraduate degree requirements and 50 quarter credit hours toward the Bioinformatics MS degree.

Bioinformatics, BS degree, typical course sequence

<i>First Year</i>	
Freshman Symposium 1001-200,259	2
Introduction to Biology I, II, III 1001-251,252, 253	12
Introduction to Bioinformatics 1001-260	2
Computer Science I & II 4003-231,232	8
Calculus I & II 1016-251,252	8
Liberal Arts (Core)*	16
First-Year Enrichment	0
Wellness Education!	0
<i>Second Year</i>	
Cell Biology 1001-311	4
Molecular Biology 1001-350	4
Bioinformatics 1001-493	4
Computer Science III 4003-233	4
General & Analytical Chemistry I, II 1011-215,216	7
Chemical Principles Lab I, II 1011-205,206	2
Introduction to Organic Chemistry 1011-213	3
Introduction to Organic Chemistry Lab 1011-207	1
Discrete Math I, II 1016-265,366	8
Liberal Arts (Core)*	12
<i>Third & Fourth Years</i>	
Introduction to Microbiology 1001-404	5
Introduction to Bioinformatics Computing 1001-362	4
Genetic Engineering 1001-450	5
Genetics 1001-421	4
Genomics 1001-492	4
Molecular Modeling & Proteomics 1001-494	4
Advanced Bioinformatics Computing 1001-363	4
High Performance Computing for Bioinformatics 1001-364	4
Biochemistry: Conformation & Dynamics 1009-502	3
Biochemistry: Metabolism 1009-503	3
Introduction to Databases & Data Modeling 4002-360	4
Data Analysis 1016-319	4
Programming Language Concepts 4003-450	4
Statistical Analysis for Bioinformatics 1016-415	4
Liberal Arts (Concentration)*	12
Liberal Arts (Advanced Electives)*	12
Liberal Arts Senior Seminar 0520-501	2
Free Electives	8
Co-op (required) 1001-499	0
Total Quarter Credit Hours	187

* See page 7 for liberal arts requirements,

f See page 9 for wellness education requirements.

‡ Students participating in our optional co-op program may be scheduling courses in a fifth year but will be using the same number of academic quarters of classes to complete the degree.

Bioinformatics, BS/MS degree, typical course sequence

<i>First Year</i>	
Freshman Symposium 1001-200,259	2
Introduction to Biology I, II, III 1001-251, 252,253	12
Introduction to Bioinformatics 1001-260	2
Computer Science I, H 4003-231,232	8
Calculus I, II 1016-251,252	8
Liberal Arts (Core)*	16
First-Year Enrichment	0
Wellness Education!	0
<i>Second Year</i>	
Cell Biology 1001-311	4
Molecular Biology 1001-350	4
Bioinformatics 1001-493	4
Computer Science III 4003-233	4
General & Analytical Chemistry I, H 1011-215,216	7
Chemical Principles Lab I, II 1011-205, 206	2
Introduction to Organic Chemistry Lecture 1011-213	3
Introduction to Organic Chemistry Lab 1011-207	1
Discrete Math I, II 1016-265,366	8
Liberal Arts (Core)*	12
<i>Third Year</i>	
Introduction to Microbiology 1001-404	5
Introduction to Bioinformatics Computing 1001-362	4
Genetic Engineering 1001-450	5
Advanced Bioinformatics Computing 1001-363	4
Introduction to Databases & Data Modeling 4002-360	4
Data Analysis 1016-319	4
Statistical Analysis for Bioinformatics 1016-415	4
Liberal Arts (Concentration)*	12
Free Electives	8
Co-op (required) 1001-499	0
<i>Fourth Year</i>	
Genetics 1001-421	4
Genomics 1001-492	4
Ethics in Bioinformatics 1001-725	3
Molecular Modeling & Proteomics 1001-494	4
High Performance Computing for Bioinformatics 1001-764	4
Programming Language Concepts 4003-450	4
Biochemistry I, II, II 1009-702, 703, 704	9
Professional Elective	2
Liberal Arts (Advanced Electives)*	12
Liberal Arts Senior Seminar 0520-501	2
<i>Fifth Year</i>	
Bioinformatics Seminar 1001-722	2
Thesis 1001-890	10
Statistical Models for Bioinformatics 1016-715	4
Graduate Electives **	20
Total Quarter Credit Hours	231

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Students participating in our optional co-op program may be scheduling courses in a fifth year but will be using the same number of academic quarters of classes to complete the degree.

** Graduate electives may be comprised of any graduate level course in biological sciences, chemistry, mathematics and statistics, computer science, information technology, or business. These courses provide flexibility so that students can pursue a course of study consistent with personal interests and professional goals.

Environmental Science

John M. Waud, Program Director

The 21st century promises to be both an exciting time and a challenging one in which to live. Many of the most complex challenges will be environmental. To meet these challenges will require problem-solving abilities based in science, mathematics, the social sciences, and other disciplines. The BS and BS/MS environmental science programs will provide you with the education and experiences you need to be successful in meeting these challenges.

Environmental scientists solve problems relating to power generation, waste reduction, recycling, land use, manufacturing, packaging, transportation, forestry, agriculture, economics, and a wide range of other areas. They study our relationship to nature and to each other. Using the tools of science and

mathematics, as well as principles from other disciplines, they develop solutions that prevent or reverse environmental deterioration and result in sustainability.

A graduate of the environmental science program is prepared for a challenging and rewarding career in positions such as:

environmental consultant
air quality inspector
energy auditor
wetlands ecologist
water pollution investigator
solar energy research scientist
water conservation consultant
recycling coordinator

Innovative features and accelerated degree options

The environmental science program is unique because it is designed and implemented jointly by the College of Science and College of Liberal Arts. You can choose a four-year BS degree or an accelerated five-year program leading to both a bachelor of science and a master of science degree. The five-year BS/MS option is strongly recommended because it provides you a considerable advantage over other environmental science graduates in the job market. The curriculum was developed in conjunction with an advisory board of environmental leaders to ensure that your education meets the future needs of the industry.

In order to function as an environmental scientist, an individual must have an extensive background in mathematics, physical science and life science. In fact, the BS/MS program at RIT is one of the strongest programs available with respect to mathematics and science.

An environmental scientist must be able to communicate effectively and must understand economics and the law. The liberal arts portion of the curriculum provides this key group of skills.

We are flooded with information in every aspect of our lives. Successful environmental scientists must be able to assess the validity of information and to evaluate the design of experiments found in the literature. These critical thinking skills are woven into the environmental science curriculum.

Due to the interdisciplinary nature of environmental science, it is essential that environmental science professionals have a solid foundation of knowledge from a variety of academic fields. This foundation supports the understanding of interrelationships among the various disciplines with respect to environmental issues. The courses in our core curriculum teach you how environmental science fits into the "big picture." In a single class meeting, for example, faculty from several disciplines may present different aspects of one environmental topic. Environmental professionals from the community may also bring the latest "real-world" information directly into the classroom.

Environmental science is an action-oriented problem solving profession. In order to learn and understand environmental science, you must do environmental science. Our program incorporates extensive fieldwork, research, and meaningful long-term problem-solving exercises. You and your professors will work closely with members of the environmental community (government and private organizations and industry) to develop and implement workable solutions.

Environmental science concentration/track requirement

The practice of environmental science demands that you be a well-rounded specialist. To accomplish this, each student is required to select an aspect of environmental science in which he or she specializes. Students in the BS program are required to take a minimum of 20 quarter credit hours in a specified concentration. Assistance in selecting an appropriate concentration can be obtained from the program director.

The available concentrations are:

Civil engineering
Digital imaging
Environmental biology
Environmental chemistry
Environmental economics
Environmental management and technology
Environmental public policy
Mathematics and statistics
Remote sensing

Cooperative education

Although co-op is optional for environmental science majors, it's a great way to get a head start on your career with paid professional work experience. You can participate in cooperative education as soon as the summer quarter of your second year. Assignments are typically with governmental regulatory agencies, private environmental organizations, and a host of engineering and manufacturing firms.

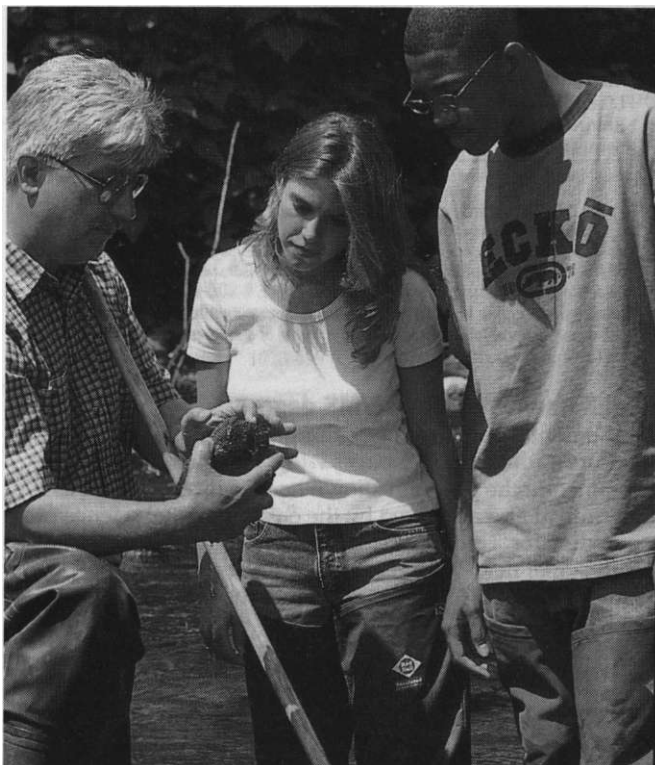
Employment opportunities

Today, there is a great need for individuals who have both a strong background in environmental science and the ability to participate in an interdisciplinary problem-solving team. Upon graduation, you'll be valued for your broad understanding of environmental science, for your depth of knowledge in a particular aspect of environmental science and for your ability to attack and solve tough environmental problems.

Transfer admission

For admission to the environmental science program as a transfer student, a minimum grade point average of 3.0 (overall and in science/math) is expected. Specific requirements will be determined for each transfer student by the program director.

For more information on the BS or BS/MS degree requirements, contact the program director for environmental science or visit our Web site: www.rit.edu/~envsci/.



Students in the Great Lakes course examine macroinvertebrates from Oatka Creek with Gary Neuderfer, biologist from the NYS Department of Environmental Conservation.

Requirements for the BS degree

The student must meet the minimum requirements of the Institute as described on pages 7 to 9. In addition, the program requires successful completion of all of the courses listed in the typical course schedule below.

Environmental science, BS degree, typical course sequence

First Year

Environmental Science Freshman Seminar I, II	1006-200,210	2
Introduction to Environmental Science I, II, III	1006-201, 202,203	12
General & Analytical Chemistry I, II, III	1011-215,216,217	10
Chemistry Lab	1011-205,206,227	4
Calculus I, II, III	1016-251, 252,253	12
or		
Elementary Calculus I, II #	1016-214,215	6
Introduction to Programming	4002-208	4
Liberal Arts (Core) *		8
First-Year Enrichment		0
Wellness Education Electives †		0

Second Year

General Biology	1001-201, 202,203	9
General Biology Lab	1001-205,206,207	3
University Physics	1017-311,312,313	15
or		
College Physics	1017-211,212,213	9
College Physics Lab	1017-271, 272,273	3
Liberal Arts (Core) *		16
Engineering Statistics	1016-314	4
or		
Data Analysis I and Lab	1016-319, 379	6
Environmental Geology	0630-370	3
Environmental Geology Lab	0630-372	1
Summer Co-op Experience (Optional)	1006-499	Co-op

Third Year

Organic Chemistry	1013-231,232,233	9
Organic Chemistry Lab	1013-235, 236,237	3
General Ecology	1001-340	4
Applied Ecology	1001-475	4
Introduction to Hydrology	0630-380	3
Introduction to Hydrology Lab	0630-382	1
Environmental Science Concentration §		4
Great Lakes I, II, III (LA concentration) *	0508-463,464,465	12
Liberal Arts (Core) *		4
Summer Co-op Experience (Optional)	1006-499	Co-op

Fourth Year

Introduction to Microbiology	1001-404	5
Environmental Applications of Remote Sensing	1051-420	4
Elective*		4
Liberal Arts Elective *		12
Environmental Science Concentration §		16
Senior Seminar* 0520-501		2

Total Quarter Credit Hours 181-186

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

§ See environmental science concentrations on previous page. It is highly recommended that students, in consultation with their faculty adviser, take additional environmental science electives during the fourth year.

Students choosing the Elementary Calculus sequence may be required to take an elective course to complete the minimum number of credits required for the degree. See adviser to select an elective course.

Requirements for the BS/MS degree

The student must meet the minimum requirements of the Institute as described on pages 7 to 9 and the requirements contained in the program shown here or its equivalent as determined and approved by the environmental science program director. Undergraduate students with an overall and professional field-of-study GPA of 3.0 or greater may apply to the program director for entry into the program.

Environmental science, BS/MS degree, typical course sequence

First Year

Environmental Science Freshman Seminar I, II	1006-200, 210	2
Introduction to Environmental Science I, II, III	1006-201,202,203	12
General & Analytical Chemistry I, II, III	1011-215,216,217	10
Chemistry Lab	1011-205,206,227	4
Calculus I, II, III	1016-251,252,253	12
or		
Elementary Calculus I, II #	1016-214,215	6
Introduction to Programming	4002-208	4
Liberal Arts (core) *		8
First-Year Enrichment		0
Wellness Education Electives †		0

Second Year

General Biology	1001-201,202,203	9
General Biology Lab	1001-205,206,207	3
University Physics	1017-311,312,313	15
or		
College Physics	1017-211,212,213	9
College Physics Lab	1017-271,272,273	3
Liberal Arts (core) *		16
Engineering Statistics	1016-314	4
or		
Data Analysis I and Lab	1016-319,379	6
Environmental Geology	0630-370	3
Environmental Geology Lab	0630-372	1
Summer Co-op Experience (Optional)	1006-499	Co-op

Third Year

Organic Chemistry	1013-231,232,233	9
Organic Chemistry Lab	1013-235, 236,237	3
General Ecology	1001-340	4
Applied Ecology	1001-475	4
Introduction to Hydrology	0630-380	3
Introduction to Hydrology Lab	0630-382	1
Environmental Science Concentration §		8
Great Lakes I, II, III (LA concentration)*	0508-463,464,465	12
Liberal Arts (core) *		4
Summer Co-op Experience (Optional)	1006-499	Co-op

Fourth Year

<i>Environmental Science Problem Solving I, II, III</i>	<i>1006-701, 702, 703</i>	<i>12</i>
Introduction to Microbiology	1001-404	5
Environmental Applications of Remote Sensing	1051-420	4
<i>Environmental Chemistry</i>	<i>1015-720</i>	<i>3</i>
Elective #		4
Liberal Arts Elective *		12
Environmental Science Concentration!		12
Senior Seminar * 0520-501		2
Summer Research or Co-op Experience (Optional)	1006-499	Co-op

Fifth Year

Biochemistry: Bio-molecular Conformation & Dynamics	1009-702	3
Biochemistry: Metabolism	1009-703	3
Fundamentals of Statistics II	0307-712	4
Environmental Microbiology	1001-767	4
Chemical Toxicology	1013-730	4
Professional Electives		8
Environmental Science Research	1006-877,879	5
Advanced Geology	0630-500	4
<u>Environmental Science Graduate Seminar</u>	<u>1006-870</u>	<u>1</u>

Total Quarter Credit Hours 232-237

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

§ See Environmental Science Concentrations on previous page.

Students choosing the Elementary Calculus sequence must take an elective course to complete the minimum number of credits required for the degree. See adviser to select an elective course.

Note: The articulation of the BS and the MS curriculum is accomplished by the inclusion of 15 quarter credit hours of graduate work in the fourth year of the curriculum (courses in italics).

Chemistry

Terence C. Morrill, Head

The department of chemistry offers programs leading to the AS and BS degrees in chemistry; the BS degree in chemistry (environmental option); the BS degree in biochemistry; the BS degree in polymer chemistry; the MS degree in chemistry; and five-year combined BS/MS chemistry, BS chemistry

(environmental option)/MS chemistry, BS biochemistry/MS chemistry, BS polymer chemistry/MS chemistry and BS chemistry/MS materials science & engineering programs.

Requirements for the BS degree

The student must meet the minimum graduation requirements of the Institute as described on pages 7 to 9 and in addition must complete particular program requirements, or the equivalent, as determined and approved by the department of chemistry.

To meet the requirements leading to the BS degrees in chemistry, chemistry with environmental chemistry option, biochemistry, and polymer chemistry approved by the Committee on Professional Training of the American Chemical Society, the student must take specifically designated courses in chemistry and related sciences.

All students must meet the requirements for the Institute's writing policy, as specified by the department of chemistry.

Extended-day and part-time studies in chemistry

All BS degree options in chemistry, biochemistry, and polymer chemistry are designed to accommodate part-time students, beyond the associate degree, during day or evening (extended day) hours. Academic advising is available throughout, and the American Chemical Society-approved chemistry degrees are offered at extended-day hours.

The chemistry department also offers a generous array of both general chemistry and biochemistry courses in distance learning format. These courses include all lectures available on videotape and quick contact with the instructor by computer. In some cases the course is augmented by a Web page. This mode of presentation allows for virtually complete schedule flexibility. For available courses consult the quarterly schedule or RIT's online learning Web site at <http://online.rit.edu/>

Five-year combined BS/MS programs

The existing BS programs may be combined with the MS chemistry program, allowing undergraduate majors to acquire both degrees in a total of five years. Undergraduate students with both an overall and professional field-of-study GPA of 3.0 or above may apply to the chemistry graduate committee for entry as early as the third year. Students in the combined programs will be advised to complete only three quarters of cooperative education and to take graduate-level chemistry elective courses, including two summers of full-time chemistry research and thesis guidance (1010-879) during the fourth and fifth years. Students will complete the undergraduate degree requirements and 45 quarter credit hours toward the MS chemistry degree.

Chemistry

The BS chemistry degree, which has been approved by the Committee on Professional Training of the American Chemical Society, may be completed in four or five years, depending on the amount of cooperative (co-op) experience the student elects. Co-op may begin as early as the summer of the first year. The five-year course schedule shown on the next page assumes that the student will co-op a total of eight academic quarters. Students may elect to complete the BS degree requirements in a traditional four-year program with three summers of cooperative work experience.

The program prepares graduates for positions in several fields of chemistry, including professional industrial work in processing and laboratory operations, research and experimental work, supervision of technical projects, and managerial positions. A substantial fraction of graduates continue their education for advanced degrees in chemistry or pursue careers in pharmacy, medicine, and dentistry.

The chemistry program allows for flexibility in the type and number of chemistry and Institute-wide elective courses taken by the student. For example, it is highly recommended that students take the undergraduate chemistry research courses as Institute-wide electives. The program also provides students with the option of planning an elective concentration in complementary fields such as imaging science, business, graphic arts, audiovisual communications, biology, criminal justice, engineering, environmental science, forensics, packaging science, printing, computer science, physics, or mathematics.

Chemistry (ACS certified), BS degree, typical course sequence

First Year	Quarter	Credit	Hours
Chemical Safety 1010-200			1
New Student Seminar 1010-230			1
General Chemistry I, II 1010-251,252			7
General Chemistry I Lab 1010-255			1
Quantitative Analysis I, II 1008-261,262			7
Quantitative Analysis Lab I, II 1008-265,266			3
Calculus I, II, III 1016-251,252,253			12
Computer Programming Language 4002-207 (or 208)	3	(4)	
Liberal Arts (Core) *			16
First-Year Enrichment			0
Wellness Education Electives †			0
Cooperative Education 1010-499 (Optional, summer)			Co-op
Second Year			
Instrumental Analysis 1008-311			3
Instrumental Analysis Lab 1008-318			1
Separations Techniques 1008-312			3
Separations Techniques Lab 1008-319			1
Calculus IV 1016-305			4
Organic Chemistry I 1013-431			3
Preparative Organic Chemistry I Lab 1013-435			1
University Physics I, II 1017-311,312			10
Liberal Arts (Core) *			8
Cooperative Education 1010-499 (Optional)			Co-op
Third Year			
Differential Equations 1016-306			4
University Physics III 1017-313			5
Organic Chemistry II, III 1013-432,433			6
Preparative Organic Chemistry II Lab 1013-436			1
Introduction to Biochemistry 1009-300 #			1
Systematic ID of Organic Compounds III Lab 1013-437			2
Chemical Thermodynamics 1014-441			4
Chemical Thermodynamics Lab 1014-445			1
Liberal Arts (Core/Concentration/Electives) *§			8
Cooperative Education 1010-499 (Optional)			Co-op
Fourth Year			
Quantum Chemistry 1014-442			4
Quantum Chemistry Lab 1014-446			1
Chemical Kinetics 1014-443			4
Chemical Kinetics Lab 1014-447			1
Chemical Literature 1010-401			2
Inorganic Chemistry I, II 1012-562, 563 #			8
Biochemistry 1009-502 #			3
Liberal Arts (Concentration/Elective) *§			16
Institute-wide Electives ‡			‡
Cooperative Education 1010-499 (Optional)			Co-op
Fifth Year			
Preparative Inorganic Chemistry Lab 1012-565 #			3
Advanced Instrumental Analysis 1008-511 #			3
Advanced Instrumental Analysis Lab 1008-621 #			2
Chemistry Electives			6
Liberal Arts (Concentration) *§			4
Liberal Arts (Senior Seminar) * 0520-501			2
Institute-wide Electives ‡			‡
Cooperative Education 1010-499 (Optional)			Co-op
Total Quarter Credit Hours			181

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ 1010-541, -542, -543, Chemistry Research, may be used as Institute-wide electives and are highly recommended. Electives are necessary to bring the total quarter credit hours to 180 for graduation. Twelve quarter credit hours are necessary for full-time status.

§ ACS (American Chemical Society) requirements highly recommend a foreign language (preferably German).

‡‡ Required only for ACS certification

Chemistry, combined BS/MS degree, typical course sequence

<i>First Year</i>		<i>Quarter Credit Hours</i>
Chemical Safety 1010-200		1
New Student Seminar 1010-230		1
General Chemistry I, II 1010-251,252		7
General Chemistry I Lab 1010-255		1
Quantitative Analysis I, II 1008-261,262		7
Quantitative Analysis Lab I, II 1008-265,266		3
Calculus I, II, III 1016-251,252,253		12
Computer Programming Language 4002-207 (or 208)	3 (4)	
Liberal Arts (Core) *		20
First-Year Enrichment		0
Wellness Education Electives †		0
Cooperative Education 1010-499 (Optional, summer)	Co-op	
<i>Second Year</i>		
Instrumental Analysis 1008-311		3
Instrumental Analysis Lab 1008-318		1
Separations Techniques 1008-312		3
Separations Techniques Lab 1008-319		1
Calculus IV 1016-305		4
Differential Equations 1016-306		4
Organic Chemistry I 1013-431		3
Preparative Organic Chemistry I Lab 1013-435		1
University Physics I, II, III 1017-311,312, 313		15
Liberal Arts (Core) *		12
Liberal Arts Concentration *‡		8
Cooperative Education 1010-499 (Optional, summer)	Co-op	
<i>Third Year</i>		
Chemical Literature 1010-401		2
Organic Chemistry II, III 1013-432,433		6
Preparative Organic Chemistry II Lab 1013-436		1
Introduction to Biochemistry 1009-300 #		1
Systematic ID of Organic Compounds III Lab 1013-437		2
Chemical Thermodynamics 1014-441		4
Chemical Thermodynamics Lab 1014-445		1
Liberal Arts (Concentration) *‡		8
Liberal Arts (Electives) *		12
Chemistry Electives §		§
Cooperative Education 1010-499 (Optional, summer)	Co-op	
<i>Fourth Year</i>		
Quantum Chemistry 1014-442		4
Quantum Chemistry Lab 1014-446		1
Chemical Kinetics 1014-443		4
Chemical Kinetics Lab 1014-447		1
Biochemistry 1009-702 #		3
Advanced Instrumental Analysis 1008-711 #		3
Advanced Instrumental Analysis Lab 1008-621 #		2
Inorganic Chemistry I, II 1012-562,563 #		8
Preparative Inorganic Chemistry Lab 1012-765 #		3
Liberal Arts (Senior Seminar) * 0520-501		2
Liberal Arts (Concentration) *‡		12
Chemistry Electives §		§
Research & Thesis Guidance 1010-879 **		3
<i>Fifth Year</i>		
Chemistry Seminar 1012-870		2
Research & Thesis Guidance 1010-879 **	6-13	
Course work in this year will be determined by the Graduate Committee and will need to fulfill the requirement of 225 total credit hours §		§
Total Quarter Credit Hours		226

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ ACS requirements highly recommend a foreign language (preferably German).

§ A minimum of 36 hours of 700-level or higher chemistry courses is required to graduate with both a BS and MS degree in chemistry

Required only for ACS certification

** A student will normally have 9-16 credit hours of Research and Thesis Guidance.

Environmental chemistry option (ACS certified)

The environmental chemistry option in the BS chemistry program requires the following courses: Biology (1001-201 and 205), Microbiology (1004-210), Environmental Chemistry (1015-520), Atmospheric Chemistry (1015-521), and Aquatic Toxicology and Chemistry (1015-522) in place of chemistry electives, Institute-wide electives, and Inorganic Chemistry II. The environmental studies concentration is recommended as part of the liberal arts upper-level electives.

In addition, environmentally related science courses may be selected according to the student's interest in areas such as field biology, ecology, oceanography, hydrology, environmental monitoring, geology, treatment of waste and sewage, packaging, polymer technology, and chemical research.

Chemistry, combined BS (environmental chemistry option)/MS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Chemical Safety 1010-200	1
New Student Seminar 1010-230	1
General Chemistry I, II 1010-251,252	7
General Chemistry I Lab 1010-255	1
Quantitative Analysis I, II 1008-261,262	7
Quantitative Analysis Lab I, II 1008-265,266	3
Calculus I, II, III 1016-251,252,253	12
Computer Programming Language 4002-207 (or 208)	3 (4)
Liberal Arts (Core) *	12
First-Year Enrichment	0
Wellness Education Electives †	0
General Biology 1001-201	3
General Biology Lab 1001-205	1
Cooperative Education 1010-499 (Optional, summer)	Co-op
<i>Second Year</i>	
Instrumental Analysis 1008-311	3
Instrumental Analysis Lab 1008-318	1
Separations Techniques 1008-312	3
Separations Techniques Lab 1008-319	1
Calculus IV 1016-305	4
Organic Chemistry I 1013-431	3
Preparative Organic Chemistry I Lab 1013-435	1
University Physics I, II 1017-311,312	10
Applied Microbiology 1004-210	4
Liberal Arts (Core) *	12
Cooperative Education 1010-499 (Optional, summer)	Co-op
<i>Third Year</i>	
Introduction to Biochemistry 1009-300	1
Organic Chemistry II, III 1013-432,433	6
Preparative Organic Chemistry II Lab 1013-436	1
Systematic ID of Organic Compounds Lab 1013-437	2
Liberal Arts (Concentration) *‡	12
Liberal Arts (Core)*	4
Differential Equations 1016-306	4
Advanced Instrumental Analysis 1008-511	3
Advanced Instrumental Analysis Lab 1008-621	2
University Physics III 1017-313	5
Aquatic Toxicology & Chemistry 1015-522	3
Cooperative Education 1010-499 (Optional, summer)	Co-op
<i>Fourth Year</i>	
Biochemistry 1009-702	3
Chemical Thermodynamics 1014-441	4
Chemical Thermodynamics Lab 1014-445	1
Quantum Chemistry 1014-442	4
Quantum Chemistry Lab 1014-446	1
Chemical Kinetics 1014-443	4
Chemical Kinetics Lab 1014-447	1
Environmental Chemistry 1015-720	3
Inorganic Chemistry I 1012-562	4
Preparative Inorganic Chemistry Lab 1012-565	3
Liberal Arts (Senior Seminar) * 0520-501	2
Liberal Arts (Electives) *	12
Chemistry Electives §	‡
Research & Thesis Guidance 1010-879 #	3
Chemical Literature 1010-401	2
<i>Fifth Year</i>	
Atmospheric Chemistry 1015-721	3
Chemistry Seminar 1010-870	2
Research & Thesis Guidance 1010-879 #	6-13
Course work in this year will be determined by the Graduate Committee and will need to fulfill the requirement of 225 credit hours §	
Total Quarter Credit Hours	226

* See page 7 for liberal arts requirements. Environmental Studies concentration is recommended.

† See page 9 for wellness education requirements.

‡ ACS (American Chemical Society) requirements highly recommend a foreign language (preferably German).

§ A minimum of 36 hours of 700-level or higher chemistry courses is required to graduate with both a BS and MS degree.

A student will be required to have 9-16 credit hours of Research & Thesis Guidance.

BS Chemistry/MS Materials Science and Engineering Option

The combined BS chemistry/MS materials science & engineering program is designed for students who may wish to enter industrial applications of chemistry in the areas of developing new materials (polymers, plastics, natural product substituents), new processes for producing those materials, and research into new applications for existing and newly devised materials.

Chemistry, combined BS/MS Materials Science & Engineering degree, typical course sequence (BS is ACS certified)

First Year	Quarter	Credit	Hours
Chemical Safety 1010-200			1
Intro to Co-op & Chemical Careers 1010-230			1
General Chemistry I, II 1010-251,252			7
General Chemistry I Lab 1010-255			1
Quantitative Analysis I, II 1008-261,262			7
Quantitative Analysis I, II Lab 1008-265,266			3
Calculus I, II, III 1016-251,252,253			12
Computer Programming Language 4002-207 (or 208)		3(4)	
Liberal Arts (Core) *			16
First-Year Enrichment			0
Wellness Education Electives †			0
Cooperative Education 1010-499 (Optional, summer)		Co-op	
Second Year			
Instrumental Analysis 1008-311			3
Instrumental Analysis Lab 1008-318			1
Separations Techniques 1008-312			3
Separations Techniques Lab 1008-319			1
Organic Chemistry I 1013-431			3
Preparative Organic Chemistry I Lab 1013-435			1
Calculus IV 1016-305			4
Differential Equations 1016-306			4
University Physics I, D, ffl 1017-311,312,313 "			15
Liberal Arts (Core/Concentration/Electives) *‡			16
Cooperative Education 1010-499 (optional, summer)		Co-op	
Third Year			
Introduction to Biochemistry 1009-300"			1
Chemical Literature 1010-401			2
Organic Chemistry II, III 1013-432,433			6
Preparative Organic Chemistry II Lab 1013-436			1
Systematic ID of Organic Compounds Lab 1013-437			2
Chemical Thermodynamics 1014-441			4
Chemical Thermodynamics Lab 1014-445			1
Quantum Chemistry 1014-442			4
Quantum Chemistry Lab 1014-446			1
Chemical Kinetics 1014-443			4
Chemical Kinetics Lab 1014-447			1
Liberal Arts (Concentration/Electives) *‡			20
Institute-wide elective			4
Cooperative Education 1010-499 (optional, summer)		Co-op	
Fourth Year			
Advanced Instrumental Analysis 1008-511 (or 711) "			3
Advanced Instrumental Analysis Lab 1008-621 "			2
Biochemistry: Conformation & Dynamics 1009-502 **			3
Inorganic Chemistry I, II 1012-562,-563 "			8
Preparative Inorganic Chemistry Lab 1012-565 "			3
Advanced Chemistry Electives §			§
Intro to Materials Science 1028-701			4
Intro to Polymer Science 1028-702			4
Intro to Experimental Techniques 1028-705			4
Liberal Arts (Senior Seminar) * 0520-501			2
Research & Thesis Guidance 1028-879*			#
Materials Science Electives §			§
Fifth Year			
Atmospheric Chemistry 1015-721			3
Solid State Science 1028-703			4
Intro to Theoretical Methods 1028-704			4
Materials Properties & Selection 1028-710			4
Sensors & Actuators 1028-780			4
Sensors & Actuators Lab 1028-785			2
Materials Science Electives §			§
Research & Thesis Guidance 1028-879 #			#
Seminar 1028-890			1
Total Quarter Credit Hours			225

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ ACS (American Chemical Society) requirements highly recommend a foreign language (preferably German).

§ A minimum of 36 hours of 700-level or higher chemistry/materials science courses is required to graduate with both a BS and MS degree.

A student will be required to have 9-16 credit hours of Research b Thesis Guidance. *Required only for ACS certification.

Biochemistry

Biochemistry is an exciting variation of the BS chemistry program and may be completed in four or five years, depending on the amount of cooperative education. Co-op may begin as early as the summer of the first year. Students who enroll in the program often have an interest in combining the life and health sciences with a chemistry degree. Students take a year of general biology in addition to a typical chemistry curriculum during the first two or three years. During the upper-level years, students in the biochemistry program take a substantial core of biochemistry courses, physical chemistry, chemical literature, liberal arts and elective courses in biology, biotechnology, and clinical sciences. Students must take a minimum of two upper-division biology electives (300 or higher) that include laboratory for the biochemistry major. The biochemistry program offers two tracks: one that follows the guidelines of the American Society of Biochemists and Molecular Biologists (ASBMB) and one that is certified by the American Chemical Society (ACS). The ASBMB program allows more science and institute-wide electives in such fields as biology while the ACS program is for students interested in a graduate chemistry program like RIT's MS chemistry program.

Employment opportunities for biochemistry graduates exist in the chemical, pharmaceutical, agricultural, forensic and rapidly expanding biotechnological fields. Graduates also are well-prepared to enter advanced degree programs in biochemistry, medicine, dentistry, and veterinary medicine.

Biochemistry, BS degree, typical course sequence (Follows ASBMB guidelines)

First Year	Quarter	Credit	Hours
Chemical Safety 1010-200			1
New Student Seminar 1010-230			1
General Chemistry I, H 1010-251,252			7
General Chemistry I Lab 1010-255			1
Quantitative Analysis I, II 1008-261,262			7
Quantitative Analysis Lab I, II 1008-265,266			3
Calculus I, H, III 1016-251,252,253			12
General Biology 1001-201, 202,203			9
General Biology Lab 1001-205, 206, 207			3
Computer Programming Language 4002-207 (or 208)		3 (4)	
Liberal Arts (Core) *			4
First-Year Enrichment			0
Wellness Education Electives †			0
Cooperative Education 1010-499 (Optional, summer)		Co-op	
Second Year			
Instrumental Analysis 1008-311			3
Instrumental Analysis Lab 1008-318			1
Calculus IV 1016-305			4
Organic Chemistry I 1013-431			3
Preparative Organic Chemistry I Lab 1013-435			1
University Physics I, O 1017-311,312			10
or			
College Physics I, n 1017-211,212			6
College Physics I, II Lab 1017-271,272			2
Liberal Arts (Core) *			8
Institute-wide Electives ‡			‡
Cooperative Education 1010-499 (Optional)		Co-op	



Laboratory-intensive programs emphasizing hands-on applications give College of Science students a competitive edge in the work place.

Third Year

Introduction to Biochemistry	1009-300	1
Differential Equations	1016-306	4
University Physics III	1017-313	5
or		
College Physics III	1017-213	3
College Physics III Lab	1017-273	1
Organic Chemistry II, III	1013-432,433	6
Preparative Organic Chemistry II Lab	1013-436	1
Systematic ID of Organic Compounds III Lab	1013-437	2
Chemical Thermodynamics	1014-441	4
Chemical Thermodynamics Lab	1014-445	1
Liberal Arts (Core) *		8
Cooperative Education	1010-499 (Optional)	Co-op

Fourth Year

Chemical Kinetics	1014-443	4
Chemical Kinetics Lab	1014-447	1
Chemical Literature	1010-401	2
Biochemistry	1009-502	3
Biochemistry: Nucleic Acids	1009-504	3
Biochemistry: Experimental Techniques Lab	1009-505	3
Liberal Arts (Core) *		8
Liberal Arts (Concentration) *		4
Institute-wide Electives ‡		‡
Cooperative Education	1010-499 (Optional)	Co-op

Fifth Year

Biochemistry: Metabolism	1009-503	3
Science Electives ‡		‡
Liberal Arts (Electives) *		12
Liberal Arts (Senior Seminar) *	0520-501	2
Liberal Arts (Concentration) *		4
Cooperative Education	1010-499 (Optional)	Co-op

Total Quarter Credit Hours 180

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ 1009-541,542,543, Biochemistry Research, may be used as science electives and are highly recommended. Two electives must be upper-division biology courses (300 or higher) that include laboratory, for a minimum of 8 credit hours. Electives are necessary to bring the total quarter credit hours to 180 for graduation.

Biochemistry, BS degree, typical course sequence (ACS certified)

First Year	Quarter	Credit	Hours
Chemical Safety	1010-200		1
New Student Seminar	1010-230		1
General Chemistry I, II	1010-251,252		7
General Chemistry I Lab	1010-255		1
Quantitative Analysis I, II	1008-261,262		7
Quantitative Analysis Lab I, II	1008-265,266		3
Calculus I, II, III	1016-251,252,253		12
General Biology	1001-201,202,203		9
General Biology Lab	1001-205, 206, 207		3
Computer Programming Language	4002-207 (or 208)		3 (4)
Liberal Arts (Core) *			4
First-Year Enrichment			0
Wellness Education Electives †			0
Cooperative Education	1010-499 (Optional, summer)		Co-op

Second Year

Instrumental Analysis	1008-311		3
Instrumental Analysis Lab	1008-318		1
Calculus IV	1016-305		4
Organic Chemistry I	1013-431		3
Preparative Organic Chemistry I Lab	1013-435		1
University Physics I, II	1017-311,312		10
Liberal Arts (Core) *			8
Science Electives ‡			‡
Cooperative Education	1010-499 (Optional)		Co-op

Third Year

Introduction to Biochemistry	1009-300		1
Differential Equations	1016-306		4
University Physics III	1017-313		5
Organic Chemistry II, III	1013-432,433		6
Preparative Organic Chemistry II Lab	1013-436		1
Systematic ID of Organic Compounds III Lab	1013-437		2
Chemical Thermodynamics	1014-441		4
Chemical Thermodynamics Lab	1014-445		1
Liberal Arts (Core) *			8
Cooperative Education	1010-499 (Optional)		Co-op

Fourth Year

Chemical Kinetics	1014-443		4
Chemical Kinetics Lab	1014-447		1
Chemical Literature	1010-401		2
Biochemistry	1009-502		3
Biochemistry: Nucleic Acids	1009-504		3
Biochemistry: Experimental Techniques Lab	1009-505		3
Quantum Chemistry	1014-442		4
Quantum Chemistry Lab	1014-446		1
Liberal Arts (Core) *			8
Liberal Arts (Concentration) *			4
Cooperative Education	1010-499 (Optional)		Co-op

Fifth Year

Biochemistry: Metabolism	1009-503		3
Inorganic Chemistry I	1012-562		4
Preparative Inorganic Chemistry Lab	1011-565		3
Liberal Arts (Electives) *			12
Liberal Arts (Senior Seminar) *	0520-501 *		2
Liberal Arts (Concentration) *			4
Cooperative Education	1010-499 (Optional)		Co-op

Total Quarter Credit Hours 183

* See page 7 for liberal arts requirements. ACS certification recommends a foreign language (preferably German),

† See page 9 for wellness education requirements.

‡ 1009-541,542,543, Biochemistry Research, may be used as science electives and are highly recommended. Two electives must be upper-division biology courses (300 or higher) that include laboratory, for a minimum of 8 credit hours. Biology electives may be either Cell Biology (1001-311), Molecular Biology (1001-350), Genetics (1001-421), or Genetic Engineering (1001-450). Electives are necessary to bring the total quarter credit hours to 182 for graduation.

Biochemistry, combined BS/MS degree, typical course sequence

First Year	Quarter Credit	Hours
Chemical Safety 1010-200		1
New Student Seminar 1010-230		1
General Chemistry I, II 1010-251, 252		7
General Chemistry Lab 1010-255		1
Quantitative Analysis I, II 1008-261,262		7
Quantitative Analysis Lab I, II 1008-265,266		3
Calculus I, II, III 1016-251, 252,253		12
General Biology 1001-201,202,203		9
General Biology Lab 1001-205,206, 207		3
Computer Programming Language 4002-207 (or 208)	3 (4)	
Liberal Arts (Core) *		4
First-Year Enrichment		0
Wellness Education Electives †		0
Cooperative Education 1010-499 (Optional, summer)	Co-op	
Second Year		
Instrumental Analysis 1008-311		3
Instrumental Analysis Lab 1008-318		1
Calculus IV 1016-305		4
Differential Equations 1016-306		4
Organic Chemistry I 1013-431		3
Preparative Organic Chemistry I Lab 1013-435		1
University Physics I, II, III 1017-311,312,313		15
Liberal Arts *		20
Cooperative Education 1010-499 (Optional, summer)	Co-op	
Third Year		
Introduction to Biochemistry 1009-300		1
Organic Chemistry II, III 1013-432,433		6
Preparative Organic Chemistry II Lab 1013-436		1
Systematic ID of Organic Compounds III Lab 1013-437		2
Chemical Thermodynamics 1014-441		4
Chemical Thermodynamics Lab 1014-445		1
Chemical Literature 1010-401		2
Quantum Chemistry 1014-442		4
Quantum Chemistry Lab 1014-446		1
Chemical Kinetics 1014-443		4
Chemical Kinetics Lab 1014-447		1
Liberal Arts *		20
Cooperative Education 1010-499 (Optional, summer)	Co-op	
Fourth Year		
Biochemistry 1009-702		3
Inorganic Chemistry I 1012-562		4
Advanced Instrumental Analysis 1008-711		3
Preparative Inorganic Chemistry Lab 1011-765		3
Biochemistry: Metabolism 1009-703		3
Biochemistry: Nucleic Acids 1009-704		3
Biochemistry: Experimental Techniques Lab 1009-705		3
Biology Electives ‡		‡
Chemistry Electives §		§
Liberal Arts *		8
Liberal Arts (Senior Seminar) 0520-501 *		2
Research & Thesis Guidance 1010-879 #		
Fifth Year		
Chemistry Seminar 1010-870		2
Advanced Instrumental Analysis Lab 1008-621		2
Advanced Organic Chemistry 1013-737		4
Advanced Physical Chemistry 1014-741 or 1014-743		4
Chemistry Electives §		§
<u>Research & Thesis Guidance 1010-879 #</u>		
Total Quarter Credit Hours		228

* See page 7 for liberal arts requirements. ACS certification recommends a foreign language (preferably German).

† See page 9 for wellness education requirements.

‡ Two upper-division biology electives with laboratory. Biology electives may be either Cell Biology (1001-311), Molecular Biology (1001-350), Genetics (1001-421), or Genetic Engineering (1001-450).

§ A minimum of 36 hours of 700-level or higher chemistry courses is required to graduate with a BS and MS degree.

A student will be required to have 9-16 hours of Research & Thesis Guidance.

Polymer Chemistry

Polymer science is one of the increasingly important areas of modern science. The polymer chemistry program has been approved by the Committee on Professional Training of the American Chemical Society when the program includes the Preparative Inorganic Chemistry Lab (1012-765). The program is one of a handful in the nation and provides students with a solid background in the traditional areas of chemistry (general, analytical, organic, physical, and inorganic) supplemented with advanced courses and intensive laboratory experiences in polymer science. The polymer program may be completed in four or five years, depending on the amount of cooperative education, which may begin as early as the summer of the first year. It is highly recommended that students take the undergraduate chemistry research courses as Institute-wide electives in this program. Because two-thirds of all chemists work with polymers during their professional lives, this program provides the background important for success in many industrial research areas and also enables graduates to pursue further education in chemistry, polymer chemistry or materials science and engineering.

Polymer chemistry, BS degree, typical course sequence (ACS certified)

First Year	Quarter Credit	Hours
Chemical Safety 1010-200		1
New Student Seminar 1010-230		1
General Chemistry I, II 1010-251,252		7
General Chemistry I Lab 1010-255		1
Quantitative Analysis I, II 1008-261,262		7
Quantitative Analysis Lab I, II 1008-265,266		3
Calculus I, II, III 1016-251,252,253		12
Computer Programming Language 4002-207 (or 208)	3 (4)	
Liberal Arts (Core) *		20
First-Year Enrichment		0
Wellness Education Electives †		0
Cooperative Education 1010-499 (Optional, summer)	Co-op	
Second Year		
Instrumental Analysis 1008-311		3
Instrumental Analysis Lab 1008-318		1
Separations Techniques 1008-312		3
Separations Techniques Lab 1008-319		1
Calculus IV 1016-305		4
Organic Chemistry I 1013-431		3
Preparative Organic Chemistry I Lab 1013-435		1
University Physics I, II 1017-311,312		10
Liberal Arts (Core) *		8
Cooperative Education 1010-499 (Optional)	Co-op	
Third Year		
Introduction to Biochemistry 1009-300		1
Introduction to Polymer Technology 1029-301		2
Differential Equations 1016-306		4
University Physics III 1017-313		5
Organic Chemistry II, III 1013-432,433		6
Preparative Organic Chemistry II Lab 1013-436		1
Chemical Thermodynamics 1014-441		4
Chemical Literature 1010-401		2
Chemical Thermodynamics Lab 1014-445		1
Liberal Arts (Core/Concentration) *‡		4
Cooperative Education 1010-499 (Optional)	Co-op	
Fourth Year		
Quantum Chemistry 1014-442		4
Quantum Chemistry Lab 1014-446		1
Chemical Kinetics 1014-443		4
Chemical Kinetics Lab 1014-447		1
Organic Chemistry of Polymers 1029-501		4
Synthesis of High Polymers Lab 1029-505		2
Inorganic Chemistry I 1012-562		4
Polymer Chemistry: Chains & Solutions 1029-502		4
Liberal Arts (Concentration) *		8
Cooperative Education 1010-499 (Optional) §	Co-op	

Fifth Year	
Biochemistry 1009-502 #	3
Polymer Chemistry: Properties of Bulk Materials 1029-503	4
Polymer Characterization Lab 1029-504	2
Preparative Inorganic Chemistry Lab 1012-765 #	3
Chemistry Electives #	4
Liberal Arts (Electives) *‡	12
Liberal Arts (Senior Seminar) * 0520-501	2
Institute-wide Electives **	
<u>Cooperative Education 1010-499 (Optional) §</u>	<u>Co-op</u>
Total Quarter Credit Hours	181

* See page 7 for liberal arts requirements.
 † See page 9 for wellness education requirements.
 ‡ ACS requirements highly recommend a foreign language (preferably German).
 § Students must take A-block co-op.
 # Required only for ACS certification
 "1010-541,542,543, Chemistry Research, may be used as Institute-wide electives and are highly recommended. Electives are necessary to bring the total quarter credit hours to 180 for graduation. Twelve credits are necessary for full-time status.

Polymer chemistry, combined BS/MS degree, typical course sequence

First Year	Quarter Credit Hours
Chemical Safety 1010-200	1
New Student Seminar 1010-230	1
General Chemistry I, II 1010-251,252	7
General Chemistry I Lab 1010-255	1
Quantitative Analysis I, II 1008-261,262	7
Quantitative Analysis Lab I, II 1008-265, 266	3
Calculus I, H, m 1016-251,252, 253	12
Computer Programming Language 4002-207 (or 208)	3 (4)
Liberal Arts (Core) *	20
First-Year Enrichment	0
Wellness Education Electives †	0
<u>Cooperative Education 1010-499 (Optional, summer)</u>	<u>Co-op</u>

Second Year	Quarter Credit Hours
Instrumental Analysis 1008-311	3
Instrumental Analysis Lab 1008-318	1
Separations Techniques 1008-312	3
Separations Techniques Lab 1008-319	1
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Organic Chemistry 11013-431	3
Preparative Organic Chemistry I Lab 1013-435	1
University Physics I, II, III 1017-311,312,313	15
Liberal Arts (Core) *	12
Liberal Arts (Concentration) *‡	8
<u>Cooperative Education 1010-499 (Optional, Summer)</u>	<u>Co-op</u>

Third Year	Quarter Credit Hours
Introduction to Biochemistry 1009-300 #	1
Introduction to Polymer Technology 1029-301	1
Chemical Literature 1010-401	2
Organic Chemistry II, m 1013-432,433	6
Preparative Organic Chemistry II Lab 1013-436	1
Chemical Thermodynamics 1014-441	4
Chemical Thermodynamics Lab 1014-445	1
Liberal Arts (Concentration) *‡	8
Liberal Arts (Electives) *‡	12
Chemistry Electives §	§
<u>Cooperative Education 1010-499 (Optional, Summer)</u>	<u>Co-op</u>

Fourth Year	Quarter Credit Hours
Quantum Chemistry 1014-442	4
Quantum Chemistry Lab 1014-446	1
Organic Chemistry of Polymers 1029-701	4
Polymer Chemistry: Chains & Solutions 1029-702	4
Polymer Characterization Lab 1029-704	2
Preparative Polymer Chemistry 1029-705	4
Chemical Kinetics 1014-443	4
Chemical Kinetics Lab 1014-447	1
Advanced Instrumental Analysis 1008-711 #	3
Advanced Instrumental Analysis Lab 1008-621 #	2
Inorganic Chemistry I 1012-562	4
Liberal Arts (Senior Seminar) * 0520-501	2
Preparative Inorganic Chemistry Lab 1012-765 #	3
Chemistry Electives §	§
Research & Thesis Guidance 1010-879 "	3

Fifth Year	
Biochemistry 1009-702 #	3
Polymer Chemistry: Properties of Bulk Materials 1029-703	4
Chemistry Seminar 1010-870	2
Research & Thesis Guidance 1010-879 **	6-13
Course work in this year will be determined by the Graduate Committee and will need to fulfill the requirement of 225 total credit hours. §	
Total Quarter Credit Hours	226

* See page 7 for liberal arts requirements.
 † See page 9 for wellness education requirements.
 ‡ ACS requirements highly recommend a foreign language (preferably German).
 § A minimum of 36 hours of 700-level or higher chemistry courses is required to graduate with both a BS and MS degree in chemistry.
 # Required only for ACS certification
 "A student will normally have 9-16 credit hours of Research and Thesis Guidance.

Mathematics and Statistics

Sophia A. Maggelakis, Head

Over the past several years a growing demand has developed for mathematicians and statisticians with broad-based quantitative backgrounds and extensive computer skills. Indeed, mathematical and statistical theory is the basis for many fields of practical application, and employers need people whose education merges mathematics with another field of study: computer science, statistics, chemistry, physics, engineering, or business, to name a few.

The department of mathematics and statistics has established three BS degree programs in response to these long-term industry needs: applied mathematics, computational mathematics, and applied statistics. Each has been carefully designed to meet the needs of both students and their potential employers. Constant feedback from industry has enabled the department to update its courses, programs and equipment in order to make sure students are well-trained in current techniques, equipment, and applications. Students utilize symbolic computation software in many of their courses. Our specially equipped classrooms for multimedia presentations and symbolic computation and statistics labs lend support to all of our programs. Industrial needs and trends are carefully discussed with employers in order to update the curricula, and graduates find that their RIT backgrounds seem tailor-made for their professional careers.

Many exciting career opportunities exist for mathematics majors. Students typically become involved in research, consulting, or using computers for statistical analyses or to analyze complex mathematically modeled physical problems.



A mathematics study group gives students the chance to reinforce classroom knowledge.

Examples of co-op and permanent jobs typically obtained by department of mathematics and statistics majors include the following:

- actuary
- analyst for mathematical modeling
- statistician
- mathematical statistician
- demographics analyst
- software designer
- scientific programmer
- systems analyst
- cryptographic mathematician
- manufacturing engineering consultant
- biological systems analyst
- computer modeling consultant
- graphic modeling consultant
- simulations programmer
- reliability analyst
- statistical forecaster
- robotics software specialist
- database programmer
- data analyst
- telecommunications analyst
- software engineer
- marketing analyst
- aerospace systems analyst

Students in all three programs enjoy small classes and opportunities to get to know their teachers outside the classroom. Job prospects for graduates are plentiful, and the department is proud of its outstanding record in placing students in both co-op and permanent jobs.

Actuarial studies

A plan of study has been designed to assist students seeking a career in the actuarial sciences. These courses not only provide a foundation for students who will work as actuaries, but also prepare students to take the first actuarial exams. These courses may count for credit in any of the three major programs in the department of mathematics and statistics or may be taken independently.

BS/MS programs

Each of the three BS degree programs has a complementary master's degree program that can be completed in one additional year. Students in all three BS programs are also eligible for the combined BS/MS in the department of mathematics and statistics' master of science in industrial and applied mathematics.

Minors

Students majoring in other programs at RIT may choose to pursue a minor in mathematics or statistics to complement their primary area of interest.

Transfer programs

Transfer programs are arranged on an individual basis.

Requirements for the BS degree

The student must meet the minimum requirements of the Institute as described on pages 7 to 9. In addition he or she must complete the requirements contained in one of the particular programs listed here, or its equivalent, as determined and approved by the department of mathematics and statistics. In conjunction with a faculty adviser, individual student programs will be established to meet particular needs, interests, and goals.

Applied Mathematics

The applied mathematics program focuses upon the study and solution of problems that can be mathematically analyzed. Industry has a great need for individuals with this type of education. Students choose a sequence of courses from one of more than 20 application areas that provide them with the knowledge and skills to collaborate on complex problems with scientists, engineers, computer specialists, or other analysts. Some application minors are applied statistics; biology; business; economics; chemistry; electrical, industrial or mechanical engineering; operations research; and imaging science.

Graduates typically are employed in scientific, engineering and business environments, applying their mathematics background to the analysis and solution of real-world problems.

Applied mathematics students who minor in business can accelerate the MBA degree from RIT through careful choice of undergraduate courses. With one year of additional study, a student can earn the MBA degree.

Applied mathematics, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
Freshman Seminar	1016-210,211		2
Calculus I, II, III	1016-251,252,253		12
Discrete Math I	1016-265		4
Computer Science 1	4003-231		4
Computer Science 2	4003-232		4
Science Electives			12
Liberal Arts (Core) *			12
First-Year Enrichment			0
Wellness Education Electives †			0
<i>Second Year</i>			
Calculus IV	1016-305		4
Differential Equations I	1016-306		4
Probability & Statistics I, II	1016-351,352		8
Co-op Seminar	1016-399		0
Mathematics Elective			4
Matrix Algebra	1016-331		4
Liberal Arts (Core) *			16
Institute-wide Electives			8
<i>Third Year</i>			
Numerical Analysis	1016-511		4
or			
Numerical Linear Algebra	1016-512		4
Linear Algebra	1016-432		4
Mathematical Modeling	1016-461		4
Mathematics Electives			8
Liberal Arts (Core/Concentration) *			8
Cooperative Education	1016-499 (Optional)		Co-op
<i>Fourth Year</i>			
Real Variables I, II	1016-411,412		8
Mathematics Electives			8
Applications Minor			4
Liberal Arts (Concentration/Electives) *			12
Cooperative Education	1016-499 (Optional)		Co-op
<i>Fifth Year</i>			
Abstract Algebra I, II	1016-531,532		8
Applications Minor			8
Liberal Arts (Electives) *			8
Liberal Arts (Senior Seminar) *	0520-501		2
Cooperative Education	1016-499 (Optional)		Co-op
Total	Quarter	Credit	Hours
			184

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ This program can be completed in four years if co-op option is omitted.

Computational Mathematics

Computational mathematics prepares students for a mathematical career that incorporates extensive computer science skills. In this program, much emphasis is given to use of the computer as a tool to solve mathematically modeled physical problems. Graduates of the program often choose positions as mathematical analysts, scientific programmers, software engineers, or systems analysts. Job opportunities in private industry and government literally abound in this field.

The BS in computational mathematics can be joined with the MS in computer science. An accelerated program of study allows students who choose this option to receive both the BS and MS degrees following one year of graduate study.

Computational mathematics, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Freshman Seminar	1016-210,211		2
Calculus I, H, III	1016-251,252,253		12
Discrete Math I	1016-265		4
Computer Science 1	4003-231		4
Computer Science 2	4003-232		4
Computer Science 3	4003-233		4
Science Electives		12	
Liberal Arts (Core) *		8	
First-Year Enrichment		0	
Wellness Education Electives †		0	
<i>Second Year</i>			
Calculus IV	1016-305		4
Differential Equations I	1016-306		4
Probability & Statistics I, II	1016-351,352		8
Co-op Seminar	1016-399		0
Matrix Algebra	1016-331		4
Computer Science 4	4003-334		4
Software Engineering	3010-361		4
Computational Math Concentration			4
Institute-wide Elective			4
Liberal Arts (Core) *		12	
<i>Third Year</i>			
Linear Algebra	1016-432		4
Graph Theory	1016-467		4
Mathematical Modeling	1016-461		4
Computational Math Concentration			8
Institute-wide Elective			4
Liberal Arts (Core) *		8	
Cooperative Education	1016-499 (Optional)	Co-op	
<i>Fourth Year</i>			
Real Variables I	1016-411		4
Numerical Analysis	1016-511		4
Numerical Linear Algebra	1016-512		4
Computational Math Concentration			4
Institute-wide Electives			5
Liberal Arts (Concentration) *		12	
Cooperative Education	1016-499 (Optional)	Co-op	
<i>Fifth Year</i>			
Abstract Algebra I, II	1016-531,532		8
Computational Math Concentration			4
Liberal Arts (Electives) *		12	
Liberal Arts (Senior Seminar) *	0520-501		2
Cooperative Education	1016-499 (Optional)	Co-op	
Total Quarter Credit Hours			189

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ This program can be completed in four years if co-op option is omitted.

Applied Statistics

The applied statistics program provides the student with a solid foundation in mathematical and statistical principles, experience in the application of statistics, thorough knowledge of computers and statistical software, and the skills to communicate the results of a statistical analysis. The demand for graduates with this type of preparation is precipitated from the recognition by business, industry, and government that a large number of problems can be effectively analyzed and solved using statistical methodology.

Graduates of the program collaborate with specialists in both scientific as well as nontechnical areas to design, experiment, and interpret the results. Application areas include product designs, quality control, marketing, customer satisfaction, and actuarial sciences.

The BS in applied statistics may be combined with an MS in applied and mathematical statistics. An accelerated program of study allows the student who chooses this option to receive both the BS and MS degrees following one year of graduate study.

Applied statistics, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Freshman Seminar	1016-210,211		2
Calculus I, H, III	1016-251,252,253		12
Discrete Math I	1016-265		4
Computer Science I	4003-231		4
Statistical Computing with Excel & Minitab	1016-260		2
Institute-wide Elective			2
Science Electives		12	
Liberal Arts (Core) *		8	
First-Year Enrichment		0	
Wellness Education Electives †		0	
<i>Second Year</i>			
Calculus IV	1016-305		4
Differential Equations	1016-306		4
Probability & Statistics I, II	1016-351,352		8
Co-op Seminar	1016-399		0
Applied Statistics	1016-353		4
Statistical Computing with SAS	1016-360		2
Matrix Algebra	1016-331		4
Statistical Quality Control	1016-358 or		
Research Sampling Techniques	1016-457		4
Institute-wide Elective			4
Liberal Arts (Core) *		16	
<i>Third Year</i>			
Linear Algebra	1016-432		4
Regression Analysis	1016-354		4
Design of Experiments	1016-355		4
Mathematics Elective ‡			4
Institute-wide Electives			8
Liberal Arts (Core/Concentration) *		8	
Cooperative Education	1016-499 (Optional)	Co-op	
<i>Fourth Year</i>			
Nonparametric Statistics	1016-454		4
Mathematics Electives ‡			12
Institute-wide Electives			6
Liberal Arts (Concentration/Electives) *		12	
Cooperative Education	1016-499 (Optional)	Co-op	
<i>Fifth Year</i>			
Mathematical Statistics I, II	1016-451,452		8
Statistics Seminar	1016-555		4
Mathematics Elective ‡			4
Liberal Arts (Electives) *		8	
Liberal Arts (Senior Seminar) *		2	
Cooperative Education	1016-499 (Optional)	Co-op	
Total Quarter Credit Hours			188

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Up to 16 quarter credits of mathematics electives may be chosen from the applied mathematics minor courses.

§ This program can be completed in four years if co-op option is omitted.

Physics

David J. Axon, Head

The department of physics offers programs leading to the AS and BS degrees in physics as well as a minor in physics and a minor in astronomy. The BS degree is a five-year program with cooperative work experience beginning as early as the summer of the second year. Graduates find employment opportunities with industrial, academic, and governmental agencies or continue their education in MS or Ph.D. programs in physics or physics-related areas such as astrophysics, biophysics, geophysics, atmospheric science, imaging science, and engineering. Students may also prepare for entry into medical, law, or business schools.

Requirements for the BS degree in physics

The student must meet the minimum requirements of the Institute as described on pages 7 to 9. In addition, he or she must complete the requirements contained in the program shown here or its equivalent as determined and approved by the department of physics. In conjunction with a faculty adviser, individual student programs will be established to meet particular needs, interests, and goals. A planned elective concentration in another field such as biology, chemistry, mathematics, computer science, business, or imaging science is possible.

Students may elect to take a concentration in optical physics as part of their BS degree in physics. The concentration includes, in part, three courses: Optical Physics II, Laser Physics, and Experimental Optics. These can be taken as physics, technical, or free electives during the fourth and fifth years with no additional credit hours to obtain a BS degree.

For additional information on AS and BS degree requirements or requirements for the minors in physics or astronomy, contact the head of the department of physics.

Physics, BS degree, typical course sequence

	Quarter Credit Hours
<i>First Year</i>	
Physics Orientation I, II 1017-200, 201	2
University Physics I, II 1017-311,312	10
Calculus I, H, HI 1016-251,252, 253	12
Chemical Principles I, II 1011-211,212	6
Chemistry Lab I, II 1011-205, 206	2
Intro. to Computational Physics & Programming 1017-317	4
Liberal Arts (Core) *	16
First-Year Enrichment	0
Wellness Education Electives †	0
<i>Second Year</i>	
University Physics III 1017-313	5
Modern Physics I, H 1017-314,315	8
Introduction to Laboratory Techniques 1017-321	4
Modern Physics Lab 1017-374	1
Sophomore Physics Seminar 1017-350	1
Calculus IV 1016-305	4
Differential Equations I 1016-306	4
Free Elective	4
Liberal Arts (Core) *	12
(Free Electives) (Optional)	(6-8)
Cooperative Education 1017-499 (Optional)	Co-op



RIT's observatory features computer-controlled 16-inch and 10-inch telescopes and four portable telescopes used on a concrete pad adjacent to the structures. Students taking astronomy courses offered by the College of Science can investigate the rotation and shape of asteroids, study the physics of the stars and planets, and observe supernova explosions. It also is used for research and opens for public viewing at scheduled times. See the Web site for details: wunuritedu/~*itobs/.

<i>Third Year</i>	
Intermediate Mechanics I, II 1017-401,402	8
Thermal Physics 1017-415	4
Electronic Measurements 1017-431	4
Mathematical Methods in Physics I 1017-480	4
Physics Elective (400-500 level)	4
Liberal Arts (Concentration) *	8
Cooperative Education 1017-499 (Optional)	Co-op
<i>Fourth Year</i>	
Electricity & Magnetism I, II 1017-411,412	8
Experimental Physics I 1017-421	3
Optical Physics I 1017-455	4
Quantum Mechanics I 1017-522	4
Physics Elective (400-500-level)	4
Liberal Arts (Concentration)*	4
Liberal Arts (Elective) *	4
Cooperative Education 1017-499 (Optional)	Co-op
<i>Fifth Year</i>	
Quantum Mechanics II 1017-523	4
Senior Physics Seminar 1017-550	1
Technical Elective	3
Free Elective	8
Liberal Arts (Electives) *	8
Liberal Arts (Senior Seminar) * 0520-501	2
(Free Electives) (Optional)	(8)
<u>Cooperative Education 1017-499 (Optional)</u>	<u>Co-op</u>
Total Quarter Credit Hours	184

* See page 7 for liberal arts requirements,
† See page 9 for wellness education requirements.

Medical Sciences

The department of medical sciences includes programs of study in biomedical computing, physician assistant and diagnostic medical sonography (ultrasound). Each is designed to prepare students for entry into careers in the health sciences. Graduates find employment opportunities in hospitals and clinics, in research facilities, in industry, and with many governmental agencies. Some continue their education in graduate and professional schools.

All of the BS programs offered by the department can serve as preprofessional programs for schools of medicine, veterinary medicine, or dentistry.

In addition to the BS programs, there is a certificate option in diagnostic medical sonography and exercise science as well as an MS degree program in clinical chemistry.

Biomedical Computing

Nicolas A. Thireos, Program Director

RIT's BS degree curriculum in biomedical computing is one of only a few similar programs in the United States. It was developed by the College of Science and the department of computer science because of the increasing use of computers in every aspect of health care as well as biomedical research and education. Students receive training in the basic sciences, medical sciences, and computer science/information technology with emphasis on clinical and laboratory applications. This array of courses provides graduates with the ability to communicate with medical personnel and trains them to develop computer applications for the solution of clinical problems, laboratory analyses, medical information systems, medical research, and education. It also trains them to provide computing support to medical professionals in the above areas.

After five quarters of study, students can choose one of two tracks in this program:

- computer science (CS track) or
- information technology (IT track)

Students interested primarily in developing computer software for medicine will follow the CS track, while those interested in providing computing support for databases, networks, and Web applications will follow the IT track.

Students are strongly encouraged to obtain experiential biomedical computing education by participation in the cooperative education program (co-op). Co-op allows them to alternate quarters in school with quarters in paid employment, starting with the summer at the end of the second year. It also provides the opportunity to practice new skills in real-life situations and to test their chosen field before making a lifelong commitment. The experiences students acquire not only make their education more relevant, but also make them more valuable to prospective employers.

Students consult with faculty advisers in order to tailor their academic programs to individual career goals. Upper-level electives are used to prepare graduates for specialized employment opportunities within biomedical computing, for graduate school in the sciences or computer science/information technology, or for postgraduate professional school.

Requirements for the BS in biomedical computing

The student must meet the minimum requirements of the Institute as described on pages 7 to 9 and, in addition, must complete the requirements contained in this program or its equivalent, as determined and approved by the department of medical sciences. Transfer students may be required to take additional course work, depending on the program they attended at their previous school. Specific requirements will be determined for each transfer student by the department.

BS/MS option

The BS degree in biomedical computing can be obtained in four years. With one additional year (four quarters) of study, students have the option to earn an MS degree in computer science. Students must declare their intention to pursue the MS degree by the third year of undergraduate study. Some assistantships and scholarships are available to deserving students for graduate study.

For more information on BS degree requirements, contact the program director or head of the department of medical sciences.

Biomedical computing, BS degree, typical course sequence computer science (CS track) and information technology (IT track)

First Year	Quarter	Credit	Hours
General Biology	1001-201,202,203		9
General Biology Lab	1001-205,206,207		3
Computers in Medicine	1026-230		4
Medical Terminology	1026-301		3
M Programming	1027-305		4
Internet, Java & Health Care	1027-315		4
Data Analysis I	1016-319		4
Freshman Seminar	1026-203		1
Liberal Arts (Core) *			8
First-Year Enrichment			0
Wellness Education Electives †			0
<i>Second Year</i>			
Required for both tracks:			
Computer Science	4003-231		4
Computer Science	4003-232		4
Introduction to Biomedical Computing Seminar	1027-201		1
Calculus I, n	1016-251,252		8
or			
Elementary Calculus I, II	1016-214,215		(6)
Program Electives			8
Liberal Arts (Core) *			12
Discrete Mathematics	1016-265 (CS track)		4
General & Analytical Chemistry	1011-215, 216, 217		10
General & Analytical Chemistry Lab	1011-205,206,207		4
Wellness Education Electives †			0
and			
Computer Science	4003-233 (CS track)		4
or			
Programming with Classes (C++)	4002-210 (IT track)		4
<i>Third Year</i>			
Required for both tracks:			
Anatomy & Physiology I, II	1026-350,360		10
Program Elective			4
Liberal Arts (Core/Concentration) *			16
and			
CS track			
Computer Organization	4003-345		4
Computer Science 4	4003-440		4
Database Concepts	4003-485		4
or			
IT track			
Computer Concepts & Software Systems	4002-340		4
Intro Multimedia: Web	4002-320		4
Cooperative Education	1026-499 (Optional CS or IT track)	Co-op	

Fourth Year

Required for both tracks:

College Physics I, II	1017-211, 212	6
College Physics Lab I, II	1017-271, 272	2
University Physics I, II	1017-311,312	10
Electricity & Electronics	1017-331	4
Liberal Arts (Electives/Concentration) *		16
Program Elective ‡		4
Liberal Arts (Senior Seminar) and		
Operating Systems	4003-440	4
Computer Science Electives (CS track) or		8
Data Communications & Comp Networks	4002-341	4
Information Technology Electives (IT track)		8
Cooperative Education	1026-499 (Optional CS or IT track)	Co-op
<hr/>		
Total Quarter Credit Hours	185 (CS track) 187 (IT track)	

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Needed only if lower-level courses were selected

NOTE: Cooperative education (co-op) can be any quarter beginning with the summer at the end of the second year.

Physician Assistant

Heidi Miller, Program Director

Nancy Valentage, Associate Director/Clinical Coordinator

John Oliphant, Clinical Coordinator

Cara Calvelli, Academic Coordinator

Nancy Herbert, Clinical Data Coordinator

The RIT physician assistant program is a four-year curriculum focusing on primary care and awarding a bachelor of science (BS) degree upon completion. The first two years involve core courses in basic sciences, mathematics, and liberal arts. The third and fourth years, considered the upper division of the program, encompass 21 months. (Students participate in the program during the summer between these last two years.) This includes nine months of clinical course work and 12 months of clinical rotations. Qualified transfer students are accepted into any one of the first three years of the program.

Physician assistants provide diagnostic and therapeutic health care in conjunction with a supervising physician. They perform tasks that have, in the past, been performed by physicians, such as:

- eliciting medical histories*
- conducting physical examinations*
- ordering laboratory and radiological testing*
- diagnosing common illnesses*
- determining treatment*
- giving medical advice*
- counseling and educating patients*
- promoting "wellness" and disease prevention*
- assisting in surgery*
- casting and suturing*

Physician assistants' duties vary depending on the state and the specialty in which they practice. In most states, PAs also prescribe medications. Specialties include internal medicine, family medicine, emergency medicine, geriatrics, pediatrics, obstetrics/gynecology, general surgery, orthopedic surgery, neurosurgery, neonatology, etc. The clinical rotations during the upper division provide the student with an opportunity to explore these specialty areas.

In addition to RIT's general admission procedures (see page 369), the physician assistant program requires completion of a supplemental data packet, application, and successful completion of an admission interview (by invitation). For details of the admission procedure utilized by the physician assistant program, please contact the RIT Office of Admissions (585-475-6631). It is also important to note that the minimum grade point average for acceptance into the physician assistant program is 3.0 (on the basis of a 4.0 maximum) for both

high school and transfer students. In order to graduate from the program, a GPA of 2.8 or better must be maintained.

Physician assistant, BS degree, typical course sequence

First Year	Quarter	Credit Hours
Freshman Seminar	1026-203	1
General Biology	1001-201,202,203	9
General Biology Lab	1001-205,206, 207	3
Calculus for Management Science	1016-226	4
General & Analytical Chemistry I, II, III	1011-215,216,217	10
Chemical Principles I, II Lab	1011-205,206	2
General & Analytical Chemistry III Lab	1011-227	2
Computers in Medicine	1026-230	4
Early Clinical Experience	1032-201, 202	2
Liberal Arts (Core) *		16
First-Year Enrichment		0
Wellness Education Electives †		0

Second Year

Anatomy & Physiology	1026-350, 360	10
Organic Chemistry	1013-231,232,233	9
Data Analysis I	1016-319	4
Early Clinical Experience	1032-203	1
Physician Assistant Seminar	1032-210	1
Medical Microbiology	1032-406	4
Program Elective		3
Liberal Arts (Core) *		20

Third Year

Medical Pathophysiology	1026-415	4
Medical Lab Testing	1024-450	4
Law & Medicine	1032-330	2
Behavioral Medicine	1032-200	2
Patient History and Physical Exam I, II, III	1032-401,402,403	6
Clinical Skills	1032-410	1
Clinical Pharmacology I, II, III	1032-420,421,422	8
Clinical Diagnostic Imaging	1032-430	1
Clinical Medicine I, II, III	1032-440, 441,442	12
Clinical Rotation I	1032-490 ‡	12
Liberal Arts (Core) *		4

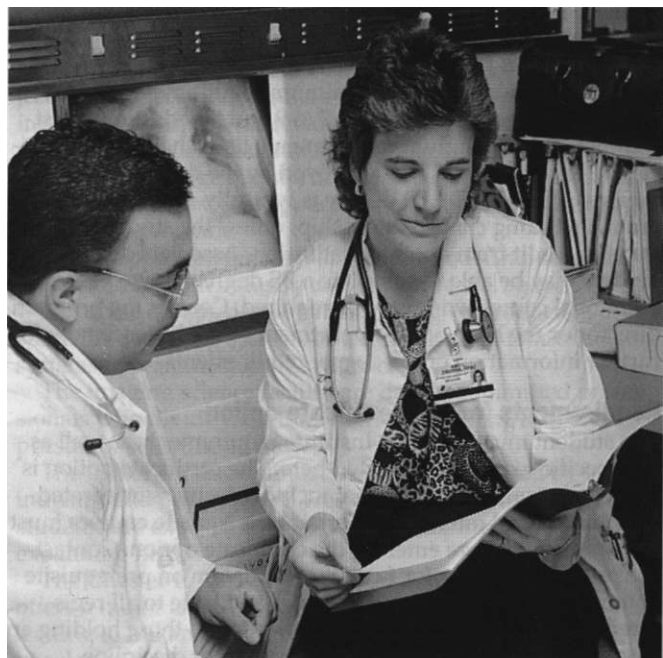
Fourth year taken at an approved hospital for training physician assistants

Clinical Rotation II, III, IV	1032-491, 492,493	36
Total Quarter Credit Hours		197

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

‡ Mandatory rotations are in fields of general clinical practice that build a solid basic understanding and groundwork. These required rotations are Internal Medicine, Family Medicine, Orthopedics, Emergency Medicine, OB/GYN, Pediatrics, General Surgery, and Psychiatry. Students also will be provided with two elective rotations. These latter rotations allow students to individualize their experiences according to their own areas of interest.



Learning how to do routine medical procedures is an important part of the physician assistant program.

Diagnostic Medical Sonography (Ultrasound)

Hamad Ghazle, Program Director
Stephen Guida, Clinical Coordinator

Diagnostic medical sonography, one of the fastest-growing areas in diagnostic medicine, is a noninvasive, nontoxic diagnostic medical imaging modality in which high-frequency sound waves are used to produce images of many different areas of the human body. Ultrasound is readily used to image the heart, blood flow, abdominal organs (kidneys, pancreas, liver, spleen, etc.), the developing fetus, and male/female reproductive organs. The profession has grown rapidly in the last 20 years and is expected to continue to grow well into the 21st century. Evaluation of the market and survey of employers indicate the strong demand for and shortage of well-trained sonographers.

RIT's program is one of only a few such degree programs in the nation. It offers both a bachelor of science degree and a certificate option. With proper scheduling of courses and without extending the date of graduation beyond the normal four years, the program prepares students for application to schools of medicine, dentistry, veterinary medicine, podiatry, and chiropractic medicine. Students can also earn a certificate in health systems administration while completing their requirements. Additionally, graduates may choose to pursue a master's or Ph.D. degree in a variety of fields.

The intent of the program is to prepare leaders in the field of ultrasound. Skills in administration and research are emphasized in addition to the development of scanning and diagnostic abilities. Students apply their theoretical knowledge and practice their skills in our dedicated ultrasound laboratory on campus before their clinical internship. Upon successful completion of the program requirements, the student is eligible to take a national certifying examination for abdominal, small parts, obstetrical, and gynecological ultrasound. Each candidate is also introduced to vascular ultrasound.

Graduates are prepared to pursue a variety of career options in medical, industrial, and educational settings both nationally and internationally. Our graduates can be found in a wide range of positions, including supervisory or administrative positions in hospitals, clinics, private physician's offices, teaching, research, sales, and industry. Graduates can also choose to work freelance or for mobile services.

Requirements for the BS degree

The student must meet the minimum requirements of the Institute as described on pages 7 to 9 and, in addition, must complete the curriculum requirements listed here or the equivalent, as determined and approved by the department of medical sciences. The BS degree is typically a four-year program, including clinical internship, unless the student has transfer credit from another institution. Associate degree holders may be able to complete a BS degree in two years; additional course work may be required. Contact the program director or the head of the department of medical sciences for further information on BS degree requirements.

Requirements for the certificate option

The student must meet the Institute requirements as well as the specific requirements listed here. The certificate option is a one-year course of study that includes lectures integrated with the clinical internship. Certain prerequisite courses must be completed before entering the certificate option. Contact the program director for further information on prerequisite course work. The certificate option is available to all registered allied health practitioners, as well as to those holding an associate or a bachelor's degree in a relevant discipline.

Clinical internship

The clinical internship year (completed with a 20-percent tuition discount) provides hands-on experiences in two or more medical facilities primarily in upstate New York. All students begin the internship by attending an intensive five-week experience on campus. During this time, they learn how to perform complete sonographic examinations and recognize anatomy and disease states using equipment in the ultrasound laboratory. Students also learn about hospital departmental and administrative operations. After completing the requirements, candidates are assigned to a medical training site for clinical experience. At the medical facility students work side by side with sonographers, physicians, and other health care professionals to learn, develop, apply, and sharpen the necessary skills to perform general ultrasound examinations. The students' clinical progress and performance are monitored by the RIT program clinical coordinator who makes periodic visits to the hospital ultrasound departments. Additionally, students return to campus each month for three days of lectures, presentations, projects, and testing.

Accreditation

The program is accredited by the Joint Review Committee on Education in Diagnostic Medical Sonography of the Commission on Accreditation of Allied Health Education Programs.

Diagnostic medical sonography, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
General Biology 1001-201,202,203			9
General Biology Lab 1001-205, 206, 207			3
General & Analytical Chemistry 1011-215,216,217			10
Chemistry I, II Lab 1011-205,206			2
General & Analytical Chemistry III Lab 1011-227			2
Freshman Seminar 1026-203			1
Computers in Medicine 1026-230			4
Calculus for Management Science 1016-226			4
Liberal Arts (Core) *			12
First-Year Enrichment			0
Wellness Education Electives †			0
<i>Second Year</i>			
College Physics 1017-211,212,213			9
College Physics Lab 1017-271,272,273			3
Introduction to Diagnostic Medical Imaging 1026-205			2
Medical Terminology 1026-301			3
Physiology & Anatomy 1026-350,360			10
Data Analysis I 1016-319			4
Liberal Arts (Core) *			16
<i>Third Year</i>			
Cross-Sectional Anatomy 1030-412			4
Ultrasound Instrumentation 1030-413			4
Pathophysiology 1026-415			4
Medical Genetics 1004-315			2
Patient Care 1026-333			2
Ultrasonic Physics 1017-361			5
Program Electives			16
Liberal Arts (Concentration) *			12
<i>Fourth Year (Internship)</i>			
Introduction to Obstetrical Ultrasound 1030-552			3
Gynecologic Ultrasound 1030-553			3
Abdominal Ultrasound I 1030-556			3
Clinical Ultrasound I 1030-570			7
Advanced Obstetrical Ultrasound 1030-554			4
Abdominal Ultrasound II 1030-557			3
Ultrasound Seminar 1030-560			2
Clinical Ultrasound II 1030-571			7
Small Parts Ultrasound 1030-558			3
General Vascular Evaluation 1030-414			4
Research Seminar 1030-561			2
Clinical Ultrasound III 1030-572			7
Total Quarter Credit Hours			191

* See page 7 for liberal arts requirements.

† See page 9 for wellness education requirements.

**Diagnostic medical sonography, certificate program,
typical course sequence**

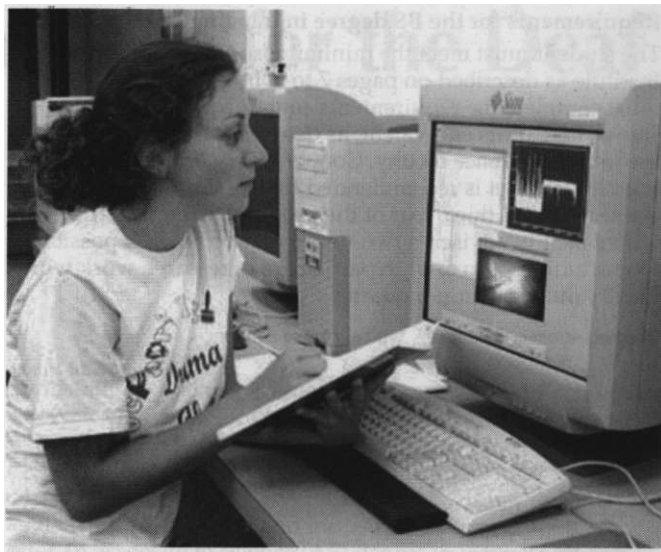
*Must be completed before entering certificate program **

Introduction to Diagnostic Medical Imaging 1026-205	2
Cross-Sectional Anatomy 1030-412	4
Ultrasound Instrumentation 1030-413	4
Pathophysiology 1026-415	4

Internship

Introduction to Obstetrical Ultrasound 1030-552	3
Gynecologic Ultrasound 1030-553	3
Abdominal Ultrasound I 1030-556	3
Clinical Ultrasound I 1030-570	7
Advanced Obstetrical Ultrasound 1030-554	4
Abdominal Ultrasound II 1030-557	3
Ultrasound Seminar 1030-560	2
Clinical Ultrasound II 1030-571	7
Small Parts Ultrasound 1030-558	3
General Vascular Evaluation 1030-414	4
Research Seminar 1030-561	2
<u>Clinical Ultrasound III 1030-572</u>	<u>7</u>
Total Quarter Credit Hours	62

* Other prerequisites may apply.



Exercise Science

Richard L. Doolittle, Program Director

College-level knowledge and professional certification are increasingly required for those who wish to work in the fitness industry, whether on a full-time or part-time basis, and whether in an athletic club, ski resort or sports medicine facility. Knowledge of and professional certification in fitness instruction and programming are also of increasing value to allied health professionals who wish to augment their care or practice with the ability to prescribe exercise programs that address special medical needs. The Certificate program in Exercise Science covers the basic principles of exercise physiology, fitness assessment and the preparation of fitness programs and prescriptions, and the development of exercise prescriptions for individuals with medical or other significant limitations. Students who successfully complete all three courses in the program will be prepared to sit for professional certification examinations from the American College of Sports Medicine, American Council on Exercise, and the American Academy of Health and Fitness Professionals, as well as for certifications from the Cooper Institute for Aerobic Research, the National Academy of Sports Medicine and a number of other recognized organizations.

**Exercise science, certificate program,
typical course sequence**

	<i>Quarter Credit Hours</i>
Sports Physiology & Life Fitness 1026-301	4
Fitness Prescription & Programming 1026-306	4
<u>Exercise Prescription for Special Populations 1026-307</u>	
<i>Certificate Total</i>	12

Center for Imaging Science

Stefi Baum, Director

Imaging science is a multidisciplinary field founded in physics, chemistry, mathematics, and computers. Students in imaging science study the theory behind the technologies used to create images, the integration of those technologies into imaging systems, and the application of those systems to solve scientific problems. The imaging science curriculum includes the study of:

- the physical observables associated with the subject of an image, such as reflected or emitted electromagnetic radiation;
- how those observables are captured by devices using optics and detectors, such as digital cameras;
- how the captured observables are processed using computers and specialized software;
- how processed signals are converted into images displayed on paper or electronic devices;
- how one assesses the quality of the displayed images or extracts information from them for scientific purposes.

Concepts presented in the classroom are reinforced through laboratory experiments and by a capstone senior research project. This project can examine a problem in any of several imaging applications, such as remote sensing, astronomy, medical imaging, document restoration, image microstructure, optics, color science, image quality, or visual perception. Both theoretical studies and practical application of technologies are integral parts of the program.

Career opportunities are many and varied. Graduates are in demand by both industry and governmental agencies to work on the design, development, testing, or production of specialized imaging systems or technologies, or to use imaging systems to perform scientific research.

The imaging science faculty are deeply committed professionals who divide their time between teaching and the pursuit of scientific advances.

The center conducts funded research sponsored by both industry and government. This research support ensures that students are exposed to the latest developments in a rapidly expanding field.

The Chester F. Carlson Center for Imaging Science also offers a minor and graduate programs in imaging science leading to MS and Ph.D. degrees as well as an MS degree in color science.

Requirements for the BS degree in imaging science

The student must meet the minimum requirements of the Institute as described on pages 7 to 9. In addition, he or she must complete the requirements contained in the program shown here or its equivalent, as determined and approved by the imaging science faculty. Cooperative work experience is not required but is recommended for the summers following the second and third year of the program. In consultation with a faculty adviser, a two-quarter co-op block is possible. Opportunities also exist to participate in research work with faculty during summer quarter.

Imaging science, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
Imaging Science First-year Seminar	1051-200		1
Imaging in the Physical Science	1051-204		4
Programming for Imaging Science	1051-211		4
Calculus I, H, III	1016-251,252, 253		12
University Physics I, II	1017-311,312		10
Science Electives**			9-12
Liberal Arts (Core)*			12
First-Year Enrichment			0
Wellness Education †			0
<i>Second Year</i>			
Introduction to Imaging Systems	1051-300		4
Optics for Imaging	1051-303		4
Linear Mathematics for Imaging	1051-320		4
Calculus IV	1016-305		4
Differential Equations	1016-306		4
Probability & Statistics I	1016-351		4
Probability & Statistics II	1016-352		4
University Physics III	1017-313		5
Liberal Arts (Core)*			12
Wellness Education †			0
<i>Third Year</i>			
Interaction Between Light & Matter	1051-313		4
Digital Image Processing I, II	1051-461,462		6
Programming	1051-411		2
Vision & Psychophysics	1051-400		3
Radiometry	1051-401		4
Modern Physics I	1017-314		4
Electronic Measurements	1017-431		4
Professional Electives		credit varies	
Liberal Arts (Core/Concentration) *			16
<i>Fourth Year</i>			
Imaging Systems Analysis I, II	1051-511,512		8
Colorimetry	1051-402		3
Tone & Color Reproduction	1051-403		4
Image Microstructure	1051-513		4
Senior Project	1051-501,502,503		5-9
Professional Electives		credit varies	
Liberal Arts (Electives) *			12
Liberal Arts (Senior Seminar) *	0520-501		2
Total Quarter Credit Hours			187

* See page 7 for liberal arts requirements,

† See page 9 for wellness education requirements.

**Consult with adviser for suggested science electives.

National Technical Institute for the Deaf

T. Alan Hurwitz, Vice President and Dean

The National Technical Institute for the Deaf (NTID), one of RIT's eight colleges, provides deaf and hard-of-hearing students with educational programs that lead to meaningful employment in business, industry, government and education. NTID represents the world's first effort to educate large numbers of deaf and hard-of-hearing students within a college campus planned principally for hearing students. NTID's location benefits both deaf and hearing students' academic, personal, social, and communication development.

Nearly 1,100 deaf and hard-of-hearing students from across the United States as well as from several U.S. territories and other countries study and reside at RIT.

NTID provides RIT's deaf and hard-of-hearing students with technical and pre-professional training in more than 20 programs. An NTID education prepares students for technical careers in areas such as accounting technology, administrative support technology, art and computer design, applied computer technology, automation technologies, business occupations, computer aided drafting technology, computer integrated machining technology, digital imaging and publishing technology, laboratory science technology, and ophthalmic optical finishing technology. Traditionally, 95 percent of NTID graduates who enter the work force find employment in their fields of study.

Deaf and hard-of-hearing students who take courses or matriculate into one of RIT's seven other colleges may request educational access services, which may include sign language interpreting in classrooms and laboratories and notetaking. Students also may request educational support services such as tutoring, personal and career counseling, and academic advising.

NTID also offers associate and baccalaureate degrees in ASL-English interpretation.

In support of its national mission, NTID has research, teaching, and learning activities that focus on understanding and enhancing the educational, social, and communication opportunities for deaf and hard-of-hearing individuals. This area provides services and programs that enhance teaching and learning within the NTID community and beyond via broad-based research activities and dissemination strategies, curriculum development, instructional design and evaluation, and instructional media services.

NTID's academic programs

NTID provides three student-oriented programmatic areas. Together, these programs provide a rich, coherent, set of educational experiences for students.

Technical Studies NTID offers a variety of associate degrees, and courses in a variety of technical fields. Numerous options/concentrations are available within the following technical areas: accounting technology, administrative support technology, art and computer design, applied computer technology, automation technologies, business technology, computer aided drafting technology, computer integrated machining technology, digital imaging and

publishing technology, industrial computer electronics, laboratory science technology, and ophthalmic optical finishing technology. Program laboratories are equipped with the latest technology and maintain a curriculum that represents current industry trends and requirements, based on routine feedback from business and industry advisory groups. We offer an associate in science (AS) degree in business that provides optimal transferability to a baccalaureate program in the College of Business. In addition, several of our associate in applied science (AAS) degrees provide students with the necessary skills to transfer to other RIT colleges. All programs require at least one 10-week external co-op experience.

Arts and Sciences NTID offers an array of arts and sciences curricular and co-curricular experiences to a broad-based population of NTID students, including those who are undecided about, or underprepared for, matriculation into a program of study. In addition, NTID offers associate and baccalaureate degrees in American Sign Language-English interpretation and provides a comprehensive sign language education program for students and faculty and staff members.

Support and Access Services NTID provides comprehensive programs in support of students enrolled in more than 250 baccalaureate or graduate programs in RIT's seven other colleges. The educational support services available include academic advising, tutoring, audiological, personal and career counseling. In addition, NTID provides access services through the department of interpreting services as well as notetaking services through support departments for deaf and hard-of-hearing students, faculty and staff to be able to participate in all aspects of the RIT community. NTID also offers Pre-baccalaureate Studies and a master of science in secondary education for students who are deaf and hard of hearing.

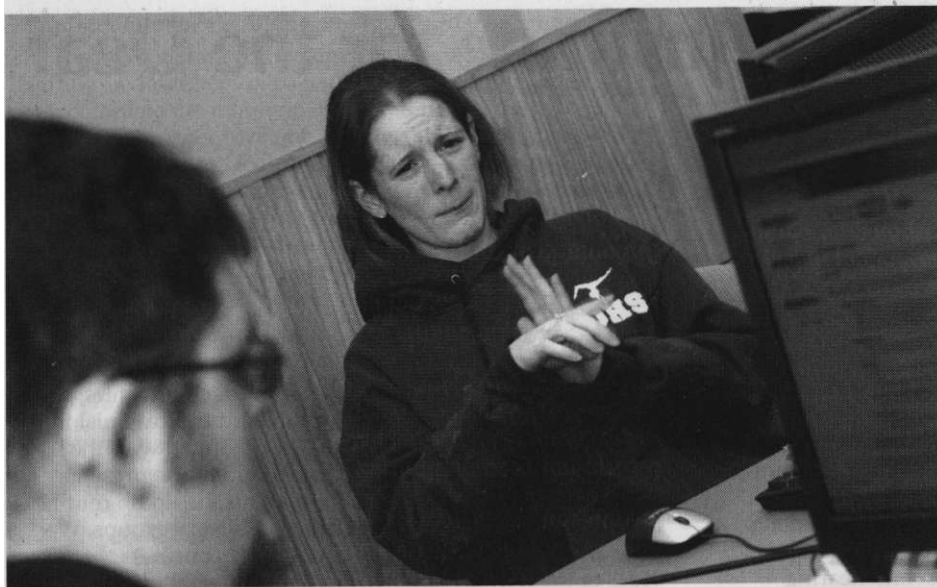
Educational opportunities through NTID

Technical Studies Programs

The technical programs offered through NTID lead to a diploma, associate in occupational studies, associate in applied science, or associate in science degree from RIT.

Diploma: Certification at this level requires 36–15 total credit hours of technical instruction. Students attain a maximum level of technical competency for entry-level positions. In addition to satisfactorily completing technical courses, students must complete a specific number of credit hours – determined by the program of study – in the NTID arts and sciences curriculum.

Associate in occupational studies degree (AOS): Certification at this level requires 57-69 credit hours of technical instruction. These programs permit students, upon completion, to enter their careers directly. In addition to satisfactorily completing technical courses, students must complete a specific number of credit hours – determined by the program of study – in the NTID arts and sciences curriculum.



NTID research, teaching and learning activities focus on understanding and enhancing the educational, social, and communication opportunities for deaf and hard-of-hearing individuals. ©2004 Photo by Ken Huth.

Associate in applied science degree (AAS): Certification at this level requires 57-69 credit hours of technical instruction. These programs permit students, upon completion, to enter their careers directly, or, in certain cases, to transfer to upper-division programs at a college of their choice. In addition to satisfactorily completing technical courses, students must complete 20 credit hours in liberal arts courses, offered through RIT's College of Liberal Arts, and other required credit hours as determined by the program of study.

Associate in science degree (AS): Certification at this level requires the completion of 45-50 credit hours of technical course work and 40-45 credit hours in liberal arts courses offered through RIT's College of Liberal Arts, mathematics and science courses offered through RIT's College of Science, and other courses as appropriate to the degree. This degree prepares students to enter and complete a bachelor's program in RIT's College of Business.

Career Exploration Studies

Career Exploration Studies offers opportunities for students to collect information about NTID majors and career paths before deciding on a program of study. It also assists students who need additional academic preparation and study in order to be ready for their chosen major.

This option allows students the opportunity to do an intensive career search while they develop a better understanding of themselves through career and personal counseling; decision-making classes; intensive sampling of various majors at RIT/NTID; use of a computer guidance program in the Career Resource and Testing Center; interest testing; and interpretation of aptitude, ability, and achievement tests. In addition, students take courses in mathematics, English, social and

Pre-baccalaureate Studies

Pre-baccalaureate Studies is available as a bridge into baccalaureate degree programs for students who are accepted by NTID and are close to, but not fully ready for, direct entry into a baccalaureate-level program. The Pre-baccalaureate Studies Career Exploration option is available to students who are undecided as to their program of study.

Pre-baccalaureate Studies is appropriate for students who need to further develop mathematics, English, or discipline-related skills. This academic option is flexible and individualized and enables students to focus on needed skills while they progress toward their chosen field of study. Students take courses taught by support department faculty and other NTID faculty, along with entry-level courses taught in other RIT colleges. (See program description on pages 157-159.)

Educational opportunities in other RIT colleges

In addition to NTID's programs, qualified deaf and hard-of-hearing students also may enroll as baccalaureate or master's degree students in one of the more than 250 professional programs offered through RIT's other seven colleges: Applied Science and Technology, Business, Computing and Information Sciences, Engineering, Imaging Arts and Sciences, Liberal Arts, and Science or may take classes in other RIT colleges. This process is called cross registration.

Each RIT college has an affiliated NTID support department that provides services for deaf and hard-of-hearing students. These services may include notetaking, tutoring, advising, and personal and career counseling. The department of interpreting services provides sign language interpreting services for deaf and hard-of-hearing students taking courses in the other seven colleges of RIT and for campus activities outside of the classroom. The policies and procedures for requesting support services are outlined in "The Student Handbook: Your Guide to Support Services at RIT through NTID."

Deaf and hard-of-hearing students who wish to enroll in a program in another RIT college must meet its admission standards. Furthermore, deaf and hard-of-hearing students supported by NTID also must meet NTID admission requirements listed on page 131 and complete both the NTID Supplemental Admission Application and standard RIT admission forms. (For admission information, see pages 131,369.)

Qualified students may choose to enroll in courses taught through the other seven colleges of RIT for several reasons: they may take selected courses at other RIT colleges as part

First-Year Experiences Program

NTID programs

Beginning with summer orientation programs, the First-Year Experiences Program provides a special array of curricular and co-curricular activities to help maximize each student's potential during the first year. These experiences are designed to enhance students' bonding with the community while providing academic and support to enter into a major, select a career path, and progress within a career program.

First-year students qualified to enter NTID may participate in a summer orientation program called Summer Orientation Program (SVP), which includes:

- placement testing in English and mathematics
- orientation/transition to college
- career sampling
- counseling
- application to technical program, College of Business, or Pre-baccalaureate Studies (see program description on page 127-128).

This summer program is followed by additional activities and experiences that allow students to work with an academic adviser to select courses and activities that meet their interests and needs.

Components of first-year experience include:

- enrollment in Freshman Seminar course during the first quarter
- completion of preparatory courses
- work with an academic adviser and advisor
- participation in career exploration and career development courses, when and if appropriate
- completion of degree requirements, including general education
- participation in cocurricular and extracurricular activities of choice
- declaring a major and degree level during the first year

Other colleges of RIT

Students who qualify to enter baccalaureate programs at other colleges of RIT participate in the first-year experiences activities designed by the affiliated support departments at the colleges. Most first-year students enrolled at other than NTID are required to:

- participate in summer orientation programs
 - RIT's Week of Welcome (WOW)
 - Student Orientation Assessment and Registration (SOAR)
- enroll in First-Year Enrichment program
- participate in opportunities to explore career options, if needed
- work with an academic adviser and advisor

Arts and sciences distribution requirements								
Degree	Freshman Seminar	Math & Science	Deaf Studies' (Interdisciplinary)	Humanities		Social Sciences	Capstone	
				Language & Literature				Other Humanities (Including foreign languages)
				ASL ²	English			
AAS	2	6	3	College of Liberal Arts—8	College of Liberal Arts—4 (lower division)	College of Liberal Arts—8 (lower division)	4	
AOS	2	6	(3) ²	12	6	6	3	
Diploma	2	6	(3) ²	12	3	3		

¹The Deaf Studies/ASL requirement can be satisfied by taking three credits in American Sign Language or an identified Deaf Studies course.

²The three-credit course taken to fulfill the Deaf Studies/ASL requirement can fulfill three credits in either humanities or social sciences, depending upon which discipline offers the course selected.

English language and literature

The English program is designed to enable students to develop English literacy skills. There are three developmental strands of courses in academic writing, nonfiction reading, and literature. The academic writing and nonfiction reading strand each have courses at four levels (A-D), while the literature strand has courses at three levels (B-D). There is also a two-course integrated sequence at Level A for students who enter with weaker skills. This program provides the English literacy skills required for AOS and diploma programs at NTID while at the same time providing access to the College of Liberal Arts language and literature curriculum required for AAS and baccalaureate degrees.

Students who plan to graduate with a diploma are required to complete 12 credits of English courses at Level B. Students who plan to graduate with an AOS degree are required to complete 12 credits of English at Level C or higher. Students who enter NTID with English skills below the level required for their degree of choice will need to successfully complete additional courses before taking the English courses required for their degree of choice.

Social sciences and humanities

The social sciences courses provide students with a broad exposure to key concepts and issues in anthropology, sociology, psychology, economics, and political science.

The humanities curriculum includes courses in communication studies, history, fine arts, performing arts, philosophy, and religion. Students also have the opportunity to study foreign languages in the College of Liberal Arts.

The communication studies curriculum offers courses to enhance students' understanding of the communication process and develop effective individual, group, professional, and cross-cultural communication skills based on linguistic background, communication preferences, and needs of a variety of audiences.

The performing arts curriculum includes performance and technical components and makes use of Panara Theatre and a smaller experimental theater where students stage plays and performances and create their own works in American Sign Language and English. This curriculum provides a bridge to the BFA program in film/video in the College of Imaging Arts and Sciences.

Students are required to take credits in humanities and in social sciences for AOS degrees, diplomas, and certificates (see chart, above).

The social sciences and humanities curricula each have courses at three levels (B-D). Students who plan to graduate with an AOS degree are required to complete six credits of social sciences courses and six credits of humanities courses at Level C or higher. Students who upon entry to NTID place

below Level C in social sciences and/or humanities will need to successfully complete a course(s) at Level B before taking courses at Level C. Students who plan to graduate with a diploma are required to complete three credits of social sciences and three credits of humanities courses at the B level or higher.

Deaf Studies/American Sign Language

Students have an opportunity to study American Sign Language (ASL) and learn about their heritage as deaf people through the Deaf Studies/ASL curriculum. All students are required to complete one three-credit course in Deaf Studies or ASL at the fundamental (B) level or higher. Students who are not skilled in sign language are strongly encouraged to take additional ASL courses, and students proficient in ASL are encouraged to take advanced courses in ASL and Deaf Studies. Deaf Studies courses also satisfy the social sciences and humanities requirements.

Capstone

All students at the AAS and AOS level are required to complete the Capstone Seminar. This is an interdisciplinary course that applies the knowledge and skills acquired in the technical and arts and science courses to the study of social, cultural, and technological issues.

Liberal arts requirements

Deaf and hard-of-hearing students enrolled in AAS or baccalaureate degree programs take required courses in language and literature, behavioral and social sciences, and science and humanities through the College of Liberal Arts. At the lower division, students can choose between course sections taught by either NTID or College of Liberal Arts faculty members.

Liberal arts courses taught by NTID faculty members are designed especially for deaf students. Instructors use simultaneous communication and provide students with additional study guides and materials.

Liberal arts courses taught by College of Liberal Arts faculty members include both deaf and hearing students. Educational access services, such as sign language interpreting and notetaking, may be requested by students. Students also may request educational support services such as tutoring and academic advising.

Deaf and hard-of-hearing students are advised to earn a passing grade in Writing and Literature II before taking any additional liberal arts courses. Students studying in colleges other than NTID should consult with their program departments about required liberal arts courses.

Placement in Writing and Literature I is based on the Liberal Arts Placement Test (LAPT) or upon satisfactory completion of **Written Communication II**.

Students seeking an AAS degree also are required to take courses in behavioral science, social science, and science and humanities.

Writing program

The College of Liberal Arts, through the NTID Department of Liberal Arts Support, offers a two-course writing sequence (Written Communication I and II) as preparation for Writing and Literature I and II. These courses provide additional experience with writing, reading, and critical thinking techniques needed for success in Writing and Literature I and II. Eligible students must meet with the liberal arts support writing coordinator before registering for these courses.

Admissions information

Costs of attending RIT through NTID

The total cost of attending RIT under NTID sponsorship includes tuition, room, board, and fees. Charges to NTID-sponsored students are updated each year. Fixed charges for 2004-05 are listed on page 132.

The cost of books and supplies is the students' responsibility. These costs also vary depending on the program of study. Annual costs for books and supplies for the 2004-05 academic year range from \$450-\$800.

New students accepted to the Summer Vestibule Program will be charged according to the fee schedule on page 132.

Students on co-op are not charged tuition or fees for that particular quarter and are charged room and board and residence hall fees only if they live on campus while they work.

All students are required to carry accident and sickness insurance. Students may choose coverage through RIT or they may waive this coverage if they provide evidence of other coverage. Waiver cards will be sent to all accepted students during the summer and will be available at registration. The fee for health insurance for 2004-05 is approximately \$370.

Deaf and Hard-of-Hearing Applicants

Deaf or hard-of-hearing students may apply for admission to programs offered at the National Technical Institute for the Deaf (NTID) or to any other college of RIT. All applicants with a hearing loss should check the appropriate box on Part 1 of the Application and complete NTID's Part 2 application in order to qualify for educational access and support services (such as sign language interpreters, notetakers, tutors), as well as NTID's federally supported tuition rate. Send application materials to the NTID Office of Admissions. For further details regarding application requirements, refer to the information on Admission to Undergraduate Study (see page 369).

Transfer credit

Deaf and hard-of-hearing students may transfer into an NTID program, or they may qualify for transfer directly into a program in another RIT college with NTID sponsorship. Deaf students accepted to the Summer Vestibule Program will have their transfer credit evaluated in the fall when they are accepted into a specific program.

Campus visits

Deaf and hard-of-hearing students who wish to enter NTID or another RIT college may contact NTID's Office of Admissions, Lyndon Baines Johnson Building, 52 Lomb Memorial Drive, Rochester, NY 14623-5604, or call 585-475-6700 (voice/TTY) or e-mail us at ntidadmissions@rit.edu.

Deaf and hard-of-hearing students may take tours offered at NTID and arrange personal interviews. Both of these are strongly encouraged but are not required for admission.

Facilities

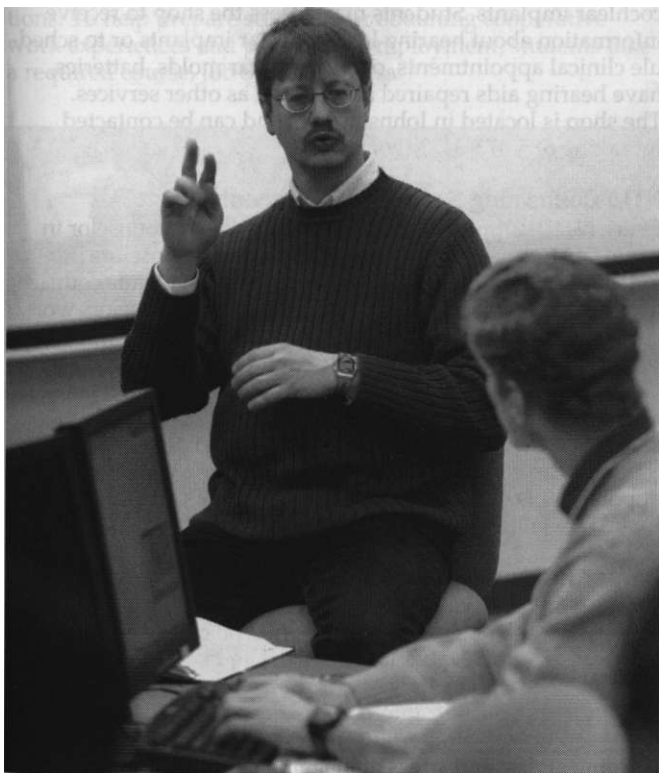
A modern academic/residential building complex on the campus is designed to meet the specific needs of deaf and hard-of-hearing students. The Lyndon Baines Johnson Building—NTID's main academic facility—and the Hugh L. Carey Building—located on the west end of the RIT campus—house laboratories, offices, speech and hearing areas, classrooms, and a 500-seat theater with closed-circuit television.

Most classrooms and laboratories have been remodeled to support the delivery of instruction using the latest technologies (large-screen projection, Internet access, various video sources, and other computer-based delivery services). In addition, classrooms have been designed to reduce distractions to the students and teachers.

All dormitory rooms, campus apartments, classrooms, laboratories, and administrative areas are equipped with high-speed (Ethernet) computer connections. These provide all members of the community with access to the campus-wide computer networks and the Internet. In addition, most classrooms are now equipped with high-technology lecture/presentation capabilities, including high-resolution projection displays, digital document displays, VCRs, and assistive listening systems.

NTID's main academic building, the Lyndon B. Johnson Building, boasts a state-of-the-art Learning Center. Using the latest technologies available, this center provides academic experiences, tutorial services, and course enrichment opportunities for all students. It provides students with access to networked computer workstations, videoconferencing capability and use of "smart" classroom technology.

One of the features of the Lyndon B. Johnson Building is the Joseph F. and Helen C. Dyer Arts Center. This 7,000-square-foot facility on two levels features changing exhibits and NTID's permanent art collection throughout the year. The center also incorporates art-related educational activities, such as lectures and demonstrations, while serving as a multi-use facility.



NTID students get personal attention from instructors who teach in ASL.
©2004 Photo by Ken Huth.

NATIONAL TECHNICAL INSTITUTE FOR THE DEAF FIXED CHARGES 2004-05 (DOMESTIC STUDENTS)

	Summer Vestibule Program 8/22- 9/5/04	SOAR* 8/29- 9/5/04	Fall 9/6- 11/12/04	Winter 11/29/04- 2/18/05	Spring 3/7- 5/13/05	Summer 6/6- 8/15/05
Tuition	\$445	\$89	\$2,490	\$2,490	\$2,490	\$2,490
Room	140	0	1,551	1,551	1,551	1,551
Board (standard meal plan)	118	6	1,161	1,161	1,161	1,161
Student Fees ¹			196	196	196	196
Orientation Fee ²			165			
Student Sickness Insurance Fee			370			
Total	\$703	\$95	\$5,933	\$5,398	\$5,398	\$5,398

NOTE: Required books and supplies ² impact these figures and are outlined on the following page.

¹SOAR (Student Orientation Assessment and Registration) orientation program for NTID-supported students accepted to other RIT colleges.

² Student fees are required of all full-time students and include: Student Health fee (\$61); Student Activities fee (\$58); Athletics fee (\$6); Student Alumni Union fee (\$66); and NTID Activities fee (\$2).

¹ Charge to defray cost of Fall Orientation Program for freshmen and new students only.

²The Sickness Insurance Fee is estimated. It has not been finalized.

The standard academic year includes the fall, winter, and spring quarters. New students accepted to the Summer Vestibule Program will be charged according to the prorated fee schedule indicated above.

Students on co-op are not charged tuition or fees for that particular quarter and will be charged room and board only if they live on campus while they work.

Incidental personal expenses for students average \$50-60 per month. This accounts for such things as local transportation, laundry and dry cleaning, toiletries, entertainment, hearing aid batteries, etc.

All RIT and NTID residence halls have undergone major renovations and provide students with an appealing and highly functional living environment. Special rooms have been created to serve physically challenged students. Students are encouraged to bring their own computers for connecting to the campus network and Internet from their rooms. A mixture of older and new apartment units is also available. Visual emergency strobe lights and visual doorbells are present throughout residence halls, apartments, and academic buildings.

Television, a basic part of the college's communication network, is used for both education and entertainment. Campus cable connections are provided in each residence hall room, classrooms, and various other locations. The system supports 22 channels of basic service, which include ABC, CBS, Fox, WB, PBS, a local news channel, a local public access channel, and several channels used on campus for distribution of educational programming. In addition to these "free" cable channels, students may elect to purchase full cable channel services from the Rochester cable system provider.

A well-equipped television facility provides studio services to produce class and self-instruction media for use within the Institute.

Telecommunications

Deaf, hard-of-hearing, and speech-impaired students can access telephone services through various TTY and computer relay services. The relay service operates 24 hours every day, seven days a week, and can be used to make and receive campus, local, long-distance, and international calls. While there is no charge for using relay services, students are responsible for their personal phone bills.

Communication skills

The attainment of communication competence is considered an important component of the student's educational experience at NTID. Students have opportunities to develop skills through a wide range of curricular and co-curricular activities that promote communication success in educational, social, and work situations. The Department of Speech and Language, the Audiology Department, the Department of American Sign Language and Interpreting Education, and the Department of Cultural and Creative Studies provide

intensive support and instruction for the development of communication skills. Faculty conduct assessments and provide course work, workshops, and individualized instruction. They also work in collaboration with technical faculty and support department faculty and professional staff. (See Speech and Language Department services on page 353, Audiology Department services on page 353, Deaf Studies/ASL-English Interpretation curriculum on page 133, and Deaf Studies on page 156.)

Hearing Aid Shop

The NTID Hearing Aid Shop provides the RIT community with services related to hearing loss, hearing aids and cochlear implants. Students may access the shop to receive information about hearing loss, cochlear implants or to schedule clinical appointments, obtain new ear molds, batteries, have hearing aids repaired and as well as other services. The shop is located in Johnson 3130 and can be contacted by calling 585-475-6473 (voice/tty).

NTID Counseling Services Department

Every NTID-supported student is assigned to a counselor in the NTID Counseling Services Department. Counselors provide individual personal/social, career, and academic counseling services to their students. In addition, the counselors work closely with students and the faculty in the students' academic programs to help students achieve academic success. Counselors also consult and network extensively with families, and internal and external resources with the goal of helping students achieve personal, career, and educational success. Students can contact their assigned counselors to arrange for appointments. Student counselor assignments can also be looked up online at www.ntid.rit.edu/current/counseling.

Career Resource and Testing Center

The Career Resource and Testing Center (CRTC) provides students with materials and information on careers and college programs with special services for deaf and hard-of-hearing students. Services include access to the computerized guidance system; aptitude, interest, and personality testing; as well as noncredit skill-building workshops on study skills, learning styles, and stress management.

The CRTC is staffed by a professional counselor from the NTID Counseling Services Department with the help of student assistants. It is open daily with evening hours available upon request. For additional information or an appointment, call 585-475-6468 (voice/TTY).

Mental health/psychological counseling

Mental health counseling services for deaf and hard-of-hearing students are part of a continuum of personal and social counseling services at the RIT Counseling Center. Mental-health emergency services and crisis intervention are provided by the RIT Counseling Center on a 24-hour basis in collaboration with other campus service providers.

Direct counseling and psychotherapy are provided for students on a walk-in or referral basis. Examples of concerns students may need help with include depression, anxiety, family conflicts, interpersonal and intimate relationships, and personal identity. The Counseling Center also coordinates medication consultation and management when appropriate, through the RIT psychiatrist.

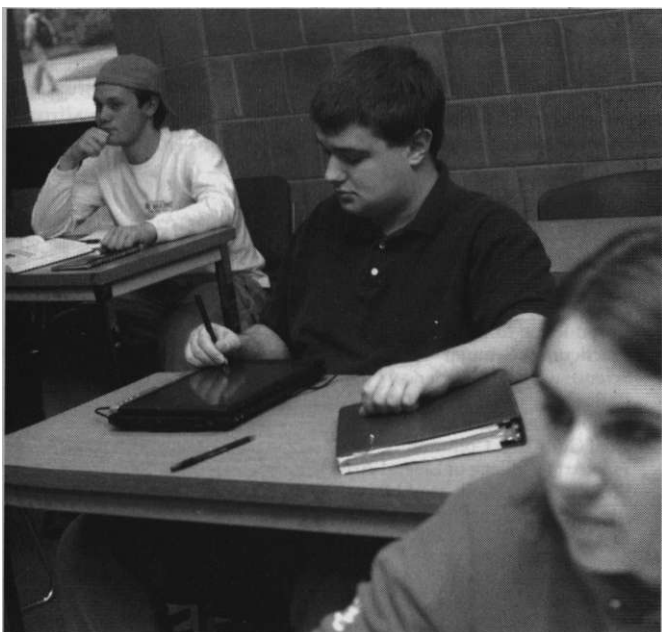
Through consultations within and outside the RIT community, Counseling Center representatives share expertise about mental health and deafness on campus, locally, nationally, and internationally.

Cooperative work experience

A feature of most RIT academic programs, including those offered through NTID, is cooperative (co-op) work education that stresses "learning by doing." All NTID programs require a co-op work experience, which introduces students to the world of work. The majority of the co-op experience occurs during the summer but can be taken anytime during the year consistent with student's course schedule.

Placement

Employment of RIT's deaf and hard-of-hearing graduates is a high priority. To help ensure that graduates obtain program-related employment, NTID's Center on Employment (NCE) assigns to each new student an adviser experienced in employment assistance in the different academic concentrations. To help prepare students for obtaining cooperative work experiences and permanent employment, students take a required course, Job Search Process.



Many deaf students rely on the some 400 notetakers RIT employs to help make classroom information more accessible.

NCE employment advisers are in constant contact with potential employers throughout the United States. In addition, NCE hosts an annual Job Fair attended by national employers. Such services have contributed to a high employment rate of deaf and hard-of-hearing NTID/RIT graduates.

Research

NTID faculty members conduct research to understand and support the education of deaf and hard-of-hearing students in a variety of contexts. In conducting this research, researchers hope to promote the personal, educational, and career success of RIT students. Students are invited to help in research efforts; this can mean taking tests and being part of research studies or conducting research themselves in collaboration with NTID professionals. Researchers sometimes contact graduates to see how well their education has prepared them for work and other aspects of their lives.

ASL-English Interpretation

Rico Peterson, Chairperson

AAS Degree Program

On-the-job responsibilities

The AAS degree program in ASL-English interpretation prepares entry-level sign language interpreters for work in settings where deaf and hard-of-hearing people can use interpretation.

Places of employment

Elementary, secondary, and post-secondary educational institutions; community service organizations; vocational rehabilitation agencies; business/industry; and government agencies

Special entrance requirements

In addition to RIT's general admissions procedures (see page 360), the ASL-English interpretation program requires completion of additional admission materials obtained from the NTID Admissions Office.

Academic preparation:

- Applicants are required to have at least a high school diploma or equivalent.
- High school preparation should include a college preparatory program with a minimum two years of mathematics, one year of science, two years of a foreign language, and a minimum of a B average in English.
- SAT-I results should be at least 1050; Verbal score should be at least 550 (or ACT equivalent results).

For those applicants who have had college experience:

- College transcripts should document a GPA of 3.0 or better with evidence of very good performance in English courses.

Application essay:

- The writing sample will be judged on vocabulary, grammar, mechanics, style, and creativity.

Interview:

- Qualified applicants will be judged on general knowledge of the field of interpreting, general knowledge of deaf people and the deaf community, and overall poise and maturity.

American Sign Language:

- Applicants must demonstrate proficiency in ASL at an intermediate level as measured by the departmental skill assessment. This assessment will take place on the same day as the interview.

TECHNICAL EDUCATION PROGRAMS OF NTID
(Leading to diploma or associate degrees)

RELATED EDUCATIONAL PROGRAMS OF OTHER RIT COLLEGES

(Leading to associate, bachelor's, or master's degrees through cross registration into other RIT colleges; students may request educational access services such as sign language interpreting and notetaking.)

NTID Programs	Other RIT Colleges	Other RIT Programs
Applied Computer Technology	College of Applied Science and Technology	• Computer Engineering Technology
• Industrial Computer Electronics	Golisano College of Computing and Information Sciences	• Computer Science
• Computer Support	College of Business	• Information Technology
Art and Computer Design	College of Imaging Arts and Sciences	• Business Administration— Management Information Systems
Automation Technologies	College of Applied Science and Technology	• Art Education
• Applied Robotics	College of Engineering	• Ceramics/Ceramic Sculpture
• Semiconductor Technology	College of Business	• Computer Graphics Design
Business Careers	College of Applied Science and Technology	• Fine Arts (Illustration, Medical Illustration and Fine Arts Studio)
• Accounting Technology	College of Applied Science and Technology	• Glass/Glass Sculpture
• Business	College of Applied Science and Technology	• Computer Integrated Manufacturing Engineering Technology
• Business Technology	College of Applied Science and Technology	• Microelectronic Engineering
• Administrative Support Technology	College of Applied Science and Technology	• Business Administration— Accounting
Computer Aided Drafting Technology	College of Applied Science and Technology	• Business Administration— Finance
Computer Integrated Machining Technology	College of Applied Science and Technology	• Health Care Billing & Coding Technology
Digital Imaging and Publishing Technology	College of Imaging Arts and Sciences	• Business Administration— Marketing
Laboratory Science Technology	College of Applied Science and Technology	• Business Administration— Management
Applied Optical Technology	College of Applied Science and Technology	• Civil Engineering Technology
	College of Applied Science and Technology	• Mechanical Engineering Technology
	College of Engineering	• Computer Integrated Manufacturing Engineering Technology
	College of Engineering	• Industrial Engineering
	College of Engineering	• Mechanical Engineering
	College of Imaging Arts and Sciences	• Biomedical Photographic Communications
	College of Imaging Arts and Sciences	• Film/Video/Animation
	College of Imaging Arts and Sciences	• Graphic Communications
	College of Imaging Arts and Sciences	• Graphic Media
	College of Applied Science and Technology	• Environmental Management and Technology
	College of Science	• Biology
	College of Science	• Biochemistry
	College of Science	• Biomedical Computing
	College of Science	• Chemistry
	College of Science	• Diagnostic Medical Sonography
	College of Science	• Medical Technology

Note: In addition to the technical programs noted above, NTID also offers Pre-baccalaureate Studies. This program is available as a bridge for qualified students accepted by NTID and interested in enrolling in another RIT college, but not yet ready to enter a baccalaureate-level program.

For more information on application requirements and procedures, contact the Department of American Sign Language and Interpreting Education (ASLIE) at 585-475-6809 (voice/TTY).

ASL-English Interpretation, AAS degree, typical course sequence

First Year	Quarter	Credit Hours
American Sign Language IV, V, VI	0875-301,302, 303	12
Intercultural Communication for Interpreters	0875-211	4
Discourse Analysis for Interpreters	0875-310	4
Processing Skills Development	0875-311	4
Introduction to the Field of Interpreting	0875-213	4
Voice to Sign Interpreting I	0875-315	4
Sign to Voice Interpreting I	0875-316	4
Writing & Literature I, II	0502-225,226	8
Mathematics (College of Science)		4
Physical Education (Activity Course)		0
Physical Education (Wellness Component)		0

Second Year

Voice to Sign Interpreting II	0875-325	4
Sign to Voice Interpreting II	0875-326	4
Practical & Ethical Applications	0875-320	4
Introduction to Transliteration	0875-330	4
Practicum & Seminar	0875-350	4
Science (College of Science)		4
Philosophy (College of Liberal Arts)		4
History (College of Liberal Arts)		4
Deaf Culture & Community	0875-212	4
Fine Arts (College of Liberal Arts)		4
Social Science (College of Liberal Arts)		4
Total Credit Hours		96

BS Degree Program

On-the-job responsibilities

The BS degree program in ASL-English interpretation prepares advanced-level sign language interpreters for work in settings where deaf and hard-of-hearing people can use interpretation. This degree allows students to develop specialized skills for working in educational and community settings.

Places of employment

Elementary, secondary, and post-secondary educational institutions; community service organizations; hospitals and mental health agencies; vocational rehabilitation agencies; business/industry; and government agencies

Special entrance requirements

In addition to RIT's general admissions procedures (see page 367), the ASL-English interpretation program requires completion of additional admission materials obtained from the NTID Admissions Office.

Academic preparation:

- Applicants are required to have successfully completed an associate degree in ASL-English interpretation or a related area.
- Associate degree should include at least one science course (with a lab), one math course, 8 quarter credits in writing and literature (with a grade of B or better), three courses in humanities (4 quarter credits each), and two courses in the social sciences (8 quarter credits).
- College GPA with 3.0 or better based on a 4.0 system

Interpreting portfolio:

- A 10-15-minute videotape demonstrating the applicant discussing an issue using American Sign Language
- A 10-15-minute videotape demonstrating an unrehearsed sample of the applicant's sign-to-voice interpreting ability
- A 10-15-minute videotape demonstrating an unrehearsed sample of the applicant's voice-to-sign interpreting ability
- A documented term paper written for a college-level course
- At least three letters of recommendation from deaf consumers, employers, and/or the applicant's past practicum/internship supervisor(s), indicating the applicant's potential as an interpreter and contributor to the profession. The applicant's final practicum/internship evaluation may also be included in lieu of a letter.

Interview

Applicants will be judged on knowledge of the field of interpreting and of the deaf community, and overall poise and maturity.

For more information on application requirements and procedures, contact the department of American Sign Language and interpreting education (ASLIE) at 585-475-6809 (voice/TTY).

ASL-English interpretation, BS degree, typical course sequence

First Year	Quarter	Credit	Hours
Advanced Interactive Interpreting	0875-325, 326		6
Interpreting Frozen & Literary Texts	0875-400		4
Professional Electives			8
Practicum & Seminar	0875-400		4
Liberal Arts Concentration or Minor (College of Liberal Arts)			12
Liberal Arts Elective (College of Liberal Arts)			4
Mathematics Elective (College of Science)			6
Science (College of Science)			4
Physical Education (Activity Course)			0
Physical Education (Wellness Component)			0
<i>Second Year</i>			
Advanced Sign to Voice	0875-400		4
Advanced Voice to Sign	0875-400		4
Interpreting Internship			12
Issues in Interpreting	0875-515		4
Professional Elective			4
Liberal Arts Electives (College of Liberal Arts)			8
Senior Seminar (College of Liberal Arts)			2
Science (College of Science)			4
<i>Total Credit Hours</i>			90

Applied Computer Technology

Elissa M. Olsen, Chairperson

Careers that involve work with computers increase daily. Computers are an important part of business, industry and other parts of the economy. Computer careers involve operating computers, maintaining the software and hardware of microcomputers, and networking computers so that they can communicate with one another.

Students may choose from diploma, AOS, or AAS degree programs in applied computer technology and the AS (transfer) program.

AS Degree (Transfer) Program

The associate of science (AS) in Applied Computer Technology is a two-year degree program to prepare deaf and hard-of-hearing students to enter and successfully complete a baccalaureate program in RIT's B. Golisano College of Computing and Information Sciences in Information Technology field of study.

As a direct transfer program, specifically designed to articulate with RIT's B. Golisano College of Computing and Information Sciences, NTID's AS degree maximizes the number of credits a student may transfer toward a baccalaureate degree within the B. Golisano College of Computing and Information Sciences.

Prerequisites

ACT composite test score of 16 or better.

English: Ready for College of Liberal Art's Written Communication II (0502-111)

Mathematics: Ready for NTID's Elements of Trigonometry (0884-220)

Transfer Requirements

To transfer to RIT's B. Golisano College of Computing and Information Sciences, the student must present a grade point average of 2.8 or higher upon graduation with the AS degree in Applied Computer Technology.

Students in the applied computer technology program receive a foundation in computer hardware, networking, and computer applications. They also have the option of choosing to concentrate in one of two areas: computer support or industrial computer electronics.

First Year	Quarter	Credit Hours
Application Software 0805-201		3
PC Hardware I, II 0805-216,217		6
Elements of Trigonometry 0884-220		4
Freshman Seminar 0880-200		2
Introduction to UNIX 0805-220		3
Advanced Math 0884-275		4
Writing and Literature I, II 0502-225,226		8
PC Operating Systems 0805-215		3
Programming Fundamentals 0853-310		4
Lab Science †		4
Communication Elective *		4
Second Year		
Programming for IT 4002-217 ‡		4
Programming for IT XX 4002-2XX ‡		4
Programming for IT XX 4002-2XX ‡		4
Introduction to Multimedia 4002-320		4
Networking I 0805-224		3
Data Communication and Networks 4002-341		4
Liberal Arts 05XX-XXX		
Social Science (2), Fine Arts and History		16
Lab Science 05XX-XXX †		4
Philosophy or STV 05XX-XXX		4
Total Quarter Credit Hours		92

* Communication Elective-Options include a course in professional communication, technical writing, foreign language, public speaking, sign language, or another course relating to interpersonal communications (including Written Communication ID. This course may be taken from College of Liberal Arts or College of NTID. A course taken from NTID must be at Level D.

† Lab Science-Any NTID science courses numbered 200 or higher offered for 4 credits with an included lab component. These courses include: Human Genetics and Evolution (0885-281), Scientific Basics of Social Responsibility (0885-282), and Physiology of Human Development and Maturation (0885-283). Any two courses from the College of Science can also be used.

‡ Students must complete a three-quarter course sequence in programming from the IT Department. Students must take 4002-217,218,219 or 4002-217,220,221. Appropriate course sequence will be determined after successful completion of 4001-217.

Students who desire to work in computer support positions in a business environment may choose to take the computer support option in the diploma, AOS, or AAS in applied computer technology programs. This option gives students a background in systems administration and midrange computer operations, Internet and database applications.

Students who desire to work in computer support positions in a manufacturing/industrial environment may choose to take the industrial computer electronics option in the AAS and AOS applied computer technology programs. This option gives students a background in electronics and a more advanced skill set in computer hardware than the computer support option.



On-the-job responsibilities

Diploma: Work in either the computer operations area controlling computers in a variety of operations-related support areas or in hardware and networking.

AAS and AOS degrees: Work as computer technician, personal computer support specialist, or network technician or operate mainframe computer systems or remote computers.

Places of employment

Banks, insurance companies, large stores, manufacturing companies, public utilities, government agencies, and other computer centers

Diploma Program

Positions for which graduates qualify

Computer operator and peripheral equipment operator

Prerequisites

Successful completion of a sampling experience in the applied computer technology area, either through the Summer Vestibule Program or a Career Exploration course

English—Diploma: Placement into level B English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing a diploma typically enter with reading scores equivalent to 7.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

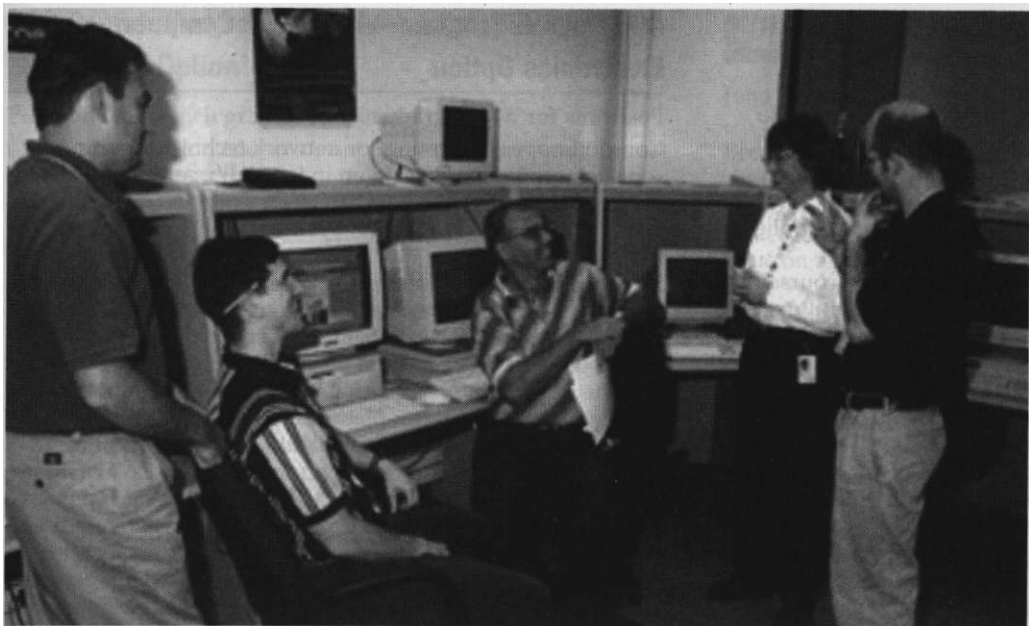
Applied computer technology, diploma, typical course sequence

First Year	Quarter	Credit Hours
Applications Software 0805-201		3
Introduction to Midrange		
Computer Operations 0805-205		3
Command Language/Utilities for Midrange Computers 0805-206		3
Multiprogramming & Spooling for Midrange Computers 0805-207		3
PC Operating Systems 0805-215		3
PC Hardware I 0805-216		3
PC Hardware II 0805-217		3
Internet Technologies I 0805-251		3
Orientation to Business 0804-101		3
Mathematics Elective (Level B or above) *		3
Freshman Seminar 0887-200		2
Job Search Process 0806-101		2
Science (Level B)		3
English (Level B or above)		8
Cooperative Education 0805-299		0
Second Year		
Introduction to UNIX 0805-220		3
Networking I 0805-224		3
Networking II 0805-225		3
Programming I 0805-230		3
Technical Elective †		3
Employment Seminar 0806-201		1
Humanities		3
Social Science		3
English (Level B or above)		4
Deaf Studies/ASL ‡		(3)
Total Quarter Credit Hours		71

* The following courses cannot be used as a math elective: 0884-100 Introduction to College Mathematics; 0884-120 Preparation for Algebra,

† Student may select from ACT department electives or approved electives from: business occupations, electronic publishing b printing technology, or imaging technology departments.

‡ This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.



AOS Degree Program—Computer Support Option

Positions for which graduates qualify

Computer operator, trainee or network technician and personal computer specialist

Prerequisites

Successful completion of a sampling experience in the applied computer technology area, either through the Summer Vestibule Program or equivalent Career Exploration course

English—AOS: Placement into level C English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees typically enter with reading scores equivalent to 8.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or Elements of Geometry (0884-170) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into any level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

Applied computer technology, AOS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Applications Software 0805-201	3
Introduction to Midrange Computer Operations 0805-205	3
Command Language/Utilities for Midrange Computers 0805-206	3
Multiprogramming & Spooling for Midrange Computers 0805-207	3
PC Operating Systems 0805-215	3
PC Hardware I 0805-216	3
PC Hardware n 0805-217	3
Internet Technologies I 0805-251	3
Orientation to Business 0804-101	3
Foundations of Algebra 0884-180	4
Mathematics Elective (Level B or above) *	4
Freshman Seminar 0887-200	2
Job Search Process 0806-101	2
English (Level C or above)	8
Cooperative Education 0805-299	0
Physical Education (Wellness Component)	0

Second Year

Introduction to UNIX 0805-220	3
Networking I 0805-224	3
Networking II 0805-225	3
Networking III 0805-226	3
Programming I 0805-230	3
Programming II 0805-231	3
Internet Technologies II 0805-252	3
Technical Elective †	6
Employment Seminar 0806-201	1
Social Science	6
English (Level C or above)	4
Deaf Studies/ASL ‡	(3)
Science (Level B)	3
Cooperative Education 0805-299	0
Physical Education (Activity Course)	0

Third Year

Database Elective 0805 §	3
Technical Elective †	3
Capstone Seminar 0882-295	3
Humanities	6
Total Quarter Credit Hours	103"

* The following courses cannot be used as a math elective: 0884-100 Introduction to College Mathematics; 0884-120 Preparation for Algebra,

† Student may select from ACT department electives or approved electives from: business occupations, electronic publishing, printing technology, or imaging technology departments.

‡ This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

§ Student must select Microcomputer Database Software (0805-310) or Database Systems (0805-325).

AAS Degree Program—Computer Support Option

Positions for which graduates qualify

Computer operator, trainee or network technician and personal computer specialist

Prerequisites

Successful completion of a sampling experience in the applied computer technology area, either through the Summer Vestibule Program or equivalent Career Exploration course

English—AAS: Placement into the College of Liberal Arts Writing and Literature I course. Students typically enter the Writing and Literature I course with reading scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading scores equivalent to 9.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

Applied computer technology, AAS degree, typical course sequence

First Year	Quarter	Credit	Hours
Applications Software	0805-201		3
Introduction to Midrange			
Computer Operations	0805-205		3
Command Language/Utilities for			
Midrange Computers	0805-206		3
Multiprogramming & Spooling for			
Midrange Computers	805-207		3
PC Operating Systems	0805-215		3
PC Hardware I	0805-216		3
PC Hardware II	0805-217		3
Internet Technologies I	0805-251		3
Orientation to Business	0804-101		3
Foundations of Algebra	0884-180		4
Mathematics Elective (Level B or above) *			4
Freshman Seminar	0887-200		2
Job Search Process	0806-101		2
Liberal Arts (College of Liberal Arts)			8
Cooperative Education	0805-299		0
Physical Education (Wellness Component)			0
Second Year			
Introduction to UNIX	0805-220		3
Networking I	0805-224		3
Networking II	0805-225		3
Networking III	0805-226		3
Programming I	0805-230		3
Programming II	0805-231		3
Internet Technologies II	0805-252		3
Technical Elective †			6
Employment Seminar	0806-201		1
Liberal Arts (College of Liberal Arts)			8
Deaf Studies/ASL			3
Science (Level B)			3
Mathematics Elective (Level B or above) *			4
Cooperative Education	0805-299		0
Physical Education (Activity Course)			0
Third Year			
Database Elective	0805 ‡		3
Technical Elective †			3
Capstone Seminar	0882-296		4
Humanities			4
Total Quarter Credit Hours			107

* The following courses cannot be used as a math elective: 0884-100 Introduction to College Mathematics; 0884-120 Preparation for Algebra; 0884-150 Concepts of Measurement and 0884-155 Mathematics Applications for the Business Technologies.

† Student may select from ACT department electives or approved electives from other NTID or CAST departments.

‡ Student must select Microcomputer Database Software (0805-310) or Database Systems (0805-325).

AOS Degree Program—Industrial Computer Electronics Option

Positions for which graduates qualify

Computer operator, trainee or network technician and personal computer specialist in an industrial/manufacturing environment

Prerequisites

Successful completion of a sampling experience in the applied computer technology area, either through the Summer Vestibule Program or equivalent Career Exploration course

English—AOS: Placement into level C English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees typically enter with reading scores equivalent to 8.0 on the California Reading Test.

Mathematics: Placement into Applications of Algebra (0884-210) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into any level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

Applied computer technology, AOS degree, typical course sequence

First Year	Quarter	Credit	Hours
Applications Software	0805-201		3
Applied Circuits I	0805-212		4
Applied Circuits II	0805-213		3
Fundamentals of Digital Logic	0805-240		3
PC Operating Systems	0805-215		3
PC Hardware I	0805-216		3
PC Hardware II	0805-217		3
Internet Technologies I	0805-251		3
Fundamentals of Electronics	0805-245		3
Integrated Algebra	0884-212		4
Mathematics Elective (Level B or above) *			4
Freshman Seminar	0887-200		2
Job Search Process	0806-101		2
English (Level C or above)			8
Cooperative Education	0805-299		0
Physical Education (Wellness Component)			0
Second Year			
Introduction to UNIX	0805-220		3
Networking I	0805-224		3
Networking II	0805-225		3
Networking III	0805-226		3
Programming I	0805-230		3
Programming II	0805-231		3
Microprocessor I	0805-330		3
Technical Elective †			6
Employment Seminar	0806-330		1
Social Science			6
English (Level C or above)			4
Deaf Studies/ASL ‡			(3)
Science (Level B)			3
Cooperative Education	0805-299		0
Physical Education (Activity Course)			0
Third Year			
Electronics Elective	0805 §		3
Technical Elective †			3
Capstone Seminar	0882-295		3
Humanities			6
Total Quarter Credit Hours			104

* The following courses cannot be used as a math elective: 0884-100 Introduction to College Mathematics; 0884-120 Preparation for Algebra,

† Student may select from ACT department electives or approved electives from: business occupations, electronic publishing & printing technology, or imaging technology departments.

‡ This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

§ Student must select Microprocessor II (0805-331) or Industrial Controls (0805-355).

AAS Degree Program—Industrial Computer Electronics Option

Positions for which graduates qualify

Computer operator, trainee or network technician and personal computer specialist in an industrial/manufacturing environment

Prerequisites

Successful completion of a sampling experience in the applied computer technology area, either through the Summer Vestibule Program or equivalent Career Exploration course

English—AAS: Placement into the College of Liberal Arts Writing and Literature I course. Students typically enter the Writing and Literature I course with reading scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading scores equivalent to 9.0 on the California Reading Test.

Mathematics: Placement into Applications of Algebra (0884-210) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

Applied computer technology, AAS degree, typical course sequence

First Year	Quarter Credit Hours
Applications Software 0805-201	3
Applied Circuits I 0805-212	4
Applied Circuits II 0805-213	3
Fundamentals of Digital Logic 0805-240	3
PC Operating Systems 0805-215	3
PC Hardware I 0805-216	3
PC Hardware II 0805-217	3
Internet Technologies I 0805-251	3
Fundamentals of Electronics 0805-245	3
Integrated Algebra 0884-212	4
Mathematics Elective (Level B or above) *	4
Freshman Seminar 0887-200	2
Job Search Process 0806-101	2
Liberal Arts (College of Liberal Arts)	8
Cooperative Education 0805-299	0
Physical Education (Wellness Component)	0
Second Year	
Introduction to UNIX 0805-220	3
Networking I 0805-224	3
Networking II 0805-225	3
Networking III 0805-226	3
Programming I 0805-230	3
Programming II 0805-231	3
Microprocessor I 0805-330	3
Technical Elective †	6
Employment Seminar 0806-201	1
Liberal Arts (College of Liberal Arts)	8
Deaf Studies/ASL	3
Science (Level B)	3
Mathematics Elective (Level B or above) *	4
Cooperative Education 0805-299	0
Physical Education (Activity Course)	0
Third Year	
Electronics Elective 0805 ‡	3
Technical Elective †	3
Capstone Seminar 0882-296	4
Humanities	4
Total Quarter Credit Hours	108

* The following courses cannot be used as a math elective: 0884-100 Introduction to College Mathematics; 0884-120 Preparation for Algebra; 0884-150 Concepts of Measurement; and 0884-155 Mathematics Applications for the Business Technologies

† Student may select from ACT department electives or approved electives from other NTID or CAST departments.

‡ Student must select Microprocessor II (0805-331) or Industrial Controls (0805-355).

Art and Computer Design

John W. Cox, Chairperson

Becoming a professional artist requires various kinds of computer-based and traditional art skills. The art and computer design department offers programs for students who wish to develop these skills and enter the field directly or continue on for further studies.

Introductory courses

Several introductory courses are available each quarter for students who have not yet matriculated in the art and computer design major (as well as for students in the major). Students can take these courses as part of the process of selecting a major, and all credits count toward degree requirements in art and computer design.

First-year courses

Major courses in the first year provide basic skills in both computer-based and traditional media. These courses prepare the student for either advanced courses in art and computer design or continued study toward a bachelor's degree in the College of Imaging Arts and Sciences.

Work experience

All NTID art and computer design students gain work experience through a required one-quarter external co-op. In addition, two advanced courses provide experience in completing real work assignments for various on-campus and off-campus clients.

AOS and AAS degree programs

NTID art and computer design programs prepare students for careers in the art field. Students may choose from AOS or AAS programs. The AOS degree is designed for students who wish to pursue employment after graduation. The AAS degree is for students who intend to continue their education toward a bachelor's degree in art.

In addition, students may take courses in related fields such as computer technology, imaging, and publishing.

On-the-job responsibilities

Graduates use computer-based and traditional methods to produce drawings, layouts and production art for advertising, sales promotion, public relations, and corporate communications; create visual materials for brochures, pamphlets, instructional media, magazines, newspapers, newsletters, and posters; prepare artwork for printing; use computer hardware and software and other art studio equipment.

Places of employment

Graduates usually find employment in computer graphics studios; advertising agencies; commercial art studios; newspapers; manufacturing, printing, and publishing firms; educational institutions; and government agencies.

Positions for which graduates qualify

Computer graphics artist, desktop publishing artist, layout artist, and production artist are typical job titles.

Prerequisites

Successful completion of a sampling experience in art, either through the Summer Vestibule Program or the Career Exploration course, offered during the academic year. Through this sampling experience, students must demonstrate basic skills in the following areas: program/career information, freehand drawing, design, and layout. Students' work is assessed by faculty members using a skill checklist.

English—AOS: Placement into level C English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees typically enter with reading scores equivalent to 8.0 on the California Reading Test.

English—AAS: Placement into College of Liberal Arts Writing and Literature I course. Students typically enter the Writing and Literature I course with reading scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading scores equivalent to 9.0 on the California Reading Test.

Mathematics: Placement into Concepts of Measurement (0884-150). Typically, students entering this program will have completed at least two years of high school mathematics.

Science: Placement into level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

Art and computer design, AOS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Visual Idea Development 0825-105	2
Concepts of Computer Graphics 0825-109	1
Bit-Map Graphics 0825-110	2
Freshman Seminar 0887-200	2
Perspective Drawing 0825-204	2
Figure Drawing 0825-206	2
Drawing Composition 0825-208	2
Vector Graphics 0825-210	2
Basic Design 0825-211	2
Color in Design 0825-212	2
Design for Graphics 0825-213	2
Basic Typography 0825-221	2
Electronic Layout Programs 0825-230	2
Mathematics (Level B) *	3
English (Level C or above)	12
Science (Level B)	3
<i>Second Year</i>	
Job Search Process 0806-101	2
Graphics for Communication 0825-301	3
Digital Illustration 0825-310	2
Art History I, II 0825-315,316	6
History of Graphic Design 0825-317	3
Type in Design 0825-321	2
Introduction to Print Design 0825-324	2
Basic Production 0825-322	2
Introduction to Web Design 0825-344	2
Concentrations: choose one	
Print Design	
Grid Systems 0825-326	2
Identity Systems Design 0825-327	3
Multi-page Design 0825-328	3
Production for Designers 0825-329	2
Web Design	
Creating Web Graphics 0825-346	2
Internet Technologies I, II 0805-251,252	6
Designing Web Sites 0825-347	2
Cooperative Education 0825-299	0
Graphics Studio 0825-351	4
Open Electives †	2
Science (Level B)	3
Deaf Studies/ASL I	(3)
Social Science	6
Physical Education (Activity Course)	0
Physical Education (Wellness Component)	0
Humanities	3

<i>Third Year</i>		
Employment Seminar 0806-201		1
Portfolio Presentation 0825-352		4
Open Electives †		2
Capstone 0882-295		3
Humanities		3
Total Quarter Credit Hours		105

* Satisfied by Concepts of Measurement (0884-150)
 † Concentration plus electives must total 12 quarter credit hours
 ‡ This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

Art and computer design, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Visual Idea Development 0825-105	2
Concepts of Computer Graphics 0825-109	1
Bit-Map Graphics 0825-110	2
Freshman Seminar 0887-200	2
Perspective Drawing 0825-204	2
Figure Drawing 0825-206	2
Drawing Composition 0825-208	2
Vector Graphics 0825-210	2
Basic Design 0825-211	2
Color in Design 0825-212	2
Design for Graphics 0825-213	2
Basic Typography 0825-221	2
Electronic Layout Programs 0825-230	2
Mathematics (Level B) *	3
Liberal Arts (College of Liberal Arts)	8
Science (Level B)	3
<i>Second Year</i>	
Job Search Process 0806-101	2
Graphics for Communication 0825-301	3
Digital Illustration 0825-310	2
Art History I, II 0825-315,316	6
History of Graphic Design 0825-317	3
Type in Design 0825-321	2
Introduction to Print Design 0825-324	2
Basic Production 0825-322	2
Introduction to Web Design 0825-344	2
Concentrations (choose one)	
Print Design	
Grid Systems 0825-326	2
Identity Systems Design 0825-327	3
Multi-page Design 0825-328	3
Production for Designers 0825-329	2
Web Design	
Creating Web Graphics 0825-346	2
Internet Technologies I, II 0805-251,252	6
Designing Web Sites 0825-347	2
Cooperative Education 0825-299	0
Graphics Studio 0825-351	4
Open Electives †	2
Deaf Studies/ASL	3
Liberal Arts (College of Liberal Arts)	12
Physical Education (Activity Course)	0
Physical Education (Wellness Component)	0
<i>Third Year</i>	
Employment Seminar 0806-201	1
Portfolio Presentation 0825-352	4
Capstone Seminar 0882-296	4
Open Electives †	2
<hr/>	
Total Quarter Credit Hours	105

* Satisfied by Concepts of Measurement (0884-150)
 † Concentration plus electives must total 12 quarter credit hours

Business Careers

William). Rudnicki, Chairperson

Employment opportunities in business and industry increase daily. Business careers programs respond to industry's need for people skilled in operating office equipment, maintaining financial records, performing administrative duties and using computers.

Students may choose the AOS program in business technology, the diploma and AAS degree programs in accounting technology and/or administrative support technology, and the AS in business transfer program.

AS Degree in Business (Transfer) Program

The associate of science (AS) degree in business is a two-year degree program to prepare deaf and hard-of-hearing students to enter and successfully complete a baccalaureate program in RIT's College of Business. The College of Business offers a portfolio of comprehensive programs of study designed to prepare students for leadership in the business environment and is accredited by the AACSB International (Association to Advance Collegiate Schools of Business), the premier accrediting organization for business schools.

As a transfer program, specifically designed to articulate with RIT's College of Business, NTID's AS degree maximizes the number of credits a student may transfer toward a baccalaureate degree within the College of Business. Majors offered by the College of Business include accounting, finance, international business, management, management information systems, marketing and photographic marketing management.

Prerequisites

ACT composite test score of 16 and above.

English: Placement into Writing and Literature I (0504-225). Students who qualify for Written Communication II (0502-111) will be considered for admission if they are at level D or higher in mathematics.

Mathematics: Placement into level C mathematics course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into any level D science course numbered 0885-250 or higher. Typically, students entering this program will have completed at least two years of high school science.

Transfer requirements

To transfer to RIT's College of Business, the student must present a grade point average of 2.5 or higher upon graduation with the AS business degree.

Business, AS degree, typical course sequence

First Year	Quarter	Credit	Hours
Applications of Algebra*	0884-210		4
Science (Level D or above)	0884-250		4
Orientation to Business	0804-101		3
Freshman Seminar	0853-200		2
Writing and Literature I, II	0504-225,226		8
Explorations in College Algebra	0884-260		4
Financial Accounting I, II	0801-211,212		8
Fundamentals of Management	0804-284		3
Algebra for Management Science	1016-225		4
Business Software Applications	0112-270		2
Second Year			
Liberal Arts: Humanities (History)	0507-XXX		4
Calculus for Management Science	1016-226		4
Cost Accounting I, II	0801-252,253		8
Laboratory Science I	10XX-XXX		4
Effective Communications	0102-225		2
Liberal Arts: Fine Arts	0505-XXX		4
Principles of Economics, I, II†	0511-301,401		8
Survey of MIS	0112-315		4
Liberal Arts: Social Science			4
Fundamentals of Marketing	0804-286		3
Liberal Arts: Philosophy or Science, Technology and Values			4
Physical Education (Wellness Component)			0
Physical Education (Activity Course)			0
Total Quarter Credit Hours			91~

* Entering students who have the math proficiency to waive this course may take Explorations in College Algebra (0884-260)

f Principles of Economics I is a social science course in the College of Liberal Arts. However, for students in the College of Business, it is a required professional course. Therefore, graduates of this AS program who transfer to RIT's College of Business will be required to take an additional College of Liberal Arts lower division social science course to fulfill College of Liberal Arts core distribution requirements. Principles of Economics I will be allocated to the business core in the College of Business.

‡ Principles of Economics II is a professional course in the College of Business and is not allocated to the College of Liberal Arts distribution requirements.

Accounting Technology

This program offers a diploma and an AAS degree and prepares students for entry-level employment in accounting-related occupations. Students learn the functions of the complete accounting cycle for service, merchandising, and manufacturing businesses.

On-the-job responsibilities

Use computers to maintain and reconcile various financial records, verify business records, and perform other clerical and administrative duties.

Places of employment

Business, industry, government, and self-employment

Diploma Program

Positions for which graduates qualify

Accounts receivable/payable clerk, payroll clerk, general office clerk, file clerk, recordkeeping clerk, and data-entry clerk

Prerequisites

English – Diploma: Placement into level B English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing a diploma typically enter with reading scores equivalent to 7.0 on the California Reading Test.

Mathematics: Mathematics Applications for Business Technology required. Typically, students entering this program will have completed at least two years of high school mathematics.

Science: Placement into any level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

Accounting technology, diploma, typical course sequence

<i>First year</i>	<i>Quarter Credit Hours</i>
Principles of Accounting I, II 0801-201,-202	8
Orientation to Business 0804-101	3
Business English 0804-110	3
Keyboarding 0804-111	2
OAS Formatting 0804-112	2
OAS Document Production I 0804-113	4
Records Management/Business Calculations 0804-211	3
Payroll/Spreadsheet Applications 0804-212	3
Mathematics requirement *	3
Freshman Seminar 0887-200	2
English (Level B or above)	8
Science (Level B)	3
<i>Second Year</i>	
Principles of Accounting III 0801-203	4
OAS Document Production II 0804-221	4
Fundamentals of Management 0804-284	3
Employment Seminar 0806-201	1
Law & Society 0882-242	3
OR	
Marketing 0804-286	
Humanities	3
Social Science	3
Deaf Studies/ASL †	(3)
English (Level B or above)	4
Job Search Process 0806-101	2
Cooperative Education 0801-299	0
Total Quarter Credit Hours	71

* *Mathematics Applications for Business Technology (0884-155) is required.*

† *This requirement also fulfills three credits in either humanities or social sciences, depending on which discipline offers the course selected.*

AAS Degree Program

Positions for which graduates qualify

Junior accounting technician, cost accounting clerk, accounts receivable/payable clerk, payroll clerk, general accounting clerk, and microcomputer accounting clerk

Prerequisites

English—AAS: Placement into the College of Liberal Arts Writing & Literature I course. Students typically enter the Writing and Literature I course with reading scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading scores equivalent to 9.0 on the California Reading Test.

Mathematics: Mathematics Applications for Business Technology required. Typically, students entering this program will have completed at least two years of high school mathematics.

Science: Placement into any level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

Accounting technology, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Principles of Accounting I, n 0801-201,-202	8
Orientation to Business 0804-101	3
Business English 0804-110	3
Keyboarding 0804-111	2
OAS Formatting 0804-112	2
OAS Document Production I 0804-113	4
Records Management/Business Calculations 0804-211	3
Payroll/Spreadsheet Applications 0804-212	3
Fundamentals of Marketing 0804-286	3
Mathematics requirement *	7
Freshman Seminar 0887-200	2
Deaf Studies/ASL	3
Liberal Arts (College of Liberal Arts)	12
Science (Level B)	3
Physical Education (Wellness Component)	0

Second Year

Principles of Accounting III 0801-203	4
Cost Accounting I, II † 0801-252, -253	8
OAS Document Production II 0804-221	4
Fundamentals of Management 0804-284	3
Liberal Arts (College of Liberal Arts)	8
Capstone Seminar 0882-296	4
Economics I, II 0801-231, -232	6
Job Search Process 0806-101	2
Principles of Accounting IV 0801-204	4
Applied Accounting Techniques 0801-260	2
Law & Society 0882-242	3
Employment Seminar 0806-201	1
Cooperative Education 0801-299	0
Physical Education (Activity Course)	0
Total Quarter Credit Hours	107

* *Mathematics Applications for Business Technology (0884-155) and a mathematics elective at a level B or higher is required.*

Administrative Support Technology

This program offers a diploma and an AAS degree. It provides students with opportunities for developing skills needed in processing information using a variety of integrated office software applications and developing appropriate professional interpersonal and human relations skills.

On-the-job responsibilities

Input, manipulate and retrieve data; use interactive office software, electronic mail and information processing skills for applications such as word processing, spreadsheet presentation and database; and performing other office duties.

Places of employment

Business, industry, government and schools

Diploma Program

Positions for which graduates qualify

General office clerk, accounts receivable/payable clerk, records management clerk, and payroll records clerk

Prerequisites

English—Diploma: Placement into level B English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing a diploma typically enter this degree program with reading test scores equivalent to 7.0 on the California Reading Test.

Mathematics: Mathematics Applications for Business Technology required. Typically, students entering this program will have completed at least two years of high school mathematics.

Science: Placement into any level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

Administrative support technology, diploma, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Orientation to Business 0804-101	3
Business English 0804-110	3
Keyboarding 0804-111	2
OAS Formatting 0804-112	2
OAS Document Production I 0804-113	4
OAS Document Production II 0804-221	4
Administrative Support Technology Seminar 0804-230	3
Records Management/Business Calculations 0804-211	3
Payroll/Spreadsheet Applications 0804-212	3
Mathematics Elective (Level B or above) *	3
Freshman Seminar 0887-200	2
English (Level B or above)	12
Deaf Studies/ASL †	(3)

<i>Second Year</i>	
Principles of Accounting I, II 0801-201,202	8
Internet Technologies I 0805-251	3
Fundamentals of Management 0804-284	3
Applied Business Techniques 0804-291	2
Advanced Applications for Word Processing 0804-302	4
Job Search Process 0806-101	2
Employment Seminar 0806-202	1
Business Elective †	3/4
Humanities	3
Social Science	3
Science (Level B)	3
Cooperative Education 0804-299	0
Total Quarter Credit Hours	79/80

* Satisfied by Foundations of Algebra (0884-180) or Mathematics Applications for Business Technology (0884-155).

† Satisfied by Marketing (0804-286), Business Graphics (0804-303), Database Applications (0804-304)

‡ This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

AAS Degree Program

Positions for which graduates qualify

Administrative assistant, office assistant, word processor, and secretary

Prerequisites

English—AAS: Placement into the College of Liberal Arts Writing and Literature I course. Students typically enter the Writing and Literature I course with reading scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading scores equivalent to 9.0 on the California Reading Test.

Mathematics: Mathematics Applications for Business Technology required. Typically, students entering this program will have completed at least two years of high school mathematics.

Science: Placement into any level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

Administrative support technology, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit</i>	<i>Hours</i>
Orientation to Business 0804-101	3	3
Business English 0804-110	3	3
Keyboarding 0804-111	2	2
OAS Formatting 0804-112	2	2
OAS Document Production I 0804-113	4	4
OAS Document Production II 0804-221	4	4
Records Management/Business Calculations 0804-211	3	3
Payroll/Spreadsheet Applications 0804-212	3	3
Fundamentals of Marketing 0804-286	3	3
Mathematics Elective *	3	2
Freshman Seminar 0887-200	2	12
Liberal Arts (College of Liberal Arts)	12	3
Deaf Studies/ASL	3	0
Physical Education (Wellness Component)	0	

<i>Second Year</i>	
Principles of Accounting I, II 0801-201, 202	8
Internet Technologies I 0805-251	3
Administrative Support Technology Seminar 0804-230	3
Fundamentals of Management 0804-284	3
Advanced Applications for Word Processing 0804-302	4
Business Graphics 0804-303	4
Database Applications for Business 0804-304	4
Liberal Arts	4
Capstone 0882-296	4
Applied Business Techniques 0804-291	2
Desktop Publishing Concepts & Applications 0804-310	3
Job Search Process 0806-101	2
Law & Society 0882-242	3
Liberal Arts (College of Liberal Arts)	4
Communication Studies Elective	3
Science (Level B)	3
Cooperative Education 0804-299	0
Physical Education (Activity Course)	0
Total Quarter Credit Hours	104

* Satisfied by Foundations of Algebra (0884-180) or Mathematics Applications for Business Technology (0884-155).

Business Technology AOS Degree Program

This AOS degree program includes technical course work in accounting, computers, payroll, general office skills and word processing/information processing skills. Students elect to complete a sequence of courses that provide either an accounting technology or administrative support technology concentration.

This is a nontransfer occupational program with primary emphasis on preparation for immediate employment.

Places of employment

Business, industry, government, and schools

On-the-job responsibilities

Input, manipulate, and retrieve data; use interactive software, electronic mail, and information processing skills; use computers to maintain and reconcile various financial records

Positions for which graduates qualify

General office clerk, accounts receivable/payable clerk, payroll records clerk, word processing technician, cost accounting clerk, and microcomputer accounting clerk

Prerequisites

English—AOS: Placement into level C English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees typically enter with reading scores equivalent to 8.0 on the California Reading Test.

Mathematics: Mathematics Applications for Business Technology required. Typically, students entering this program will have completed at least two years of high school mathematics.

Science: Placement into any level B science course numbered 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

"Admission to these programs has been suspended for the 2003-04 academic year."

Business technology, AOS degree, typical course sequence

First year	Quarter	Credit	Hours
Principles of Accounting I, n	0801-201,-202		8
Orientation to Business	0804-101		3
Business English	0804-110		3
Keyboarding	0804-111		2
OAS Formatting	0804-112		2
OAS Document Production I	0804-113		4
Records Management/Business Calculations	0804-211		3
Payroll/Spreadsheet Applications	0804-212		3
Mathematics requirement *			3
Freshman Seminar	0887-200		2
English (Level C or above)			12
Physical Education (Wellness Component)			0
Second Year			
Principles of Accounting III	0801-203		4
Cost Accounting I, II †	0801-252,253		8
or			
Database Applications for Business ‡	0804-304		4
and			
Administrative Support Technology Seminar ‡	0804-230		3
OAS Document Production II	0804-221		4
Fundamentals of Management	0804-284		3
Fundamentals of Marketing	0804-286		3
Advanced Applications for Word Processing	0804-302		4
Business Graphics	0804-303		4
Humanities			6
Science (Level B)			3
Social Science			6
Job Search Process	0806-101		2
Deaf Studies/ASL §			(3)
Cooperative Education	0804-299		0
Physical Education (Activity Course)			0
Third Year			
Applied Accounting Techniquet	0801-260		2
or			
Desktop Publishing Concepts & Applications ‡	0801-310		3
Applied Business Techniques	0804-291		2
Capstone Seminar	0882-295		3
Employment Seminar	0806-201		1
Law & Society	0882-242		3
Total Quarter Credit Hours			103

* Mathematics Applications for Business Technology (0884-155) is required.

† Courses required for accounting technology option

‡ Courses required for administrative support technology option

§ This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

Healthcare Billing and Coding Technology**

William J. Rudnicki, Chairperson

Students interested in science, allied health, and medical office procedures may combine these interests and prepare for a career in healthcare billing and coding.

Healthcare billing and coding technologists work with patient information to perform such medical office tasks as third-party billing, word and data processing, and basic medical information coding, as well as other computer application tasks.

Students may choose from diploma and AOS degree programs. Technical courses for the first four quarters are the same for diploma and associate degree options.

The healthcare billing and coding technology programs include one cooperative work experience for the diploma level and two cooperative work experiences for the associate degrees. Cooperative work experience is usually taken in the student's home areas, and it is the student's responsibility to obtain transportation to the practice sites.

Diploma Program**

On-the-job responsibilities

Analyze and use patient information to prepare billing and insurance claims following established procedures. Workers perform routine medical office tasks utilizing skills in computer database and word processing applications.

Places of employment

Physician and dentist offices, medical group practices, acute and long-term care agencies, healthcare billing departments, and insurance companies.

Graduates qualify for positions requiring these skills: medical terminology, keyboarding, patient information analysis, word and data processing, billing procedures, and insurance claim preparation.

Prerequisites

Fundamentals of Human Biology I and II (0885-161,162)

Medical Word Analysis (0820-105)

English – Diploma: Students successfully completing a diploma typically enter with reading scores equivalent to 7.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Completion of Human Biology I and II (0885-161, 162) or direct placement into Medical Terms with Human Anatomy I (0820-211). Typically, students entering this major will have completed at least two years of high school science, including biology.

Successful completion of a sampling experience in healthcare billing and coding, either through the Summer Vestibule Program or first-year programming.

** Admission to these programs has been suspended for the 2004-2005 academic year.

Healthcare billing and coding technology, diploma, typical course sequence

AOS Degree Program**

On-the-job responsibilities

Analyze and use patient information to prepare billing and insurance claims, perform tasks in ambulatory care coding and outpatient reimbursement procedures. Graduates of the AOS program perform cancer registry procedures using established protocols.

Places of employment

Physician and dentist offices, medical group practices, acute and long-term care agencies, ambulatory-care centers, local/regional/state tumor registries, healthcare billing departments, and insurance companies.

Graduates qualify for positions requiring these skills: medical terminology, keyboarding, patient information analysis, word and data processing, billing procedures, insurance claim preparation, ambulatory care coding, and tumor registry.

Prerequisites

Fundamentals of Human Biology I and II (0885-161,162)
Medical Word Analysis (0820-105)

English – AOS: Placement into level C English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees, typically enter with reading scores equivalent to 8.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Completion of Human Biology I and II (0885-161, 162) or direct placement into Medical Terms with Human Anatomy I (0820-211). Typically, students entering this major will have completed at least two years of high school science, including biology.

Successful completion of a sampling experience in healthcare billing and coding either through the Summer Vestibule Program or first-year programming.

Healthcare billing and coding technology, AOS degree, typical course sequence

Second Year

Orientation to Business 0804-101	3
Medical Terms with Human Anatomy IV 0820-214	4
English (Level C or above)	4
Social Science	6
Deaf Studies/ASL †	(3)
Ambulatory Disease/Surgery Process 0820-250	4
Ambulatory Care Coding 0820-251	4
Cancer Registry I, II 0820-261,262	8
Outpatient Reimbursement 0820-270	4
Humanities	3
Physical Education (Activity Course)	0
Capstone Seminar 0882-295	3
Cooperative Education II 0820-299	0
Employment Seminar 0806-201	1

Total Quarter Credit Hours

94

* Satisfies science requirement

† This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

‡ This requirement is satisfied by Communication Technologies (0880-160)

Digital Imaging and Publishing Technology

Jean-Guy Naud, Chairperson

People who work in digital imaging and publishing careers produce the millions of photographic, print and digital media products used every day by individuals and businesses. Digital technology enables data, text and graphics to meet the demand for publishing through a wide variety of information dissemination and communication strategies, including printed pages, Web pages and CD-ROMs. This program can get you ready for an exciting and challenging career in the nation's second largest and fastest growing manufacturing industry.

Diploma, AOS and AAS degree programs

Students may choose from diploma, AOS or AAS degree programs. All three options in digital imaging and publishing technology require students to complete a common core of courses that provide the necessary foundation for careers in the imaging and publishing industry. Students in the AOS and AAS degree programs will complete at least one career concentration: print publishing and prepress, image production, print output production and Web production. Technical elective courses may be taken from DI&PT concentrations and from other related NTID technical programs. Significant program flexibility is available for each student to elect courses based on career interest and aptitude. A 10-week cooperative work experience is required for students in the AOS and AAS degree programs.

Students who qualify for the AAS degree program may elect specific mathematics and science courses and technical courses from related bachelor's degree programs, as available per enrollment guidelines, in preparation for application to the related bachelor's degree programs.

On-the-job responsibilities

Depending on specific career preparation and placement, students will produce and prepare documents, illustrations, and photographic images for print reproduction, digital display, and digital distribution; produce presentation graphics; produce special-effects images for film and digital formats; perform digital retouching and restoration of photographic images; produce composite digital images; operate a variety of analog and digital video equipment to edit and produce programs; operate a variety of prepress proofing and plate-making systems; operate digital printing systems; operate offset printing presses; operate simple bindery and finishing equipment; operate paper processors; produce images on a variety of photographic materials; use a variety of quality control procedures to monitor image production, processing, and printing.

Places of employment

Graduates of the DI&PT program will have employment opportunities in commercial, corporate, and government settings. They may work in commercial printing plants, prepress and color trade shop companies, in-plant printing departments, book and magazine publishers, newspaper facilities, government printing facilities, custom or commercial photographic labs, in-house industrial photographic labs, industrial training or media departments, imaging production houses, or school or university media centers.

Positions for which graduates qualify

Technician in digital image capture and image preparation, digital prepress, film processing, media production, presentation graphics, or basic video production; photographic laboratory technician, custom copy technician, custom color printer, custom color print inspector/evaluator; operator of digital printing systems, offset lithographic printing press

Prerequisites

Successful completion of an orientation/sampling experience offered during the Summer Vestibule Program and also during the academic year. The sampling activities provide opportunities for students to learn about the digital imaging and publishing industry, identify career opportunities, and evaluate their interest and aptitude for the imaging and publishing field.

English – Diploma: Placement into level B English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing a diploma typically enter with reading test scores equivalent to 7.0 on the California Reading Test.

English – AOS: Placement into level C English or higher (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees typically enter with reading test scores equivalent to 8.0 on the California Reading Test.

English – AAS: Placement into the College of Liberal Arts Writing and Literature I course. Students typically enter the Writing and Literature I course with reading test scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading test scores equivalent to 9.0 on the California Reading Test.

Mathematics: Placement into Concepts of Measurement (0884-150). Typically, students entering this program will have completed at least two years of high school mathematics.

Science: Placement into level B science course numbers 150 or higher. Typically, students entering this program will have completed at least two years of high school mathematics.

Digital imaging and publishing technology, diploma, typical course sequence

	Quarter	Credit	Hours
<i>First Year</i>			
Digital Design & Typography	0878-210		3
Fund, of Image Acquisition	0878-215		3
Fund, of Image Manipulation	0878-220		3
Fund, of Vector Graph Illustration	0878-225		3
Fund, of Desktop Publishing	0878-230		3
Fund, of Digital Media Publishing	0878-235		3
Fund, of Network Publishing	0878-240		3
Fund, of Digital Output	0878-245		3
Color Theory & Practice	0878-250		3
Mathematics* (Level B)			3
Freshman Seminar	0882-100		2
English (Level B or above)			8
Social Science			3
<i>Second Year</i>			
Image Processes & Markets	0878-255		3
DI&PT technical elective courses			12
Production Procedures & Quality Control	0878-361		3
Job Search Process	0806-101		2
Humanities			3
Science (Level B or above)			3
English (Level B or above)			4
Deaf Studies/ASL I			(3)
Total Quarter Credit Hours			73

* Satisfied by Concepts of Measurement (0884-150)

† This requirement also fulfills 3 credits in either Humanities or Social Science, depending on which discipline offers the course selected.

AOS and AAS Degree Options—Digital Imaging and Publishing Technology

Two associate degrees are offered in the digital imaging and publishing technology program. As part of the AOS and AAS degrees, students may select from the following concentrations. These courses are represented in the course mask as DI&PT technical concentration courses in the second and third years. Additionally, two DI&PT technical electives are required for the AOS and AAS degrees.

Print Publishing & Prepress Option

	Quarter	Credit	Hours
Desktop Publishing	0878-300		3
Database Publishing	0878-302		3
Publication Publishing	0878-304		3
Image Acquisition	0878-310		3
Preflight Procedures	0878-330		3
Applied Production I	0878-362		3
Total Quarter Credit Hours			18

Imaging Production Option

	Quarter	Credit	Hours
Image Acquisition	0878-310		3
Image Manipulation	0878-312		3
Composite Imaging	0878-322		3
Image Retouch & Restore	0878-324		3
Imaging Lab Fundamentals	0878-351		3
Imaging Lab	0878-352		3
Total Quarter Credit Hours			18

Print Output Production Option

	Quarter	Credit	Hours
Proofing & Platemaking	0878-341		3
Offset Press I, II	0878-344, 345		6
Digital Printing Systems	0878-346		3
Applied Production I	0878-362		3
ST: DocuTech Operations	0878-398		3
Total Quarter Credit Hours			18

Web Production Option

	<i>Quarter Credit Hours</i>
Database Publishing 0878-302	3
Network Publishing 0878-306	3
Digital Media Production 0878-308	3
Videography 0878-326	3
Digital Media Interactive 0878-328	3
ST: Web Image Preparation 0878-398	3
Total Quarter Credit Hours	18

DI&PT Technical Electives (choose two)

	<i>Quarter Credit Hours</i>
B&W and Color Halftone Production 0878-316	3
Image Assembly: T & I 0878-332	3
Imaging Lab Production 0878-353	3
Advanced Imaging Lab 0878-354	3
Display Imaging 0878-355	3
Copywork 0878-356	3
Applied Production II 0878-363	3
Applied Production III 0878-364	3
ST: Advanced Digital Print Systems 0878-398	3

Digital imaging and publishing technology, AOS degree, typical course sequence

	<i>Quarter Credit Hours</i>
<i>First Year</i>	
Digital Design & Typography 0878-210	3
Fund, of Image Acquisition 0878-215	3
Fund, of Image Manipulation 0878-220	3
Fund, of Vector Graph Illustration 0878-225	3
Fund, of Desktop Publishing 0878-230	3
Fund, of Digital Media Publishing 0878-235	3
Fund, of Network Publishing 0878-240	3
Fund, of Digital Output 0878-245	3
Color Theory & Practice 0878-250	3
Mathematics* (Level B)	3
Freshman Seminar 0882-100	2
English (Level C or above)	12
Social Science	3
Physical Education (Wellness Component)	0
<i>Second Year</i>	
Image Processes & Markets 0878-255	3
PDF Production & Workflow 0878-305	3
Prepare Photographs for Publishing 0878-314	3
Color Management Systems 0878-318	3
DI&PT Technical Concentration Courses	15
DI&PT Technical Electives	3
Production Procedures & Quality Control 0878-361	3
Job Search Process 0806-101	2
Humanities	6
Science (Level B or above)	3
Deaf Studies/ ASL †	(3)
Cooperative Education 0878-299	0
Physical Education (Activity Course)	0
<i>Third Year</i>	
DI&PT Technical Concentration Courses	3
DI&PT Technical Elective	3
Social Science	3
Capstone Seminar 0882-295	3
Employment Seminar 0806-201	1
Total Quarter Credit Hours	104

* Satisfied by Concepts of Measurement (0884-150) or higher level

† This requirement also fulfills 3 credits in either Humanities or Social Science, depending on which discipline offers the course selected.

Digital imaging and publishing technology, AAS degree, typical course sequence

	<i>Quarter Credit Hours</i>
<i>First Year</i>	
Digital Design & Typography 0878-210	3
Fund, of Image Acquisition 0878-215	3
Fund, of Image Manipulation 0878-220	3
Fund, of Vector Graph Illustration 0878-225	3
Fund, of Desktop Publishing 0878-230	3
Fund, of Digital Media Publishing 0878-235	3
Fund, of Network Publishing 0878-240	3
Fund, of Digital Output 0878-245	3
Color Theory & Practice 0878-250	3
Mathematics* (Level B)	3
Freshman Seminar 0882-100	2
Liberal Arts (College of Liberal Arts)	12
Physical Education (Wellness Component)	0
<i>Second Year</i>	
Image Processes & Markets 0878-255	3
PDF Production & Workflow 0878-305	3
Prepare Photographs for Publishing 0878-314	3
Color Management Systems 0878-318	3
DI&PT Technical Concentration Courses	15
DI&PT Technical Electives	3
Production Procedures & Quality Control 0878-361	3
Job Search Process 0806-101	2
Science (Level B or above)	3
Liberal Arts (College of Liberal Arts)	8
Cooperative Education 0878-299	0
Physical Education (Activity Course)	0
<i>Third Year</i>	
DI&PT Technical Concentration Courses	3
DI&PT Technical Elective	3
Deaf Studies/ ASL	3
Capstone Seminar 0882-296	4
Employment Seminar 0806-201	1
Total Quarter Credit Hours	104

* Satisfied by Concepts of Measurement (0884-150) or higher level

Industrial and Science Technologies

Ronald J. Till, Acting Chairperson

Employment opportunities within industrial and science technology fields increase daily. NTID programs respond to industry's need for people with knowledge and skills in the areas of robotics and semiconductor fabrication; computer aided drafting; precision machining; food quality and environmental testing and instrumentation; and ophthalmic optical finishing.

Automation Technologies

The automation technologies (AT) program prepares graduates to function in complex automated system environments. The program promotes skill development in electrical/electronic, mechanical, and computer technologies. Students may choose from either the AOS or AAS degree program. Within each of these two degree options, students build on a set of core skills and choose to concentrate in one of two areas: applied robotics or semiconductor fabrication. Graduates will be particularly well suited to take advantage of growing employment opportunities in these expanding industries.

On-the-job responsibilities

Automation technologies technicians have as their primary responsibility to install, troubleshoot, repair, upgrade, and maintain automated systems and their components.

Places of employment

The program prepares graduates for technical jobs in the robotics and semiconductor industries.

AOS Degree Applied Robotics Option

Positions for which graduates qualify

Robotics technician; semiconductor maintenance technician; semiconductor process technician; automation systems technician; electromechanical technician; instrumentation technician; engineering technician; fluid power controls/system technician; quality control technician; process control technician

Prerequisites

English – AOS: Placement into level C English or above (Nonaction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees typically enter with reading scores equivalent to **8.0** on the California Reading Test.

Mathematics: Placement into Integrated Algebra (0884-212) or Elements of Trigonometry (0884-220) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into Physics I (0885-201) or a higher level course. Typically, students entering this program will have completed at least three years of high school science. High school physics is beneficial.

Automation technologies, AOS degree, applied robotics option, typical course sequence

First Year	Quarter	Credit	Hours
Survey of Automation Technologies 0891-201			3
Applied Circuits 0805-212			4
Vocabulary Development 0860-003			0
Digital Logic 0805-240			3
Pneumatic & Hydraulic Systems 0891-210			3
Electronics 0805-245			3
Electromechanical Devices 0891-214			4
Integrated Algebra 0884-212			4
Elements of Trigonometry 0884-220			4
Physics I 0885-201			4
Freshman Seminar 0887-200			2
Writing ffl 0883-211			4
Non Fiction Reading 0883-210			4
Physical Education (Wellness Component)			0
Job Search 0806-101			2
Physical Education (Activity Course)			0
Second Year			
Automated Systems I, II 0891-220,320			8
Automated Systems Troubleshooting 0891-230			4
Programming Concepts 0891-216			4
Programmable Logic Controllers (PLC) Programming 0891-314			4
Robotics Fundamentals 0891-218			1
Applied Robotics 0891-318			4
Mechanical Devices & Systems 0891-316			3
Industrial Statistics 0884-235			4
Advanced Math 0884-275			4
Advanced Topics in Mechanics 0885-203			4
Deaf Studies/ASL*			(3)
Humanities/Social Science			3
Analyzing Literature 0883-200			4
Cooperative Education 0813-299			0
Third Year			
Automated Systems Troubleshooting 0891-330			4
Capstone AOS 0882-295			3
Humanities/Social Science			9
Total Quarter Credit Hours			107

* This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected

AOS Degree Program— Semiconductor Technology Option

Positions for which graduates qualify

Robotics technician; semiconductor maintenance technician; semiconductor process technician; automation systems technician; electromechanical technician; instrumentation technician; engineering technician; fluid power controls/system technician; quality control technician; process control technician

Prerequisites

English – AOS: Placement into level C English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees typically enter with reading scores equivalent to **8.0** on the California Reading Test.

Mathematics: Placement into Integrated Algebra (0884-212) or Elements of Trigonometry (0884-220) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into Physics I (0885-201) or a higher level course. Typically, students entering this program will have completed at least three years of high school science. High school physics is beneficial.

Automation technologies, AOS degree, semiconductor technology option, typical course sequence

First Year	Quarter	Credit	Hours
Survey of Automation Technologies 0891-201			3
Applied Circuits 0805-212			4
Vocabulary Development 0860-003			0
Digital Logic 0805-240			3
Pneumatic & Hydraulic Systems 0891-210			3
Electronics 0805-245			3
Electromechanical Devices 0891-214			4
Integrated Algebra 0884-212			4
Elements of Trigonometry 0884-220			4
Physics I 0885-201			4
Freshman Seminar 0887-200			2
Writing m 0883-211			4
Non Fiction Reading (0883-201)			4
Physical Education (Wellness Component)			0
Job Search 0806-101			2
Physical Education (Activity Component)			0
Second Year			
Automated Systems I, II 0891-220,320			8
Automated Systems Troubleshooting 0891-230			4
Vacuum and RF 0891-344			3
Programming Concepts 0891-216			4
Robotics Fundamentals 0891-218			1
Industrial Statistics 0884-235			4
Advanced Topics in Mechanics 0885-203			4
Principles of Chemistry I, II 0885-211,212			8
Deaf Studies/ASL *			(3)
Humanities/Social Science			3
Analyzing Literature 0883-200			4
Cooperative Education 0813-299			0
Third Year			
Semiconductor Tooling 0891-350			4
Capstone AOS 0882-295			3
Advanced Math 0884-275			4
Humanities/Social Science			9
Total Quarter Credit Hours			107

* This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

AAS Degree Program—Applied Robotics Option

positions for which graduates qualify

Robotics technician; semiconductor maintenance technician; semiconductor process technician; automation systems technician; electromechanical technician; instrumentation technician; engineering technician; fluid power controls/system technician; quality control technician; process control technician

Prerequisites

English—AAS: Placement into the College of Liberal Arts Writing and Literature I course. Students typically enter the Writing and Literature I course with reading scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading scores equivalent to 9.0 on the California Reading Test.

Mathematics: Placement into Integrated Algebra (0884-212) or Elements of Trigonometry (0884-220) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into Physics I (0885-201) or a higher level course. Typically students entering this program will have completed at least three years of high school science. High school physics is beneficial.

Automation technologies, AAS degree, applied robotics option, typical course sequence

First Year	Quarter Credit Hours
Survey of Automation Technologies 0891-201	3
Applied Circuits 0805-212	4
Vocabulary Development 0860-003	0
Digital Logic 0805-240	3
Pneumatic & Hydraulic Systems 0891-210	3
Electronics 0805-245	3
Electromechanical Devices 0891-214	4
Integrated Algebra 0884-212	4
Elements of Trigonometry 0884-220	4
Physics I 0885-201	4
Freshman Seminar 0887-200	2
Liberal Arts (College of Liberal Arts)	8
Physical Education (Wellness Component)	0
Job Search 0806-101	2
Physical Education (Activity Course)	0
Second Year	
Automated Systems I, II 0891-220, 320	8
Automated Systems Troubleshooting 0891-230	4
Programming Concepts 0891-216	4
Programmable Logic Controllers (PLC) Programming 0891-314	4
Robotics Fundamentals 0891-218	1
Applied Robotics 0891-318	4
Mechanical Devices & Systems 0891-316	3
Industrial Statistics 0884-235	4
Advanced Math 0884-275	4
Advanced Topics in Mechanics 0885-203	4
Deaf Studies/ASL	3
Liberal Arts (College of Liberal Arts)	4
Cooperative Education 0891-299	0
Third Year	
Automated Systems Troubleshooting 0891-330	4
Capstone AAS 0882-296	4
Liberal Arts (College of Liberal Arts)	8
Total Quarter Credit Hours	107

AAS Degree Program—Semiconductor Technology Option

Positions for which graduates qualify

Robotics technician; semiconductor maintenance technician; semiconductor process technician; automation systems technician; electromechanical technician; instrumentation technician; engineering technician; fluid power controls/system technician; quality control technician; process control technician

Prerequisites

English—AAS: Placement into the College of Liberal Arts Writing and Literature I course. Students typically enter the Writing and Literature I course with reading scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading scores equivalent to 9.0 on the California Reading Test.

Mathematics: Placement into Integrated Algebra (0884-212) or Elements of Trigonometry (0884-220) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into Physics I (0885-201) or a higher level course. Typically students entering this program will have completed at least three years of high school science. High school physics is beneficial.

Automation technologies, AAS degree, semiconductor technology option, typical course sequence

First Year	Quarter Credit Hours
Survey of Automation Technologies 0891-201	3
Applied Circuits 0805-212	4
Vocabulary Development 0860-003	0
Digital Logic 0805-240	3
Pneumatic & Hydraulic Systems 0891-210	3
Electronics 0805-245	3
Electromechanical Devices 0891-214	4
Integrated Algebra 0884-212	4
Elements of Trigonometry 0884-220	4
Physics I 0885-201	4
Freshman Seminar 0887-200	2
Liberal Arts (College of Liberal Arts)	8
Physical Education (Wellness Component)	0
Job Search 0806-101	2
Physical Education (Activity Course)	0
Second Year	
Automated Systems I, H 0891-220, 320	8
Automated Systems Troubleshooting 0891-230	4
Programming Concepts 0891-216	4
Robotics Fundamentals 0891-218	1
Vacuum and RF 0891-344	3
Industrial Statistics 0884-235	4
Advanced Topics in Mechanics 0885-203	4
Principles of Chemistry I, II 0885-211,212	8
Deaf Studies/ASL	3
Liberal Arts (College of Liberal Arts)	4
Cooperative Education 0891-299	0
Third Year	
Semiconductor Tooling 0891-350	4
Capstone AAS 0882-296	4
Advanced Math 0884-275	4
Liberal Arts (College of Liberal Arts)	8
Total Quarter Credit Hours	107



NTID students tap into the expertise of faculty with industry experience.

Computer Aided Drafting Technology

People who work in computer aided drafting technology use their skills to create two- and three-dimensional drawings on the computer. These drawings are used to visually describe buildings, bridges, canals, automobiles, airplanes, mechanical parts, and electronic circuit boards. CAD operators (technicians) take an engineer's, architect's, or designer's sketches and produce a set of technical drawings.

Manufacturing option

Students who wish to work in manufacturing settings may choose to enter the manufacturing option in the diploma, AOS, or AAS degree programs. In addition to a strong emphasis on computer aided drafting, this option gives students a background in mathematics, manufacturing systems, tolerance systems, engineering materials and methods, circuit boards, components, and mechanical assembly.

Architecture/engineering/construction (A/E/C) option

Students who wish to work in the architectural, engineering, or construction fields may choose to enter the A/E/C option in the diploma, AOS, or AAS degree program. In addition to a strong emphasis on computer aided drafting, this option gives students a background in mathematics, building systems, construction regulations, site utilities, and materials and methods used in the A/E/C industry.

Diploma Program

On-the-job responsibilities

Graduates will enter businesses and industries that need technical employees with skills in computer aided drafting technology and a broad knowledge of applications and procedures. Graduates will work in manufacturing or A/E/C firms creating engineering CAD drawings.

Places of employment

Manufacturing firms, government agencies, architectural, engineering, and construction firms

Positions for which graduates qualify

CAD drafters/technicians: architectural, highway design, civil, mechanical and electrical (electronic) environments

Prerequisites

English—Diploma: Placement into level B English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing a diploma typically enter with reading scores equivalent to 7.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or Elements of Geometry (0885-170) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into Physics I (0885-201) or a higher level course. Typically, students entering this program will have completed at least three years of high school science. High school physics would be beneficial.

Computer aided drafting technology manufacturing, diploma, typical course sequence

	Quarter Credit Hours
<i>First Year</i>	
CAD I, II 0890-201,202	4
Manufacturing CAD I 0890-215	4
Applications Software 0805-201	3
CADT Seminar 0890-204	3
Manufacturing Measurement Systems 0890-206	2
Foundations of Algebra 0884-180	4
Elements of Geometry 0884-170	4
Trigonometry for Coordinate Analysis I 0884-205	3
Freshman Seminar 0887-200	2
Processes of Science: Physics of Matter 0885-154	3
English (Level B or above)	12
Physical Education (Activity Course)	0
Physical Education (Wellness Component)	0
<i>Second Year</i>	
Manufacturing CAD II 0890-225	4
Electrical CAD 0890-235	4
Cooperative Education 0890-299	0
Geometric Dimensioning & Tolerancing 0890-260	3
Intro, to Manufacturing Materials 0890-270	3
Electrical Components 0890-250	3
Social Science	3
Job Search Process 0806-101	2
Deaf Studies/ASL*	(3)
Humanities	3
Making Formal Presentations 0860-008	0
Communication Technologies 0880-160	3
<i>Total Quarter Credit Hours</i>	72

* This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

Computer aided drafting technology, A/E/C, diploma, typical course sequence

	Quarter Credit Hours
<i>First Year</i>	
CAD I, II 0890-201,202	4
Construction CAD I 0890-210	4
Applications Software 0805-201	3
CADT Seminar 0890-204	3
A/E/C Measurements Systems 0890-208	2
Foundations of Algebra 0884-180	4
Elements of Geometry 0884-170	4
Trigonometry for Coordinate Analysis I 0884-205	4
Freshman Seminar 0887-200	3
Processes of Science: Physics of Matter 0885-154	3
English (Level B or above)	12
Physical Education (Activity Course)	0
Physical Education (Wellness Component)	0
<i>Second Year</i>	
Construction CAD II, III 0890-220,230	8
Construction Materials & Methods I, II 0890-255,265	6
Principles of Structural Systems 0890-275	3
Cooperative Education 0890-299	0
Social Science	3
Job Search Process 0806-101	2
Deaf Studies/ASL *	(3)
Humanities	3
Making Formal Presentations 0860-008	0
Communication Technologies 0880-160	3
<i>Total Quarter Credit Hours</i>	72

* This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

AOS Degree Program

On-the-job responsibilities

Graduates will enter businesses and industries that need technical employees with skills in computer aided drafting technology and a broad knowledge of applications and procedures. Graduates will work in manufacturing or A/E/C firms creating engineering CAD drawings.

Places of employment

Engineering and manufacturing firms, government agencies, architectural and construction firms

Positions for which graduates qualify

CAD drafters/technicians: architectural, highway design, civil, mechanical and electrical (electronic) environments

Prerequisites

Successful completion of a sampling experience either through the Summer Vestibule Program or equivalent Career Exploration course.

English – AOS: Placement into level C English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing an AOS degree typically enter with reading scores equivalent to 8.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into Physics I (0885-201) or a higher level course. Typically, students entering this program will have completed at least three years of high school science. High school physics would be beneficial.

Computer aided drafting technology manufacturing, AOS degree, typical course sequence

First Year	Quarter	Credit	Hours
CAD I, II	0890-201,202		4
Manufacturing CAD I	0890-215		4
Applications Software	0805-201		3
CADT Seminar	0890-204		3
Manufacturing Measurements Systems	0890-206		2
Foundations of Algebra	0884-180		4
Integrated Algebra	0884-212		4
Job Search Process	0806-101		2
Freshman Seminar	0887-200		2
Processes of Science: Physics of Matter	0885-154		3
Physics I	0885-201		4
English (Level C or above)			12
Physical Education (Activity Course)			0
Physical Education (Wellness Component)			0
Second Year			
Manufacturing CAD II	0890-225		4
Electrical CAD	0890-235		4
Electrical/Mechanical CAD Design	0890-315		5
Geometric Dimensioning & Tolerancing	0890-260		3
Intro, to Manufacturing Materials	0890-270		3
Deaf Studies/ASL *		(3)	
Intro, to Material Processes	0890-350		3
Electrical Components	0890-250		3
Humanities			6
Social Science			6
Internet Technologies I	0805-251		3
Making Formal Presentations	0860-008		0
Group Dynamics & Effective Teams	0880-206		3
Elements of Trigonometry	0884-220		4
Cooperative Education	0890-299		0
Third Year			
3-D Solid Modeling	0890-325		5
Internet CAD Applications	0890-360		3
Mechanical Components	0890-370		3
Capstone Seminar	0882-295		3
Total Quarter Credit Hours			108

* This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

Computer aided drafting technology, A/E/C, AOS degree, typical course sequence

First Year	Quarter	Credit	Hours
CAD I, II	0890-201,202		4
Construction CAD I	0890-210		4
Applications Software	0805-201		3
CADT Seminar	0890-204		3
A/E/C Measurement Systems	0890-208		2
Foundations of Algebra	0884-180		4
Integrated Algebra	0884-212		4
Job Search Process	0806-101		2
Freshman Seminar	0887-200		2
Processes of Science: Physics of Matter	0885-154		3
Physics I	0885-201		4
English (Level C or above)			12
Physical Education (Activity Course)			0
Physical Education (Wellness Component)			0
Second Year			
Construction CAD II, III	0890-220,230		8
Construction Materials & Methods I, II	0890-255,265		6
Internet Technologies I	0805-251		3
Principles of Structural Systems	0890-275		3
Presentation Graphics	0890-320		5
Deaf Studies/ASL*		(3)	
Site Utilities, Mechanical/Electrical Systems	0890-355		3
Humanities			6
Social Science			6
Making Formal Presentations	0860-008		0
Group Dynamics & Effective Teams			3
Elements of Trigonometry	0884-220		4
Cooperative Education	0890-299		0
Third Year			
Advanced Construction CAD	0890-310		5
Internet CAD Applications	0890-360		3
Construction Regulations	0890-375		3
Capstone Seminar	0882-295		3
Total Quarter Credit Hours			108

* This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

AAS Degree Program

On-the-job responsibilities

Graduates will enter businesses and industries that need technical employees with skills in computer drafting technology and a broad knowledge of applications and procedures. Graduates will work in manufacturing and A/E/C firms creating engineering CAD drawings.

Places of employment

Manufacturing firms; government agencies; architectural, construction, and engineering firms

Positions for which graduates qualify

CAD drafters/technicians: architectural, highway design, civil, mechanical, and electrical (electronic) environments.

Prerequisites

English – AAS: Placement in the College of Liberal Arts Writing and Literature I course. Students typically enter the Writing and Literature I course with reading scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading scores equivalent to 9.0 on the California Reading Test.

Mathematics: Completion of Foundations of Algebra (0884-180) or placement in Integrated Algebra (0884-212). Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into Physics I (0885-201) or a higher level course. Typically, students entering this program will have completed at least three years of high school science. High school physics would be beneficial.

Computer aided drafting technology A/E/C, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
CAD I, H 0890-201,202	4
Construction CAD I 0890-210	4
Applications Software 0805-201	3
CADT Seminar 0890-204	3
A/E/C Measurement Systems 0890-208	2
Integrated Algebra 0884-212	4
Elements of Trigonometry 0884-220	4
Job Search Process 0806-101	2
Freshman Seminar 0887-200	2
Processes of Science: Physics of Matter 0885-154	3
Physics I 0885-201	4
Writing & Literature I, II 0504-225,226	8
Humanities (College of Liberal Arts)	4
Physical Education (Activity Course)	0
Physical Education (Wellness Component)	0
<i>Second Year</i>	
Construction CAD II, III 0890-220,230	8
Construction Materials & Methods I, II 0890-255,265	6
Internet Technologies I 0805-251	3
Principles of Structural Systems 0890-275	3
Presentation Graphics 0890-320	5
Site Utilities, Mechanical/Electrical Systems 0890-355	3
Making Formal Presentations 0860-008	0
Group Dynamics & Effective Teams	3
Deaf Studies/ASL	3
Social Science (College of Liberal Arts)	8
Advanced Mathematics 0884-275	4
Cooperative Education 0890-299	0
<i>Third Year</i>	
Advanced Construction CAD 0890-310	5
Internet CAD Applications 0890-360	3
Construction Regulations 0890-375	3
Capstone Seminar 0882-296	4
<hr/>	
<i>Total Quarter Credit Hours</i>	108

Computer aided drafting technology manufacturing, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
CAD I, II 0890-201,202	4
Manufacturing CAD I 0890-215	4
Applications Software 0805-201	3
CADT Seminar 0890-204	3
Manufacturing Measurement Systems 0890-206	2
Integrated Algebra 0884-212	4
Elements of Trigonometry 0884-220	4
Job Search Process 0806-101	2
Freshman Seminar 0887-200	2
Processes of Science: Physics of Matter 0885-154	3
Physics I 0885-201	4
Writing & Literature I, II 0504-225,226	8
Humanities (College of Liberal Arts)	4
Physical Education (Activity Course)	0
Physical Education (Wellness Component)	0
<i>Second Year</i>	
Manufacturing CAD II 0890-225	4
Electrical CAD 0890-235	4
Electrical/Mechanical CAD Design 0890-315	5
Geometric Dimensioning & Tolerancing 0890-260	3
Intro, to Manufacturing Materials 0890-270	3
Social Science (College of Liberal Arts)	8
Intro, to Material Processes 0890-350	3
Electrical Components 0890-250	3
Deaf Studies/ASL	3
Internet Technologies I 0805-251	3
Making Formal Presentations 0860-008	0
Group Dynamics & Effective Teams	3
Advanced Mathematics 0884-275	4
Cooperative Education 0890-299	0
<i>Third Year</i>	
3-D Solid Modeling 0890-325	5
Internet CAD Applications 0890-360	3
Mechanical Components 0890-370	3
Capstone Seminar 0882-296	4
<hr/>	
<i>Total Quarter Credit Hours</i>	108

Computer Integrated Machining Technology

Computer integrated machining technology students prepare for employment in precision machining occupations. These include tool and die making, mold making, instrument making and computer-numerical-control machining. Graduates are successfully employed in both large manufacturing corporations and small contract manufacturing shops. In addition, graduates can continue their education in manufacturing and engineering technology programs.

Diploma Program

On-the-job responsibilities

Set up and operate such machine tools as lathes and milling machines, shape metal into precision parts by conventional and nonconventional processes, follow blueprints and use special instruments to inspect work.

Places of employment

Manufacturing industries, metal-working industries, engineering firms, and engineering research firms

Positions for which graduates qualify

Entry-level and apprenticeship programs: tool and die maker, instrument maker, mold maker, pattern maker, model maker, machinist, CNC operator

Prerequisites

Successful completion of a sampling experience either through the Summer Vestibule Program or equivalent Career Exploration courses.

English—Diploma: Placement into level B English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing a diploma typically enter with reading scores equivalent to 7.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or Elements of Geometry (0884-170) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into any level B science course numbered 150 or above. Typically, students entering this program will have completed at least two years of high school science.

Computer integrated machining technology, diploma, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Manufacturing Processes I, II, in 0813-131,132,133	12
Blueprint Reading I, II 0813-139,140	4
Precision Measurement 0813-154	2
Elements of Geometry 0884-170	4
Foundations of Algebra 0884-180	4
Mathematics Elective	2
Freshman Seminar 0887-200	2
Job Search Process 0806-101	2
English (Level B or above)	12
Cooperative Education 0813-299	0
<i>Second Year</i>	
Introduction to Numerical Control 0812-150	2
Basic Drafting I, II 0813-101,102	4
Manufacturing Processes IV, V, VI 0813-134,135,136	12
Industrial Materials 0813-151	3
Manufacturing Analysis 0813-152	3
Applications of Algebra 0844-210	4
Trigonometry for Coordinate Analysis I, II 0884-205,206	6
Social Science	3
Science (Level B)	3
Deaf Studies/ASL* ,	(3)
Humanities	3
<hr/>	
<i>Total Quarter Credit Hours</i>	97

* This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

AOS Degree Program

On-the-job responsibilities

Set up and operate such machine tools as lathes and milling machines, set up and operate computer-numerical-controlled machine tools, shape material into precision parts by conventional and nonconventional processes, follow blueprints, and use advanced measuring techniques to inspect work.

Places of employment

Manufacturing industries, metal-working industries, engineering firms, and engineering research firms

Positions for which graduates qualify

Entry-level and apprenticeship programs: tool and die maker, instrument maker, mold maker, pattern maker, model maker, machinist, CNC operator, and CNC programmer trainee.

Prerequisites

Successful completion of a sampling experience either through the Summer Vestibule Program or equivalent Career Exploration course.

English—AOS: Placement into level C English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees typically enter with reading scores equivalent to 8.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or Elements of Geometry (0884-170) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into any level B science course numbered 150 or above. Typically, students entering this program will have completed at least two years of high school science.

Computer integrated machining technology, AOS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Manufacturing Processes I, II, III 0813-131,132,133	12
Blueprint Reading I, II 0813-139,140	4
Precision Measurement 0813-154	2
Elements of Geometry 0884-170	4
Foundations of Algebra 0884-180	4
Mathematics Elective	2
Freshman Seminar 0887-200	2
Job Search Process 0806-101	2
Trigonometry for Coordinate Analysis I 0884-205	3
English (Level C or above)	12
Cooperative Education 0813-299	0
Physical Education (Wellness Component)	0
<i>Second Year</i>	
Introduction to Computer Numerical Control 0812-150	2
Basic Drafting I, II 0813-101,102	4
Manufacturing Processes IV, V, VI 0813-134,135,136	12
Industrial Materials 0813-151	3
Manufacturing Analysis 0813-152	3
Applications of Algebra 0884-210	4
Trigonometry for Coordinate Analysis II 0884-206	3
Humanities	6
Science (Level B)	3
Cooperative Education 0813-299	0
Physical Education (Activity Course)	0
<i>Third Year</i>	
Computer Numerical Control I, II, III 0812-151,152,153	12
Welding I 0813-153	2
Advanced Machining Processes 0813-237	4
Advanced Precision Measurement 0813-256	3
Senior Seminar 0813-260	1
Capstone Seminar 0882-295	3
Deaf Studies/ASL †	(3)
Social Science	6
Technical Elective ‡	3
Total Quarter Credit Hours	121

† This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

‡ Technical electives: Career Exploration (0813-100); Welding II (0813-155)

Laboratory Science Technology

The laboratory science technology program prepares graduates for employment in analytical testing laboratories with an emphasis on food quality assessment and environmental testing. Graduates also gain general knowledge and skills in analytical laboratory test procedures and instrumentation for employment in related areas of laboratory science. Technicians may work in the research, design, development, and manufacturing of scientific products and equipment, testing of raw materials, processes, and finished products. Students may choose from AOS and AAS degree programs.

AOS and AAS Degree Programs

On-the-job responsibilities

Preparation and collection of air, water, soils, and food samples. Analysis of test results and experiments using a variety of instrumentation. Technicians may also submit test results in the form of charts, graphs, and narrative reports.

Places of employment

The program prepares graduates for technical jobs in municipal, public, private, and industrial laboratories.

Prerequisites

English—AOS: Placement into level C English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees typically enter with reading scores equivalent to 8.0 on the California Reading Test.

English—AAS: Placement into College of Liberal Arts Writing and Literature I course. Students typically enter Writing and Literature I course with reading scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading scores of 9.0 on the California Reading Test.

Mathematics: Placement into Integrated Algebra (0844-212) or higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into level B science course numbering 150 or higher. Typically, students entering this program will have completed at least two years of high school science.

Laboratory science technology, AOS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Introduction to LST 0879-200	2
Fundamentals of Human Biology I 0885-161	4
English (Level C or above)	12
Freshman Seminar 0887-200	2
LST Lab Applications I 0879-201	2
Intro, to LST Microbiology 0879-218	3
Fundamentals of Chemistry I 0885-181	4
Integrated Algebra 0884-212	4
LST Lab Applications II 0879-202	2
LST Microbiology 0879-241	4
Fundamentals of Chemistry II 0885-182	4
Laboratory Math I 0884-231	3

<i>Second Year</i>	
LST Lab Applications III 0879-203	2
Instrumentation I 0879-301	3
Principles of Chemistry I 0885-211	4
Laboratory Math II 0884-232	3
Job Search Process 0806-101	2
LST Lab Applications IV 0879-204	2
Instrumentation II 0879-302	3
Food Laboratory Science I 0879-311	4
or	
Environmental Laboratory Science I 0879-321	4
Principles of Chemistry II 0885-212	4
Social Science	6
LST Lab Applications V 0879-205	2
Instrumentation III 0879-303	4
Food Laboratory Science II 0879-312	4
or	
Environmental Laboratory Science II 0879-322	4
Deaf Studies/ASL *	(3)
Physical Education (Activity Course)	0
Physical Education (Wellness Component)	0
Cooperative Education 0879-299	0

<i>Third Year</i>	
LST Lab Applications VI 0879-206	2
Senior Seminar 0879-250	2
Technical Elective†	4
Humanities	6
<u>Capstone Seminar 0882-295</u>	<u>3</u>
<i>Total Quarter Credit Hours</i>	<i>106</i>

* This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course.

† Students must choose one technical elective from the following list:

Applied Microbiology 0879-341	4
Sampling & Testing of Soils & Groundwater 0879-280	4
Concepts of Surveying & Mapping 0879-270	3

Laboratory science technology, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Introduction to LST 0879-200	2
Fundamentals of Human Biology I 0885-161	4
Writing & Literature I 0504-225 (College of Liberal Arts)	4
Freshman Seminar 0887-200	2
LST Lab Applications I 0879-201	2
Intro, to LST Microbiology 0879-218	3
Fundamentals of Chemistry I 0885-181	4
Integrated Algebra 0884-212	4
Writing & Literature H 0504-226 (College of Liberal Arts)	4
LST Lab Applications II 0879-202	2
LST Microbiology 0879-241	4
Fundamentals of Chemistry II 0885-182	4
Laboratory Math I 0884-231	3
Humanities (College of Liberal Arts)	4

<i>Second Year</i>	
LST Lab Applications HI 0879-203	2
Instrumentation I 0879-301	3
Principles of Chemistry I 0885-211	4
Laboratory Math II 0884-232	3
Deaf Studies/ASL	3
Job Search Process 0806-101	2
LST Lab Applications IV 0879-204	2
Instrumentation II 0879-302	3
Food Laboratory Science I 0879-311	4
or	
Environmental Laboratory Science I 0879-321	4
Principles of Chemistry II 0885-212	4
Social Science (College of Liberal Arts)	8
LST Lab Applications V 0879-205	2
Instrumentation ID 0879-303	4
Food Laboratory Science II 0879-312	4
or	
Environmental Laboratory Science II 0879-322	4
Physical Education (Activity Course)	0
Physical Education (Wellness Component)	0
Cooperative Education 0879-299	0

<i>Third Year</i>	
LST Lab Applications VI 0879-206	2
Senior Seminar 0879-250	2
Technical Elective*	4
<u>Capstone Seminar 0882-296</u>	<u>4</u>
<i>Total Quarter Credit Hours</i>	<i>HQ</i>

* Students must choose one technical elective from the following list:

Applied Microbiology 0879-341	4
Sampling & Testing of Soils & Groundwater 0879-280	4
Concepts of Surveying & Mapping 0879-270	3

Applied Optical Technology

An optical technologist makes eyeglasses prescribed by physicians and optometrists. Technologists refine lenses to prescription specifications as ordered by vision care specialists. Students may choose from AOS and AAS degree programs.

The applied optical technology programs include an optical laboratory affiliation in Rochester during one of the academic quarters. A cooperative work experience is taken in students' home areas during the summer quarter between the first and second years in the program. Students are responsible for obtaining their own transportation to these practice sites.

More than 90 percent of those applying for the applied optical technology programs need to satisfy specific prerequisites noted below. These prerequisites can be taken at the same time as first-year course work in English, mathematics, and science.

AOS Degree Program

On-the-job responsibilities

Technicians are individuals who transcribe prescriptions, select appropriate lens forms, cut, polish, shape, and edge lenses. They also apply cosmetic lens features and assemble lenses and frames. All work is done according to specifications provided by ophthalmologists, optometrists, dispensing opticians, and 2nd optical design technicians.

Places of employment

Wholesale and retail optical laboratories and offices of ophthalmologists, optometrists, and dispensing opticians

Graduates qualify for positions requiring these skills

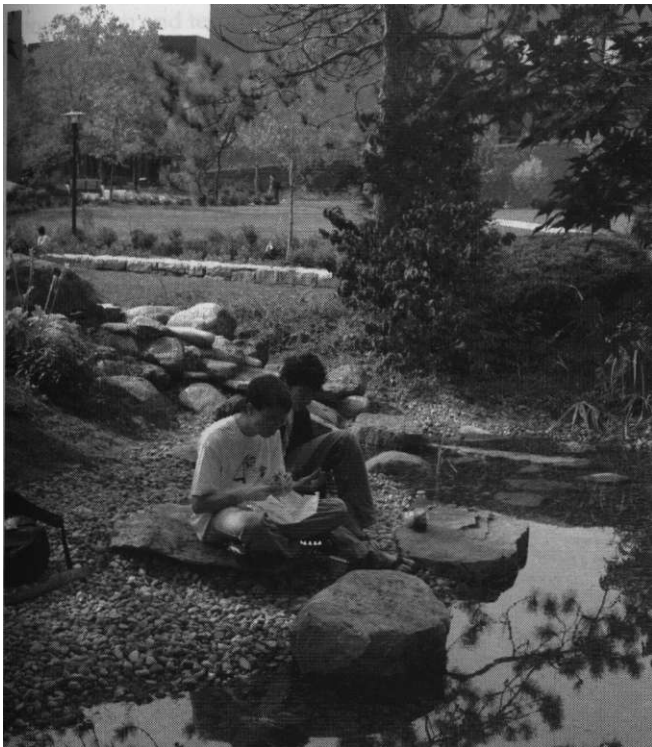
Lens generating, finishing, and polishing, vertometric evaluation, single vision/multifocal layout, lens blocking, automatic edging, hand beveling, lens heat treatment, rimless/notching/ drilling, lens dyeing, final inspection, and evaluation

Prerequisites

English – AOS: Placement into level C English or above (Nonfiction Reading, Academic Writing, and Literature). Students successfully completing AOS degrees typically enter with reading scores equivalent to 8.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or Elements of Geometry (0884-170) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science: Placement into Optical Technology Physics (0885-200) or a higher level course. Typically, students entering this program will have completed at least two years of high school science.



Enhanced outdoor spaces in the heart of campus feature gardens, benches, sculptures, reflecting pools, accent lighting, and quiet places for students to gather. ©2004 Photo by Jan Regan.

Applied optical technology, AOS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
OFT Mathematics I, II 0827-111,112			6
Prescription Analysis I 0827-115			3
Optical Techniques I, II, III 0827-121,122,123			12
Optical Terminology I, II, III 0827-161,162,163			9
Job Search Process 0806-101			2
Foundations of Algebra 0884-180			4
Freshman Seminar 0887-200			2
English (Level C or above)			12
Physical Education (Wellness Component)			0
Cooperative Education 0827-200			0
<i>Second Year</i>			
Optical Techniques TV 0827-224			5
Lab Simulation I 0827-225			5
Orientation to Lens Surfacing 0827-270			3
Applications of Lens Surfacing 0827-280			4
Optical Technology Physics 0885-200 *			4
Lens Design 0827-117			3
Elements of Geometry 0884-170			4
Humanities			3
Internet Communication † 0880-210			3
Social Science			6
Physical Education (Activity Course)			0
<i>Third Year</i>			
Lab Simulation II 0827-226			5
Capstone Seminar 0885-295			3
Employment Seminar 0806-201			1
Optical Technology Seminar 0827-251			2
Technical Elective!			3
<u>Deaf Studies/ASL §</u>			(3)
Total Quarter Credit Hours			104

* Satisfies science requirement

† This requirement fulfills three credits in the humanities.

‡ Students may choose Orientation to Business (0804-101) or Medical Word Analysis (0820-105).

§ This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

AAS Degree Program

On-the-job responsibilities

Technicians are individuals who transcribe prescriptions, select appropriate lens forms, cut, polish, shape, and edge lenses. They also apply cosmetic lens features and assemble lenses and frames. All work is done according to specifications provided by ophthalmologists, optometrists, and dispensing opticians.

Places of employment

Wholesale and retail optical laboratories, offices of ophthalmologists, optometrists, and dispensing opticians, and 2nd precision optics companies

Graduates qualify for positions requiring these skills

Vertometric evaluation, single vision/multifocal layout, lens blocking, automatic edging, hand beveling, lens heat treatment, rimless/notching/drilling, lens dyeing, final inspection, and evaluation

Prerequisites

English – AAS: Placement into the College of Liberal Arts Writing and Literature I course. Students typically enter the Writing and Literature I course with reading scores equivalent to 10.0 on the California Reading Test. However, students who complete AAS degrees typically enter NTID with reading scores equivalent to 9.0 on the California Reading Test.

Mathematics: Placement into Foundations of Algebra (0884-180) or Elements of Geometry (0884-170) or a higher level course. Typically, students entering this program will have completed at least three years of high school mathematics.

Science – OFT: Placement into Optical Technology Physics (0885-200) or a higher level course. Typically, students entering this program have completed at least two years of high school science.

Applied optical technology, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit</i>	<i>Hours</i>
OFT Mathematics I, II 0827-111,112			6
Prescription Analysis I 0827-115			3
Optical Techniques I, II, III 0827-121,122,123			12
Optical Terminology I, II, III 0827-161,162,163			9
Job Search Process 0806-101			2
Foundations of Algebra 0884-180			4
Freshman Seminar 0887-200			2
Liberal Arts (College of Liberal Arts)			12
Cooperative Education 0827-200			0
Physical Education (Wellness Component)			0
<i>Second Year</i>			
Optical Techniques IV 0827-224			5
Lab Simulation I 0827-225			5
Orientation to Lens Surfacing 0827-270			3
Applications of Lens Surfacing 0827-280			4
Lens Design 0827-117			3
Internet Communication † 0880-210			3
Elements of Geometry 0884-170			4
Optical Technology Physics 0885-200 *			4
Liberal Arts (College of Liberal Arts)			8
<i>Third Year</i>			
Capstone 0882-296			4
Lab Simulation II 0827-226			5
Employment Seminar 0806-201			1
Deaf Studies/ASL ‡			3
Optical Technology Seminar 0827-251			2
Technical Elective ‡			3
<u>Physical Education (Activity Course)</u>			0
Total Quarter Credit Hours			107

* Satisfies science requirement

† This requirement fulfills three credits in the humanities.

‡ Students may choose Orientation to Business (0804-101) or Medical Word Analysis (0820-105).

Special Certificates

Deaf Studies Certificate

The deaf studies certificate is intended for people in the public and/or private sector who are interested in communicating effectively with deaf people in their communities. Classes in the certificate program provide a stimulating basic foundation in communicative and cultural competence in American Sign Language. It is ideally suited as an introduction to ASL and Deaf Culture for people who might be interested in subsequent coursework in the fields of interpreting for the deaf or deaf education.

Rochester has the highest per capita population of deaf and hard-of-hearing individuals in the United States. There are numerous educational and social resources for this community here, making NTID the ideal place to begin your study of sign language.

The 16-credit curriculum is composed of the seven courses listed below. Although a primary emphasis in the curriculum is learning basic American Sign Language, students also deepen their understanding of deafness through courses related to the physical, psychological, social, and linguistic aspects of deafness.

Substitution of one course for another is generally not permitted. However, students are able to challenge course content for any of the courses in the program. Students must maintain a cumulative GPA of 2.0 for courses in the program in order to receive the certificate.

Course Title	Quarter	Credit	Hours
American Sign Language I, II, III	0876-211,212,213	6	
American Sign Language IV, V	0876-311, 312	4	
Aspects & Issues of Deafness I, II	0876-241,242	6	
Total Quarter Credit Hours		16	

For advising or further information about this program, call 585-475-6809 (v/TTY), or 585-475-6851 (TTY).

Introductory Programming Certificate

The demands of the computing and information technology fields require that college graduates have a broad background in the fundamentals of programming languages. This four-course certificate is designed to provide skill development in two of the most popular and sought after programming languages used today—Visual Basic and C++. Current full-time students within the applied computing technology program can add to their skill portfolio by choosing this certificate option en route to obtaining an AOS or AAS degree. Students from other NTID majors who satisfy the certificate prerequisites can enhance their skill set in programming and apply it to other fields and careers. In addition, this certificate provides an excellent transition path for individuals currently in the computer technology field who need to upgrade their programming skills.

Prerequisites

Applicants for the introductory programming certificate program must meet NTID admissions requirements. Applicants may be either matriculated or non-matriculated students. Applicants must demonstrate fundamental computer skills and a familiarity with the Microsoft Windows operating system, including knowledge of how to create folders, move and copy files, and access the World Wide Web using a browser such as Internet Explorer or Netscape Navigator. These skills can be demonstrated through successful completion of the prerequisite course for Programming I (0805-215 PC Operating Systems) or an equivalent course or experience.



Required Courses	Quarter Credit Hours
Programming I (Visual Basic) 0805-230	3
Programming II (Visual Basic) 0805-231	3
C++ Programming 10805-301	4
C++ Programming II 0805-302	4

Total Quarter Credit Hours 14

Candidates will be granted the introductory programming certificate upon successful completion of the core courses. All of the required courses are currently offered as part of the associate programs in applied computer technology.

Performing Arts Certificate

The performing arts certificate is designed to provide students currently matriculated in a technical or professional program at RIT/NTID with an additional set of marketable skills.

Students develop knowledge of standard theatrical operating procedures, as well as principles and practices of theater accessibility for deaf people allowing them to work in professional, regional, and community theater. The program also provides a solid foundation for both deaf and hearing students who wish to pursue further education in film, video, theater, and related forms of performing arts.

The certificate includes knowledge of theater terminology, practices and protocols; issues in script analysis; ASL translation and accessibility; and experience in performance and technical theater. Students may take four three-credit courses in the performance/script track (for those students interested in acting, dramaturgy, translation, and dance/movement) or the technical theater track (for those students interested in

scenic design and technology, lighting, costume, and stage management). A three-credit production practicum is also required for both tracks. Students will be granted the performing arts certificate in either performance/script or technical theater upon successful completion of 15 credits. This program is not intended as a stand-alone certification.

Prerequisites

Applicants for the performing arts certificates (either performance/script or technical theater) must be currently matriculated and in good standing in an undergraduate program at RIT/NTID or graduates holding an undergraduate degree from one of those programs. Introduction to Performing Arts (0881-250) is a prerequisite.

performance/script emphasis: required courses

(Select 12 credits from the following)

Course Title	Quarter	Credit	Hours
Script Analysis 0881-256			3
Acting I 0881-210			3
Acting II 0881-260			3
Introduction to Play Creating 0881-258			3
Jazz 0881-168			3
Ballet 0881-266			3
Fundamentals of Choreography 0881-267			3
History of Theatre 0881-202			3
Deaf Theatre History 0881-204			3
Stage Combat 0881-217			3
Dance History 0881-218			3
Sign Mime and Creative Movement 0881-166			3
Arts Management 0881-253			3
Creative Translation 0881-259			3
Audition Technique 0881-261			3
Dance Performance 0881-167			3
Introduction to Dramatic Literature 0881-257			3
PLUS			
<u>Performing Arts Practicum 0881-298</u>			<u>3</u>
Total Quarter Credit Hours			15

Technical theater emphasis: required courses

(Select 12 credits from the following)

Course Title	Quarter	Credit	Hours
Script Analysis 0881-256			3
Scenic Technology I 0881-222			3
Scenic Technology II 0881-223			3
Scene Painting 0881-224			3
Costume Technology I 0881-231			3
Costume Technology II 0881-232			3
Stage Make-up 0881-233			3
Lighting Technology I 0881-241			3
Lighting Technology II 0881-242			3
Lighting Studio 0881-291			3
Arts Management 0881-253			3
Stage Management 0881-272			3
PLUS			
<u>Performing Arts Practicum 0881-298</u>			<u>3</u>
Total Quarter Credit Hours			15

Pre-baccalaureate Studies

Business, Computer Science and Information Technology

James Biser, Chairperson, Business and Computing Technologies

Criminal Justice

Linda Rubel, Chairperson, Liberal Arts Support

Imaging Arts and Science

Michael White, Chairperson, Imaging Arts and Science Support

Science and Engineering

Sharon L. Rasmussen, Interim Chairperson, Science and Engineering Support

Social Work

Dean Santos, Staff Chairperson, Social Work Support

General information

Pre-baccalaureate studies is available as a bridge into baccalaureate degree programs for students who are accepted by NTID and are close to but not fully ready for direct entry into an RIT baccalaureate-level program. Students who qualify for pre-baccalaureate studies are those who have academic transcripts, scores on admissions tests,* and other evidence that support reasonable expectation of success in baccalaureate course work. Qualified students who are undecided as to program of study may choose the pre-baccalaureate studies career exploration option.

Pre-baccalaureate studies is appropriate for students who need to further develop mathematics, English or discipline-related skills. The academic program is flexible and individualized and enables students to focus on needed skills while concurrently progressing toward their chosen field of study. Students take courses taught by support department faculty and other NTID faculty, along with entry-level courses taught in other RIT colleges. While in the program, students receive academic advising as well as career counseling.

Students do not receive a degree in pre-baccalaureate studies. They apply for admission into a baccalaureate program as soon as they are academically ready and the college offering their chosen baccalaureate program reviews their application for admission. After completing an entire academic year in the program, a student must transfer to either an RIT baccalaureate- or an NTID associate-level program.

Pre-baccalaureate studies in information technology, typical course sequence

First Year	Quarter	Credit	Hours
Freshman Seminar 0853-200			2
Computing Fundamentals 0853-310			4
Programming I 4002-217			4
Intro to Multimedia 4002-320			4
Liberal Arts *			12
Algebra & Trigonometry 1016-204 †			4
Discrete Math for Technology I, II 1016-205,206 †			8
Pre-baccalaureate courses ‡			2-4
Total Quarter Credit Hours			40-42

* Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.

† NTID mathematics courses may be required as prerequisites, depending on placement.
‡ Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.

Pre-baccalaureate studies in computer science, typical course sequence

First Year	Quarter	Credit	Hours
Freshman Seminar 0853-200			2
Computing Fundamentals 0853-310			4
Computer Science I, II & III 4003-231,232,233			12
Liberal Arts *			12
Calculus I, II & III 1016-251,252, 253 †			12
Pre-baccalaureate courses ‡			2-4
Total Quarter Credit Hours			44-46

* Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.

† NTID mathematics courses may be required as prerequisites, depending on placement.
‡ Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.

Pre-baccalaureate studies in business, typical course sequence

First Year	Quarter	Credit	Hours
Freshman Seminar	0853-200		2
Business Software Applications	0112-270		2
Laboratory Science			4
Liberal Arts *			12
Algebra, Calculus for Management Science	1016-225,226 †		8
Pre-baccalaureate courses ‡			6-8
Total Quarter Credit Hours			34-36

* Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.
 † NTID mathematics courses may be required as prerequisites, depending on placement.
 ‡ Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.

Pre-baccalaureate studies in criminal justice, typical course sequence

First Year	Quarter	Credit	Hours
Freshman Seminar	0853-200		2
Computer Applications in Criminal Justice	0501-406		4
Criminology	0501-203		4
Liberal Arts *			12
Algebra for Management Science	1016-225 †		4
NTID Humanities & Social Science courses			4
Pre-baccalaureate courses ‡			6-8
Total Quarter Credit Hours			36-38

* Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.
 † NTID mathematics courses may be required as prerequisites, depending on placement.
 ‡ Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.

Pre-baccalaureate studies in School of Art (illustration, medical illustration, fine arts studio) and School of Design (graphic design, industrial design, interior design) programs and program options in School for American Crafts programs (ceramics/ceramic sculpture, glass/glass sculpture, metal and jewelry design, woodworking/furniture design), typical course sequence*

First Year	Quarter	Credit	Hours
Basic Design I, II, III	2012-201,202,203		6
Basic Drawing Media I, II, III	2012-201,202,203		6
Still Photo I, II, III	2012-201,202,203		6
Liberal Arts *			12
Pre-baccalaureate courses †			2-i
Total Quarter Credit Hours			32-34

* Portfolio of original artwork is required to determine admission. See the College of Imaging Arts and Sciences Support Department for further information.
 † Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.
 ‡ Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.

Pre-baccalaureate studies in School of Photographic Arts and Sciences in imaging arts and sciences, professional photographic illustration option, typical course sequence

First Year	Quarter	Credit	Hours
Still Photography I, II, III	2060-257,258,259		3
History & Aesthetics of Photography	2060-301, 302, 303		12
Two-dimensional Design	2013-231,232, 233		9
Liberal Arts *			12
Pre-baccalaureate courses †			6-8
Total Quarter Credit Hours			34-36

* Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.
 † Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.

Pre-baccalaureate studies in imaging arts and sciences, biomedical photography option, typical course sequence

First Year	Quarter	Credit	Hours
Still Photography I, II, III	2060-257,258,259		
Medical Terminology	1026-301		
Human Biology	1004-211		
Human Biology Lab	1004-231		j
Liberal Arts *			y
Pre-baccalaureate courses †			
Total Quarter Credit Hours			28-32

* Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.
 † Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.

Pre-baccalaureate studies in imaging arts and sciences, film and video option, typical course sequence

First Year	Quarter	Credit	Hours
Intro, to Portable Video	2065-243,244		4
or			
Writing for Film/Video I	2065-342		3
Film Language	2065-222		2
Theater electives/NTID Performing Arts *			2-8
Liberal Arts †			12
Pre-baccalaureate courses ‡			6-8
Total Quarter Credit Hours			26-34'

* See CIAS Support Department adviser for current information regarding theater electives.
 † Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111), or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.
 ‡ Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies, and specific discipline areas. See page 331 for available courses.

Pre-baccalaureate studies in imaging arts and sciences, printing option, typical course sequence

First Year	Quarter	Credit	Hours
Graphic Media Perspectives	2082-201 *		3
or			
New Media Perspectives	2083-201		3
Application of Typography & Design	2082-211 *		4
Digital Image Capture	2082-221*		4
Color Separation Systems	2081-409 *		3
Liberal Arts *			12
Algebra for Management Science	1016-225†		4
Pre-baccalaureate courses †			6-8
Total Quarter Credit Hours			36-38

* Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.
 † Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.

Pre-baccalaureate studies in biology, biotechnology, medical sciences, environmental science and environmental management, typical course sequence

First Year	Quarter	Credit	Hours
Freshman Seminar	0853-200		2
Learning Strategies	0853-210 *		(2)
Processes of Science	0853-220 *		(3)
Human Biology I, II, III	1004-231,232,233		12
AND			
Human Biology Lab	1004-211, 212,213		
OR			
General Biology I, II, III	1001-201,202,203		12
AND			
General Biology Lab	1001-205,206,207		
OR			
General & Analytical Chemistry	1011-215,216,217 †		
AND			
Chemical Principles Lab I, II, III	1011-205,206, 227		14
Liberal Arts ‡			12
College Algebra & Trigonometry §	1016-204		4
Elementary Calculus I, II	1016-214, 215		6
Total Quarter Credit Hours			36-43

i » *pre-baccalaureate* courses are an available **option** to strengthen students' **skills in critical thinking, learning strategies and specific discipline** areas. See page 331 for available courses.

† *Chemical Principles 1,11 and 111 option only for environmental management*
t Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.

§ *Alternative mathematics courses may be required as prerequisites, depending on placement.*

Pre-baccalaureate studies in science, chemistry option, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 0853-200	2
Learning Strategies 0853-210 *	(2)
Processes of Science 0853-220 *	(3)
General & Analytical Chemistry I, II, III 1011-215,216,217 AND	14
Chemistry Labs 1011-205, 206,227 OR	
General Chemistry I, II 1010-251,252 AND	8
General Chemistry Lab 1010-255 AND	
Quantitative Analysis 1008-261 AND	4
Quantitative Analysis Lab 1010-265	
Liberal Arts †	12
Pre-Calculus 1016-230 ‡	4
<u>Calculus & Analytical Geometry I & II 1016-241,242</u>	<u>12</u>

Total Quarter Credit Hours **42-49**

* *Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.*

† *Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.*

‡ *Alternative mathematics courses may be required as prerequisites, depending on placement.*

Pre-baccalaureate studies in science, math or physics options, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 0853-200	2
Learning Strategies 0853-210 *	(2)
Processes of Science 0853-220 *	(3)
General Biology I, II, III 1001-201, 202, 203 AND	12
General Biology I, II, III Lab 1001-205, 206,207 OR	
General & Analytical Chemistry I, II, III 1011-215, 216,217 AND	14
Chemical Principles Labs I, II, III 1011-205, 206,207 OR	
College Physics I, II, III 1017-211,212,213 †	12
AND	
College Physics Labs 1017-271,272, 273 OR t	
University Physics I, II, III 1017-311,312,313 †	15
Liberal Arts §	12
<u>Calculus I, II, III 1016-251, 252, 253 †</u>	<u>12</u>

Total Quarter Credit Hours **38-46**

* *Pre-baccalaureate courses are an available option to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.*

† *Alternate mathematics courses may be required as prerequisites, depending on placement.*

‡ *Students must choose one of the two physics sequences for the physics option.*

§ *Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.*

Pre-baccalaureate studies in engineering option, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 0853-200	2
Learning Strategies 0853-210 *	(2)
Major-related courses depending on area of interest	16
College Chemistry 1011-0208	4
University Physics I, II 1017-311, 312	10
Liberal Arts †	12
<u>Calculus I, II, III 1016-251,252,253 ‡</u>	<u>12</u>

Total Quarter Credit Hours **40-46**

* *Pre-baccalaureate courses are an available option to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.*

t *Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.*

‡ *Alternative mathematics courses may be required as prerequisites, depending on placement.*

Pre-baccalaureate studies in engineering technology option, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 0853-200	2
Learning Strategies 0853-210 *	(2)
Engineering Technology Seminar 0606-101	2
Major-related courses depending on area of interest	16
Liberal Arts †	12
Technical Math I 0692-221 ‡	4
Technical Math II 0692-221 ‡	4
<u>Calculus for Technology 1019-420 ‡</u>	<u>4</u>

Total Quarter Credit Hours **44-46**

* *Pre-baccalaureate courses are an available option to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.*

t *Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.*

‡ *Alternative mathematics courses may be required as prerequisites, depending on placement.*

Pre-baccalaureate studies in social work, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 0853-200	2
The Professional Social Work Role 0516-210	4
Self-Awareness in the Helping Role 0516-212	4
Liberal Arts *	12-16
Mathematics †	8
NTID Humanities & Social Science ‡ AND/OR	
Pre-baccalaureate courses §	4-12

Total Quarter Credit Hours **42-46**

* *Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Literature II (0502-226), depending on placement. See page 7 for liberal arts requirements.*

f *NTID algebra sequence; specific courses dependent on placement*

‡ *Courses in communication studies and sign communication, as recommended.*

§ *Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 331 for available courses.*



Course Number Index

HIT course numbering: Throughout this bulletin and in registration materials that are published quarterly, courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100-399); upper division (400-699); or graduate level (700 and above).

College of Business

0101	Accounting	188
0102	Management	188
0104	Finance	190
0105	Marketing	190
0106	Decision Sciences	190
0112	Management Info. Systems	191

College of Engineering

0301	Electrical Engineering	202
0302	General Engineering	206
0303	Industrial & Systems Engineering	206
0304	Mechanical Engineering	207
0305	Microelectronics Engineering	210
0306	Computer Engineering	212
0307	Quality & Applied Statistics	214

College of Liberal Arts

0501	Criminal Justice	246
0502	Language	248
0503	Foreign Languages	250
0504	Literature	254
0505	Fine Arts	258
0507	History	261
0508	Science, Technology & Society	263
0509	Philosophy	265
0510	Anthropology	266
0511	Economics	267
0513	Political Science	269
0514	Psychology	272
0515	Sociology	274
0516	Social Work	275
0519	Interdisciplinary – Aerospace	278
0520	Interdisciplinary – Liberal Arts	279
0521	Public Policy	279
0522	Women's Studies	281
0523	American Studies	281
0535	Communication	283

College of Applied Science and Technology

0606	Electrical/Mechanical Engineering Technology	162
0607	Packaging Science	162
0608	Civil Engineering Technology	164
0609	Electrical Engineering Technology	166
0610	Mechanical Engineering Technology	168
0614	Telecommunications Engineering Technology	170
0617	Manufacturing Engineering Technology	171
0618	Computer Engineering Technology	172
0619	Hospitality Service Management	173
0620	Nutrition Management	174
0621	Food Management	174
0622	Hotel & Resort Management	175
0623	Travel & Tourism Management	175
0626	Human Resources Management	177
0627	Instructional Technology	177

0630	Environmental Management & Safety	177
0633	Safety Technology	178
0634	Disaster & Emergency Management	179
0635	Health Systems Administration	179
0640	Reserve Officer Training Corps – Army	180
0650	Reserve Officer Training Corps – Air Force	180
0680	Accounting & Business Systems	181
0681	Business Administration – Management	181
0684	Quality Management	182
0686	Humanities & Social Sciences	183
0688	Technical Communication	183
0692	Math & Science	185
0697	Multi/Interdisciplinary Studies	186

National Technical Institute for the Deaf

0801	Accounting Technology	308
0804	Business Technology/ Administrative Support	314
0805	Applied Computer Technology	309
0806	Interdisciplinary Studies	306
0812	Computer Integrated Machining Technology	318
0813	Computer Integrated Machining Technology	318
0820	Healthcare Billing & Coding Technology	324
0825	Art & Computer Design	311
0827	Applied Optical Technology	330
0853	Pre-baccalaureate Studies	331
0860	Speech & Language	334
0875	ASL-English Interpretation	306
0876	Deaf Studies Certificate	335
0878	Digital Imaging & Publishing Technology	320
0879	Laboratory Science Technology	327
0880	Communication Studies and Humanities	316,319,324,326
0881	Performing Arts	319,326
0882	Social Science	320,333
0883	English	323
0884	Mathematics	329
0885	Science	331
0886	American Sign Language	319,325
0886	Deaf Studies	319
0890	Computer Aided Drafting Technology	316
0891	Automation Technologies	313

College of Science

1001	Biology	284
1004	General Biology	287
1005	Field Biology	287
1006	Environmental Science	287
1008	Analytical Chemistry	288
1009	Biochemistry	288
1010	Chemistry	288
1011	General Chemistry	289
1012	Inorganic Chemistry	290

1013	Organic Chemistry	291
1014	Physical Chemistry	291
1015	Environmental Chemistry	291
1016	Mathematics & Statistics	292
1017	Physics	299
1018	General Science	299
1024	Medical Sciences	297
1025	Nuclear Medicine Technology	299
1026	Clinical Science – General	300
1027	Biomedical Computing	301
1029	Polymer Chemistry	291
1030	Diagnostic Medical Sonography	302
1032	Physician Assistant	302
1051	Imaging Science	304
1055	Honors Courses	288

Center for Human Performance

1105	Wellness	336
1109	Fitness	336
1110	Health & Safety	337
1111	Lifetime Recreation Activities	338
1112	Interactive Adventures	342
1113	Martial Arts	343
1114	Military Sciences	344

College of Imaging Arts and Sciences

2001	Interdisciplinary Imaging Arts	215
2009	New Media Design	221
2010	Graphic Design	222
2012	Art & Design Extended Studies	216
2013	Foundation Courses	215
2015	Interior Design	224
2019	Illustration	218
2020	Medical Illustration	220
2021	Fine Arts Studio	221
2035	Industrial Design	225
2039	Art History	216
2040	Ceramics	226
2041	Glass	227
2042	Metals	228
2043	Textiles	228
2044	Wood	228
2045	General Crafts Studies	228
2046	Crafts Extended Studies	229
2060	Fine Art Photography	233
2061	Biomedical Photography	234
2065	Film and Animation	229
2067	Photographic Arts	235
2068	Imaging Systems Management	239
2076	Imaging & Photographic Technology	239
2080	Printing Management	241
2081	Printing Technology	242
2082	Graphic Media	243
2083	New Media Publishing	245

B. Thomas Golisano College of Computing and Information Sciences

4002	Information Technology	193
4003	Computer Science	197
4010	Software Engineering	200

Course Descriptions

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites and/or corequisites are noted in parentheses at the end of the course description.

College of Applied Science & Technology

Index

0606	Electrical/Mechanical Engineering Technology.	162
0607	Packaging Science.	162
0608	Civil Engineering Technology.	164
0609	Electrical Engineering Technology.	166
0610	Mechanical Engineering Technology.	168
0614	Telecommunications Engineering Technology.	170
0617	Manufacturing Engineering Technology.	171
0618	Computer Engineering Technology.	172
0619	Hospitality & Service Management	173
0620	Nutrition Management	174
0621	Food Management	174
0622	Hotel & Resort Management	175
0623	Travel & Tourism Management	176
0626	Human Resource Management	177
0627	Training & Instructional Technology.	177
0630	Environmental Management & Safety.	177
0633	Safety Technology.	178
0634	Emergency Management	179
0635	Health Systems Administration	179
0640	Reserve Officer Training Corps – Army.	180
0650	Reserve Officer Training Corps – Air Force	180
0680	Accounting & Business Systems.	181
0681	Business Administration Management	181
0684	Quality Management	182
0686	Humanities & Social Sciences	183
0688	Technical Communication	183
0692	Math & Science	185
0697	Multidisciplinary Studies.	186

Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100-399); upper division (400-699); or graduate level (700 and above).

Electrical/Mechanical Engineering Technology

0606-099 Co-op Preparation Course
This course is intended for third-year set students. It introduces the concept of cooperative education and the services of the office of cooperative education and placement, and provides the student with basic job search skills; research and identification of potential employers; resume writing and correspondence; interviewing techniques. Ethics of the job search and expectations of employers will also be covered. This course is required for all set students before registering for co-op and using the services of the office of cooperative education and placement. Class 1, Credit 0

Packaging Science

0607-200 New Student Seminar
An introduction to RIT and the department of packaging science. Course covers the basics of the packaging profession. Class 1, Credit 1

0607-201 Principles of Packaging
An overview of packaging: the historical development of packaging; the functions of packaging; and the materials, processes and technology employed to protect goods during handling, shipment and storage. A brief review of container types, package design and development, and research and testing are presented, along with information about economic importance, social implications and packaging as a profession. Class 4, Credit 4.

0607-202 Packaging Science Freshman Seminar II
Continuation of new student seminar. Credit 1.

0607-210 TM & D Skills Seminar
A beginning course for students interested in pursuing a career in technical sales. The student is introduced to seasoned technical sales professionals, traditional and TQM sales organizations, and different styles of selling. Students learn what strategies are important for a successful career in technical sales. Class 2, Credit 2

0607-301 Engineering Design Graphics
A basic course in engineering drawing. Topics include, but are not limited to, lettering, line quality, use of instruments, free-hand sketching, orthographic projections, pictorials, sections, auxiliary views and dimensioning. Students learn how drawing is accomplished using a computer-aided drafting (CAD) application package. Drawing assignments required, concentrating on packaging applications. Class 3, Lab 2, Credit 4

0607-302 CAD Drawing
A course in advanced computer-aided drafting (CAD). Drawing assignments required, concentrating on packaging applications. (0607-301) Class 1, Lab 4, Credit 3

0607-311 Packaging Materials I
The manufacture, physical and chemical properties, and uses of common packaging materials. Emphasis is on metals and plastics used in packaging and on adhesives, propellants and other component materials. (0607-201) Class 4, Credit 4

0607-312 Packaging Materials II
The manufacture, physical and chemical properties, and uses of common packaging materials. Emphasis is on paper, paperboard, wood, glass and pressurized packaging used in packaging applications (0607-201) Class 4, Credit 4

0607-313 Methods of Evaluation
Information about recognized standard testing procedures is presented, and students gain practical experience in the operation of various commonly used testing instruments that determine physical properties of fiber, metal, plastic and glass packaging materials. (0607-201,311,312) Class 1, Lab 4, Credit 3

0607-321 Rigid Containers
A detailed study of primary packages. History, manufacturing processes characteristics and applications for containers in direct contact with the product. Structural design, chemical compatibility and suitability of container for intended use are analyzed for basic container types. Students practice structural design and testing of prototype containers. Primary emphasis is on rigid paperboard, glass, plastic and metal containers. (0607-301, 311, 312) Class 3, Lab 2, Credit 4

0607-322 Flexible Containers
Corollary course for 0607-321. Primary emphasis is on flexible paper, foil, plastic and laminated materials and on selected processing techniques. Topics to include folding cartons, heat seal technology and test methodologies, permeability theory, modeling and empirical testing. (0607-301,311,312) Class 3, Lab 2, Credit 4

- 0607-341 **Computer Applications**
Application of computer techniques for packaging. Review and analysis of current computer software packages for packaging and packaging-related applications, including design, optimum sizing, prototyping, simulation and specification preparation. (0607-321,322) Class 3, Lab 2, Credit 4
- 0607401 **Career Seminar**
Career opportunities in packaging science; methods and procedures used in obtaining co-op and entry-level positions. Career advancement within the corporate organization; job changes. (Recommended end of second year, prior to co-op) Class 1, Credit 1
- 0607-420 **Technical Communication**
Introduction to the principles of effective written technical communication for the packaging professional. Topics include memos, business letters, summary activity reports, technical proposals and research papers. Open only to packaging majors and required as part of the packaging program's writing skills certification process. A grade of C or better is required. (0504-225, 226 and 0607-321,322) Class 4, Credit 4
- 0607-431 **Packaging Production Systems**
A study of package forming and filling, closing, product/package identification, inspection and other machinery commonly used in packaging, plus consideration of handling and storage/retrieval systems. Students become aware of project management techniques, setting timelines, critical path and resource evaluation. Quality issues are integrated into line and machinery designs. Students gain practice in setting up complete production lines for packaging various products. (0607-321,322) Class 4, Credit 4
- 0607-432 **Packaging for Distribution**
An exploration of different shipping, storage and use environments common to various products and packages. Structural design of shipping containers for product physical protection and methods for testing and predicting package performance are studied. (0607-321,322) Class 2, Lab 4, Credit 4
- 0607-433 **Packaging for Marketing**
The interrelationship between packaging and marketing, detailing how the retail consumer package can be used as a marketing tool. Concentrates on a systematic approach to developing an optimum package for a given product to meet the demands of the retail market. Advertising, marketing demographics and the impact of color upon packaging are considered. Students gain practice in the development of a complete package system. (0607-431, 432) Class 4, Credit 4
- 0607-462 **Packaging Regulations**
A detailed study of federal, state and local regulations that affect packaging. History of the development of packaging law; detailed study of recent packaging regulations, including the Fair Packaging and Labeling Act and the Poison Prevention Packaging Act; consideration of Food and Drug Administration regulation of packaging, including requirements for tamper-evident packaging; hazardous materials packaging regulations administered by the Department of Transportation; freight classifications, freight claims; weights and measures law; consumer product safety law; environmental law; and patent, trademark and copyright law as they apply to packaging. (0607-431, 432) Class 4, Credit 4
- 0607-485 **Principles Shock & Vibration**
A study of the factors involved in analyzing potential damage to packaged items resulting from impact or vibration forces. Students are expected to master basic mathematical and physical concepts and to use various pieces of testing equipment. (0607-432) Class 2, Lab 4, Credit 4
- 0607-499 **Packaging Co-op Work Block**
One quarter of appropriate work experience in industry. Two quarters of co-op experience are required. (0607-321,322) Credit 0
- 0607-510 **Introduction to Electrostatics**
An introduction to the factors involved in understanding and controlling electrostatic phenomena and protecting sensitive devices from ESD and other waveforms. Evaluation and analysis of protective materials and performance standards are taught, as well as equipment operation and evaluation procedures. (0607-322,1017-211) Class 4, Credit 4
- 0607-520 **Packaging Management**
A study of packaging organization in the contemporary corporation and project management techniques available to the packaging manager. Organization theory is discussed and compared with typical industry practice. Other topics include PERT, value analysis and the impact of regulatory agencies upon packaging from a management standpoint. (0607-321, 322) Class 4, Credit 4
- 0607-524 **Packaging Economics**
A study of firm behavior with concentration on production costs and revenues. Market structures are analyzed in order to develop an understanding of how packaging fits into the general economy. Students are instructed in the use of basic economic reference materials for research purposes. A paper is required. (0607-321,322) Class 4, Credit 4
- 0607-530 **Packaging and the Environment**
Consideration of packaging in a social context. Factors that enhance secondary use, recycling, recovery of resources and proper disposal are discussed. Package design in relation to solid waste disposal and materials and energy shortages are considered. Other topics of current social interest are discussed. Primarily a discussion class for senior students. Open to non-majors. (0607-321,322 or equivalent) Class 4, Credit 4
- 0607-531 **Packaging Process Control**
An advanced course designed to give packaging students instruction in design, process and quality control techniques for packaging applications. Topics include the concepts of zero defects, computer applications for control charts and acceptance sampling. (0607-321, 322 and 1016-319 or equivalent) Class 4, Credit 4
- 0607-536 **Medical Products Packaging**
Study of unique requirements for pharmaceuticals and packaging materials and containers for sterilized devices. Current sterilization techniques, impacts on material properties and distribution requirements are considered for this specialized product group. FDA regulations for product development and manufacturing GMP's are addressed. (0607-321,322) Class 3, Lab 2, Credit 4
- 0607-555 **Military & Export Packaging**
Study of the particular forms and requirements for packaging for the military and export environments. Preservation techniques, military specifications, crates and large export containers, construction techniques, the export handling and transportation environment, and related topics. (0607-485) Class 3, Lab 2, Credit 4
- 0607-568 **Food Preservation & Packaging**
Study of food products, common methods of processing and preservation, impact on quality and nutritional value of the product, and the relationships with common packaging methods and distribution practices. (0607-321, 322) Class 3, Lab 2, Credit 4
- 0607-570 **Point-of-Purchase Display**
An interdisciplinary course considering the unique requirements for display packaging at the retail point of purchase. The retail store environment, display techniques, customer motivation, product tie-ins, construction techniques, production and distribution requirements, product promotion and point-of-purchase support materials and activities, design and printing of point-of-purchase displays. (An interdisciplinary, senior elective for students in packaging, packaging design, marketing, retailing and printing.) (0607-433; or equivalent) Class 3, Lab 2, Credit 4
- 0607-575 **Technical Skills for Professional Sales**
Introduction to a systematic problem-solving methodology in the sales profession. The core of the course explains the systematic 13 steps that lead to professional sales success. The rationale for each step is thoroughly explained, as are the procedures for implementing it. This course is required for all entering TM&D students. (0607-321,322) Class 4, Credit 4
- 0607-577 **Packaging Internship**
This course number is used by students in the packaging science program for earning internship credits. The number of credits and the nature of on-location experience is determined by the student's advisor, subject to approval of the department. Credit variable 1-8

0607-590 Senior Thesis
An in-depth study of a selected phase of packaging that enables the student to make use of the knowledge and skills acquired during the course of the program. Credit 4

0607-598 Independent Study
Independent study, in consultation with the instructor, on any packaging-related topic. (Independent study total credit allowed is limited to a maximum of 8 credits) Credit variable 1-4

0607-599 Independent Study
Independent study, in consultation with the instructor, on any Packaging-related topic, (independent study total credit allowed is limited to a maximum of 8 credits) Credit variable 1-4

Civil Engineering Technology

0608-198 Introduction to CET, Freshman
Introduces students to the CET program in order to ease the college transition. Information is provided on cooperative education, technical electives, liberal arts core and concentration courses, and pre-registration procedures. Discussion of topics may include PE registration and NICET certification. Class 1, Credit 1

0608-199 Introduction to CET, Transfer
Introduces students to the CET program in order to ease the transition from their previous colleges. Information is provided on cooperative education, technical electives, liberal arts core and concentration courses, and pre-registration procedures. Discussion of topics may include PE registration and NICET certification. Class 1, Credit 1

0608-211 Engineering Graphics with CAD
An introduction to engineering graphics as a means of communication in the fields of manufacturing and mechanical design. The course is laboratory oriented and provides the student with basic skills in print reading, spatial visualization, instrument drafting, freehand sketching, and computer-aided drafting. Prior knowledge of engineering drawing or CAD is not required. Class 2, Lab 4, Credit 4

0608-220 Civil Engineering Graphics
The objective of this course is to develop in the student an understanding of plans and drawings in civil engineering projects as well as in related disciplines: architecture, mechanical and electrical engineering, and landscape architecture. This understanding is implemented by requiring certain drafting exercises relating to these drawings, incorporating pertinent lectures, making field visits to civil engineering works in order to make the connection between plans and actual structures, and by requiring exercises in the use and interpretation of plans. Civil engineering works include site development, structures, hydraulic structures, water and wastewater transport and treatment facilities, and transportation facilities. Students develop an understanding of the technical and legal purpose of plans and how to assemble them. Class 2, Lab 4, Credit 4

0608-225 Computer Applications I
This course provides students with a solid foundation in the use of basic computer software programs that have common applications in future courses and in the workplace. The programs include word processing, spreadsheets, and public presentation software. The class structure includes instruction of new skills and practicing these procedures with laboratory problems. Class 1, Credit 2, Lab 2

0608-303 Land Development Computer Applications
Civil Engineering Technology students will learn to use computer-aided drafting and design software (including civil design and survey modules) to create a Mortgage Survey Map from field notes, to create a Topographic Base Map from field notes, and to design a Site Plan which will include a building layout, roadway alignment, profiles, cross sections, grading, storm sewers, earthwork, and pond design. (0608-211,0608-220,0608-320)

0608-304 Structural Loads & Systems
Introduction to structural loading and load combinations. Calculation of structural loads on buildings in accordance with the New York State 2002 Code (NYS 2002), the International Building Code (IBC) 2000 Code, and the ASCE 7-02 Code. Structural loads to be studied include dead loads, live loads, snow loads, wind loads and seismic or earthquake loads. Selection of structural systems for resisting lateral loads in building structures. (0610-302,0610-303) Credit 2, Credit 2

0608-305 Structural Computer Applications
Introduction to commercially available structural analysis and design software that is widely used in structural engineering practice. The software is used in the analysis of 2-D and 3-D trusses and frames, beams, slabs and walls. (0610-302,0610-303,0608-380). Credit 2

0608-320 Plane Surveying
An introduction to surveying. Topics include note keeping, leveling, vertical and horizontal measurement, traverses, and topographic mapping. Students apply lecture lessons to assignments in the field using modern surveying equipment. (0608-220) Class 3, Credit 4, Lab 2

0608-330 Materials of Construction
A study of Portland cement concrete and asphalt cement concrete. Aggregates, Portland cement, and asphalt cement, (each an ingredient in the concretes) are studied extensively. Mass-volume relationships are explored. Laboratory work focuses on testing aggregates, designing Portland cement concrete mixes, and testing Portland cement concrete cylinders using ASTM standards. Students also test mortar (ASTM standard) and asphalt concrete (NYS DOT standards) in the laboratory. Class 3, Credit 4, Lab 2

0608-340 Route Surveying
Introduction to the fundamentals of route surveying and earthwork. Topics include simple horizontal curves, reverse curves, compound curves, transitional spiral curves, and vertical curves. Techniques for estimating earthwork volume quantities are covered, along with development of drawing profiles and cross sections. Mass-haul diagrams are explored. Laboratory exercises include designing and laying out various types of curves in the field. (0608-320/Plane Surveying) Class 3, Credit 4, Lab 2

0608-360 Elementary Soil Mechanics
Introduction to soil mechanics and its application to problems encountered in civil engineering. Major topics include soil classification, strength and compressibility analysis, effect of water on soil characteristics, and modern and traditional soil improvement techniques. Laboratory tests commonly used to evaluate engineering properties of soils are performed. (0610-302,303 or equivalent) Class 3, Credit 4, Lab 2

0608-380 Elementary Structures
Applications of the principles of statics and strength of materials to the design and analysis of basic structural elements such as beams, T-beams, columns, slabs, and footings. The available time is split evenly between structural steel (allowable stress design using AISC guidelines) and reinforced concrete (strength design using ACI code). Design and analysis of steel connections are covered also. (0610-302,0610-303) Class 4, Credit 4

0608-404 Applied Mechanics of Materials
Basic strength of materials and statics are reviewed. Advanced topics are covered to include stress and strain, Mohr's circle concept, transversely loaded members, statically indeterminate problems, Euler's equations and column design principles. (0610-302,303) Class 3, Recitation 2, Credit 4

0608-420 Hydraulics
Study of principal physical and mechanical properties of liquids, hydrostatic pressure and forces; pressure-measuring devices; buoyancy and flotation; principles of kinematics and dynamics; Bernoulli Law; concept of momentum. Flow of liquids in closed conduits, and introductory principles of piping systems design; pumps and pump selection; flow of water in open channels and introduction to their design. (Physics, 0610-302,303) Class 3, Credit 3

0608-421 Hydraulics Laboratory
Experimental study of principal physical properties of liquids and major laws of fluid mechanics. Operating various laboratory equipment and devices along with concurrently taking 0608420, Hydraulics, for principal theoretical studies of physical and mechanical properties of liquids, hydrostatics, fluid kinematics and dynamics, hydraulic machinery and their operation. Class 3, Credit 1

0608-422 Elements of Building Construction
Elements and details of building construction, both residential and commercial, are explored. The course does not focus on design, but rather on specific building components, and on how these components work together to create a functional building. Some of the topics include: foundations, wood light frame, heavy timber frame, steel, concrete, masonry, glass, roofing, curtain wall systems, and interior finishes. The role of building codes in design and construction is introduced. Class 4, Credit 4

- 0608-432 Water & Wastewater Transport System
grief overview of surface and groundwater sources. Hydraulic design of sewers, storm drains, and potable water systems, including piping and pumping systems, storage and ancillary facilities. Class 1, Recitation 1, Credit 2
- 0608-438 Principles of Treatment Water & Wastewater
An introduction to water and wastewater treatment, interpretation of analyzed physical, chemical and biological water quality parameters associated with the design and operation of treatment processes. Fundamental principles and applications of physical, chemical and biological processes employed in water and waste-water treatment and the analysis of waste assimilative capacity of streams are introduced. (1011-272,276,0608-420) Class 3, Credit 4, Lab 2
- 0608-444 Mechanical Equipment for Building
Presentation of mechanical and electrical equipment used in both residential and commercial building construction. The course investigates HVAC, plumbing, and electrical systems/equipment with an emphasis on function rather than design. Heat loss, psychometrics, duct sizing, and refrigeration systems are among the topics covered. Class 2, Credit 2
- 0608-460 Construction Equipment
The fundamentals of equipment characteristics, uses and earthwork productivity are explored. The course investigates excavators, loaders, scrapers, off-highway trucks, bulldozers and other earth-moving machines, as well as cranes. Students gain practice in machine selection and equipment fleet assembly using productivity, operating costs, and owning costs as criteria. Class 2, Credit 2
- 0608-470 Timber Design & Construction
Discussion of the properties of structural lumber including grades, sizes and design properties. Design of beams, columns, trusses, plywood diaphragms, shear walls and glued-laminated timber. The provisions of various building codes are investigated, and the specification of the American Forest and Paper Association is followed. A comprehensive group design project is assigned and some computer work using a spreadsheet program is involved. (0608-404) Class 4, Credit 4
- 0608-480 Groundwater Hydraulics
Groundwater movement and engineering applications. Topics include construction dewatering, groundwater remediation, flow-net analysis, flow analysis to wells and trenches, design of groundwater collection systems, pump selection, and groundwater's interaction with engineered structures. Application of groundwater software. (0608-420) Class 4, Credit 4
- 0608-482 Hydrology
Presents the concept of the hydrologic cycle and the evaluation of its components. Course concentration on the analysis of stream and surface water hydrology, management of storm water runoff, practical engineering procedures and hydrologic software. (0608-420) Class 4, Credit 4
- 0608-485 Hydraulic Structures
Analysis and design of engineered systems in lakes and streams. Topics may include drainage channels, erosion protection, bridge piers and scour, dam spillways and ancillary structures, docks, breakwaters, harbor structures and roadway systems. Many of these hydraulic systems will be evaluated using USCOE and USDOT design manuals. Approximately one half of the course work involves the application of various software in analysis and design. (0608-420) Class 3, Recitation 2, Credit 4
- 0608-490 Structural Analysis
Introduction to loads, and the analysis of statically determinate and indeterminate structures by classical and modern techniques. The types of structures covered include beams, trusses and frames that are loaded in the plane of the structure. Topics include introduction to cables and arches, influence lines and the effect of moving loads, determination of the degree of indeterminacy, approximate methods (including the Portal Method), moment distribution and an introduction to matrix methods. Some computer work using a popular structural analysis software is involved. (0608-404) Class 4, Credit 4
- 0608-496 Reinforced Concrete Design
Design of members and frames of reinforced concrete. Topics include principles of structural design; loads; properties of concrete and reinforcement; design of slabs, beams, columns and footings. Emphasis is on the use of the ACI code, and a comprehensive group design project is assigned. Some computer work is involved. (0608-303,305,404,490) Class 4, Credit 4
- 0608-497 Structural Steel Design
Design of members and frames of structural steel and their connections. Topics include principles of structural design, loads, types of steels, tension members, columns, no composite and composite beams, beam-columns, column base plates, and simple bolted and welded connections. The use of the AISC LRFD specification is emphasized and a comprehensive group design project is assigned. Some computer work is involved. (0608-303, 305,404, 90) Class 4, Credit 4
- 0608-499 Civil Tech Co-op
One quarter of appropriate work experience in industry. (0606-099) Credit 0
- 0608-500 Labor Relations
Introduction to the fundamentals of labor laws as well as the understanding that good workplace relations depend upon interpersonal skills on a one-on-one basis. Topical legislative and regulatory subjects include the Fair Labor Standards Act, National Labor Relations Act, Davis-Bacon Act, Americans with Disabilities Act, Civil Rights Act and other requirements of the workplace. In addition, time is devoted to an understanding of conflict resolution, sexual harassment, age-in-hiring, family leave, and other managerial requirements and considerations that make the workplace effective and productive. Course content applies to conduct in engineering offices, construction firms and public works agencies and authorities. Several speakers from open shop and union backgrounds share their views and experiences with the class. The assumption is that graduates of the program will assume managerial positions. Class 2, Credit 2
- 0608-505 Construction Safety
General safe practices in construction operations are explored. The OSHA standards addressing trench excavation, scaffolding, temporary electric circuits, fall protection, HAZCOM, underground construction, and other topics are studied. The course also investigates worker's compensation insurance, and costs associated with job-site accidents. Class 2, Credit 2
- 0608-509 Cost Estimating
An introduction to direct cost estimating for construction projects. The estimating techniques covered include quantity take-off, labor productivity, and pricing (labor, material, and equipment). Drawings, sketches, and specifications are used as a basis for developing quantities involving site work, concrete, masonry, steel, and carpentry. Students also gain experience using Timberline Inc's. Precision Estimating, an application software package used as a tool in the development cost estimates. (0608-422) Class 4, Credit 4
- 0608-510 Design of Water Treatment
Principles of water treatment plant design. The course emphasizes the components of common municipal treatment works, although some industrial treatment processes are also covered. (0608-420,438) Class 2, Credit 2
- 0608-514 Land Use Planning
The environmental and social aspects as well as the engineering and cost considerations of land-use planning are covered. Topics included are zoning concepts, master plans, subdivision regulations and design criteria, flood plains, environmentally sensitive areas, wetlands, other planning and control tools, solar access planning, and urban revitalization. Students are involved in an independent project consisting of a concept design for a subdivision or other land-use project. Extensive use is made of field trips and attendance at appropriate meetings or work sessions. (Drafting, Surveying and 0608432) Class 4, Credit 4
- 0608-520 Design Wastewater Treatment Facilities
Principles of wastewater treatment plant design, conceptual and hydraulic design of activated sludge and trickling filter plants are studied. Tertiary treatment processes, such as nitrogen and phosphorous removal, are discussed. (0608420,438) Class 3, Recitation 2, Credit 4
- 0608-525 Civil Engineering in Resource Recovery & Waste Management
An introduction to civil engineering aspects of dealing with resource recovery and "waste" management, on source reduction and resource recovery. Topics covered are the history of the problems, societal reaction and legislation, minimizing, and recovering "wastes." Emphasis is on those aspects in which the civil engineer plays a role such as municipal solid waste landfills and hazardous waste permanent storage facilities, land application of biosolids, composting, and environmental protection projects, including the "brownfields" program. Use is made of lectures, reading materials, outside speakers, field trips, and certain projects. A section of the course focuses on international aspects of resource recovery and waste management. (0608-438) Class 4 Credit 4

0608-527 Soil Mechanics & Foundation
Study of physical, mechanical and engineering properties of soils; methods of determination of bearing capacity; stress distribution within soil mass and settlement; spread footing analysis and design; lateral earth pressure and retaining walls analysis and design; pile foundation analysis and design principles; slope stability; (0608-360, 404; 0608-528, Soil Mechanics Laboratory, must be taken concurrently) Class 3, Credit 3

0608-528 Soil Mechanics Laboratory
The soil mechanics laboratory is to be taken concurrently with 0608-527. Exercises include tests in internal friction by direct shear, unconfined compression, triaxial compression and consolidation. Credit 1, Lab 2

0608-530 Transportation Engineering
Exposes students to the fields of highway, airport and rail engineering. The areas of administration, planning, design, construction, maintenance and operation are covered. After the introductory material is presented, stress is put on specific skills needed in these fields, including highway, rail and airport standards; geometry and alignment; drainage; earthwork; safety standards; and structures. Ample field exposure to all elements is part of the formal structured program. Each student is required to perform an independent project consisting of the design of a section of highway. (Route Surveying) Class 3, Credit 4, Lab 2

0608-535 Pavement Design
This course works in conjunction with Transportation Engineering, providing detailed engineering knowledge on asphalt and portland cement concrete pavement design. Included with the theoretical knowledge will be the development of, and practice in, the necessary design skill. The course includes the design of new pavements, and also addresses the very active programs in pavement recycling, bridge and pavement rehabilitation, and strengthening. Problems are attacked in a practical manner, utilizing the expertise of national organizations and state highway departments involved in this work. Class 4, Credit 4

0608-544 Contracts & Specifications
Includes a fundamental overview of contract law, followed by the application of this material in the contracts for construction. Subsequently, the student is exposed to construction specifications. Substantial use is made of actual documents such as those of the New York State Department of Transportation, the Construction Specification Institute and trade standards such as ANSI, ASTM and others. Students are required to develop and assemble a mock-up set of contract documents. Arbitration, design-build, and partnering are discussed. Class 2, Credit 2

0608-546 Professional Principles & Practice
A treatment of legal and ethical aspects of the profession; review of codes of ethics and current professional problems. Features several guest speakers representing different segments of the civil engineering technology field. Class 1, Credit 1

0608-560 Construction Project Management I
An introduction to construction management. Topics include the various project delivery systems for building construction, along with planning, project organization, bonds, insurance, change orders, submittals, and contract documents. CPM scheduling is covered in detail. Students gain experience using Primavera Inc's Suretrak, a Windows-based application software package used for construction project planning and scheduling. (0608-509) Class 4, Credit 4

0608-570 Principles of Dynamics in CET
Study of the basic principles of engineering dynamics. Topics include kinematics of particles, force, mass, and acceleration, work and energy, force-impulse and momentum, and an introduction to vibrations and structural dynamics. Applications to practical engineering problems are emphasized. (0608-404,490) Class 4, Credit 4

0608-599 Independent Study
A supervised investigation within a civil engineering technology area of student interest. Consent of the sponsor and departmental approval are required. Students are limited to a maximum of four quarter credit hours of independent study projects and two sections in any quarter, plus a maximum of eight quarter credit hours of independent study credits earned toward degree requirements. Credit 1-4

Electrical Engineering Technology

0609-201 DC Circuits
An introduction to DC circuit analysis techniques. Topics include resistance, inductance, and capacitance, with circuit techniques of Ohm's Law; current-voltage division; simplification of series, parallel, bridge and ladder networks; Kirchhoff's Laws; Thevenin's and Norton's Theorems; Mesh and Nodal Analysis; and Superposition. (Corequisite 1016-204) Note: This course has been replaced by 0609-214 Circuits Theory I and 0609-215 Circuits Theory II.

0609-202 AC Circuits
An introduction to AC circuits, including the topics of phasor algebra reactance, impedance, AC power and power factor, resonance, maximum power transfer, frequency, bandwidth, and three-phase circuits. (0609-201; corequisite 1016-231) Note: This class has been replaced by 0609-216 Circuits Theory III.

0609-203 Electronics I
An introduction to electronic circuits using semiconductor diodes and bipolar junction transistors. Emphasis is placed on device characteristics and specifications, biasing circuits, transistor modeling and applications in small signal amplifiers. (0609-202) Class 3, Lab 3, Credit 4

0609-207 First Year Orientation
Introduction to Electrical Engineering Technology. Topics include engineering technology versus engineering, registration system, learning styles, cooperative education, time organization and management, and electives in electrical engineering technology. (Enrollment as a freshman in the electrical engineering technology program) Class 1.5, Credit 1

0609-214 Circuit Theory I
An introduction to IX circuit analysis techniques. Topics include resistance with circuit techniques of Ohm's Law; current and voltage division; simplification of series, parallel, series-parallel circuits: bridge and ladder networks: Kirchhoff's Laws: Thevenin's, Theorem; Mesh analysis. (Corequisite 1016-230) Class 2, Lab 2, Recitation 2, Credit 4

0609-215 Circuit Theory II
A continuation of Circuit Theory I that continues the development of circuit analysis and design techniques including Thevenin, Norton, and Superposition Theorems and Nodal analysis. Inductance and Capacitance are introduced and transient circuits are studied. An introduction to AC circuits is included. (0609-214) Class 2, Lab 2, Recitation 2, Credit 4

0609-216 Circuit Theory III
A continuation of Circuit Theory II with emphasis on the characteristics and analysis of AC circuits. Including the topics of reactance, impedance, AC power and power factor, resonance, maximum power transfer, frequency, bandwidth, and three-phase circuits. (0609-215) Class 2, Lab 2, Recitation 2, Credit 4

0609-221 DC Circuits & Simulation
This course complements the lecture material of 0609-201, DC Circuits. It introduces students to d-c measurements, data recording, technical report writing and to modern schematic capture and simulation tools. (Corequisite 0609-201) Note: This course has been replaced by 0609-214 Circuits Theory I.

0609-222 AC Circuits & Simulation
This course complements the lecture material of 0609-202, AC Circuits. It introduces students to a-c measurements, data recording, technical report writing and to modern schematic capture and simulation tools. (0609-201, 0609-221 corequisite 0609-202) Note: This class has been replaced by 0609-216 Circuits Theory III.

0609-333 Concepts in Systems & Signals
Continuous-time and discrete-time linear, time-invariant, and causal systems are examined throughout the course. Theoretical concepts covered are: the Fourier representation of a periodic waveform; the Laplace transform; convolution; signal sampling; and the z-transform. MATLAB is presented and used extensively. (0609-202, corequisite 1016-304) Class 3, Credit 4, Recitation 2

0609-337 Electrical Machines & Transformers
Topics include power concepts, magnetism, electro-magnetic force, fields, armature, commutators, rotors, stators, brushes, starters, controllers, DC machines, AC motors, alternators, single-phase and three-phase dynamos, three-phase circuits, phasors, transformer properties, isolation, efficiency and voltage regulation. (0609-202 or 0609-411) Class 3, Lab 2, Credit 4

0609-361	Electronics II	Automated Data Acquisition
A continuing course in the analysis and design of electronic circuits. Emphasis will be on the characteristics, operation, and biasing of both insulated gate field effect transistors, and the use of small signal parameters. Students are introduced to frequency response of circuits, differential amplifiers and power electronics, including class A, B, and D amplifiers. (0609-203) Class 3, Lab 2, Credit 4		This course is an introduction to automated data acquisition and analysis, the Lab VIEW software package is introduced and used to perform data acquisition, analysis of data, and control of instrumentation. (0609-202 or 0609-411) Class 3, Lab 2, Credit 4
0609-362	Electronics III	Analog Simulation Seminar
The operational amplifier is covered in detail. A wide range of its application are explained and explored, including many amplifiers and comparators. DC and AC characteristics are studied. Frequency responses of RC and op-amp circuits are covered. (0609-361,1016-231) Class 3, Lab 2, Credit 4		Analog Simulation Seminar is an introductory course in schematic entry, simulation, and simulation results interpretation of analog circuit designs. The analog simulation tool will be used to perform DC, time domain, and frequency domain analysis of both passive and active analog circuits. (0609-201, 202) Class 1, Lab 2, Credit 2
0609-363	Electronics IV	Advanced Electronics
This course applies the concepts of circuits and electronics to basic analog communication circuits for amplitude and frequency modulation. Topics studied are Fourier Analysis, AM and FM transmission and reception, phase-locked loops, synthesizers, oscillators, and DSB and SSB communication systems. (0609-362) Class 3, Lab 2, Credit 4		Operational amplifiers and special purpose integrated circuits are used in signal generation, regulation and active filtering. Radiometric and photometric quantities are applied to optoelectronic components like LEDs and photodiodes. Use of discrete power devices like SCRs, diacs and triacs are studied. (0609-362 or equivalent) Class 3, Lab 2, Credit 4
0609-403	Advanced Circuit Theory	Electrical Tech Coop
An introduction to advanced circuit analysis techniques, including signal decomposition by Fourier Series, circuit characterization in the s plane using Bode straight line approximation or pole-zero plots, Laplace transform methods for solution of circuit transients, and investigations of active circuit stability. (1016 304,0609-333,0609 202 or equivalent with Pspice or other simulation software) Class 4, Credit 4		One quarter of appropriate work experience in industry. (0609-362,0618-438, 0609-407, or permission of advisor) Credit 0
0609-404	Control Systems I	Communication Systems I
Closed-loop control systems are analyzed with respect to their stability, steady-state accuracy and transient response. The design of compensation to improve system performance is included. (0609-403,1016-304) Class 3, Lab 2, Credit 4		Analog Modulation schemes and systems, and the Fourier Series are reviewed. The Fourier Transform is introduced. The noise figure, noise temperature and signal-to-noise ratio of a system are introduced. Phase-locked loop concepts and applications to communications systems and an introduction to digital communication signals and systems are presented. (0609-363, 0609-333) Class 3, Lab 2, Credit 4
0609-407	Career Orientation	Digital Signal Processing
This course is an introduction to the cooperative educational placement process at RIT, the programs in the department and RIT resources. Topics include engineering technology vs. engineering, review of resources available at RIT, the co-operative education placement process, and the ethical expectations of employers for co-op students and RIT during a job search. (Third year student in electrical, computer or telecommunications engineering technology during the current academic year.) Class 1, Credit 1		Concepts of Sampling theory is introduced along with the Discrete-time Fourier Transform (DTFT) and z-transform. Linear systems are reviewed, followed by an introduction to digital signal processing. System transfer function in the z-domain is analyzed which is followed by the design of digital filters and the Fast-Fourier Transform. (FFT) Emphasis is placed on digital filter design and digital spectral analysis. (1016-304,0609-333) Class 3, Lab 2, Credit 4
0609-408	Transmission Lines	Power Systems I
Development and application of the general transmission line equation starting from the distributed lumped LC model. Topics include the propagation of electromagnetic waves in a coaxial line; voltage, current and impedance; graphical methods for analysis; transmission lines as circuit elements. (1016-304,0609-202,403) Lecture 3, Lab 2, Credit 4		Basic elements of a power system, energy sources, substation configuration, load cycles, balanced and unbalanced three-phase circuits, power factor correction, transmission line configurations and impedance, voltage regulation of transformers and the per unit system are studied. Load flow and economic operation are introduced. (0609-337 or 0609-411 and permission of instructor) Class 3, Recitation 2, Credit 4
0609-411	Electrical Principles for Design I	Power Systems II
A service course offered to non-electrical majors studying in the technical disciplines. Topics covered include basic electrical circuits, network theorems, power and energy concepts, power factor correction, and basics of transformers. The laboratory is an integral part of the course, where the experiments complement lecture material. (1016-204 or equivalent) Class 3, Lab 2, Credit 4		Load flow and economic operation of power systems are studied. The symmetrical component method of three-phase circuit analysis is used for fault analysis. Power system relay protection, supervisory control, power quality and system stability are introduced. (0609-550) Class 3, Recitation 2, Credit 4
0609-412	Electrical Principles II	Electronic Optic Devices
An introductory survey course in the basics of analog and digital electronics. Analog topics include basic semiconductors, transistor circuits and operational amplifiers. Fundamental digital logic concepts include an introduction to combinational and sequential logic. Various transducers and associated circuits are introduced. (0609-411) Class 3, Lab 2, Credit 4		Lecture topics to be covered include: light measurement and units, optics and optoelectronic transmitters and drivers. Radiometric and photometric units, black body radiators, optical flux and intensity of LEDs will be calculated using numerical and definite integration. Reflection and refraction from mirror and lens surfaces will be studied. LEDs and laser theory of operation and applications will be analyzed. Laboratory topics to be covered include; fiber optic construction, splicing, connector application and polishing, testing, bends and OTDR theory and advanced operation. (0609-362) Class 3, Lab 2, Credit 4
0609-413	Applied Microprocessors	Senior Project
Applications of a contemporary microcontroller will be used to teach Engineering Technology students digital logic, assembly programming and microprocessor interfacing. This course is intended as a service course for non-electrical majors who have not taken digital fundamentals. (0609-411) Class 3, Lab 2, Credit 4		Selected independent study of design project by electrical technology students with the approval of the department. Approval must be granted first week of fall or winter quarter for spring quarter registration. Class/Lab as required, Credit 4
0609-414	Basic Electrical Principles	Independent Study
This is a basic study of important electrical concepts for both AC and DC circuits. Topics covered include AC/DC circuit theory, single and three-phase power distribution, power factor, line losses, efficiency, AC motors and transformers, energy costs, wiring methods, instrumentation and circuit protection. (1016-232) Class 3, Lab 2, Credit 4		A supervised investigation within an electrical engineering technology area of student interest. Consent of the instructor and the student's academic advisor is required. Credit 2-4

Mechanical Engineering Technology

- 0610-101 Freshman Seminar
A seminar course for incoming freshmen in the mechanical engineering technology and manufacturing engineering technology programs. Course includes discussions, presentations by upperclassmen, alumni, faculty and student activities concerned with helping students become familiar with RIT resources, adjusting to college and college level coursework, and identify career interests. Students practice communication skills, work in teams and discuss issues such as values, diversity of cultures and stress. Class 1.5, Credit 1
- 0610-102 Sophomore Seminar
A seminar course for sophomores in the mechanical engineering technology and manufacturing engineering technology programs. Consists of panel discussions with professionals in career areas such as manufacturing, design, construction, facilities and technical sales. There will be panel discussions with 5th year students about co-op and career opportunities. Students will become more familiar with career paths open to them and will be able to visit potential work environments and develop co-op interests. Class 1.5, Credit 1
- 0610-211 Introduction to Materials Technology
A survey of engineering material and how these materials are matched to the service requirements of the component. Emphasis is on metals; their structure, properties, heat treating and applications. (0610-304 concurrently). Class 3, Credit 3
- 0610-220 Design Dimensioning & Tolerancing
This course focuses on dimensioning and tolerancing of parts and assemblies. Geometric dimensioning and tolerancing is emphasized throughout lectures, CADD exercises and physical measurement of parts. The course is project-based where the students examine an assembly to produce freehand sketches, 3-D models of the assembly and the parts, 2D prints, and a bill of materials. Emphasis is placed on dimensioning and modeling techniques. (0617-220,262) Class 3, Studio 2, Credit 4
- 0610-230 Computing Tools for Engineering Technology
The computer is one of the fundamental tools of mechanical technologists. This course teaches a basic level of computer competency that is regarded by the faculty and industrial employers as essential for success. The course introduces a wide range of applications, including word processing, spreadsheets, making graphs, presentations, basic web page design and posting and technical mathematical calculations. The course also covers computer management related topics such as file management, anti-virus protection, and World Wide Web use as an educational resource. Class 3, Lab 2, Credit 4
- 0610-302 Introduction to Statics
An introduction to the analysis of static structures covering free-body diagrams, forces, moments, vectors, equilibrium, friction, and analysis of trusses and machine members. Applications are drawn from mechanical and civil engineering technology. (1017-211) Class 4, Studio 1, Credit 4
- 0610-303 Strength of Materials
The study of materials and how forces affect axial, shearing, and bending stresses and deflections of structural and machine members. Relationships between stress and strain, for both axial and torsional loading are explored. Beams, shafts, bolted or pinned joints and columns are analyzed and designed based on stress and deformation. Combined stress states are analyzed, including using Mohr's circle. Applications are drawn from the fields of mechanical and civil engineering technology. (0610-302) Class 4, Studio 1, Credit 4
- 0610-304 Materials Testing
A laboratory course dealing with the equipment, instrumentation and ASTM Standard Test procedures used to perform physical tests on various materials and the preparation of laboratory reports. (0610-211 concurrently) Class 0, Lab 2, Credit 1
- 0610-305 Pneumatic & Hydraulic Systems
The study of the basics of fluid power. Areas of study are pressure, viscosity, turbulence, flow, thermal properties and displacement. Hydraulic/pneumatic components such as pumps, actuators, valves, accumulators, lines, directional controls, sealing devices, servomechanisms, hydraulic fluids and fluid containers are studied. (0610-302) Class 3, Lab 2, Credit 4
- 0610-315 Principles Mechanical Design I
This course provides design fundamentals focused on developing mechanical drive systems that utilize components such as brakes, clutches, shafts, gears and pulleys. This project based course, through teams, will reverse-engineer products to not only investigate the importance of component form, fit and function but also to focus on the system itself for parts reduction, fabrication alternatives and feature improvement. Parts fabrication vs. catalog selection will be experienced through assignments, Mechanics of materials, material selection, and process capability for product tolerance and fits are utilized. Ethics, as it relates to mechanical design, will be discussed through real-world examples focusing the impact it has on society and the environment. Life long learning skills will be enforced through examples of job expectations and direct student practice in the classroom. Sketching of components and assemblies, basic tolerance analysis, project planning and technical report writing will be frequently used in this course. (0610-303) Class 4, Credit 4
- 0610-399 Independent Study
A supervised investigation within a mechanical technology area of student interest. Consent of the instructor and departmental approval are required. Credit 1-8
- 0610-403 Failure Mechanics
This course examines the modes of failure of mechanical parts: static, fatigue, and surface. The mechanisms of the different failure modes are presented, as well as the different loading models used to predict behavior of mechanical parts under various loading conditions. Concepts are applied to the analysis and design of mechanical components. The computer is used extensively in the design process. (0610-303,1016-231) Class 3, Studio 2, Credit 4
- 0610-405 Applied Dynamics
This is a course in the fundamentals of kinematics and kinetics of motion. Kinematics is the study of the geometry of motion. Kinetics relates the forces of objects to their resulting motion. This includes the study of Newton's Laws of Motion, energy methods, and impulse and momentum. (1016-232 or concurrently) Class 3, Studio 2, Credit 4
- 0610-406 Dynamics Machinery
A study of the kinematics and kinetics of machine elements. Applications in robotics mechanisms are studied. Both graphical and computer methods are used. (0610-405 and 0610-230 or 432) Class 3, Lab 2, Credit 4
- 0610-407 Mechanical Engineering Technology Lab
A course in mechanical laboratory techniques and the preparation of laboratory reports. Experiments utilize the principles of statics, strength of materials, and dynamics. Students work independently and in groups to prepare formal and informal reports and an oral presentation. (0610-303, 408, 405, 410 and 0610-231 or 432 concurrently) Class 1, Lab 2, Credit 2
- 0610-408 Applied Mechanics I
Elements of statics and strength of materials. Topics include plane equilibrium, friction, stress, strain, torsion and the bending of beams. Offered as a service course to electrical engineering technology students and electrical/mechanical engineering technology students. (1017-211) Class 3, Recitation 1, Credit 4
- 0610-409 Mechanical Engineering Lab II
Characterize polymers, ceramics, and composites by performing tests of mechanical and processing properties according to ASTM standards. Emphasis is placed on analyzing experimental results and preparing professional-quality laboratory reports. (1011-273) (0610-416 concurrently) Class 1, Lab 2, Credit 2
- 0610-410 Applied Mechanics II
The basic concepts of statics and strength of materials are briefly reviewed. Additional strength of materials topics are introduced with the view of developing basic analytical procedures for the preliminary design of engineering structures and machine components. Topics include combined stress, transformation of plane stress, principal stresses and maximum shear stress, Mohr's circle, thin-walled pressure vessels, columns and structure stability. The fundamentals of kinematics and kinetics of particle motion are developed, including the study of Newton's Laws of Motion, energy methods, and impulse and momentum. Offered as a service course to electrical engineering technology and electrical/mechanical technology students. (0610-408, 1016-232 concurrently) Class 3, Recitation 1, Credit 4
- 0610-416 Materials Technology
Topical areas of study include corrosion reactions, corrosion prevention, properties and structure of plastics, an overview of plastics processing, the nature of adhesives and adhesive bonding, properties of composite systems, ceramics properties and structure. (1011-273,0610-211) Class 4, Credit 4

0610-432 Computers in Mechanical Technology
This course reviews the use of fundamental operations and features of the Microsoft Windows Operating System. A set of projects are assigned to utilize the most commonly used features of Word, Excel and PowerPoint and to introduce other features which are important to engineering analysis and related report generation. The basic capabilities of Mathcad are utilized to perform calculations, to generate graphs and to solve equations, as well as to organize and document solutions to a variety of engineering analysis problems. Class 1, Lab 2, Credit 2

0610-440 Applied Thermodynamic I
The first and second laws of thermodynamics and their applications in mechanical engineering technology. Thermodynamic properties of fluids including ideal gasses and pure substances are studied. Thermodynamic processes and applications of thermodynamic principles to steam cycles and refrigeration cycles. (1016-232 or permission of advisor) Class 3, Recitation 2, Credit 4

0610-441 Thermodynamics & Heat Transfer
The first and second laws of thermodynamics and their applications. Thermodynamic properties of fluids, including ideal gasses and pure substances, are studied. Introduction to heat transfer by conduction, radiation and convection. Selection of heat exchangers. (1016-232 or permission of advisor) Class 3, Recitation 2, Credit 4

0610-442 Heat Transfer
The first course in heat transfer. The theory and application of the fundamentals of heat conduction, convection and radiation. The design and application of heat transfer apparatus. (0610-440, corequisite 0610-460) Class 3, Lab/recitation 2, Credit 4

0610-451 Vibration & Noise
A study of the basic concepts of vibration and noise. Designing equipment for survival in vibration and shock environments. Methods of reducing noise in machinery structures. Environmental tests for vibration and shock. Methods of vibration and noise analysis will be demonstrated. (1016-304, 0610-405) Class 4, Credit 4

0610-460 Applied Fluid Mechanics
A study of the fundamentals of fluid statics and dynamics. Principles and applications of fluid statics, fluid kinematics, fluid kinetics, the energy conservation principle, dimensional analysis and fluid momentum. Also covered are laminar and turbulent flow in pipes and products, fluid machinery, fluid meters and lifting vanes. (1016-304 or permission of advisor) Class 3, Recitation 2, Credit 4

0610-465 Thermo/Fluid Lab
Laboratory experiments in thermodynamics, fluid mechanics and heat transfer. Special emphasis is placed on report preparation and computer-aided data reduction. (0610-440,460) Class 1, Lab 3, Credit 3

0610-499 Mechanical Engineering Technology Coop
One quarter of appropriate work experience in industry. (0606-099) Credit 0

0610-506 Machine Design I
The static theories of failure and mechanical fatigue analysis are reviewed. These concepts are applied to the selection, analysis and design of power transmission shafts, power screws, fasteners, springs and spur. The design and selection of both hydrodynamic and rolling element bearings are studied.(0610-403 and 0610-230) Class 3, Studio 2, Credit 4

0610-508 Machine Design II
The study of the machine design principles in a design environment to conceptualize design, build and test a product or mechanical system. Group projects from industry or school laboratory are emphasized. (0610-405,506) Class 3, Lab/Project 2, Credit 4

0610-509 Product Design
Integrates product development and design processes with establishing a need for the product; developing concepts; generating and evaluating the product concepts; developing specifications and design reviews; considering production, service and retirement. Special emphasis is placed on team work (concurrent engineering), determining customer requirements (quality function deployment), design for manufacturing and assembly (DFMA) and quality/reliability. Students learn how to reduce material and part costs, assembly time and the number of parts in the product. (0610-506) Class 4, Credit 4

0610-512 Computer Integrated Mechanical Design
The use of computer simulation and finite element method in solving mechanical design problems, such as stress concentration, dynamic impact, thermal stresses. Industrial projects are emphasized. (0610-405, 506) Class 2, Lab 3, Credit 4

0610-515 Plastics Processing Technology
Various methods used to manufacture plastics products. Topics include compression molding, rotational molding, extrusion, injection molding, blow molding and thermoforming. (Fourth year status) Class 4, Credit 4

0610-516 Plastic Product Design & Materials Selection
The study of design guidelines for plastics products based on the interrelationships between product design, the material selected, the manufacturing process selected and the tooling to be used. (0610-515 or permission of the adviser) Class 4, Credit 4

0610-517 Product Ideation and Concept Selection
This course introduces the principles utilized in the phase of the design process. Topics include the process of generating and formulating an idea, developing a Voice of the Customer (VOC) survey, utilizing a House of Quality (HOQ) matrix for developing a product requirements document, brainstorming and ranking concepts through the Plough Concept Selection Matrix technique, among others. Patenting and intellectual property issues will be discussed and selected ideas will be evaluated against patent searches. This is planned to be the first in a series of three courses that will result in the completion of a product utilizing these methods. (Third year status or permission of instructor) Class 4, Credit 4

0610-518 Develop-Design New Product
This course is designed to offer the student an experience of what it is like to develop an idea into a real product. In this second of three courses the student will be responsible for taking the info from a previously selected concept and developing that into a working design. This design process will require the student to perform a design feasibility study, develop a product specifications document, and be responsible for defining a preliminary manufacturing and assembly feasibility assessment. CAD will now be the "tool-of-choice" where all work will be documented and handled with a standard release procedure that parallels industry protocols. It is expected that this product phase will require the implementation of many foundation principles from previous courses. (Third year status or permission from the instructor) Class 4, Credit 4

0610-519 Product Realization
This course is intended to offer the student an experience of what it is like to develop an idea into a real product. In this third of three courses the student will be responsible for taking a project that is in the final design phase (from the Development & Design of New Products course) and provide the support necessary to develop models and working prototypes. The student will be responsible for applying design, manufacturing, and assembly analysis along with other appropriate disciplines such as value analysis and process control. The results of these disciplines will guide the student into developing a fabrication process that will actually produce at a reasonable quantity to sell. The student will also be responsible for setting up test procedures and evaluating the product for robustness according to a product specification document. (Third year status or permission from the instructor) Credit 4

0610-530 Instrumentation
The design and use of force, torque, pressure, flow, temperature, acceleration, velocity and displacement instrument transducers. Laboratory experiments demonstrate calibration and set-up techniques and analysis of data. Principles of uncertainty, dynamic response, signal conditioning and computerized data acquisition are examined. (0609-411,0610-460,1016-304) Class 3, Credit 4

0610-540 Applied Thermodynamics II
Application of thermodynamics to vapor power cycles, internal combustion engines, compressors, refrigeration, air conditioning, psychometrics and combustion processes. Emerging technologies such as distributed generation, regeneration and total energy plants are covered. Field trips are taken to representative energy facilities. (0610-440) Class 4, Credit 4

0610-542 HVAC System Engineering
Principles and applications of refrigeration, air conditioning, comfort heating and ventilating. Thermodynamics of air conditioning, psychometrics, moisture calculations; also related heat-transfer topics. (0610460,440 concurrently) Class 4, Credit 4.

0610-543 Energy Management
Technical, management and cost aspects of energy conservation. Technical aspects of reducing energy consumption in utilities, processes, buildings, heating, air conditioning and ventilation systems. Special topics such as furnace efficiency, heat recovery, heat pumps, pumping and piping, and architectural considerations. (0610-542 or permission of instructor) Class 4, Credit 4

0610-570 Robust Design
The fundamental principles of robust design are developed. The history of the robust design engineering methodology is presented. The concepts of the loss function, concept selection, parameter design and tolerance design are covered in detail. A structured design engineering methodology is taught with strict attention to the importance of linking engineering knowledge to Taguchi's approach to designed experiments. Metrics and analysis techniques are developed to optimize the performance of product or process components in spite of the variability of their design, manufacturing or customer use environments. Specific attention is paid to a number of case studies to reinforce the students' conceptualization of the methods and their focus on engineering of optimized products and processes. (Fifth year student or department approval) Class 4, Credit 4

0610-599 Mechanical Technology Independent Study
A supervised investigation within a mechanical technology area of student interest. Consent of the instructor and departmental approval are required. Credit 1-8

0610-630 Tolerance Design
This is a comprehensive course on the topics of analytical and experimental development of design and production tolerances. The course covers worst case and statistical tolerance analysis, 6 Sigma methods for tolerancing, Monte Carlo Simulation Sensitivity Analysis of systems, and Taguchi's approach to tolerance design. Special emphasis will be given to developing tolerances for complex aggregations of technologies. System tolerance and cost balancing is covered in detail. The use of tolerance design in critical parameter management will be covered. Students will conduct a project in computer-aided tolerance analysis. Credit 4

Telecommunication Engineering Technology

0614-207 TET First Year Orientation
This course is designed to be an introduction to Telecommunications Engineering Technology, and the skills students need to be successful at the institute. Prerequisite: Enrolled freshman in the Telecommunications Engineering Technology program. Class 1, Credit 1

0614-208 CISCO CCNA1
CISCO Certified Network Academy course CCNA 1 provides coverage of layered network models, industry standards, network topologies, IP addressing, networking components, structured cabling, cable testing, and basic network design. This course is part 1 of the CCNA curriculum. (1016-204 or equivalent or permission of instructor) Class 1, Lab 2, Credit 2

0614-209 CISCO CCNA2
CISCO Certified Network Academy course CCNA 2 provides coverage of beginning router configuration for and troubleshooting of WANs and LANs using concepts in the layered network models. This course is part 2 of the CCNA curriculum. (0614-208 and 1016-204) Class 1, Lab 2, Credit 2

0614-210 CISCO CCNA3
CISCO Certified Network Academy course CCNA 3 provides coverage of switching configuration, network segmentation, and network management issues. This course is part 3 of the CCNA curriculum. (0614-209 and 1016-204) Class 1, Lab 2, Credit 2

0614-211 CISCO CCNA4
CISCO Certified Network Academy course CCNA 4 provides advanced coverage of switching configuration, network segmentation, and network management issues. This course is part 4 of the CCNA curriculum. (0614-210 and 1016-204) Class 1, Lab 2, Credit 2

0614-271 Telecommunications Fundamentals
A survey of and introduction to the structure and regulation of the telecommunications industry. The basics of data communications, telephony, switching systems, ISDN, multiplexing and networks are introduced. Data communication components, codes and techniques are identified. Methods for selecting, implementing and managing a computer network or telephone system are reviewed. Class 4, Credit 4

0614-440 Management Topics for Engineers
This course provides future engineers and engineering technologists with a sound foundation in business principles. It will encompass three main topics in one course (3-in-one). The selected major topics are: engineering economics, ethics and project management with business principles covered as part of each topic. It is envisioned that the course will quickly lay a foundation in project management basics and utilize a contemporary PC based project management tool. This topic will primarily be covered in one two-hour lab each week. The first half of the "traditional" lecture series of the course will introduce and develop business and engineering ethics. (Prospective students must be upper level (years 3-5) and must have successfully completed at least one co-op block. Also, knowledge of a PC spreadsheet application like Excel and knowledge of algebra.) Class 3, Lab 2, Credit 4

0614-464 Signaling & Transmission & Switching in Voice Communications
This distance learning course provides a technical understanding of the local and inter-exchange carrier environments with respect to analog and digital signaling principles, transmission equipment, services and subscriber loop engineering. Private and public telephone systems and networks are studied with respect to POTS, ISDN, digital loop carrier cellular and traffic analysis. This course covers many of the topics in the Voice Communications (0614-465) course without the associated laboratory. Additional topics included in this course are voice over IP networks, computer-telephone integration, digital network signaling and digital transmission principles. Students are also required to write a research paper. (0614-271 and 4002-200 or equivalent) Class 4, Credit 4

0614-465 Voice Telecommunications
This course provides a technical understanding of the local and interexchange carrier environments with respect to analog and digital signaling principles, transmission equipment, services and subscriber loop engineering. Private and public telephone systems and networks are studied with respect to POTS, ISDN, digital loop carrier, cellular and traffic analysis. Students may not take both this course and 0614-464 for credit. (0614-271 and 4002-200 or equivalent) Class 3, Lab 0, Credit 3

0614-466 Voice Telecommunications Lab
This course provides the laboratory component for material presented in 0614-465 and 0614-464. Day and evening sections are offered in sequence with offerings of course 0614-465. Distance learning sections are offered as an intensive weekend lab in conjunction with Distance learning section 0614-464. (Distance learning students must have completed either prerequisite prior to attending the scheduled RIT intensive weekend lab). On-campus day and evening students may register concurrently with on-campus offerings of 0614-465. Class 0, Lab 2, Credit 1

0614-475 Switching Technologies
This course covers narrowband and broadband switching, protocol, transmission, signaling and transport concept used in public and private telecommunications networks. Signaling System #7, frame relay, ATM, SONET, packet and circuit switching fabrics are studied. (0614-465 and 0614466 or 0614-464, 0614-477) Class 4, Credit 4

0614-477 Networking Technologies
Provides a practical study of data communications from the point of OSI seven-layer and the TCP/IP five-layer protocol model. This course covers the operation of the lower four layers in detail by examining some of the foundation laws including Nyquist and Shannon as well as selected protocols. Special emphasis is placed on internetworking, local-area networking and wide-area networking. This course is a problem based course in that students apply the learning to various computer and networking problems. A laboratory ensures a level of networking competency and provides reinforcement of some of the concepts developed in the lecture. (1016-319, 1016-231, 0614-271 or permission of the instructor) Class 3, Lab 2, Credit 4

0614479 Network Management
This course provides an intensive overview of the art and science of management of emerged and emerging telecommunications networks. It integrates technical, management and financial aspects of network management with emphasis on defining requirements, identifying methods of proactive measurement as well as providing specific study of the Telecommunications Management Network (TMN) architecture model and interface specifications. The OSI and TMN compliant Network Management Package—NetExpert is used as a real-world reference. Where possible, other real-world examples are utilized to illustrate lecture topics. A case study/team project is researched and presented. (0614465 and 0614466 or 0614464,0614-477) Class 4, Credit 4

0614-480 Introduction to Telecommunications Policy
This course provides an introductory overview of domestic and international telecommunications policy and issues with special emphasis on domestic policy, regulation and law. Current issues, trends and standards will also be discussed. The course starts with a basic definition of telecommunications and why policy, regulation/deregulation and law are important to understand. It then moves to the history of US telecommunications development with emphasis on the regulatory environment and continues with discussions of current US regulatory policy at the state and federal levels. Current sweeping changes in the regulatory and legal arenas and the move to a new US and world model will be discussed. The importance of standards for domestic and international telecommunications will be studied along with a description of the standards definition process. (0614-271) Class 4, Credit 4

0614-483 Telecom Transmission Systems
Fundamentals of transmission systems are introduced. Different types of transmission systems such as coaxial, fiber optic, microwave, and satellite systems are studied and compared. At the end of this course students will be able to apply transmission system theory to the analysis and design of copper, fiber optic, and wireless transmission systems. (0609-333, 1016-304) Class 3, Lab 0, Credit 3

0614-484 Telecommunications Transmissions System Lab
Laboratory and applications experience with transmission system concepts and analysis is provided to complement the lecture material in 0614-483 Telecommunication Transmission Systems. Students will use circuit simulation software, spreadsheet software, and laboratory equipment to analyze, measure and characterize transmission system hardware components. (0614-483) (on-campus offerings allow concurrent registration in 0614-483) Class 0, Lab 2, Credit 1

0614-499 Telecommunications Engineering Tech Coop
One quarter of appropriate work experience in a telecommunications related industry. (0609-363, 0609-407, 0614-465 and 0614466, 0614-477 or permission of academic advisor.) Credit 0

0614-520 Fiber-Optic Telecommunications Technology
An introduction to fiber optic telecommunications technology. Review of basic optics including ray, wave and quantum optics. Light propagation through multi-mode and single-mode fiber attenuation, dispersion and non-linear effects. Introduction to optical components used in communications systems including light emitting diodes, laser diodes, photodiodes and passive optical components. Optical amplifiers and wave division multiplexing. Emphasis on reading and understanding manufacturers' data sheets for fiber and optical devices. (0609-363) (1017-212/272) (1016-304) Class 4, Credit 4

0614-561 Telecommunications Network Engineering
This course considers the design of PSTN backbone carrier networks with respect to loss, delay timing and synchronization. Data networks are considered with respect to router placement, addressing space and capacity in the face of various types of modeled traffic. (0614-475,0614-477,1016-304) Class 3, Lab 0, Credit 3

0614-562 Telecommunications Network Engineering Lab
This course provides the laboratory experience to complement 0614-561 Telecommunications Network Engineering. Routers are configured for IP, various frame relay, and routing protocols over various LAN, WAN and synchronous facilities. (0614-561) (On-campus offerings permit concurrent registration in 0614-561) Class 0, Lab 2, Credit 1

0614-574 Network Planning & Design
This course provides participants with an introduction to the art and science of wide area network design. Various design approaches are introduced and several heuristic design algorithms are utilized. Blocking networks (telephone voice circuit networks) and delay networks (packet) are studied; greater emphasis is placed on delay networks. The course instills in participants the concept that most networks are holistic entities and therefore, piecemeal approaches to their design yield limited results. A design tool called Delite (design "lite" version) is utilized. The course is taught in a collaborative participatory manner with considerable student interaction as opposed to straight lecture. Whenever possible, real-world examples are utilized to illustrate topics. (0614-479,0614-561 and 562) Class 4, Credit 4

0614-599 Independent Study
The student is required to research or work in laboratory as dictated by the requirements/nature of the independent study. (Student must be a fifth year student in terms of credits earned and have the approval of the telecommunications engineering technology program chair.) Credit 2-4

Manufacturing Engineering Technology

0617-220 Manufacturing Processes I
This course will focus on the basic understanding and application of traditional manufacturing processes. Students will be challenged to discover and learn how typical industrial piece parts and assemblies are constructed. Topics include material properties, powder metal processes, bulk deformation processes, metal removal processes and sheet metal forming processes Class 3, Lab 3, Credit 4

0617-261 Introduction to CAD-A
This is an introductory course in computer aided design. It teaches the basic concepts of automated design and drafting including two and three dimensional model creation, automatic dimensioning and text generation. The course will be taught with the aid of a PC-based CAD system (AutoCAD). (0608-210) Class 3, Lab 2, Credit 4

0617-262 Solid Modeling & Design
This course introduces students to the engineering design process and solid modeling. Students learn visualization skills, parametric solid modeling and creation of engineering drawings which meet industrial drafting standards. Design projects are used to reinforce concepts and provide practical design experience. Class 3, lab 2, Credit 4

0617-271 Fundamentals of Solid Modeling
This course is intended for transfer students who have a background in a solid modeling package other than what is used in 0610-220. Students will learn the fundamentals of Solidworks, in preparation for taking 0610-220. Lab 2, Credit 1

0617-410 Computers in Manufacturing
A course dealing with concepts in data acquisition and control and application of computers for manufacturing process integration. This course will introduce the concepts in digital and hexadecimal number systems, digital logic, parallel and serial communication, microcomputer architecture, sensors and actuators and real-time programming. Concepts in networking and distributed systems will also be introduced. Students will use C or C++ programming language to control experimental setups in the laboratory. (C or C++ Programming) Class 3, Lab 2, Credits 4

0617-411 Design for Manufacturing Assembly
The basics of Manufacturing Processes (I and U)are expanded and applied to the design process. Design is taken from early courses that deal with function and theories of failure and now is considered from the viewpoint of manufacturability. Part concepts will be considered for various manufacturing processes to determine which process will yield the lowest cost part that meets all product functional requirements. Cost will consider the sum of both piece part associated tooling, and assembly costs. (0617-420 and 0610-220, or instructor permission) Credit 4

0617-420 Manufacturing Processes II
This course will focus on the basic understanding and application of traditional and non-traditional manufacturing processes. Students will be challenged to discover and learn how typical industrial piece parts and assemblies are constructed. Topics include: plastics fundamentals, joining processes, electro-discharge machining, water jet cutting, ultrasonic machining, laser beam machining and review of rapid prototype manufacturing processes.(0617-220) Class 4, Credit 4

0617-436 Engineering Economics
A study of techniques required to make economic decisions. Topics covered in the course include cash flow analysis, present worth analysis, annual worth analysis, rate of return evaluations, benefit cost analysis, break even analysis, replacement analysis, bonds, the effect of tax on cash flows, and sensitivity analysis. Class 4, Credit 4

0617-440 Production & Operations Management I
This introductory course in Production and Operations Management focuses on operations terminology, operations strategy, design for manufacturing, project planning/control, value analysis and statistical quality control. (1016-319) Class 4, Credit 4

0617-441 Production & Operations Management II
This course is designed to provide the student with knowledge of the latest theories and practices of operations management employed by world class manufacturing organizations. Topics include TQM, MRP, JIT, lean manufacturing, six sigma, theory of constraints, work simplification and operations research. Class 4, Credit 4

0617-455 Introduction to Surface Mount Electronics
This course will provide a thorough understanding of the technology, components, equipment, design and manufacturing process for surface mount electronics manufacturing. As an introductory course, it will provide students with a strong foundation needed for advanced work in surface mount technology (SMT). The laboratory demonstrations will provide the students an orientation and familiarization of the manufacturing equipment and process for printed circuit board assembly (0609-411) Class 4, Credit 4

0617-456 Advanced Concepts in Electronic Packaging
This course deals with advanced topics in Surface Mount Electronics Packaging. Topics include: electronics packaging standards, single-chip and water level packaging technologies, advanced passive component technology, high density interconnection and microvia technology, thermal management, thermomechanical behavior of packaging, solder metallurgy and joint formation for packaging, failure modes, mechanisms and reliability testing. (0617-455) Class 2, Lab 2, Credit 4

0617-457 Electronics Packaging Lab
This laboratory class will provide the hands-on training in surface mount electronics packaging. Students will learn to set-up and operate production scale equipment, understand process parameters and their influence and characterize the entire PCB assembly process. Lab experiments will also include analytical evaluation of raw materials such as solder paste viscosity, tackiness, wetting, component and board solder ability, solder balling, etc. Class O, Lab 2, Credit 1

0617-460 Computer-Aided Design
CAD is introduced as an integral part of the computer integrated manufacturing process. Basic concepts of CAD software and hardware, interactive graphics, CAD applications, CAD economics and the interrelationship of CAD and CAM are discussed. The course work gives the student the skills needed to create 3D solid models using parametric 3D solid modeling application. Emphasis is placed on laboratory work such as creating solid models and assemblies containing solid models with limited view creation and dimensioning. Class 4, Credit 4

0617-470 Controls for Manufacturing Automation
This course deals with the principles and application of programmable logic controllers (PLC). Topics include PLC hardware, programming and application of PLCs in a computer integrated manufacturing (CIM) environment. Students will also be exposed to man machine interface (MMI) and PLC networks. Class 3, Lab 2, Credit 4

0617-471 Computer Numerical Control
An advanced course in computer numerical control. Emphasis is placed on machine language and computer aided parts program generation, tool path verification and program editing. Students create three axis programs for CAD, generate models, then modulate their instructions to CNC machine tools to actually cut the finished part from raw stock. CAD/CAM integration concepts are presented. (0617-220,262) Class 2, Lab 2, Credit 4

0617-472 Tool Engineering
The course content includes the principles of design for industrial tooling, the concepts of jig, fixture, measurement, die and automated equipment design, engineering analysis and manufacture. Work piece locating, supporting and clamping systems are emphasized. (0617420,262,) Class 2, Lab 2, Credit 4

0617475 Computer Aided Manufacturing
This course deals with the use of computers for the various aspects of manufacturing. These aspects include group technology, process planning, automated CNC part programming, shop floor control, concurrent engineering and flexible manufacturing systems. The course also deals with CAD/CAM integration and the importance of CAD database in manufacturing. It introduces the relationship of CAM with the various elements of computer integrated manufacturing (CIM). Emphasis is on the design and development of a real world CAM system in the laboratory. (0617-470,471,485) (0617-510 must be taken in following quarter.) Class 3, Lab 2, Credit 4

0617485 Robots in Manufacturing
This course deals with the technology and application of robots in a Computer Integrated Manufacturing (CIM) environment. It will provide a thorough understanding of robotic hardware and software. The hardware aspects include robot configurations, drive mechanisms, power systems (hydraulic, pneumatic and servo actuators), end-effectors, sensors and control systems. The software aspect deals with the various methods of textual and lead through programming. Digital interfacing of robots with other CIM components such as programmable logic controllers, computer-controlled machines, conveyors, etc. will be introduced. Robotic cell design and the socio-economic impact of robotics will also be discussed. A strong laboratory hands-on training component is part of the course. Class 3, Lab 2, Credit 4

0617499 Manufacturing Technology Co-op
One quarter of appropriate work experience in industry. (0606-099) Credit 0

0617-510 Process Design
A project oriented capstone course to enable students to design, develop, implement and test a CIM Cell. The students are required to work in teams and identify suitable product and process concepts that fit into a CIM environment. The students must demonstrate successful operation of the cell to receive a satisfactory grade. (0617-475 must be taken immediately prior to this course.) Class 1, Lab 4, Credit 4

0617-530 Special Topics in CIM
This course is designed as a technical elective offered to enable students to pursue subjects of special interest to themselves. Subject matter is limited to the area of CIM. Students will be given the opportunity to present a proposal outlining their goals for the course. Upon approval by the course instructor students will be given wide latitude to investigate their CIM area of interest to a breadth and depth not available in a structured course. Students will be expected to work in areas and on problems of concern to the manufacturing industry. Acceptable projects will include those undertaken in response to specific requirements of an industry contact, individual research or research in conjunction with faculty or fellow students, library research, intercollegiate competitions, or investigative or original (innovative) papers suitable for publication. Credit 2-5

0617-599 Independent Study
A supervised investigation within a manufacturing technology area of student interest. Consent of the instructor and department approval are required. Credit 1-8

Computer Engineering Technology

0618-101 Freshman Seminar
This course provides first-year students an opportunity to develop skills necessary to succeed in the computer engineering technology Program. Through interactions in a small group environment, students will make friends with other students in their major, create a stronger bond with RIT, and develop a working relationship with their academic advisor. The students will become more knowledgeable about the computer engineering technology discipline, career options and ethical issues. (Enrolled as a freshman in the computer engineering technology program) Class 1, Credit 1

0618-200 Digital Fundamentals AP
This course is used ONLY for the purpose of transferring advanced placement (AP) credit for Digital Fundamentals (0618-301). Transfer credit will only be granted to students who receive a letter grade of B, or better in Project Lead The Way's Digital Electronics course. Credit 4

0618-206 Computers & Their Applications
This is an introduction to the fundamental concepts and problem areas of computers and their applications through a survey of the major sub-areas of the field. Students will learn the nature of programming and how to create simple programs using HTML. Students will also spend time using Word, Excel as well as other applications. Since this course is a combination of concepts of computers and applications, students will also study the history of computing, how computers are built, the internet, automation and control systems, the future of computers and ethical and social issues associated with computers and their applications. Class 4, Credit 4

0618-220	Electronic Fabrication Techniques An introduction to the electrical, computer, and telecommunications engineering technology field with an emphasis on the hands-on laboratory skills that students will need during their first two academic years. These skills include circuit layout, prototyping, wire wrapping and soldering. The fundamentals of printed circuit board design and fabrication for both surface mount and thru-hole technology will be explored. Note: This course has been replaced by 0609-214 Circuits Theory I.	Computer Engineering Tech Co-op One quarter of appropriate work experience in a computer related industry. (0618-339,0618-233,0609-407 or permission of academic advisor) Credit 0
0618-231	Technical Programming I The first course, of a three-course sequence, in developing software for the solution of technical applications. Specifically, procedure-oriented programming of the C++ language will be employed to develop software solutions for engineering and scientific applications. Object-oriented programming will be introduced by the use of predefined objects. (Computer Competence Placement Test, 0610-230 or 4002-200) Class 3, Lab 2, Credit 4	Embedded Systems Design I A beginning course in embedded systems architecture. This is the first in a three-course sequence. System design principles are developed and analyzed. Formal modular assembly language and C are studied for embedded systems. Focus is on monitor operations and peripheral interfacing. Students design and debug hardware and software to augment an existing system. (0618438 and a formal, structured C or C++ programming course) Class 3, Lab 2, Credit 4
0618-232	Technical Programming II The second course, of a three-course sequence, in developing software for the solution of technical applications. Specifically, object-oriented programming of the C++ language will be employed to develop software solutions for engineering and scientific applications. Fundamental data structures (arrays, pointers, records) will be introduced. (0618-231) Class 3, Lab 2, Credit 4	Embedded Systems Design II This is the second of a three course embedded systems sequence. General hardware and software principles are expanded upon as students build their own 32-bit microprocessor based system from the ground up. Debugging techniques unique to a new system design are explored in detail as students bring to life a completely untested system. Concepts such as dynamic bus sizing, burst accesses, interfacing to a standard bus, and design for test and manufacture are covered in detail. (0618-561 and a formal, structured C or C++ programming course) Class 3, Lab 2, Credit 4
0618-233	Technical Programming III The final course of a three-course sequence, in developing software for the solution of technical applications. Specifically, classical data structures and advanced data types (lists, strings, stacks, queues, trees and graphs) will be studied and employed to develop software solutions for engineering and scientific applications. These applications will include an introduction to numerical methods (i.e. root finding, bisection method, secant method, numerical integration, trapezoidal rule and Simpson's rule) (0618-232) Class 3, Lab 2, Credit 4	Embedded Systems Design III This is the final of a three course embedded systems sequence. Students expand upon the 32-bit microprocessor based system they built in 0618-562. More complex peripherals, cache principles, multi-master systems, arbitration and resource sharing, and bus standards are covered in detail. (0618-562 and a formal, structured C or C++ programming course) Class 3, Lab 2, Credit 4
0618-301	Digital Fundamentals A first course in digital fundamentals. Topics include binary arithmetic, Boolean algebra, logic gates, Karnaugh mapping, sequential and combinational logic circuits, and an introduction to state machines. (0609-201, 0609-221; corequisite 0609-222) Class 3, Lab 2, Credit 4	Senior Project A course that provides the motivated student an opportunity to pursue a supervised design project of mutual interest to him/herself and the sponsoring faculty. The design project must be within the computer engineering technology discipline. (Fifth-year status in the computer engineering technology program) Credit 4
0618-303	Microcomputers An introductory course involving the hardware and structure of a basic microprocessor based microcomputer. Emphasis will center on the hardware characteristics, design considerations, trouble shooting skills and interfacing principles. (0618-301 and a formal, structured programming course) Class 3, Lab 3, Credit 4	Independent Study A supervised investigation that provides the student with a vehicle to pursue areas of study not currently offered in the program. (Approval of the computer engineering technology chair) Credit 2-4
0618-339	Microcontrollers An advanced course in interfacing microcontrollers to sensors, actuators, and input/output devices. Topics include: the measurement of light and temperature levels, interfacing issues related to keypads, LCD panels and LED display modules, and concepts of analog to digital conversion, pulse width modulation and serial communications. It is assumed that the student is already familiar with assembly and machine language programming of microprocessors. (0618-301 and 0618-303) Class 3, Lab 2, Credit 4	
0618-371	Special Topics Special Topics is an experimental lower-division course intended as a means for offering innovative topics not reflected in the current curriculum. Class, Credit variable 24	
0618-438	Digital Systems Design An advanced course in the design techniques of complex combinatorial and sequential logic circuits and subsystems. Emphasis is on the use of systematic design procedures for implementing state machine designs. The internal structure and functions of various logic gates and families are analyzed. The problems of interfacing various logic families are discussed. (0618-303, 0609-203) Class 3, Lab 2, Credit 4	
0618-439	Principles of Electronic Design Automation An advanced course in the VHSIC Hardware Descriptive Language (VHDL). The course provides an in-depth coverage of the language and describes the VHDL design environments that will be used for synthesis and verification. Topics include the behavioral, dataflow, and structural modeling of both combinatorial and sequential logic, design methodologies, synthesis and optimization. An IEEE-1076 standard VHDL development system will be extensively utilized to synthesis VHDL for PLD, CPLD and FPGA applications. (0618-438 and a formal, structured programming course) Class 3, Lab 2, Credit 4	
		Hospitality Management
0619-220		Survey of Service Industry Seminar designed to define career opportunities in the hospitality, nutrition, and service management industries. Students receive guidance in developing career objectives. Leading industry executives participate. Class 2, Credit 2
0619-221		Basic Computer Application This course teaches students basic computer applications used in the service industry. Emphasis is on word-processing, spreadsheets, and computer-developed presentations. Students have projects and tests in each of the three areas. Class 2, Credit 2
0619-320		Global Standards Service Industry Globalization of commerce carries with it increasing global standards. This course examines different kinds of standards, especially those related to international trade and commerce. Students are expected to identify situations in which standards are mandated, identify the relevant standards, and then describe the applications of the appropriate standards. The course also looks at current issues and emerging trends in standards. Class 4, Credit 4
0619410		Assessing Service Quality Excellence in customer service is the hallmark of success in service industries. But what exactly is service excellence? This course surveys the various issues related to measuring customer satisfaction. It examines those issues that cause service quality problems and what service organizations can do to solve these problems and improve service. Guidelines for developing questionnaires are discussed, with emphasis on issues of reliability and validity. The role and mechanisms associated with focus groups are addressed. (1016-301 or permission of instructor). Class 4, Credit 4

0619-426 **Technology in Service Systems**
Predicting the future...adapting to change...connecting and communicating...lifelong learning...A fundamental societal revolution has begun which is changing the nature of work and leisure. Explore the emerging and future work worlds, consumer trends, and the technologies that are changing the way society works. Emphasis is on technologies impacting the food, nutrition, hotel and travel service industries. Technologies explored may include those associated with communication, information retrieval, imaging, marketing, employee training, product quality, production customization, customer service, security, health, entertainment and customer interface, as time permits. Student teams will chart the flow of product/service systems and identify technologies to enhance them to meet customer needs. Individual (personal) and team (business) web sites will be constructed. **Class 4, Credit 4**

0619-470 **Leadership in Service Culture**
The leadership and executive development course prepares you to assume leadership and management roles as you prepare to enter the work force. Principles, applications and exercises specifically designed around hospitality and tourism industry examples will enable you to more effectively progress as future leaders and managers in the hospitality and tourism industries. You also will begin to establish your own personal leadership and management style based on examples and exercises. The course makes extensive use of lectures, laboratories and industry expertise. **Class 4, Credit 4**

0619-480 **Human Resources Management**
This course presents hospitality and service management students with a complete repertoire of human resource management (HRM) issues. It addresses all the current HRM topics and is designed to enhance the student's ability to deal effectively with HELM topics. The laboratories attempt to develop conceptual thinking abilities. The course also focuses on HRM training techniques—an area of specific concern in the hospitality industry. By emphasizing various training techniques and practices, highly skilled graduates can immediately employ one of the hospitality industry's most valuable tools—training to aid in the retention and management of human resources. The course makes extensive use of lectures and laboratory exercises. **Class 4, Credit 4**

0619-490 **Senior Project**
A capstone course that explores the integration of disciplines in addressing problems and issues facing the service/hospitality industries. Students have the opportunity to identify and investigate (as individual projects) challenges to these industries. Various modes of research, problem-solving techniques and presentation styles are utilized. Students also have the opportunity to select a faculty mentor. The class culminates with a presentation made by the student to peers and faculty. **Class 4, Credit 4**

0619-501 **Service Management**
This course is designed to evaluate management software applications, new service technologies, and best management practices and implementation of strategies in hospitality and service organizations. Students will interact with departmental managers, Hospitality and Service Management faculty, and various market segments in order to gain experience in a service environment. **Class 1, Lab 3, Credit 2**

0619-506 **Franchising in the Service Sector**
Franchising has been a successful method for business expansion. This course covers the advantages and disadvantages of franchising as well as the key factors in obtaining, developing, and operating a franchise operation that meets specific customer needs. Legal and financing issues are also covered. Major project developing a franchise plan is required. **Class 4, Credit 4**

Nutrition Management

0620-213 **Contemporary Nutrition**
The study of specific nutrients and their functions; physiological, psychological and sociological needs of humans for food; development of dietary standards and guides; application of nutritional principles in planning and analyzing menus for individuals of all ages; survey of current health nutrition problems and food misinformation. **Class 4, Credit 4**

0620-402 **Dietetic Environment**
Introductory supervised practice course. Students interact with a representative sampling of personnel in all areas of food and nutrition. Supervised observations are planned in food management systems, health care facilities and community nutrition programs. Practicum hours by arrangement. **Class 1, Credit 4**

0620-510 **Nutrition Alternative Medicine**
This class offers an overview of controversial and accepted alternative diet therapies, basic medicine guidelines, and vitamin/mineral supplementation. **Class 2, Credit 2**

0620-525 **Medical Nutrition Therapy I**
The applied study of metabolism and the interrelationships between nutrients and other biochemical substances in humans. Etiology, symptoms, treatment and prevention of nutritional diseases; evaluation of nutritional status; role of the diet in gastrointestinal, renal, musculoskeletal, cardiac, endocrine, surgical and other diseases. **Class 5, Credit 5**

0620-526 **Medical Nutrition Therapy II**
The applied study of metabolism and the interrelationships between nutrients and other biochemical substances in humans. Etiology, symptoms, treatment, and prevention of nutritional diseases; evaluation of nutritional status; role of the diet in gastrointestinal, renal, musculoskeletal, cardiac, endocrine, surgical, and other diseases. **Class 4, Credit 4**

0620-550 **Community Nutrition**
Study of current nutrition problems and delivery of nutrition information and service in the community. Survey of facilities involved in giving nutrition information or nutritional care. Emphasis on acquiring skills necessary for delivering nutrition information and services in traditional and nontraditional markets. Independent practicum's involving nutrition care in community facilities are required. Assignments are arranged by the instructor. Practicum hours by arrangement. **Class 2, Credit 4**

0620-554 **Nutrition in Life Cycle**
An applied course in nutritional needs throughout the life cycle. Emphasis is given to nutrition during pregnancy, infancy, early childhood, adolescence, young and middle adulthood, and the elderly. Practicum in facilities delivering nutrition services to these age groups is required. Practicum hours by arrangement. **Class 4, Credit 5**

Food Management

0621-225 **Principles of Food Production**
Introduction to the basic principles involved in the preparation of high-quality food. Topics include product identification, market forms, varieties availability, composition, standards of quality, preparation techniques, and function of foods and ingredients. Standard methods of preparation will be introduced. Professionalism in appearance and work habits, self-organization, sanitation, management, team work, and techniques for efficient food production are stressed. Uniform and professional knife and pastry kits are required. **Class 2, Credit 4, Lab 4**

0621-310 **Commodity Market Analysis**
An overview of the commodity futures and options market. Special emphasis is placed on the fundamental economic factors affecting agricultural and energy-based futures prices. The economic principles and policies supporting hedging and speculating strategies are analyzed. Students are introduced to technical price analysis, basis analysis and global economics of foodservice commodities. **Class 4, Credit 4**

0621-314 **Sanitation & Safety**
Survey of micro-organisms of importance to the food industry; emphasis on causes and prevention of food spoilage and poisoning. Responsibilities of management to provide and establish safe working conditions and policies; discussion of current problems confronting the industry as a result of recent legislative developments as they relate to safety and health. **Class 2, Credit 2**

0621-315 **Foodservice Marketing**
Provides students with a business-to-business perspective of the marketing of products to the foodservice industry. Also provides an understanding of distribution systems and foodservice marketing environments. Both macro and micro marketing environments and issues are explored. The class considers various marketing mix elements as they relate to segments of the foodservice industry. Case studies and readings are utilized to give students realistic opportunities to analyze and develop practical solutions. **Class 4, Credit 4**

0621-318 **Food & Beverage Management**
An introductory course involving the basic principles involved in the management of food and beverage operations. Topics include food and beverage marketing, menu planning, nutrition principles, staffing, cost, production and preparation procedures, service and design. Both commercial and non-commercial food operations will be discussed. **Class 4, Credit 4**

0621-321 Menu Planning & Merchandising
The menu is the main focus of the foodservice operation, and its relationship to efficient operation, merchandising, theme and customer satisfaction is considered. Truth in menu issues, layout, copywriting, standardized recipes and pricing techniques are explored. A wide variety of menus are critiqued. The student plans and produces a menu for a theme restaurant and also creates a cycle or other menu for a specific customer and situation. Class 2, Credit 2

0621-331 Restaurant Operations
Entry-level production and service skills for line positions currently used in the hospitality industry. Laboratory assignments are in the operation and maintenance of Henry's, a full-service restaurant modeled after industrial, hotel and restaurant operations. Students are assigned to defined job descriptions in production and service on a rotating basis. (0621-225, 314) Class 3, Credit 6, Lab 10

0621-334 Integrated Service Management
Students will develop management, marketing and customer service skills appropriate for current and future hospitality industry environments. Laboratory assignments are designed to develop front of the house operation and management skills, including the adaptation of new technologies to food service businesses. Henry's, a full service restaurant modeled after industrial, hotel and restaurant operations, is the laboratory setting. Students will be asked to define roles needed to operate and market Henry's Restaurant and to create individual professional goals and objectives that they will meet during the quarter. Class 4, Credit 4

0621-410 Food Processing & Quality Assurance
An introduction to traditional and contemporary food processing methods with emphasis on applications to foodservice operations. The effect of these technologies on the storage life and sensory qualities of the products is examined along with common modes of quality loss in foods. Students are introduced to industry-standard quality assurance measures. Class 4, Credit 4

0621-416 Product Development
Students will explore their creativity through instructor and student-planned experiments involving sensory and objective evaluation of food quality, recipe development, problem-solving, experimental design, written and oral communication of research. Individual research projects focus on assessing new ingredients or technologies, creating new products, and/or evaluating the marketability of new product. (0621-225) Class 2, Credit 4, Lab 4

0621-424 Food & Labor Cost Controls
Deals with industry-related problems. Combines classroom study of the fundamental principles of costs and controls, as applied by management, with on-location application of financial practices and specialized methods and techniques utilized in solving cost and management problems in the hotel/motel and food services industry. Class 4, Credit 4

0621-499 Cooperative Education
Career-related work experience. Employment within the hospitality and service management industry, monitored by the office of cooperative education and career services and the hospitality and service management program. Designed for the student to experience progressive training on the job as related to the academic option. Freshmen begin co-op the summer following their first-year studies. Graduation requirement. Credit 0

0621-501 Wines of the World
An introduction to wines: history, points of origin, production, handling techniques, flavor characteristics and commercial value. Includes guest speakers and sampling of products. Lab fee required. Class 2, Credit 2

0621-502 Decorative Techniques
Introduction to techniques of food decoration, with emphasis on elementary and advanced pastry-bag work; design and color in the creation of special-occasion cakes; molding of gum paste, marzipan and pulled-sugar decorative items; and the art of molded and piped chocolate pieces. Students design and create four projects representing these skills. Lab 4, Credit 2

0621-512 Design & Layout Food Operations
Evaluation of different foodservice facilities with regard to design and layout. Review of layouts in operating full-service facilities and suggestions for innovative ways to utilize the space to its fullest potential. (0621-331 or permission of instructor) Class 2, Credit 2

0621-525 Restaurant Management
Students develop entry-level management competence through the operation of a full-service restaurant with beverage operations. Students rotate through various management positions for exposure to four major areas: planning, organization, leadership and control. Use of the school's computer lab in planning is an integral part of the course. Class 2, Credit 6, Lab 10

0621-532 International Food Dist Seminar
Presentation and discussion of current and relevant issues in food-service marketing and distribution. Discussion topics compare and contrast domestic and international distribution and marketing systems as well as monetary, cultural and political/legal issues. Class 4, Credit 4

0621-554 Senior Career Seminar
A variety of courses are offered under this course number. Titles will appear in the course listings each quarter. The course may be taken more than once as the topics change. Contact the department for a course description of a specific title. Credit 1-4

0621-599 Independent Study
The student will work independently under the supervision of a faculty adviser on a topic not covered in other courses. The proposal must be signed by a faculty member. Credit 1-6

Hotel and Resort Management

0622-200 Hotel Operations
Introduction to the distinctive nature of hotel operations through identifying the standard functions that interrelate to produce the whole hotel service. The hotel's principal product, the guest room, is given detailed study, as well as the various forms of business organization that comprise the accommodation sector of the hospitality industry. Class 4, Credit 4

0622-205 Hospitality Industry Real Estate
Provides the student with insight into the development of hospitality real estate and the elements that contribute to decisions on construction, development and expansion of properties. Attention is given to site selection and development processes as they relate to the commercial hotel, resort, foodservice and travel locations. Contributing elements of market conditions, financial feasibility, construction needs and property sizing are explored. Class 4, Credit 4

0622-210 Hotel Marketing & Sales Management
Introduces the student to the application of the marketing concepts in hotel operations and the visitor industry. Included are conventions and visitors bureaus, hotels and convention centers. This is accomplished by defining the marketing function, situation analysis, marketing organization, sales office work flow, customer contact methods and servicing procedures generally practiced in the hotel industry. Class 4, Credit 4

0622-221 Orientation to Computers in Hospitality
Students gain experience in computer programs used in the hospitality industry, including word processing, spreadsheets, e-mail, internet access, specialized industry programs, databases and electronic presentation software. Required projects utilize packages individually and in an integrated fashion. Class 1, Credit 2, Lab 2

0622-310 Resort Development and Management
Gives the student an understanding of how resort and hotel properties are developed as tourist and business destinations. Focus is on the planning, development, operation, design and special needs of recreational surfaces and financing of such properties. As part of this study, students select a specific type of property and analyze the methods used to develop it. Class 4, Credit 4

0622-315 Facility & Property Management
Provides the student with information on the maintenance and engineering discipline in hotel and resort facilities. Management and administrative practices, life safety concepts, energy monitoring, computer applications and budgeting in the realm of hotel maintenance are studied. Class 4, Credit 4

0622-355 Financial Management for Hotels
Presents hospitality and service management students with accounting and finance concepts that are essential in hospitality management. Hotel accounting principles, income statement analysis, industry-accepted ratio analysis, operational forecasting and budgeting strategies are examined. (0101-301 or permission of instructor) Class 4, Credit 4

0622420 Hospitality Law
This course introduces the student to contract, tort and agency law as they relate to the hospitality industry. The course covers the legal rights and responsibilities of patrons and owners as they relate to public accommodations, providers of transportation and livery and common law. The course focus is on civil rather than criminal law. A considerable amount of case work is anticipated in this course and this should enable students to develop a preventative attitude toward liability and assumption of responsibilities. Class 4, Credit 4

0622-510 Convention Management
Provides the student an opportunity to explore the function of conventions from the point of view of the convention center manager. Consideration is given to various methods used to sell a location to a planner and the servicing of large groups. Also included are the identification of vocabulary and the role of the meeting planner as a force in the marketing of conventions. Trade shows, floor layouts and local codes affecting conventions also are reviewed. Class 4, Credit 4

0622-532 International Hotel Development
This course will focus on the impact and importance of political, social, cultural and economic aspects, as it influences hospitality development on an international level. This course aims to enhance perceptions and skills of global developments and trends in the competitive and growing global industry of hospitality and tourism. Class 4, Credit 4

0622-534 Space Tourism Development
This course extends the boundaries of the traditional hospitality and tourism planning and management. Students will explore the unusual and often unique factors of hospitality and tourism management in an earth orbit habitat (like the International Space Station) or other celestial bodies (like moon or an asteroid). Students will investigate market demand for tourism and business and compare them with the plans and objectives of organizations already developing space tourism. Students will make recommendations for the future development in one or more areas in the earth terrestrial habitation and tourism. Class 2, Credit 2

0622-536 Legal Policy Analysis in Hospitality
This course is designed for the student to examine the impact of federal, state and local legislation on the hospitality industry, managers, convention/visitor bureaus and corporations involved in the hospitality industry or with regard to certain related legislation that is passed into law. There are federal, state, and local laws that would subject the above groups to compliance. Students will research case studies from a variety of issues pertinent to the hospitality industry and analyze the positive and negative affects to those concerned. Class 4, Credit 4

0622-540 Risk Management
An examination of the environment in which the hospitality manager functions. Focus is on the management of risk as part of operations. The implications of tort and contract law specifically relating to the industry are undertaken, and an explanation of how persons may avoid exposure to risk is made. This includes forms of insurance, hold-harmless clauses and management decisions on the importance of coverage given different degrees of risk. Class 4, Credit 4

0622-550 Casino Management I
This course gives students an advanced introduction to the casino environment. After satisfactorily completing this course, students will have a strong working knowledge of casino operations and the interrelationship of the casino with other major departments (lodging, food, beverage, entertainment, etc.). Topics include the history of gaming in America, recent trends that impact growth and acceptance rates of legalized gaming, the rules and protection of table games, the various types of "slots," the role of computerized information systems, layout and design within a casino operation, surveillance in a casino environment, casino accounting and back-office procedures, consumer behavior, casino marketing strategies, gaming regulations and economic impact issues. Class 4, Credit 4

0622-552 Casino Management II
This course gives students an advanced introduction to the casino environment. After satisfactorily completing this course, students will have a strong working knowledge of casino operations and the interrelationship of the casino with other major departments (lodging, food, beverage, entertainment, etc.). Topics include casino marketing strategies, gaming regulations and economic impact issues. Class 4, Credit 4

0622-580 Destination Marketing
The processes and techniques used to promote tourism destinations such as resorts, attractions and individual communities. Emphasis is on the role that destination marketing organizations such as convention centers, visitor's bureaus and tourism-promotion agencies play in marketing a destination. The development of tourism marketing plans and management of inquiry-fulfillment-referral processes are discussed. Class 4, Credit 4

Travel and Tourism

0623-206 Distribution Systems
A functional approach is used to describe the market distribution channels for service industry inputs and products/services. The role of retail and business travel agents, tour wholesalers and operators, and specialty channelers such as meeting planners, convention bureaus and corporate travel buyers, food processors, producers, distributors and transportation suppliers are discussed. Various economic models are examined in order to analyze the pricing structure associated with the selling and distribution of service industry inputs and outputs. The service philosophy and its application to distribution in the travel/tourism and foodservice industry are explored. Class 4, Credit 4

0623-375 Travel Destinations
Geographers are concerned with the physical, political and cultural composition of the world. Geography is a field in which the concerns of both the social and physical sciences converge in the study of specific places. Touristic geography applies to these themes to the travel, tourism and transportation industries. It is also concerned with the social, cultural and economic environmental aspects of places. The identification of major touristic locations as attractors of people's leisure time, energies and interests is the basis of this course. Class 4, Credit 4

0623-410 Meeting & Exposition Management
Introduces the student to the field of meeting management. We take the point of view of a corporate or independent meeting planner in examining the various phases of meeting planning. Students also examine the formulation of goals and how meetings may be evaluated from both a return on investment perspective and the satisfaction of the attendees. Computer programs are investigated and tested, and a variety of budget strategies are examined. Class 4, Credit 4

0623413 Corporate Travel Marketing & Sales
The processes and techniques used to promote tourism attractions and communities to the corporate buyer. Emphasis is on the role that corporate travel plays in marketing the corporation. How promotional organizations can be used by the corporate meeting planning and travel manager to compare sites is discussed. Class 4, Credit 4

0623-418 Corporate Travel Planning Marketing
This course focuses on the specific goals and objectives required to develop control and evaluate guidelines established by corporate travel departments and how to market these programs to the organization. Three major orientations of corporate travel are examined: purchasing travel services, the corporate travel communications process and the evaluation and acceptance of globalized corporate travel service. Emphasis will be placed on the forging of partnerships within these relationships. Class 4, Credit 4

0623-420 Corporate Travel Planning
The specific travel goals, accounting policies and informational requirements of corporate (commercial-business) travel. Three major orientations of corporate travel are examined: corporate travel operated through the firm's travel coordinator, corporate travel provided by the retail travel agency and incentive travel. Major topics include corporate travel policy and procedures, exhibition marketing, requests for proposal (RFP), newsletters, and the sales blitz. Class 4, Credit 4

0623-438 Tourism Planning & Development
Examines the processes involved in planning and developing a tourist's destination, including the required infrastructure. A major focus is on benefits and impacts associated with tourism development, as well as the strategies for maximizing benefits and minimizing adverse effects. Class 4, Credit 4

0623-520 Exhibit Marketing
Examination of the budgeting process associated with developing and marketing corporate exhibits. A major focus of the course is the evaluation of exhibits based on cost-to-revenue ratios. Class 2, Credit 2

0623-522 **Negotiation & Conflict**
Examines the negotiation process within the hospitality/tourism industry by exploring the nature and sources of interpersonal conflict and its dynamics. Collaborative versus competitive approaches to managing conflict are discussed. Role-play situations are used to differentiate and reinforce negotiation strategies. **Class 2, Credit 2**

Human Resource Management

0626-234 **Interviewing Techniques**
A practical approach to interviewing techniques with emphasis on role plays and case studies. Coverage includes employment, disciplinary, counseling, and performance appraisal interviews. **Class 4, Credit 4**

0626-239 **Human Resource Administration**
An introduction to human resource administration including an overview and discussion of employment, equal employment opportunity, job evaluation, training, performance appraisal, compensation, benefits, personnel planning, labor relations, and other related topics. **Class 4, Credit 4**

0681-333 **Compensation Administration**
The course is designed to acquaint the student with the practical problems of employee compensation. Topics covered include compensation issues and theory, compensation as a motivator, wage and salary levels and structures, individual wage determination, and indirect compensation. (0681-239) **Credit 4**

0626-390 **Compensation and Benefits Administration**
An examination of the general structure of an organization and the rewards employees seek in exchange for the efforts and contributions they provide. Topics will include: rewards and motivation; government and market influence; job content analysis, description, and evaluation; developing pay structures and administering them; pay for performance; the range of benefit programs; choosing benefit programs for your organization and how to administer them; the relationship between compensation and benefits; employee expectations; costing of benefit programs. **Credit 4**

0626-428 **Training Design & Delivery**
The new workplace requires new solutions. In this environment, training that is well planned, presented, and meets organization needs takes on a critical strategic role. This course is aimed at managers, team leaders, HR specialists and those involved in the continuous, self-directed, formal and informal learning needed to help their organizations improve their business success. Core topics include design and delivery of training, the needs assessment process, job and core competencies analysis, targeting learner needs, training program design and program development issues. **Credit 4**

0626-433 **Benefits Administration**
A study of the theory, design, and practical administration of employee benefit plans including paid excused time, health care, capital accumulation plans, life insurance, retirement, Social Security and other related benefits. Government regulations as well as issues and trends will also be covered. (0626-239) **Class 4, Credit 4**

0626-434 **Advanced Human Resources Administration**
Study of application of advanced principles and techniques of personnel administration to particular firms and special personnel problems. Extensive use of both individual and group projects as well as case studies. (0626-239 or equivalent) **Class 4, Credit 4**

Training and Instructional Technology

0627-519 **Techniques of Dietetics**
This course prepares dietetic and nutrition specialists to prepare and give presentations for the purpose of informing, persuading and training a variety of audiences. Topics include communications methods, audience analysis, developing communications and training objectives, selecting media, designing and making presentations, evaluating and communications effectiveness. Students are required to make presentations as part of the course. **Class 4, Credit 4**

Environmental Management & Safety

0630-200 **Environmental Health & Safety Seminar**
This course will present the key principles of environmental health focusing on human life and the support of human existence. Since most of what we do in the environmental arena can be reduced to basic human needs and desires, and all of what we do in the occupational health and safety arena is concerned with the human condition, this will provide an appropriate basis upon which to introduce students to these vital disciplines. **Class 2, Credit 1**

0630-201 **Principles of Environmental Management**
This course presents a comprehensive overview of the sciences, technologies, and strategies used to reduce the threat to the environment resulting from discharges of pollutants to the air, water, and land. It also introduces the federal laws and regulations that govern such discharges. **Class 4, Credit 4**

0630-350 **Solid & Hazard Waste Management**
An examination of strategies and technologies currently in use for reducing, recycling, handling, treating, storing and disposing of solid and hazardous waste in industry. Associated environmental impacts, regulatory concerns, technical feasibility and costs are considered. Students learn to identify applicable environmental regulations and monitoring and measurement requirements, and develop strategies for managing wastes and protecting human health and the environment. (0630-201,1011-211) **Class 4, Credit 4**

0630-352 **Industrial Wastewater Management**
Investigates characteristics and sources of industrial wastewaters, related environmental impacts, regulatory implications, and technical considerations of current treatment and disposal methodologies. Students learn to identify appropriate methods, technologies and sequences for source reduction, treatment and pretreatment, direct discharge and management of associated industrial wastewater treatment plant sludges. (0630-201,1011-211) **Class 4, Credit 4**

0630-354 **Air Emissions Management**
This course will provide an overview of industrial air pollution and its sources. Subjects covered will include the history of air pollution, the chemistry and effects of pollutants, regulations and standards, control technologies, air quality management and global concerns and trends. (0630-201) **Class 4, Credit 4**

0630-360 **Environmental Monitoring & Measurements**
An in-depth view of environmental monitoring and measurements, giving the student the knowledge to plan, execute and interpret a sampling project. Covers techniques for sampling air, soil, surface water and groundwater with an emphasis on remedial investigations and contaminated sites. Students learn to plan sampling events, collect quality assurance/quality control samples, determine correct sampling technique and specify analysis. (1011-211, 213; 1001-201; 0630-380,382) **Class 4, Credit 4**

0630-370 **Environmental Geology**
This course covers many subtopics within the broad field of geology. Students will learn the theoretical background, and practical applications of the science. Topics include internal earth forces, geological materials and resources, surface processes, and geologic waste disposal. Geology has important applications to environmental management, and these applications will be highlighted in the class. Geology is a descriptive science so students will learn a great deal of new vocabulary, and will come to understand the mechanisms and results of continuous change to our planet. **Class 3, Credit 3**

0630-372 **Environmental Geology Lab**
Laboratory to accompany 0630-370, Environmental Geology. Lab includes field trips to significant local geologic features and mines. (Credit or co registration in 0630-370) **Class 2, Lab 3, Credit 1**

0630-380 **Introduction to Hydrology**
This course will cover most subdisciplines within the broad field of hydrology. Students will learn the theoretical background, and practical applications of selected aspects of the science including the hydrologic cycle, surface water calculations, vadose zone flow, groundwater hydraulics, groundwater monitoring, water chemistry and groundwater contaminant transport. The class culminates in an investigation of a mock contaminated site in which the students apply aspects of all of the above mentioned topics. Hydrology has important applications for environmental managers, and these applications will be highlighted in the class. (0630-370,372) **Class 3, Credit 3**

0630-382 **Introduction to Hydrology Lab**
Laboratory to accompany 0630-380, Introduction to Hydrology. The lab focuses on field and computational techniques. Field activities include stream gauging in Oatka Creek and well installation. (Credit for or coregistration in 0630-380) **Lab 3, Credit 1**

0630-440 Environmental Permitting
This course will provide a practical knowledge of Federal and State environmental permitting processes and procedures. Regulatory requirements will be reviewed with emphasis placed on the major programs in New York State, including Water, Air and Solid and Hazardous Waste. Students will become familiar with the environmental review and audit as a part of the application process. Discussion will introduce the environmental permit as a management tool for the environmental professional. The use of facility audits, development of proper information for permit applications and negotiation of permit terms and conditions will be explored as means to assure compliance with State and Federal statutes. The course will also explore the consequences of non-compliance with regulations by presenting enforcement options available to government agencies. (Open only to fourth-year environmental management majors with department approval) Class 4, Credit 4

0630-444 Remedial Investigation/Corrective Action
Delineates and describes the sequence of events required in remedial investigations (RI), feasibility studies and corrective actions at hazardous waste sites. Explains the process flow logistics, concepts and rationale behind each RI action. Investigates the strategies, technologies and methodologies commonly in use for site investigation and characterization and corrective action. Explores current issues of "how clean is clean?" and "Superfund" liability. Students learn to develop conceptual site characterization plans; effective solicitations for RI proposals; review and evaluate work plans, procedures and operations plans, and contingency plans. (Open only to fourth-year environmental management majors or with departmental approval) Class 4, Credit 4

0630-450 Occupational Health
This course will provide students with an overview of the fundamentals of industrial hygiene. Emphasis will be placed on the toxicological effects of various industrial substances on the body; monitoring and personal sampling for these substances and personal protection against such substances. (1011-211, 1001-201,1017-211) Class 4, Credit 4

0630-451 Occupational Health Lab
Hands-on practical hazardous material response. Must be taken in conjunction with 0630-450 or with permission of the instructor. Credit 1

0630-454 Occupational Safety
This course is an overview of the safety management tools utilized in today's industry. Students are expected to have a foundational knowledge of safety management techniques upon completion of this course. Topics examined include recordability and safety indices; incident investigation; guarding, electrical and material handling; welding, fire prevention, excavation; medical surveillance and worker's compensation; inspection techniques and auditing; committee's incentives and voluntary programs. Class 4, Credit 4

0630-465 Product Stewardship
This course examines the principles of product stewardship. The ethical, legal, liability and economic issues which product manufacturers face will be covered. In addition students will be exposed to the methods used to identify and manage product environmental, health and safety (EHS) issues in today's world. The concept of sustainability will be covered and students will learn the principles of product life cycle assessment. Students will also learn and use specific EHS analysis techniques. Case studies will also be reviewed. This course is open to 4th and 5th year engineering technology, packaging science, safety technology and environmental management & technology students who have completed at least one co-op or with permission of the instructor. Class 4, Credit 4

0630-480 Environmental Regulatory Law I
An overview of environmental law and regulatory activities at the federal and state levels, with emphasis on New York State. Topics include a review of the historical and modern sources for environmental protection and regulation, including Federal and State roles, the responsibilities of the separate branches of government and the emergence of administrative law. The class will discuss how the current enthusiasm for private property concepts, state's rights and deregulation are being used to limit or revise existing environmental programs. In addition, the environmental review and permitting process will be discussed, using New York State and DEC procedures as representative models. Open only to fourth-year or fifth-year students. Class 4, Credit 4

0630-490 Project Management
This course has been designed to give the student an overview of the fundamental concepts of modern project management. Areas of focus include: the Project Life Cycle (PLC), the Project Management Body of Knowledge (PMBOK), Review Technique (PERT), Critical Path Method (CPM) and various budgeting and resource allocation techniques. Discussion of project management organizations, negotiation and conflict resolution and project termination will be included, along with an introduction to Project Management Institute (PMI) and Microsoft Project for Windows. (Open only to upper division students) Class 4, Credit 4

0630-505 Resource Reduction
This course will focus on strategies for reducing the use of material and environmental resources. It builds upon Environmental Management & Technology courses for controlling air emissions, wastewater and solid and hazardous waste and moves upstream into the production process to reduce or eliminate waste by not producing it in the first place. Students learn how to conduct resource reduction assessments and identify opportunities to reduce or conserve resources. This course will take you beyond end-of-the-pipe controls and look at lifecycle assessment as an environmental management tool. (0630-350, 352,354) Class 4, Credit 4

0630-509 Senior Project Planning
This individualized course prepares the student for the senior project, 0630-511. Credit 1

0630-511 Senior Project
Consists of independent work demonstrating the ability to solve a significant safety or environment management problem in a comprehensive fashion. The problem will focus on future or emerging technologies as well as current techniques.(0630-509) Credit 3

0630-515 Corporate Environmental Management
Presents the fundamentals of how companies manage their environmental issues. Explores regulatory and environmental motivations and strategies for corporate environmental management. Identifies organizational considerations in managing corporate environmental programs. Introduces concepts of total quality management and its applications to corporate environmental problem solving. The course focuses on elements of environmental management systems including: environmental policies, codes of conduct, setting objectives and targets, implementing programs, and evaluating and auditing environmental performance. The course also addresses the environmental manager's role in training and corporate environmental reporting. (Open only to fifth-year environmental management majors) Credit 4

0630-521 Environmental Health/Safety Engineering Tech
Today's professional engineers and technologists face ethical, legal and economic responsibilities to incorporate environmental protection, health and safety (EHS) elements into the design of products, activities and services of the organizations they serve. This course will provide engineering technology and other technology students with an overview of key EHS issues. This course will also provide students with an awareness of the role of EHS professionals, and of the integrated role engineers and technologies play in recognizing and controlling EHS issues. Students will also be provided with an overview of the legal and liability concerns associated with EHS, the principles of incident causation and prevention, the role of perceptions and behaviors (i.e. the human element) in EHS, the identification and control of EHS issues, and the fundamental techniques for managing EHS issues in a cost effective manner. Class 4, Credit 4

Safety Technology

0633-401 Fire Protection
Introduces fundamental concepts in protection of industrial workers and property from fire and explosion. Fire chemistry, control of ignition sources in industry, and properties of combustible materials are discussed. Fire detection and extinguishment are covered along with building construction for fire prevention, life safety, fire codes and related topics. (Engineering technology and safety technology students only or permission of department; 0630-454) Class 4, Credit 4

0633-506 Construction Safety Lab
The course is designed to cover construction health and safety hazards, and study OSHA regulations in depth. Students get to handle and investigate construction safety issues. The topics covered will allow the student to receive an OSHA 30-hour construction outreach training card, (corequisite: Construction Safety 0608-505 or permission of department) Class 2, Credit 1

0633-526 Occupational Health II
The course focuses on industrial hygiene applications and hands on participation. Particular attention will be given to sampling strategies from similar exposure grouping, actual sampling experiences with a wide range of industrial hygiene instruments, and sampling analysis using statistical protocols. Field experience with instrumentation, as well as professional written and oral communication of results is emphasized. There are several out of classroom learning experiences required (team based). This course also explores environmental health engineering applications including ventilation systems, process safety, and inspection/audit protocol skill building for many different types of processes, including: laboratories, machining centers, painting and solvent usage. This course culminates in a one week block of emerging issues in occupational health—the content of which is expected to change accordingly (0630-450) Class 4, Credit 4

0633-530 Mechanical & Electrical Controls & Standards
Discussion of machinery safety with emphasis on hazard analysis, risk estimation, safeguarding techniques and electrical considerations. Particular attention will be paid to applicable OSHA regulations, ANSI, NFPA and EN standards as they relate to wood, metal, films and automation. A portion of the course will change regularly to reflect emerging issues in industry. (Engineering technology and safety technology students only or permission of the department) (0630-454) Class 4, Credit 4

0633-540 Systems Safety/Incident Investigation
Focuses on the evaluation of systems designs using detailed system analysis techniques. Topics covered include system definition, economics of system safety, systems safety methodology, ergonomic approaches, mathematics of system analysis, including statistical methods, Boolean algebra and reliability, preliminary hazard analysis, application of fault tree analysis, and incident investigation. Class 4, Credit 4

0633-545 Safety & Health Program Management
This course presents an in-depth examination of the concepts, methods and techniques involved in safety & health program management. The strengths and weaknesses of existing safety programs, performance management techniques, behavior-based safety, design safety, legal aspects of safety & health management and emerging trends in safety & health management are covered. This course expands on concepts presented in introductory topics. Case studies are utilized in order to foster application of management techniques and involve the resolution in an ethical manner. Fourth or fifth year status in Safety Technology. Class 4, Credit 4

Emergency Management

0634-311 Earth Science
This is the first course in the Emergency Management Disaster Certificate. Students gain a theoretical understanding of the causes of extreme geological and meteorological events such as earthquakes, volcanoes, landslides, floods, hurricanes, and tornados. Students also research the likely effects these disasters have on populations, infrastructure, and the environment. Significant emphasis is placed on emergency response and the role of the emergency manager in each type of extreme event. Class 4, Credit 4

0634-321 Man-Made Hazards
This course introduces the fundamental aspects of chemistry using man-made hazards as the vehicle. The course covers the chemistry of hazardous materials, including toxics, caustics, flammables, and their effects on humans. Additionally, the physics of radiation, the design of commercial power reactors, and reactor disaster scenarios is covered in the course. The course uses current events in man-made hazards to facilitate the learning of the chemistry principles behind the events. (Minimally high school chemistry. Recommend college level chemistry) Class 4, Credit 4

0634-401 Emergency Preparedness Law
Principle statutes, regulations, and court cases governing emergency preparedness. (0634-311 or 321) Class 4, Credit 4

0634-471 Emergency Planning & Method
Comprehensive emergency planning and methods of risk and hazard analysis. Also, turf problems with multi-agency plans, command structures, and the role of new technologies in disaster response. Preparation of hazard analyses and sections of plans for actual communities. (0634-311 or 321 and 401) Credit 4

0634-475 Counter Terrorism for the First Responder
This advanced course in the emergency and disaster management certificate program uses a technical approach. The course examines the issues of terrorism as they relate to the planners and responders at the local level. The history and patterns of terrorism are examined by reviewing specific incidents. The technical aspects of terrorism are presented for the participants. Concepts of planning for a terrorist incident are presented with emphasis on integrating emergency operation plans. The course will also discuss preparations and guidelines for terrorist attacks focusing on planning problems, countermeasures, response actions and the roles of local, state, and federal government agencies. Policy development related to the media and critical incident stress will be presented. Significant emphasis will be placed on examining incident management tools such as the incident command system. (0634-321 or substantial field experience) Class 4, Credit 4

0634-481 Emergency Operations
Roles of fire, police, EMS and volunteer agencies like the Red Cross on disaster sites. Also, command posts and off-site operations centers, the incident command system, and how to critique incidents.(0634-311 or 321 and 401) Credit 4

Health Systems Administration

0635-310 Survey Health Care Systems
An overview of the development, structure and current forces transforming the health care system. Topics include the status of the national and regional populations, physician practice and payment, private and government health insurance, the impact of medical technology, manpower issues, hospital services and reimbursement systems, ambulatory care and alternative delivery systems, and mental health and long-term care. (Offered on campus and online) (Previous experience or course work in health care and permission of chair) Class 4, Credit 4

0635-320 Health Systems Administration
A survey of administration in health care facilities focusing on the application of general management principles in the unique health care environment. Issues such as organizational structures, planning and performance monitoring, personnel management, finance and the respective roles of medical professional and administrator in managing the facility are discussed. (0635-310, previous experience, course work in health care and permission of chair) Class 4, Credit 4

0635-351 Health Care Economics/Finance
Introduction to the efficiency, effectiveness and equity of the new economics of health care; a conceptual and practical knowledge of health care finance, including sources of funding, accounting and reporting; and the influence of third-party payers. No previous work in economics is assumed. (0635-310 or 320) Class 4, Credit 4

0635-421 Legal Aspects of Health Care Administration
An overview of statute and regulation as they apply to the health care field. Topics include an overview of the American legal system, licensure of institutions, licensure and discipline of practitioners, physician-patient relationship, reproductive issues, the right to die, organ donations, medical records, legal liability, malpractice and labor law. (0635-310 or 320) Class 4, Credit 4

0635-431 Health Care Quality Assurance
An introduction to quality assurance in health care. Course explores past and current definitions of quality and competing concepts of quality assurance; reviews existing quality assurance requirements and accrediting organizations, federal and state agencies, and third-party payers; describes and explains quality assurance methods and tools and their application in various settings. (0635-310 or 320) Class 4, Credit 4

0635-441 Health Planning & Program Development
A review of the methodology of planning effectively for health care services. The use of data systems, forecasting, and identifying and analyzing problems are explored, along with the process of strategic planning, setting priorities, developing projects and allocating resources. Students prepare actual applications for new programs to regulatory agencies. (0635-310 or 320) Class 4, Credit 4

**Department of Military Science,
Reserve Officers Training Corps, ARMY (ROTC)**

0640-201 **Introduction to Military Science/Master Student**
Designed to assist students in the survival of their first quarter at RIT as well as the ROTC program. Prepares students for academic college survival with the use of *Becoming a Master Student*, by David Ellis and College Survival Inc. Students learn time management, test taking, note taking, stress management, memory, writing papers and interpersonal skills strategies to assist them in surviving the high academic standards of this institution. **Class 1, Lab 2, Credit 2**

0640-202 **Applied Military Dynamic**
Gives students an introduction to some military dynamics. Topics of primary interest include the organization and purpose of the ROTC program; the organization of the U.S. Army, the National Guard, the Army Reserve; career branches; and the role of a lieutenant. Other topics of interest are military writing style, experimental small-group leadership opportunity, weapons and marksmanship training, and an introduction to evaluating and applying first aid. Students must register for lab under the department of physical education. **Class 1, Lab 2, Credit 2**

0640-203 **Military Heritage**
Provides a practical introduction to the basic military organization and rank structure; the historical basis for customs and traditions found in the military, and current discussions on the military and its impact upon society; leadership laboratory. Students must register for lab under the department of physical education. **Class 1, Lab 2, Credit 2**

0640-301 **Military Geography**
A study of military land navigation with special emphasis given to navigation using a map and compass. Geographic concepts and realities are studied as they apply to the solution of military problems. Major topics for discussion include identification of terrain features, use of grid coordinates, polar coordinates, military correspondence and first aid tasks. Stresses practical application rather than theory; leadership lab. Students must register for lab under the department of physical education. **Class 1, Lab 2, Credit 2**

0640-302 **Psychology & Leadership**
Provides the student with the basic principles of leadership and management of human resources; motivation, morale and communication. Special emphasis is on applying the theories and models of the behavioral sciences and personnel management to leadership as it functions in a military environment; leadership laboratory. Students must register for lab under the department of physical education. **Class 1, Lab 2, Credit 2**

0640-303 **Military & American Society**
An introduction to the principles of war and the study of their application in recent military history. Emphasis is on the Army's role today as peacekeeper and NATO partner. Other topics include Soviet Union military systems command and staff functions and the officer personnel management system. Leadership laboratory. Students must register for lab under the department of physical education. **Class 1, Lab 2, Credit 2**

0640-401 **Military Tactics**
Stresses practical exercises on basic map-reading skills and provides working knowledge of fundamentals and principles of combat operation as planned for and executed at light infantry squad and platoon level; leadership laboratory. Students must register for lab under the department of physical education. **Class 2, Lab 2, Credit 3**

0640-402 **Military Communications**
Provides knowledge and training of basic military skills essential as junior officer; an introduction to military communication equipment and techniques; the leadership communication process. Leadership laboratory. Students must register for lab under the department of physical education. **Class 2, Lab 2, Credit 3**

0640-403 **Military Operations**
A continuation of military skills training with emphasis on military intelligence/security; operations at the small-unit level; staff functions and leadership laboratory; field training exercise. Students must register for lab under the department of physical education. **Class 2, Lab 2, Credit 3**

0640-501 **Army Training System**
An introduction to the U.S. Army's training philosophy and training system. Students learn how to assess, develop, plan and evaluate training. Provides instruction in how to plan, conduct and assess a training meeting. Both short and long-range training plans are developed. The importance and use of the After Action Review process is stressed and continued refinement of proper military briefing techniques is emphasized. Students must register for lab under the department of physical education. **Class 2, Lab 2, Credit 3**

0640-502 **Military Administration & Logistics**
Includes discussions and seminars on the Army training management system, military justice, supply and property accountability, maintenance management, officer-enlisted personnel management; leadership laboratory. Students must register for lab under the department of physical education. **Class 2, Lab 2, Credit 3**

0640-503 **Military Ethics**
Examines the ideas and issues that define the role of the military in our larger society. Emphasis is on the professional and ethical standards required of the military officer. Other topics include planning and conducting meetings, teaching and counseling, active-duty orientation, preparations for commissioning; leadership laboratory; field training exercise. Students must register for lab under the department of physical education. **Class 2, Lab 2, Credit 3**

0640-510 **Senior Seminar & Project**
For military science students who have completed their junior year of military study. The seminar is directly related to military science projects that students are working on and consists of written and/or oral presentations given during the quarter. Students also may be required to present this material to other students in a classroom environment. Students must register for lab under the department of physical education. **Class 2, Credit 2**

0640-520 **Survey American Military History**
A study of American Military History from the 1700's to the present day. Discussions will show how military actions affected U.S. History; how developing technologies impacted U.S. Military doctrine, tactics and strategy; and the change of the U.S. Military from a part time civilian volunteer militia to a professional full time force. **Credit 4**

**Department of Aerospace Studies,
Reserve Officers Training Corps, Air Force (ROTC)**

0650-201/202/203 **Leadership Lab I**
A three course series designed to provide the student with a foundational understanding of the benefits, opportunities, privileges and responsibilities associated with an Air Force commission. Students will also be introduced to AF customs, courtesies, environment, drill, flight movement and ceremonies. **Credit 1 (per quarter)**

0650-210/211/212 **The Air Force Today I/II/III**
A three course series designed to introduce students to the United States Air Force and Air Force Reserve Officer Training Corps. Featured topics include mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force officer opportunities, and an introduction to communication skills. **Credit 1 (per quarter)**

0650-301/302/303 **Leadership Lab II**
A three course series in which the student will demonstrate proficiency in commanding individual drill positions and flight formations, effective execution of cadet functions within parade ceremonies, and squadron drill movements. The student will apply personal leadership to both military and civilian activities and comprehend field training requirements. **Credit 1 (per quarter)**

0650-401/402/403 **Leadership Lab III**
A three course series preparing students for active duty by applying principles of advanced leadership in officer duties, lab activities, and AF courses. **Credit 1 (per quarter)**

0650-404/405/406 **Leadership Lab IV**
A three course series preparing students for active duty by applying principles of advanced leadership in officer duties, lab activities, and AF courses. **Credit 1 (per quarter)**

0650-501/502/503 **Leadership Lab V**
A three course series preparing students for active duty by applying principles of advanced leadership in officer duties, lab activities, and AF courses. **Credit 1 (per quarter)**

Accounting and Business Systems

0680-201 Financial Accounting
Emphasis is placed on analyzing and recording business transactions and understanding the results of these transactions. Preparation of basic financial statements required by any business are included. Credit 4

0680-203 Managerial Accounting
The functions and uses of accounting information are presented. Emphasis is placed on the preparation and operation of dynamic budgets and the use of accounting data for control and profit planning. (0680-201) Credit 4

0680-224 Personal Financial Management
Manage your personal finances more effectively; personal budgeting, protection of personal assets, consumer credit, investments and estate planning are presented. Credit 4

0680-308 Intermediate Accounting
Designed to broaden understanding of accounting practices and improve skills in gathering, analyzing reporting and evaluating accounting theory and concepts as they relate to business problems. (0680-203) Credit 4

0680-309 Intermediate Accounting II
A continuation of Intermediate Accounting (0680-308) with advanced study of accounting theory and concepts as they relate to business problems. Credit 4.

0680-311 Business Law I
Introductory course in business law including basic legal principles and procedures, criminal law, torts, contracts, sales and real property. Credit 4

0680-312 Business Law II
Continuation of 0680-311 includes law agency, partnerships, corporations, insurance and bankruptcy. Also presents survey of commercial paper, secured transactions and bank deposits. Credit 4

0680-315 Legal Environment of Business
Foundation course, which introduces the function of law in society, the fundamentals of the federal and state court systems, contract formation (offer, acceptance, consideration and capacity) and related ethical issues, and the emergence of the federal regulatory agencies and practical impact of these agencies on the American business community. Credit 4

0680-341 Information Resources Network Tools
An overview of the evolution and structure of the computing environment and information networks. Topics include the evolution of the computer; personal computers, workstations and local area networks; tools for managing information; systems design and analysis tools; electronic mail; and using the Internet. Labs explore information resources and data communication tools available on the RIT computer network and the Internet. Credit 4

0680-353 Management Science
Foundation course, which introduces mathematical model building and the use of management science in the decision-making process. Mathematical techniques include linear programming, the assignment model, the transportation model, inventory control models, critical-path models (PERT/CPM) and computer simulation. Homework assignments include running "canned" computer application programs. (0692-211,212,311,312 and 0680-341). Credit 4

Business Administration Management

0681-200 Management Process
A comprehensive three-quarter course in effective supervision and management for supervisors and potential supervisors. Approximately 50 topics of current importance to supervisors are presented, as well as essential management principles, business communication and practical supervision techniques. Specific supervisory problems of course participants are discussed in informal sessions and through projects conducted outside the classroom. Instruction is usually guided by a team of management specialists. Lecture discussion, panel presentations, audiovisual presentation, simulation exercises and case studies. (Course extends over three consecutive quarters and should be taken in sequence.) A management certificate is awarded for successful completion of the course. Credit 4 per quarter (12 Total)

0681-201 Management Process II
A comprehensive three-quarter course in effective supervision and management for supervisors and potential supervisors. Approximately 50 topics of current importance to supervisors are presented, as well as essential management principles, business communication and practical supervision techniques. Specific supervisory problems of course participants are discussed in informal sessions and through projects conducted outside the classroom. Instruction is usually guided by a team of management specialists. Lecture discussion, panel presentations, audiovisual presentation, simulation exercises and case studies. (Course extends over three consecutive quarters and should be taken in sequence). A management certificate is awarded for successful completion of the course. Credit 4, (12 credits total)

0681-202 Management Process III
A comprehensive three-quarter course in effective supervision and management for supervisors and potential supervisors. Approximately 50 topics of current importance to supervisors are presented, as well as essential management principles, business communication and practical supervision techniques. Specific supervisory problems of course participants are discussed in informal sessions and through projects conducted outside the classroom. Instruction is usually guided by a team of management specialists. Lecture discussion, panel presentations, audiovisual presentation, simulation exercises and case studies. (Course extends over three consecutive quarters and should be taken in sequence). A management certificate is awarded for successful completion of the course. Credit 4 (12 credits total)

0681-205 Organization & Management
A general introduction to the major management functions and the organization of business. Topics include business and personal planning, organizing, staffing, implementing, directing, control, time management, appraisal, compensation, organization theories, decision making, problem solving, influences on managerial decision making, communication, management styles and motivation. Extensive use is made of learning groups in which students work together to discuss and apply concepts. Some out-of-class time is required to prepare for a learning group presentation. Credit 4

0681-221 New Venture Development
Course presents factors to be considered by those interested in the ownership and management of small business enterprises. Includes who should be an entrepreneur, guidelines for starting a new business, basic legal consideration, and approaches for obtaining capital and credit. Credit 4

0681-222 Small Business Management
The functions required to successfully manage and finance a small business are presented. A variety of topics include staffing a small business, purchasing and supplier relations, consumer credit policies, and the financial and administrative controls necessary to minimize business risk. Credit 4

0681-223 Small Business Marketing & Planning
Presents various successful planning and marketing approaches (including market determination, distribution and pricing strategies). The regulatory environment facing small business is included along with techniques for planning growth. Credit 4

0681-234 Interviewing Techniques
A practical approach to interviewing techniques with emphasis on role plays and case studies. Coverage includes employment, disciplinary, counseling, and performance appraisal interviews. Credit 4

0681-241 Production Management
The organization of production functions with emphasis on management responsibilities. All levels of factory operation are discussed, and relationships between various aspects of production are presented. Credit 4

0681-261 Effective Selling
Investigates the importance of the sales function within the overall marketing organization and the necessary general characteristics of a successful sales person. The various steps of the sales process and the practical applications of effective sales presentation are discussed. Credit 4

0681-263 Advertising Principles
Social, economic and mass communication aspects of advertising with special emphasis on the role of advertising in the marketing mix. Special topics include agency/client relationship, radio and TV ratings, history of advertising, the creative process and psychographics. Guest lecturers discuss corporate campaigns. Credit 4

0681-264 Advertising Evaluations & Techniques
Course presents basic approaches used in planning, preparation and evaluation of advertising and sales promotional materials. A number of projects involving writing/layout/production for print, broadcast and specialized media advertising are incorporated. **Credit 4**

0681-341 Fundamentals of Industrial Engineering
An overview of industrial engineering problems and techniques is presented, including facilities selection and layout, methods analysis, work measurements, operations planning and control, materials handling and an introduction to operations research. **Credit 4**

0681-342 Industrial Engineering Economy
The economic factors required for rational decisions are presented. Emphasis is placed on analytical tools used in a manufacturing environment, including evaluation of capital spending alternatives, depreciation methods, decision making under risk conditions and value analysis methods. **Credit 4**

0681-345 International Standards
As the marketplace becomes increasingly oriented toward the international exchange of goods and services, the International Organization of Standards continues to develop a set of quality standards assuring that goods and services produced by a supplier are capable of meeting the requirements of customers around the globe. The emerging developments of international standards in terminology and quality standards are addressed. Manufacturing standardization in such industries as telecommunications and electronics is considered. Elective for the international business and culture certificate. **Credit 2**

0681-361 Marketing
An introductory course in marketing that provides a better awareness of the function of marketing and how marketing relates to other areas of business. Topics include the marketing concept, developing a product strategy, behavioral aspects of consumer marketing, the marketing mix, segmentation and current marketing issues. **Credit 4**

0681-398 Special Topics
Special topics are experimental courses offered quarterly. Watch for titles in the course listing each quarter. **Credit 4**

0681-410 Project Management
An overview of the fundamental concepts and traditional analytic tools used to plan, schedule and track complex projects. Topics include identifying objects, defining tasks and dependencies, making schedules, estimating resources, specifying constraints, estimating risks, establishing monitoring procedures and communicating results. Analytic tools such as Gantt charts, Program Evaluation and Review Technique (PERT), Critical Path Method (CPM), net present value analysis, and various budgeting and resource allocation techniques will be presented. The computer software package, Microsoft Project, is used by the instructor to illustrate planning and scheduling procedures and by students to complete assignments. (0692-211,0680-341 or equivalent or department approval) **Credit 4**

0681-451 Introduction to Logistics & Transportation
Overview of the transportation and logistics industry as a vital part of the nation's social and economic structure. Introduces basic understanding of the functional areas of logistics management and their interrelationships. The purchase and use of transportation services as related to the firm's logistical mission is emphasized. **Credit 4**

0681-525 Strategic Logistics Management
Introduces the basic skills required to move materials in support of the logistics function internationally. Includes discussions of duties, customs regulations and the various instruments used to facilitate international trade. **Credit 4**

0681-526 Logistic Law & Economics
Introduces the role of government in the transportation industry. The evolution of the past and current regulatory and promotional policies is explored. The determination and utilization of freight rates are examined. Various methods to forecast and control transportation costs are also discussed. **Credit 4**

Quality Management

0684-225 Recruiting, Training & Supervising Personnel
Problems and solutions related to establishing realistic and attractive wages and career paths for employees in service sector businesses are examined. In addition, motivation, training and communication techniques that lead to the kind of quality performance required in service industries and organizations to optimize customer satisfaction are explored. **Credit 2**

0684-227 New Service Economy
Provides an overview of the emerging national and regional service economies. Defines the service sector, both consumer and producer of services, using a variety of local examples drawn from health care, information and communication, hospitality, financial and personnel services. Economic and labor force implications of the service economy are analyzed along with the structure of service organizations, service delivery systems and levels of service. **Credit 2**

0684-310 Introduction to Quality
An introduction to the fundamental concepts of total quality management. Includes an overview of the competitive environment, the cost of non-quality, and the history of quality; a systematic examination of the leading definitions of quality and models of quality management; and an exploration of the implication of quality management concepts for organizational structure and roles, decision making and interpersonal relations. **Credit 4**

0684-320 Basic Statistical Quality Control Techniques
An introductory course in Statistical Quality Control techniques used in determining operating quality levels and recognizing degrees of process control and capability in a service industry or a manufacturing process. Topics include tools for diagnosing sources of variation; construction and interpretation of charts for variables and attributes; tolerances, specifications and process capability. Product quality (i.e. high yield) and product reliability also are addressed. (High school algebra or equivalent) **Credit 4**

0684-330 Leadership Skills Quality
Analytical and behavioral strategies and techniques for providing leadership in quality management. Includes examination of problem-solving models and processes; personal values related to leadership; and behavioral, conceptual and communication skills for successful team building and team working, conferencing, negotiating, and assessing and promoting quality behavior. Case studies, interactive simulations and assessment of individual leadership characteristics. **Credit 4**

0684-340 Statistics for Total Quality
An introductory course in statistics and probability that emphasizes the analysis and interpretation of variation in quality control. Topics include descriptive statistics (statistical tables and graphs, measures of central tendency and dispersion), a brief overview of probability theory, probability distributions, sampling distributions, confidence interval estimates, and one and two sample hypotheses tests of means and proportions. The statistical package MINITAB is used extensively by the instructor to illustrate statistical procedures and by students to complete assignments. (Certificate in basic quality or approval of department) **Credit 4**

0684-350 Customer Service Technology
An overview and analysis of technological systems for handling goods and information quickly and cost effectively to maximize customer satisfaction. **Credit 4**

0684-362 Marketing Practices or Service Economy
Focuses on applications of traditional marketing concepts and techniques to the service sector (e.g., banking, health care, transportation and services within organizations) to optimize quality, customer satisfaction and sales/revenues/profits. Includes a brief review of the increased role of service in the economy. **Credit 2**

0684-370 Reliability I
Introduces the students to the concepts embodied in maintenance strategies — mainly reactive maintenance, preventive maintenance, predictive maintenance and proactive maintenance—and in reliability based maintenance. These strategies will be defined and their goals set forth. Reliability concepts and tools will be introduced that will form the foundation of a reliability-based maintenance program. **Credit 4**

0684-376

Reliability II

This course examines the underlying probability distributions and statistical tests that are used in reliability based/centered maintenance. Included are: the exponential distribution, curve fitting techniques, the normal distribution, the lognormal distribution, extreme value statistics, the Weibull distribution, and reliability analyses of repairable systems. Graphical techniques will be emphasized along with data analysis using the statistical package MINITAB and reliability software programs provided by the instructor. (0609-221 or equivalent and 0684370,375) Credit 4

0684-410

Costing for Quality

An introductory course in the decision-making process used for determining and evaluating the cost of quality in support of manufacturing, government or service industries. Topics include a review of basic accounting, an analysis of items that are directly and indirectly affected by conformance or nonconformance to customer requirements. (Certificate in basic quality or approval of department) Credit 4

0684-430

Implementing Total Quality

Theory and techniques for introducing and institutionalizing quality management concepts and practices in all areas of organizational activity. Includes fundamental principles of organizational development, model programs for improving quality throughout the organization, and techniques for analyzing organizational culture and identifying and remediating barriers to quality management. Introduces benchmarking and identifying and translating customer requirements as the foundations of the implementation process. (Certificate in basic quality) Credit 4

Humanities & Social Sciences

0686-298

Special Topics: Humanities

Experimental lower-division courses are offered under this number; titles appear in each quarter's course listing. Credit Variable 1-5

0686-331

Psychology: Behavior in Industry

Industry presents one environment for understanding human behavior. This course applies psychological and social concepts to the industrial setting. Topics covered are motivation, performance, assessment quality of work life, group behavior, leadership, organizational structure, communication and decision making. (0514-210 recommended) Credit 4

0686-332

Psychology of Stress & Adjustment

Physiological, psychological, and social stress can have serious consequences on one's daily life. This course familiarizes students with basic concepts, the positive and negative ramifications of stress and strategies for stress management. (0514-210 or equivalent) Credit 4

0686-333

Psychology of Persuasion

Examines important research on persuasive communication, covering: What causes people to respond to persuasive communication in different ways? How can the communicator predict group responses to a given persuasive message? Projects require students to use theory in designing effective strategies for various purposes and audiences. Required for the Public Relations Communications Certificate. Credit 2

0686-341

Values & Experience

A study of the interaction between values and experience. Focuses on the impact of social institutions (religion, family, education, government) and technological developments on values and beliefs (Including the definition of reality). This is a science, technology and humanities elective. Credit 4

0686-342

Contemporary Moral Problems

A one-quarter course that presents moral issues that arise in the professions and other vocations of technical expertise. These problems in applied ethics are studied through contemporary literature by moral philosophers (e.g. Habermas, Singer) as well as key classical texts (e.g. Plato, Locke, Hume, etc.) Credit 4

0686-351

African-American Film

Five thematic periods of African American filmmaking are explored through the lenses of history, theme type and sociological content. Special emphasis is given to the evolution of roles played by African American actors and to the achievements of African American directors. Credit 4

Technical Communication

0688-214

Dynamic Communication

Dynamic Communication focuses on developing and improving writing skills. The achievement of clarity, coherence, logical development of ideas and effective use of language is emphasized. Basic research techniques are included. (Requires pretest) Credit 4

0688-220

Communications

Focuses on refining writing skills emphasizing organization, support and effective expression of ideas in multiparagraph papers. The major exercise is preparation of a position paper and an oral defense of the paper's thesis. Research methods and principles of effective argumentation are studied. (Requires pretest or completion of 0688-214) Credit 4

Note: Students who apply for Dynamic Communication, 0688-214, or Communication 0688-220, must take a pretest to determine the course most appropriate for their communication needs. Only students who have credit for 0688-214 or equivalent may register for this course.

0688-225

Interpersonal Communication Skills

Knowing when to speak, what to say and how to say it is a prime asset for achieving success in many areas of our lives. This course focuses on techniques for communicating successfully in career, social and personal interactions. Topics include assessing communication situations, clarifying ideas, listening, persuading and managing conflicting viewpoints. Credit 2

0688-260

Art for Reproduction

Prepares students to enter the field of graphic design by providing orientation and the studio experience in the presentation of imagery for reproduction. Presentations include board techniques, materials, tools, mechanical art procedures, printing and bindery processes, etc. Credit 3

0688-261

Graphic Communication for the Non-artist

Introduces basic skills in communication graphics, including elements of design (line, shape, texture, color, space) and their application to two-dimensional projects, typography and commercial layout procedures (from rough layouts to comprehensives), rendering techniques, marker sketching, shadowing and perspective). Designed for people with little or no previous art training. Lecture/demonstration and studio format; student projects followed by critiques. Credit 3

0688-262

Graph Communication Non-artist II

An exploration of current approaches to solving graphic design problems in the communications professions, applying basic skills in design, lettering and layout, and rendering, with emphasis on the use and selection of art materials, photographs and photographic/electronic image producing equipment; and an exploration of design in the advertising process, involving planning, creating, producing and evaluating media. (0688-261 or equivalent) Credit 3

0688-271

Basic Computer Graphics

Experimenting with basic principles and elements of design, students approach the computer as a tool for image making. The software application CorelDraw is used to design and develop all assignments and projects. No prior design training or computer background is necessary. Credit 2

0688-272

Special Topics: Design

Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter. Credit variable

0688-320

Professional Presentations

Focuses on the principles of preparing and delivering oral presentations. Students deliver a variety of speech types representative of those commonly occurring in business, industrial, community and social settings. Self, peer and instructor critiquing are used for evaluation of in-class and videotaped speeches. Credit 4

0688-321

Discussion Skills & Leadership

Students study the theory of leadership in small groups and the dynamics of group behavior. The major exercises of the course are leading and participating as members in conferences that stimulate those of civic, business and industrial settings. Peer critiquing and videotaping allow students to apply theory as they learn to recognize the elements of successful conferences. Credit 4

0688-322 **Interpersonal Communication for Customer Service**
Examines key dimensions of interpersonal communication, focusing on effective message styles and listening strategies to improve customer satisfaction. Techniques and actions that lead to positive outcomes such as conflict resolution, problem solving and goal attainment are stressed. Organizational policy, management and ethical issues are considered. Through simulation and role playing, skills are developed that may be applied to a variety of work, social and other situations. **Credit 4**

0688-325 **Communicating in Business**
Focuses on the development of those communication skills essential to functioning effectively in the business world. Students learn the process of analyzing communication situations and responding to them appropriately. Topics include reports, memos, letters, oral presentations and interpersonal skills. (0688-220 or equivalent) **Credit 4**

0688-327 **Environmental Communication**
Communication of environmental information and issues is critical for awareness, information, and action. Students develop skill in reporting and conveying environmental and scientific information as well as an understanding of the role of the media and public relations in the environmental communication process. Writing and speaking skills are sharpened for successful business and media communication. (0502-225 or equivalent) **Credit 4**

0688-330 **Technical Report Writing**
Students learn to prepare reports of the sort required by practicing engineers and managers in industry and business. Focus is on developing the ability to analyze audiences and purposes, state problems, design reports, and write and edit them. Assigned reports are discussed and critiqued by peers and instructor. (0688-220 or equivalent) **Credit 4**

0688-331 **Report Writing**
Principles of organizing information into clear, concise reports. Techniques for oral reports, formal reports, and informal letter and memo reports. Also includes proposals, project status and progress reports. **Credit 2**

0688-333 **Technical Writing & Editing**
Focuses on the writing skills required for preparing technical documents. Adapting material and language for audience and purpose and conventions of technical writing style are emphasized. Strategies for evaluating technical discourse are studied and applied. Prior to enrolling in this course, students must demonstrate command of standard written English prose. (For students in basic technical communication program. Others contact program chair) **Credit 4**

0688-347 **Promotional Writing**
Focuses on practical guidelines for preparing marketing materials including brochures, data sheets, trade press articles, press kits and advertising copy. (0504-225 or equivalent) **Credit 2**

0688-348 **Managing the Project**
Principles of project management are studied and applied in cases and examples taken from the fields of technical and public relations communication. Major topics include planning, organizing, scheduling, budgeting, controlling, monitoring and reporting. Conflict resolution, team building and motivation are also covered. Use of project management software is introduced. **Credit 2**

0688-350 **Introduction to Public Relations**
An overview of the public relations function, covering tasks, responsibilities and roles of the PR practitioner as researcher, image-developer, designer, editor, coordinator, marketer and advertiser; as adviser to management; and as spokesperson, media manager and services purchaser and provider. Course may be counted as either a business or communication elective. (Consult adviser) **Credit 2**

0688-352 **Writing for the Organization**
Introduction to public relations writing at the corporate level, including planning, writing and producing documents and publications intended to interpret the organization both internally and externally. Provides practice in writing a variety of information products including news and feature copy and annual report copy. **Credit 2**

0688-353 **Scripting AV & Video Presentations**
Introduces writing and production techniques for audiovisual and video presentations. Scripting prepares students to write a specialized form of communication-dialogue that is to be spoken and heard. Instruction on enhancing the verbal message with visuals is presented. Dimensions of wording, voice characterization, sound, motion and color are explored. Includes storyboarding and an introduction to traditional and emerging production methods. (0688-220 or equivalent) **Credit 2**

0688-354 **Speechwriting**
Introduces principles of speechwriting, a highly specialized form of professional communications. Speechwriting covers techniques for preparing a speech in the "voice" of another. Writing for the "ear" and adapting the message, wording, body language and tone to the speaker are included. Techniques for enhancing message retention are studied. (0688-220 or equivalent) **Credit 2**

0688-355 **Coordinating Publication Production**
A survey course for professional communicators. Provides an overview of major phases of print production and general understanding of the factors that must be considered in purchasing print production services: estimates, schedules, paper and binding options, colorization, print trade customs and illustrations; and guidelines for coordinating the stages of production. **Credit 2**

0688-356 **Strategic Communications**
This is a survey of strategic reactions to organization and communication problems. Case studies are used to analyze how communications research, planning, implementation, and evaluation are used to contribute to organizational goals and respond to needs and crises. Students study real cases where organizations have developed strategies for communication with consumers, employees, investors, government bodies, communities, and other publics. **Credit 2**

0688-357 **Media Relations**
Designed for writers whose positions frequently require preparation of public relations copy for media use. Emphasis is on developing clarity, precise use of language, and style in writing media letters and news releases. (0688-220 or equivalent) **Credit 2**

0688-361 **Research Techniques**
This course offers exposure to and experience with electronic and traditional resources for information generation. Student assignments simulate workplace fact-finding assignments and culminate in an extended feasibility project of the student's choice. Students work in teams and use problem-solving strategies, assess project requirements, collect data, report periodically on their progress, and formally present their results. A variety of research methodologies are introduced, including interviewing skills, developing and using questionnaires, testing procedures, review and use of literature, and blueprint and specification reading. **Credit 4**

0688-362 **Instructional Design Principles**
This course presents an overview of the process of designing instructional packages from need and task analysis through identifying goals and objectives, media selection, program development and validation testing. **Class 4, Credit 4**

0688-363 **Technical Document Design**
This course presents an overview of the principles and contemporary techniques involved in document design and provides the student with an opportunity to exercise them in the preparation of a technical manual. Topics include the basic principles of graphic design and visual communication, use of computer graphics and page layout programs, typography and its role in document design and reproduction and distribution methods. Students will plan, research, design, write, format, edit and produce a finished technical manual. **Class 4, Credit 4**

0688-365 **Writing for the Sciences**
Course introduces students to the writing requirements for describing scientific and technological subject matter for presentation to general audiences. Students will learn to write and edit material for professional, in-house, trade, and popular publications that cover developments in the scientific and technical areas. The editing of scientific writing is also introduced. **Credit 4**

0688-366 **Managing Media Presentations**
An introduction to design principles and software applications for creating and organizing media presentations on technical topics. Includes principles of Web page design, the development of computer-based illustrations and electronic presentations. Covers the use and introduces HTML and other software applications. Project management skills are introduced. **Credit 4**

0688-367

Writing Software User Documentation

An introduction to the creation of end-user documentation for software products. This course defines the audiences, content, structures, and language of software user manuals and identifies typical problems with them. Practice is provided in writing step-by-step procedures, defining system and software concepts, and describing end user needs. Other types of software documentation as well as usability testing and online information are introduced. Credit 4

0688-371

Designing with Computers I

An introduction to the computer as a design tool. Created for people just beginning to apply their design skills to a computer. In a hands-on lab over two quarters, the software application Freehand (vector based program) for illustrative techniques is introduced. Discussions on a variety of related topics, such as design concepts, other software, computer needs and misconceptions. Previous design experience is necessary. (0688-271 or equivalent). Class 3, Credit 3

0688-372

Designing with Computers II

In a hands-on lab the basic software application PageMaker (page-layout program) for layout techniques is introduced. Discussions on a variety of related topics, such as design concepts, other software, computer needs and misconceptions. Previous design experience is necessary. (0688-271 or equivalent) Credit 3

0688-373

Electronic Presentation Design

This course introduces basic techniques for the creation of electronic presentations using computer software. Students will learn to design individual slides and transparencies and dynamic and effective assembled presentations. The software application Power Point is used. Credit 3

0688-374

Designing with Corel Draw

The second course of a two-course sequence, this provides a foundation in raster and vector-based computer graphics. Students design text and graphics for press and Internet using the Corel Draw suite. Skills and information gained will carry into other software applications. (0688-271 or permission from instructor) Credit 3

0688-381

Photo Imaging with Computers I

An introduction to the computer as a photographic tool for people just beginning to apply their photography or photo-design skills to a computer. Adobe Photoshop is presented in a hands-on, two-quarter lab sequence. In the first quarter lab, students explore traditional photographic techniques using a computer with an electronic camera; second quarter, photographic manipulation using a computer with a flatbed scanner. Credit 3

0688-382

Photo Imaging with Computers II

Adobe Photoshop is presented in a hands-on, two quarter lab sequence. In the second-quarter lab, students explore photographic manipulation using a computer with a flat-bed scanner. Credit 3

0688-383

Introduction to Internet Design

This course introduces basic techniques for the creation and design of electronic sites and pages for the Internet and the World Wide Web. Students learn the graphic techniques and tools to construct a well-designed and effective homepage and site. Credit 3

0688-384

Designing with Quark XPress

In-class lecture, instructor demonstration and guided practice are used to familiarize students with the techniques of using Quark XPress a sophisticated desktop publishing program. Students are instructed in basic document design principles, including such topics as layout and typography, and using Quark to implement them. Credit 3.

0688410

Advanced Internet Design

This course concentrates on building web design skills beyond basic HTML while exploring current topics in web development. Students focus on learning Flash interaction and animation through exercises and projects to produce web sites that apply effective information architecture and usability concepts. Students are introduced to the Flash Action Script programming language. An emphasis is placed on learning how to keep abreast of current Internet technologies through an overview of related technologies such as JavaScript, XML, PHP and Cold Fusion. Credit 4

0688465

On Camera! On Mike!

Focuses on preparation and delivery skills for effective radio and TV appearances by non-professionals serving as spokespersons for their organizations. Audio and video tapings of simulated interviews, press conferences and panel presentations provide opportunities for student practice and for instructor and peer critiques. Also, presents a framework for understanding the perspectives and functions of the broadcast media as well as guidelines for effective use of broadcast formats to achieve public relations or marketing goals. (0688-220 or 320, or equivalent) Credit 4

0688-500

Communications Elective

This course covers special communication topics and subject areas and is offered on demand. Variable credit.

0688-510

Technical Information Design

Intensive practice in the creation of content for online and multimedia documents with emphasis on the presentation of technical and scientific concepts, products and processes. A survey of graphic methods for the display of complex technical relationships and processes. Students will also be introduced to contemporary topics and applications in technical information design. Credit 4

0688-511

Documentation Usability

This class presents concepts, tolls and techniques used to increase the usability of printed and online documentation, including multimedia products and multimedia interfaces, through usability evaluation and usability testing. It discusses ways to incorporate usability testing into the design process, saving time and money by eliminating design and functionally problems early in the design process. (0688-333 or equivalent). Credit 4

0688-512

Writing Procedures & Online Help

The development of task-oriented procedural documentation. Procedures for complex physical and mental tasks including time-constrained activities, emergencies, diagnostics and troubleshooting, and multiple-path processes. Formats for print, electronic, and multimedia instructions. An introduction to applications used for the creation of online help, including we-delivered and HTML help. The course will also cover the principles of designing and writing online help, regardless of the help authoring toll used to create it. Practice will be given in writing procedures of various formats, as wells as writing online delivery, particularly via online help. Credit 4

0688-514

Technical Proposals

The elements of proposal writing, including responsiveness, establishing credibility, and technical clarity. The proposal process as practiced in government and industry, including an understanding of RFPs, RFIs, and the decision process. Specialized proposals including NDAs, on-line and multimedia proposals and technical marketing presentations. Credit 4.

Math & Science

0692-201

Math Thought & Processes

An examination of mathematical thought and processes through a study of elementary mathematical concepts. This course will acquaint the student with the "mathematical way of thinking". Topics include sets, numeration systems, number theory, real numbers and finite systems. Credit 4

Note: A math assessment is required of students applying for courses, 0692-201, 211, 221.

0692-202

Modern Math Methods

A continuation of 0692-201 with an examination of selected modern mathematical methods used in today's society. This examination includes a study of equations, inequalities, problem solving, graphs and functions, probability, statistics and the usefulness of these methods in today's society. Credit 4

0692-211

College Math for Business

An introduction to mathematical concepts and quantitative methods required in business management. Included are sets and real number system; linear, nonlinear and exponential functions; and system of equations and inequalities. Differential and integrated calculus is introduced, as well as some special topics in quantitative analysis such as linear programming and simulation. Credit 4

0692-212

College Math for Business II

An introduction to mathematical concepts and quantitative methods required in business management. Included are sets and real number; linear, nonlinear and exponential functions; and system of equations and inequalities. Differential and integrated calculus is introduced, as well as some special topics in quantitative analysis such as linear programming and simulation. Credit 4

0692-221 Technical Math
A two-quarter sequence introducing college algebra and trigonometry, covering basic algebraic concepts and operations, algebraic and transcendental (trigonometric, logarithmic and exponential) functions. (Three years high school math or equivalent; requires pretest) Credit 4

0692-222 Technical Math II
A two-quarter sequence introducing college algebra and trigonometry, covering basic algebraic concepts and operations, algebraic and transcendental (trigonometric, logarithmic and exponential) functions. (Three years high school math or equivalent; requires pretest) Credit 4

0692-223 Technical Calculus
An elementary applied calculus course covering the basic differential and integral calculus of algebraic and transcendental functions with applications. (0692-222 or equivalent) Credit 4

0692-231 Contemporary Science: Biology
An introduction to the fundamental principles of biology for non-science majors and the application of these concepts to areas of interest in our contemporary technological society. Topics discussed include the cell as a biological unit, the biogenesis-abiogenesis controversy, genetic coding and introduction to plant and animal biology. The course is presented in a lecture-demonstration format. (0692-221 or 0692-201 or 0692-211 or equivalent) Credit 4

0692-232 Contemporary Science-Chemistry
An introduction to the fundamental principles of chemistry for non-science majors and the application of those concepts to areas of interest and concern in our contemporary technological society. Topics discussed include the atomic theory, chemical compounds, chemical reactions, organic chemistry, biological chemistry and macromolecular chemistry. The course is presented in lecture-demonstration format. (0692-221 or 0692-201 or 0692-211 or equivalent) Credit 4

0692-233 Contemporary Science-Physics
An introduction to the fundamental principles of physics for non-science majors, and the application of these concepts to areas of interest and concern in our contemporary technological society. The conceptual basis for the phenomena of heat, light, sound, mechanics, electricity and magnetism is discussed and related to such topics as astronomy, space exploration, lasers and environmental concerns. The course is presented in a lecture-demonstration format. (0692-221 or 0692-201 or 0692-211 or equivalent) Credit 4

0692-234 Oceanus
An introduction to the fundamental principles of oceanography for non-science majors, and the application of those concepts to areas of interest and concern in our contemporary technological society. The marine environment is investigated in terms of basic scientific concepts, and topics discussed include plate tectonics and earthquake prediction, the impact of ocean pollutants, climate fluctuations, cetacean intelligence and resources from the sea. (Distance learning offering) (High school algebra) Credit 4

0692-236 Contemporary Science-Astronomy
An introduction to the fundamentals of astronomy for non-science majors. After learning to locate and identify visible objects in the night sky, students are introduced to the scientific instruments and techniques used to investigate celestial phenomena. Subsequent discussions show how observational data reveals the physical nature and evolution of planets, stars, and galaxies. Requires proficiency in algebra and a familiarity with simple trigonometric relationships. This is a distance learning offering. Credit 4

0692-250 Introduction to Computer Program
Basic concepts and overview of computer science. The topics include historical development, algorithms, flowcharting and programming in BASIC. Exposure to hardware concepts, software concepts, binary and hex numbers and logic. Application of the computer to various disciplines. Not for computer science majors. This is a distance learning offering. (High school intermediate algebra) Credit 4

0692-311 Statistics
An introduction to the basic tools of statistical analysis used in business, including charts, frequency distribution, averages, dispersion, probability theory, sampling. Logical procedures for making business decisions under conditions of uncertainty are emphasized. Hypothesis testing including one, two and k-sample test means, proportions, regression, and correlation analysis are also included. (0692-212) Credit 4

0692-312 Statistics II
An introduction to the basic tools of statistical analysis used in business including charts, frequency distribution, averages, dispersion, probability theory, sampling. Logical procedures for making business decisions under conditions of uncertainty are emphasized. Hypothesis testing including one, two and k-sample test means, proportions, regression and correlation analysis are also included. (0692-212) Credit 4

Multidisciplinary Studies

0697-201 Student Seminar
This is a required, developmental course in the University Program in which students focus on the essential college and life success skills. Utilizing individual active learning activities, group work, role plays, and class discussion, students explore topics such as personal responsibility, success, career goals, learning and personal style, academic performance and expectations, and time and stress management. Specific college success skills such as test taking, textbook reading, using the library and information/communication systems, note taking and study systems, are reviewed. Credit 2

0697-220 Career Plan & Decision

0697-240 Methods of Learning
Provides students with analytical thinking skills and strategies that are effective across academic disciplines. The process of "learning to learn" considers an individual's natural learning skills and how to apply them to academic work. The importance of questioning in the active learning process is established through guided instruction. The application of skills to current academic course work is reinforced through small group sessions and carefully monitored independent student self-assessment. Credit 4

0697428 Training Design & Delivery
The new workplace requires new solutions. In this environment, training that is well planned, presented, and meets organization needs takes on a critical strategic role. This course is aimed at managers team leaders, HR specialists, and those involved in the continuous, self-directed, formal and informal learning needed to help their organizations improve their business success. Core topics include: design and delivery of training, the needs assessment process, job and core competencies analysis, targeting learner populations and learner needs, training program design and program development issues. Credit 4

0697-430 Survey of Organizational Change
This course will facilitate a student's understanding of factors that impact and influence behavior in contemporary organizations. In addition, students will develop skills that can be used to effectively function in the workplace. The course focuses on individual behavior, teams, motivation, decision-making, and creativity. Leadership, power, and politics in organizations are also addressed. Other topics include culture and change including the need for continuous learning and attention to the learning organization, ethics and values, organizational structure and conflict. The importance of effective communication is stressed throughout the course. Credit 4.

0697-431 Understanding Corporate Culture
An introduction to the concepts of organizational/corporate culture and the methods of analyzing it. Focuses on the development of skills required to assess corporate culture in terms of such constitute parts as ritual, symbol, structure, language and identity. Also included are a history of the study of corporate culture, an analysis of leadership styles and communication patterns in the workplace, an overview of strategies for managing corporate and organizational change and an orientation to leadership styles appropriate to the successful manipulation of cultural elements. Emphasis is both on individual and interactive learning processes. (0510-210 and either 0514-210 or 0515-210) Credit 4

0697-432 Managing Organizational Change
At a time when America is learning that change-and not stability-is at the heart of business and organizational vitality, this course offers students insight into theories of organizational dynamics and change as well as an introduction to skills for managing change and negotiating. The strategies covered include, but are not limited to, community building, managing corporate and individual change, and identifying resistance conflict. Credit 4

0697433 **Teams & Team Development**
fleets the increasing need to understand and participate in teams in the workplace. Students establish a strong framework of group theory through topics that include current group and team theory research, individual functions in a team and team leadership, mission and global development, evaluating team effectiveness, negotiating persuasion and conflict resolution. This course is highly interactive, with projects that require the student to use the theory in constructing and observing cross-functional work teams, self directed teams and integrated work teams. Learning takes place through lectures, case studies, simulations and group projects that develop strong team skills and reinforce team theory. **Credit 4**

0697434 **Change & Leadership Project**
This course integrates the knowledge gained in the courses that make up the Organizational Change & Leadership Certificate and, therefore, cannot be taken until all the courses in the certificate have been completed. Students will be expected to identify an area within their studies of change and leadership that is of most interest to them. Once they have identified their area of interest, they will discuss this with the faculty member assigned to the course and begin the process of developing a proposal of the work to be accomplished. Well planned and fully thought-out proposals lead to the best projects and the ones that are most easily executed and completed. Upon acceptance of the proposal, the student will complete the project and write a paper reflecting their area of choice, integrating the knowledge gained from the courses in the certificate. **Credit 4.**

0697435 **Global Forces & Trends**
Dealing with unpredictable futures is an on-going challenge for every leader, manager, and individual. Whether you are making personal or organizational decisions, your success depends on your ability to envision the future with a proactive, strategic approach. The ability to analyze, adjust to, and take advantage of emerging opportunities, trends, and forces, and to integrate and connect information patterns, determines the success or failure of your decisions. In this course, methodologies and approaches such as scenario-based strategy, visual thinking, mind-mapping, mental models, strategic thinking theory, and challenging prevailing ideas are introduced and used to examine the technical, social, economic and demographic trends and forces affecting people, organizations, and the choices they need to make. **Credit 4.**

0697441 **Creative Critical Thinking & Problem Solving**
An interdisciplinary approach to the generation and evaluation of ideas and solutions. Includes analysis of the conditions limiting creativity and the development of a "toolkit" of strategies and techniques for discovering, inventing and assessing new, unique and useful ideas, applications and solutions. Applicable to a range of life and work situations, from complex environmental concerns to competitive business challenges to family disputes. **Credit 4**

0697442 **Learning Organization**
This interdisciplinary course combines management thought, control theory psychology and systems thinking. It focuses on theory and techniques for building and sustaining an efficient, creative organization that promotes problem solving and collaborative learning. Learning organization principles of systems thinking, personal mastery, mental models, shared vision, team learning. Provides an introduction to control theory psychology with applications for improved personal interaction and a non-coercive approach for lead managing. Includes analysis of the conditions limiting an organization's capacity to learn and remediation of organizational "learning disabilities." **Credit 4**

0697444 **Self-Directed Learning in the Workplace**
This multidisciplinary course provides a practical overview of self-directed learning: theory, design, development and implementation. Students examine self-directed learning from personal an organizational perspectives that include individual learning differences. Student projects focus on identifying learning objectives and utilizing a systematic approach for promoting active learning in the workplace. **Credit 4**

0697448 **Managing Learning & Knowledge**
The new workplace requires new solutions. In this environment, training that is well-planned, presented, and meets organization needs takes on a critical strategic role. This course is aimed at managers, team leaders, HR specialists, and those involved in the continuous, self-directed, formal and informal learning needed to help their organizations improve their business success. Core topics include: design and delivery of training, the needs assessment process, job and core competencies analysis, targeting learner populations and learner needs, training program design, and program development issues. **Class 4, Credit 4.**

0697451 **Preparing /21st Century**
An interactive seminar for advanced students that focuses on interdisciplinary issues of wide interest and application. Course theme and content change periodically, ranging from "Negotiation and Conflict Resolution" to "Microeconomic Battle Plans" and "Organizational Culture." Limited to qualified applied arts and science BS degree students. (Approval of adviser) **Credit 4**

0697452 **Special Topics**
This course provides an overview of urban issues and how to develop action plans that address some of a city's most critical challenges. Student teams will address issues of economic development, education, public safety, the quality of life and metropolitan solutions. **Credit 4**

0697462 **Empowered Leadership**
This multidisciplinary course has a three-tier structure: fundamental look at the theories and practices of leadership; a study of leadership styles and their impact on the work environment; and a reflection and self-analysis by the students of their leadership styles. Course work will include extensive readings, case studies, written reports and reflections. Much of the course will operate in a team manner. **Credit 4**

0697510 **Multidisciplinary Life**
In this seminar capstone course, required of all Applied Arts and Science degree candidates prior to graduation, students reflect upon their multidisciplinary education and identify the learning experiences that arose from individual courses or concentrations within their academic program. Students will identify the changes, and other developments within their lives and workplaces, that have the most significance to their future. In consultation with their faculty advisors, students will articulate how they might use this new knowledge to foster life-long learning, multi-disciplinary understandings, and success in their careers and other endeavors. **Credit 4**

College of Business

Index

0101	Accounting	188
0102	Management	188
0104	Finance	190
0105	Marketing	190
0106	Decision Sciences	190
0112	Management Information Systems	191

Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100-399); upper division (400-699); or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites and/or corequisites are noted in parentheses near the end of the course description.

Accounting

0101-301 Financial Accounting
Accounting as an information system for investors and creditors making economic decisions. The accounting cycle, accounting theory and interpretation of major financial statements are discussed. Current issues in applying generally accepted accounting principles are explored through relevant cases and current corporate annual reports, (sophomore status) **Credit 4**

0101-302 Managerial Accounting
Introduction to the use of accounting information by managers within a business. Explores the value of accounting information for the planning and controlling of operations, assessing the cost of a product/service, evaluating the performance of managers, measuring costs of quality and strategic decision making. (0101-301) **Credit 4**

0101-319 Legal Environment of Business
An introduction to legal principles and their relationships to business organizations. Includes a review of the laws and regulations that govern their operations. Explores the background and origin of the U.S. legal system, its law enforcement agencies and the legal procedures used by the government to enforce its laws. Representative topics include constitutional, antitrust, consumer protection, torts, bankruptcy and regulatory law. A substantial portion of the course deals with contract law. A legal research project is an important aspect of this course. **Credit 4**

0101-320 Business Law
Explores in depth the implications of the Uniform Commercial Code to business operations. Topics covered include sales, commercial paper, corporations, partnerships, joint ventures, sole proprietorships, bailments and agency. Topical cases and examples are used to help the student grasp the business implications of the law and its nomenclature. A legal research project is an important aspect of this course. (0101-319) **Credit 4**

0101-335 Cost & Managerial Accounting
An extensive introduction to the use of accounting information by managers within a business. It explores the value of accounting information in planning and controlling operations, assessing the cost of a product/service, activity-based costing, evaluating the performance of managers, measuring costs of quality and strategic decision making. (0101-301, junior status) **Credit 4**

0101-345 Accounting Information Systems
Emphasis is on developing a conceptual understanding of accounting information systems. This course combines information systems concepts, computer technology, and accounting issues. Topics include computer security, information privacy, accounting cycles, specialized journals, systems development, computer crime, database applications, e-commerce and other information systems issues. Discussion of current literature and use of a computerized accounting system will be included. Students analyze accounting information systems topics through problem solving, essays, presentations, exams and case studies. (0101-301 or equivalent, sophomore status) **Credit 4**

0101-408 Financial Reporting & Analysis I
Extensive exposure to the accounting cycle with full integration of the data flow in an accounting information system. Accounting theory developed by accounting standard-setting bodies is covered in depth. Generally accepted accounting principles are discussed as they apply to the preparation of financial statements and the recognition and measurement of current assets. (0101-301,0104-350, junior status.) **Credit 4**

0101-409 Financial Reporting & Analysis II
In-depth consideration of generally accepted accounting principles and theory as they apply to the recognition and measurement of all non-current assets current and non-current liabilities, and owner equities, including partnerships. Issues related to convertible securities and the computation of earnings per share are discussed. (0101-408, junior status) **Credit 4**

0101-435 Role of Accounting in Organizations
Gives students an understanding of how accounting is used to help organizations achieve their goals. Students learn how to account and the reasons why we account as we do. Special emphasis is placed on the resolution of controversial accounting issues within the context of the firm's goals. Positive accounting theory and agency theory are discussed throughout. (Distance Learning course, not for College of Business majors) **Credit 4**

0101-522 Tax Accounting I
A basic introductory course in federal income taxation. Emphasis is on taxation of individuals and sole proprietorships. Topics include income measurement and deductibility of personal and business expenses. (0101-301, junior status) **Credit 4**

0101-523 Tax Accounting II
A continuation of Tax Accounting I. Emphasis is on tax treatment of property transactions and taxation of business entities. Also covers the use of technology to prepare complex returns and to research tax issues. (0101-522, junior status) **Credit 4**

0101-530 Auditing
A study of the legal, ethical and technical environment in which the auditor works. Current auditing theory, standards, procedures and techniques are studied. The audit process is studied to ascertain how it leads to the development of an audit opinion. (0101-409, junior status) **Credit 4**

0101-540 Advanced Accounting
This course investigates the application of generally accepted accounting principles to corporations with investments in subsidiaries. Issues involving consolidated financial statements, including international topics, are considered. Also examined are objectives for not-for-profit and governmental entities, and how these objectives affect their financial accounting and reporting. (0101-409, junior status) **Credit 4**

0101-550 Financial Accounting & Reporting Issues
A study of complex issues facing preparers and users of financial statements and how these issues are resolved. Topics include revenue recognition, accounting changes, deferred taxes, pensions, post-employment benefits, leasing, cash flows, price level statements, interim reporting and segment disclosures. (0101-409, senior status) **Credit 4**

0101-554 Seminar in Accounting
Designed by individual instructor. (Varies by instructor.) **Credit 4**

Management

0102-225 Effective Communications
Organization and structure of communications are discussed, with focus on oral presentations, meeting skills, listening strategies and summarization techniques. Research skills and library usage also are covered. **Credit 2**

0102-235 Quality Concepts for Transfers
Required for incoming transfer students. Exposes students to the current Total Quality Management (TQM) movement and considers its implications for personal, academic and career goals. Emphasis is on the history and underlying principles of TQM. At the completion of this course, the student should recognize those factors that have created the need for change in American business practices; be capable of identifying and articulating the underlying principles of the current TQM movement; and demonstrate an ability to analyze the impact the TQM movement may have on personal, academic and career decisions. **Credit 2**

0102-250	World of Business	This is a course designed for first year business students. It emphasizes the processes and functional inter-relationships of business. Topics include the role and responsibility of the manager, the role, the impact of technology, delivering goods and services in global environments, and career exploration. Credit 4	0102-462	Management & Career Development	Emphasizes an acquisition of management skills such as communicating, resolving conflict, motivating, creative problem solving, and their management processes and functions of business management development and coaching. Students receive feedback on their management skills. An overview of management development and training techniques is also presented, along with basic aspects of career development (0102-430, junior status) Credit 4
0102-310	Air Force Management & Leadership I	Integrated management and leadership courses emphasize the concepts and skills required of the successful young officer, manager and leader. The first course includes applied written and oral communication techniques, coordination, history of management theory, analytic methods of decision-making, strategic and tactical planning, various leadership theories and followership. The second course stresses organizing, staffing, controlling, counseling, human motivation and group dynamics, ethics, managerial power and politics, managing change, career development and performance appraisal. Actual Air Force case studies are used to enhance the learning process. (ROTC) Credit 5	0102-465	Strategy in the Global Environment	This course concentrates on the strategic challenges faced by management of multinational enterprises (MNE's) when operating, as they do, in a global environment. It deals with the critical issues of international business strategy development and the realities of translating plans into action. (0102-360, junior status) Credit 4
0102-311	Air Force Management & Leadership II	Integrated management and leadership courses emphasize the concepts and skills required of the successful young officer, manager, and leader. The first course includes applied written and oral communication techniques, coordination, history of management theory, analytic methods of decision-making, strategic and tactical planning various leadership theories, and followership. The second course stresses organizing, staffing, controlling, counseling, human motivation and group dynamics, ethics, managerial power and politics, managing change, career development, and performance appraisal. Actual Air Force case studies are used to enhance the learning process. Credit 5	0102-490	Entrepreneurship	Focus is the creation and growth of new ventures. Major topics include evaluating business opportunities, franchising, the role of small business and entrepreneurship in the economy, problems associated with family firms, sources of financing and the psychology of the entrepreneur. An integral part of the course is the development, writing and presentation of a business plan. (Junior status) Credit 4
<i>Note: Other Air Force ROTC course listing can be found under the College of Applied Science and Technology.</i>			0102-507	Business, Government, & Society	An analysis of society's changing expectations of business; the means by which business can deal with these expectations; ethical reasoning, which can be used to determine the responsibility for meeting these expectations; the manner in which public policy is formulated to impose these expectations on business; and the manner in which business can influence the formulation of public policy. (Senior status) Credit 4
0102-360	Global Business: An Introduction	A comprehensive review of critical international business issues is offered. The hot political issue of globalization is dealt with in detail. An analysis of the opportunities and threats, such as China and foreign exchange movements, faced by enterprises and individuals is presented. There is focus on the politics of international trade and the strategies executed by multinational enterprises. (MNE's) (0511-301, sophomore status) Credit 4	0102-520	Technology & Quality Management	This course will focus on a number of special topics within the broad area of technology and quality management. Managing technology and quality within the firm requires the deliberate coordination of the research, production, and service functions with the marketing, finance and human resource functions of the organization. The emphasis of the course is on customer satisfaction, quality improvement, problem solving, team building, benchmarking, innovation, and new product and process development. (Junior status) Credit 4
0102-430	Organizational Behavior	An overview of human behavior in organizations with respect to enhancing individual and organizational effectiveness. Emphasizes individual differences, teamwork, work teams, motivation, communication, leadership, conflict resolution and organizational change. (Junior status) Credit 4	0102-536	Organizational Performance & Design	Applications of organizational design and theory to organizational performance. Traditional and emerging concepts that affect work organization performance. Characteristics of high performance organizations. Interaction of organization and environment. May include a strengths/weaknesses analysis of an existing organization. (0102-430, junior status) Credit 4
0102-432	Managing in Global Environment	An analysis of the key implementation issues facing firms conducting business around the globe. Emphasis is placed on the pervasive topic of culture. We examine its impact on management, individuals, groups, on the differential effect of cultures on management, individuals, and how they affect organizational performance. Leadership styles, in the cross cultural context, will be deconstructed as well as communication, negotiation, risk tolerance and motivation. (0102-360, junior status). Credit 4	0102-547	Field Experience in Business Consulting	Students nearing the completion of their studies, work in consulting teams to assist local small firms and entrepreneurs. Problems are isolated and solutions then developed. A team consultant's report is prepared for the firms/entrepreneurs. (Senior status) Credit 4
0102-438	Business Ethics	Examines major western society ethical theories and moral traditions and their business applications. Students have an opportunity to bring theories and traditions to bear on specific issues. These issues will be related to case studies: equal opportunity and affirmative action, product liability, introduction of new technologies (such as bioengineering) and also to business practices in other cultures. (Junior status) Credit 4	0102-551	Strategy & Policy	A capstone course drawing upon a variety of functional areas including accounting, finance, marketing, production operations, organizational theory and international business to provide an integrated perspective of business organizations. Focuses on how corporations can achieve superior profitability through establishment of a sustainable competitive advantage. Topics include the analysis of general environmental trends, industry attractiveness, competition, and knowledge management. Students learn how to formulate and implement effective business and corporate-level strategies. Extensive use is made of complex cases and/or a computer simulation of decision making in a highly competitive industry environment. (0102-430,0105-363,0104-441,0106-401,0102-360, senior status) Credit 4
0102-455	Human Resources Management	An overview of the human resource function in both large and small organizations. Major topics studied include employee selection, compensation, training and development, performance evaluation and managing diversity. Emphasis is on how human resources management influences and enables the achievement of organizational goals. (0102-430, junior status) Credit 4	0102-554	Seminar in Management	Designed by individual instructor. (Varies by seminar content) (Permission of instructor, junior status) Credit 4
0102-460	Leadership in Organizations	A comprehensive explanation of how managerial leadership guides employees toward attaining organizational goals. The personal attributes of leaders are described, along with the leader's contribution to teamwork, achieving cultural diversity, and knowledge management. Emphasis is placed on the development of leadership skills. (0102-430, junior status) Credit 4	0102-575	Global Business: Special Issues	A variety of contemporary special interest topics in the context of international business will be covered. Sample topics may be foreign direct investment strategies, regions of the world: Asia, Europe, China, Japan, Korea, etc. The role of multinational enterprises (EMN's), transformation of transitional economies. (0102-360, junior status) Credit 4

Finance

0104-340 Personal Financial Management
Examines financial decisions people must make in their personal lives. Covers personal taxation, housing and mortgages, consumer credit, insurance (including life, health, property and casualty) and retirement and estate planning. Also reviews the common financial investments made by individuals, including stocks, bonds, money market instruments and mutual funds. This class involves extensive use of the internet for access to information. Calculators are also used in the classroom.

0104-350 Corporate Finance
Basic course in financial management. Covers business organization, time value of money, valuation of securities, capital budgeting decision rules, financial ratios, financial planning and working capital management. (0101-301, sophomore status.) Credit 4

0104-452 Managing Corporate Assets & Liabilities
Advanced course in financial management. Covers project cash-flow analysis, risk, cost of capital, market efficiency, issuance of securities, debt policy and dividend policy. (0104-350, junior status) Credit 4

0104-453 Intermediate Investments
Focuses on the financial investment problems faced by individuals and institutions. Theoretical topics include asset pricing, hedging and arbitrage. Application topics include risk management in bond and stock portfolio context. A discussion of options, futures and swaps also is included. (0104-350, junior status) Credit 4

0104-460 Financial Analysis & Modeling
In this course, students learn to obtain and organize financial data and conduct financial analysis such as DCF analysis, risk analysis and financial forecasting. Sources of data include web-based sources and proprietary databases. Excel will be the main software tool. (0104-452) Credit 4

0104-504 Finance in Global Environment
Discusses problems posed by the international financial environment in which corporations operate. In particular, students learn to quantify and manage risks arising from shifting exchange rates. Other topics include exchange rate systems, international trade finance, international capital budgeting, country risk analysis and long-term international financing. (0104-350, junior status) Credit 4

0104-505 Advanced Corporate Financial Planning
Focuses on the strategic management of the corporation. Topics include forecasting models for critical variables such as sales; budgeting; strategic decisions such as mergers, divestitures and executive compensation; and working capital management. (0104-452, junior status) Credit 4

0104-510 Management of Financial Institutions
Analysis of the different kinds of financial institutions, such as commercial banks, savings institutions, insurance companies, pension funds and others. Central emphasis is on interest rate risk exposure. Special focus is on institutions products as represented in their liability structures and the consequent asset decisions. (0104-350, junior status) Credit 4

0104-554 Seminar in Finance
Designed by individual instructor. (Varies by seminar content) (Permission of instructor, junior status) Credit 4

Marketing

0105-363 Principles of Marketing
An introduction to the field of marketing, stressing its role in the organization and society. Emphasis is on determining customer needs and wants and how the marketer can satisfy those needs through the controllable marketing variables of product, price, promotion and distribution. (Sophomore status) Credit 4

0105-440 Internet Marketing
The course examines the impact of the Internet on traditional marketing and the new form of marketing. It explores the impact of the Internet on marketing strategy and tactics. It explicitly considers using the Internet to increase the value delivered to customers and improve a firm's competitiveness. (0105-363, junior status) Credit 4

0105-445 Business to Business E-Commerce
The focus of this course is on the effective integration and coordination of various operations in e-business to business transactions. The course includes organizational and financial issues related to successful e-business operation and it explores relationships among suppliers and buyers in these type of businesses. The course looks at the strategies and tactics that organizations can use to build and/or enhance their business to business relationships using electronic business tools and strategies. (0105-563 or equivalent) Credit 4

0105-505 Buyer Behavior
A study of the determinants of consumer and business buying behaviors. Emphasis is on understanding the buying decision process model as a framework for analysis of why and how consumers and businesses purchase and consume products and services. Social, cultural and psychological factors influencing buyer behavior are discussed. Consumption patterns, market segmentation, attitude formation and change, customer satisfaction are also covered. (0105-363, junior status). Credit 4

0105-550 Marketing Management
A capstone course that gives the student an in-depth knowledge of middle- and upper-management-level marketing problems and processes. Topics include tools used by marketing managers and the role of total quality in the development, implementation and control of marketing plans. (0105-363, prior or concurrent registration with 0105-551, senior status and one completed block of co-op) Credit 4

0105-551 Marketing Research
A study of research methods used to understand the changing needs of markets and customers in order to guide the decision making of marketing managers. Students will use projects and cases to learn topics including problem formulation, sources of marketing data, research design, data collection and analysis. (0105-363,1016-319, junior status) Credit 4

0105-553 Sales Management
A study of the role, activities and tools employed by sales managers. Topics include account management, sales planning, territory design and deployment of sales reps, organization, recruitment and selection, training, supervision, performance appraisals and motivating the sales force. (0105-363, junior status) Credit 4

0105-554 Seminar in Marketing
Current issues in marketing are the focus of the course. Topics have included direct and database marketing, pricing, advanced marketing research and other current issues in marketing, based on student and faculty interest. (0105-363, junior status) Credit 4

0105-555 Marketing in Global Environment
A study of the management challenges of marketing in foreign countries. Topics include the assessment of foreign markets, foreign customer requirements, entry strategies, foreign channel management, promoting internationally, transfer pricing and world-class quality. (0105-363, junior status) Credit 4

0105-559 Professional Selling
Selling concepts, tools, strategies and tactics are discussed as they apply to both external and internal customers. Students learn and experience some of the problems faced and rewards earned by those in professional sales. Selling in a Total Quality environment is emphasized. Customer relationship management/partnering with customers and truly seeking to meet their requirements are discussed as a key to long-term success. (0105-363, junior status) Credit 4

0105-560 Integrated Marketing Communications
An in-depth view of tools of advertising, sales promotion and public relations. Students develop a comprehensive promotion plan, beginning with the marketing strategy and ending with implementation and evaluation. (0105-363, junior status) Credit 4

Decision Sciences

0106-334 Management Science
A survey of quantitative approaches to decision making. Topics include formulation and solution of linear programming models, decision analysis and simulation. Involves use of computer software. (1016-319 or equivalent) Credit 4

0106-401 Operations Management
A survey of production/operations management. Topics include quality control, total quality management, project management, forecasting, production planning, material requirements and capacity planning, inventory management, just-in-time, international operations, impact of technology and strategic considerations. (0106-319, junior status) **Credit 4**

0106-405 Statistical Methods of Quality Control
A course in statistical quality control. Topics include statistical process control (SPC) techniques (such as control charts, process capability analysis, etc.), acceptance sampling plans and some examples of reliability and design of experiment techniques. (1016-319 or equivalent) **Credit 4**

0106-425 Tools for Total Quality Management
Examines the concepts of quality. Perspectives include quality planning and improvement. Addresses what tools and techniques including quality function deployment (QFD), six sigma, check sheets, Pareto diagrams, flow charts, histograms, run charts, statistical control charts and benchmarking. (Some background in statistics recommended) (Distance Learning course, not for College of Business majors) **Credit 4**

Management Information Systems

0112-270 Business Software Applications
This course provides students with hands-on experience with the analytical software tools and techniques that are in use today. Emphasis will be placed on the theory of spreadsheet and database development for supporting management decision making. The theory will be applied in the context of the tools to be used. **Credit 2**

0112-300 Business Computer Applications
The primary focus of the course is to provide students with hands-on skills in using microcomputers as productivity tools in the workplace. Students will be exposed to a combination of advanced productivity software including word processors, spreadsheets, presentation graphics and database management applications. Hands-on exercises and assignments will help to develop computer proficiency and problem-solving skills. **Credit 4**

0112-310 Introduction to E-Business Technologies
This course gives students both a conceptual and hands-on understanding of the technology that supports today's e-business revolution. Students will study the technical infrastructure that enables business online, and will also create e-business Web sites that will interact with "back end" databases to allow customer transactions. Students who complete this course will be able to approach technical decisions about e-business in an informed and effective manner. (Not for College of Business MIS majors) **Credit 4**

0112-315 Business Information Systems Processes
In this course students obtain a comprehensive overview of management information systems, their tactical, operational, and strategic importance, and how they affect and relate to business processes of the organization. The students are exposed to many different types of information systems, related state-of-the-art technologies, and management practices. (Sophomore status) **Credit 4**

0112-330 Business Programming
Students in this class will learn the fundamentals of computer programming in the current computer language. Each student will analyze simple problem statements and design structured computer programs that implement solutions. Basic programming concepts will be introduced including: variables and data types, assignment and computation statements, conditional statements, repetitive constructs, file input and output and simple data structures. (Freshman status) **Credit 4**

0112-335 Visual Basic & GUI Design
Students in this class will build on earlier programming experience to develop usable data-driven computer programs. By the end of the quarter, students will be able to analyze user requirements and formulate effective user interfaces. Also, every student will develop knowledge of how to build computer programs that interact with common business files including spreadsheets and databases **Credit 4**

0112-340 Database Management Systems
This introductory course to business database management systems introduces students with no prior database knowledge to the concept of databases and database management systems (DBMS). It includes basic and intermediate hands-on concepts for designing, implementing and querying databases using a current DBMS. (Sophomore status) **Credit 4**

0112-360 MIS Hardware & Operating Systems
This course provides the hardware/operating system software fundamentals for various computer/operating system architectures used in the design, development and implementation of contemporary information systems. These concepts enable systems development personnel to explain tradeoffs in computer architecture for effective design and to select appropriate operating system architectures for single user, central, and networked computing systems. Single and multi-user operating systems, including Microsoft operating systems, are covered as well. (0112-270 or 0112-300, sophomore status) **Credit 4**

0112-370 Systems Analysis & Design
Students who complete this course will be able to design, redesign, and model business processes. They will know how to conduct interviews approach the design or redesign of business processes; model system designs; effectively communicate systems designs to various levels of management; approach the implementation of a new or redesigned system. (0112-315, sophomore status) **Credit 4**

0112-380 Network Technologies
This course stresses a business oriented approach to evaluating and selecting network technology. Students who successfully complete this course gain practical knowledge of network telecommunications technology including hardware and software. They learn enough to allow them to help design systems that include network components. They are also able to discuss network issues with network engineers from a systems design perspective. Several versions of this course are taught throughout the institute. This one differs from the other in that, while covering the basics of network protocols, hardware, and other technologies, it stresses a business evaluation model throughout. (0112-315, sophomore status) **Credit 4**

0112-405 Object-Oriented Business Programming
Object-Oriented Business Programming will prepare students to plan and implement systems using the Object-Oriented approach. This course will build on earlier programming classes, and will emphasize the programming practices of polymorphism, inheritance and data hiding. (0112-330, junior status) **Credit 4**

0112-410 Object-Oriented Analysis & Design
Object-oriented analysis and design concepts and techniques are covered. Computer-aided software engineering (CASE) software and software quality metrics are introduced. Students that successfully complete this course and the prerequisite Systems Analysis & Design will have acquired knowledge of the full range of analysis and design concepts currently used in systems development. (0112-370, junior status) **Credit 4**

0112-430 Web Systems Development
Students in this class will analyze business problems and develop data-driven web applications to solve them. A popular industry application server, such as IBM WebSphere, will provide the framework for integrating and deploying a set of client and server technologies to create the applications. Development skills will include presenting and receiving information through a web site, validating entered information and storing entered information in text file or databases. Students will design solutions using Hypertext Markup Language, client scripting and server programs for database and file access. (0112-320, 0112-340, junior status) **Credit 4**

0112-440 Database Systems Development
This course builds upon the basic concepts from the Database Management Systems course and introduces students to a real world client/server database development environment with hands-on experience. Students completing the course should be able to create both the client side and server side of a relational database project, using a tool such as Oracle. (0112-340, junior status) **Credit 4**

0112-450 Enterprise Systems
This course is an introduction to the concepts and foundations of enterprise-resource planning systems and their role in modern organizations. Students in this class will analyze cross-functional business process integration and the Enterprise Resource Planning (ERP) systems commonly used by organizations. Students will receive basic hands-on experience with a current ERP system, such as SAP R/3, and will utilize a series of exercises to explore how these systems are configured based on organizational structures and business process definitions. (0112-340,0112-370, junior status) **Credit 4**

01X2-460

Software Quality & Testing

Students will learn the essential features involved in developing timely, cost effective and high quality software products that meet the users' requirements. They will examine the effective deployment of quality assurance procedures throughout the entire software development process. Other topics covered in this course will include quality concepts, development of quality assurance plans, implementation of verification and validation functions, selection of tools to support quality assurance and software testing, and application of software metrics to measure quality. (0112-410, junior status) Credit 4

0112-510

Designing the E-Business Organization

Students in this e-business course are required to propose and, to the extent possible, develop an e-business. The primary method for learning is the student's own pursuit of the problem solutions. Strategic, financial and technical perspectives will be emphasized. Most of the student work for this course will involve research and analysis of electronic marketplaces and ultimately, the design and development of competitive e-businesses. (0112-310, 0105-440, 0105-445) Credit 4

0112-520

Project Management & Practice

This course unifies the MIS student's education by having them complete a team project utilizing project management techniques. It provides an introduction to the concepts of project management and techniques for estimating, planning and controlling of resources to accomplish specific project goals. The factors necessary for successful management of projects involving the development or enhancement of information systems and the role of project management in modern organizations are examined. Both technical and behavioral aspects of project management are discussed. (Completion of two junior level MIS electives, senior status) Credit 4

0112-554

Seminar in MIS

Design by individual instructor. (Varies by seminar content) Credit 4

B. Thomas Golisano College of Computing and Information Sciences

Index

4002	Information Technology	193
4003	Computer Science	197
4010	Software Engineering	200

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Information Technology

4002-102 Freshman Honors Seminar
This course provides an introduction to the Honors program for all freshman GCCIS Honors students. The course provides an overview of GCCIS, its program and the requirements for the Honors program at the institute, college and program level. Honors students will hear discussions of the professional and research interests for faculty members from all three departments. Class 2, Lab 0, Credit 0

4002-201 Freshman Seminar in Information Technology
An orientation seminar taken by first-year students in information technology. Topics covered include a curriculum overview, co-op and career alternatives in information technology, and orientation to RIT and college life. Class 1, Lab 0, Credit 1

4002-206 Web Foundations
An introduction to Internet and web foundations including electronic communication and information, basic HTML and WYSIWYG editors, web page design, digital images, and web site implementation and maintenance. There are no prerequisites. Class 4, Lab 0, Credit 4

4002-208 Introduction to Programming
A first course in programming using C++ in writing modular, well-documented programs. Topics include an overview of problem-solving methods, C++ control structures and their uses, procedures and functions with parameters, elementary data types, arrays, records and modular programming. Weekly programming assignments stress features of structured programming and C++. (4002-200 or computer literacy; corequisite: 4002-208 lab) Class 3, Lab 2, Credit 4

4002-210 Programming with Classes
A second course in programming with emphasis on object-oriented programming. Student will first use classes and then build classes. Topics include information hiding through classes, construction of classes, operator overloading, friend functions, constructor functions and destructor functions. Inheritance and templates are also covered. Scheduled laboratory section and programming projects are required. (4002-208 or 4002-215 or 4002-217; corequisite: 4002-210 lab) Class 3, Lab 2, Credit 4

4002-217 Programming for Information Technology I
This is the first course in the introductory programming sequence required for all Information Technology students. Topics include elementary data types, arithmetic and logical operations, control structures and error handling, methods and functions, and an introduction to object-oriented programming design and implementation. Emphasis is placed on the development of problem-solving skills. Programming projects are required. (4002-200 or computer literacy) Class 5, Lab 0, Credit 4

4002-218 Programming for Information Technology II
This is the second course in the introductory programming sequence required for all students majoring in Information Technology. Topics include further exploration of classes and objects, programming through composition and inheritance, reusability, input/output, and object oriented design. Emphasis is placed on the development of problem-solving skills. Moderately large programming assignments are required. (4002-217) Class 5, Lab 0, Credit 4

4002-219 Programming for Information Technology III
This is the third course in the introductory programming sequence required for all students majoring in information technology. Topics include advanced interface concepts, traditional programming data structures, programming utilities and reusability, introductory project design and management concepts and other concepts as time permits. Emphasis is placed on the development of problem-solving skills. Large programming assignments are required. (4002-218 or 4002-221) Class 5, Lab 0, Credit 4

4002-220 Programming for Information Technology IIA
This is the first of two courses that is equivalent to 4002-218. 4002-218 is the second course in the introductory programming sequence required for all students majoring in information technology. This course and the subsequent one (4002-221) are designed to cover the same materials covered in 4002-218. These two courses are designed to help those students that find programming difficult and would like to have more time to learn OOP concepts and programming techniques. Topics include further exploration of classes and objects, programming through composition and inheritance, reusability, and object-oriented design. Emphasis is placed on the development of problem-solving skills. Moderately large programming assignments are required. (4002-217) Class 5, Lab 0, Credit 4

4002-221 Programming for Information Technology IIB
This is the second of two courses that is equivalent to 4002-218. 4002-218 is the second course in the introductory programming sequence required for all students majoring in information technology. This course and the previous one (4002-220) are designed to cover the same materials covered in 4002-218. These two courses are designed to help those students that find programming difficult and would like to have more time to learn OOP concepts and programming techniques. Topics include further exploration of inheritance, exceptions, and collections. New topics include IO classes and GUI. Emphasis is placed on the development of problem-solving skills. Moderately large programming assignments are required. (4002-220) Class 5, Lab 0, Credit 4

4002-230 Introduction to Programming for New Media
This course provides an introductory programming experience to students of new media. Students will write scripts to implement navigational strategies and control the display of graphics, text, audio and video. The course will look at both event-driven and time-driven models of interaction. Students will employ the fundamental structures of computer programming such as loops, variables, parameters and functions in their scripts. They will learn iterative user centered strategies for program design and implementation. (4002-320 or equivalent) Class 4, Lab 0, Credit 4

4002-231 Programming II for New Media
As the second course in programming for new media students, this course continues an object-oriented approach to programming for interaction. Topics will include reusability, lists and other data structures, strategies for event-driven programming, object design and inheritance, and media synchronization. Emphasis is placed on the development of problem-solving skills as students develop moderately complex applications. Programming projects are required. (4002-230) Class 4, Lab 0, Credit 4

4002-318 Java for Programmers
This course is intended for students with previous programming experience in a language other than Java and who also have some background in object-oriented programming. It is a rapid deployment of the introductory information technology programming sequence and may not be taken as an information technology elective or concentration course. The course covers both applets and application programs. Topics include: basic language concepts (declaring and evaluating values, statements, expressions, debugging, control flow, and input/output), the development environment, internet concepts, applet programming essentials, classes and objects, error handling, event handling, and threads. Programming assignments are required. (A two-course programming sequence in any language except Java) Class 5, Lab 0, Credit 4

- 4002-320 Introduction to Multimedia:
The Internet and the Web
This class provides an introduction to key Internet, web, and multimedia technologies, as well as familiarity with the Macintosh computer platform. Topics covered include computer-mediated communication, basic Internet applications such as telnet, FTP, and the WWW, basic digital image, audio, and video techniques, and web page development and publishing. (4002-200 or computer literacy) Class 4, Lab 0, Credit 4
- 4002-330 Interactive Digital Media
Students will create interactive multimedia content for CD-ROM and the World Wide Web. They will capture, combine, control and synchronize video, audio, text and images using authoring environments such as Macromedia Director. Students will write event handlers to control interactive applications. Programming will be required. (4002-320 and 4002-215 or 4002-217 or equivalent) Class 4, Lab 0, Credit 4
- 4002-340 Computer Concepts and Software Systems
An introduction to the concepts of computer hardware design, hardware organization, and computer operating systems. Topics can include: Boolean algebra, digital logic design, integrated circuit logic families, central processing unit design, buses and addressing, interrupts and direct memory access, memory models and processor modes, computer peripherals and interfacing techniques, operating system, system performance, evaluation, and discussions of historical and current technological developments and commercially available computers. (4002-216 or 4002-218 or 4002-317 or 4002-318; corequisite: 4002-340 lab) Class 3, Lab 2, Credit 4
- 4002-341 Data Communications and Computer Networks
An introduction to data communications hardware and software, and use of these components in computer networks. Topics include communication system components, communications software, packet switching, network control, common carrier issues, long-haul vs. local area networks, and performance considerations. (4002-340) Class 4, Lab 0, Credit 4
- 4002-342 Internetworking Lab
This course is a laboratory-based course on the interconnection of digital devices for the purpose of enabling data communication. The focus is on the hardware for peripheral communication and network communication, with a substantial laboratory component. Accessing computers and networks from a remote site will also be studied. Students will be required to construct cables, install network cards, configure modems and establish a working connection between digital devices. Problems will be introduced into working systems and students will be required to use diagnostic tools (both software and hardware) to determine and repair the problem. The use of remote access techniques to control and diagnose computers and networks will also be introduced. (4002-340 and 4002-341; corequisite: 4002-342 lab) Class 3, Lab 2, Credit 4
- 4002-350 Seminar in IT Co-op Preparation
This is a one-credit IT co-op preparation course providing sophomores, juniors, and transfer students in Information Technology with an overview of job-seeking skills necessary to research, identify, and secure a co-op position. The classes meet for five consecutive weeks, beginning week one. (Sophomores, juniors, transfers, or permission of instructors) Class 2, Lab 0, Credit 1
- 4002-360 Introduction Database & Data Modeling
A presentation of the data modeling process and database implementation fundamentals. Data modeling, fundamental relational concepts, the process of normalization, relational algebra, SQL, and guidelines for mapping a data model into a relational database will be covered. Students will model a multimedia or text-only information problem and implement it with a commercially available database package on a single machine. (4002-216 or 4002-218 or 4002-317 or 4002-318,1016-206) Class 4, Lab 0, Credit 4
- 4002-402 OS Scripting
This course is a survey of tools and techniques used to script common tasks in operating system environments. It will focus on Unix shell script programming. Students will gain experience in writing scripts for both Unix and Windows/NT and will be challenged to bend traditional programming paradigms to the writing of effective scripts in the OS environment. Programming projects will be required. (4002-210 or 4002-216 or 4002-218; corequisite: 4002-402 lab) Class 3, Lab 2, Credit 4
- 4002-403 Concepts of Wireless Data Networking
This course is designed to provide the student with an understanding of the principles and concepts of radio and optical communication as they apply to wireless data networking for local area networks and peripherals. Topics include an examination of modulation techniques, measurement standards nomenclature, equipment and theory behind transmissions in this portion of the electromagnetic spectrum. (4002-341) Class 4, Lab 0, Credit 4
- 4002-409 Web Site Design & Implementation
Builds on the basic aspects of HTML and multimedia programming that are presented in 4002-320 and 4002-330. An overview of web design concepts, including usability, accessibility, information design, and graphic design in the context of the web. Introduction to web site technologies, including cascading style sheets and dynamic HTML. (4002-330 and a two course programming sequence) Class 4, Lab 0, Credit 4
- 4002-413 Applications of Wireless Data Networking
This course explores wireless data networking technologies and equipment. This course reviews the fundamental concepts and technologies learned in 4002-342 and expands upon them to include other contemporary and emerging wireless technologies. Topics include Wireless Local Area Networks (WLAN), wireless network operation, network integration, construction, and network design. (4002-342,4002-403; corequisite: 4002-413 lab) Class 3, Lab 2, Credit 4
- 4002-415 Ethics in Information Technology
Ethics in Information Technology is intended to be an introductory course to the various ethical issues which may present themselves in our concentration areas: human factors, database, networking, multimedia, gaming, systems administration, and programming. The class will start with a historical examination of ethics and, through research, presentations and discussions, will provide opportunity to learn why it is essential to understand the ethical implications of our professional activities. Topics include: global implications of technology, First Amendment, Fourth Amendment, security, intellectual property law, and personal responsibility. This is a blended learning course offering onsite and online sections. (Second year standing) Class 4, Lab 0, Credit 4
- 4002-421 System Administration I
This course is a survey of tools and techniques used in the administration of computing systems. Included will be system installation, halting and booting the system, file systems and file and directory permission structures, print and disk quotas, device configuration and management, and user account administration. Unix and Windows NT will be among the systems studied. A laboratory section is a corequisite of this course. (4002-402; corequisite: 4002-421 lab) Class 3, Lab 2, Credit 4
- 4002-422 System Administration II
This course is a survey of tools and techniques used in the administration of computing systems. Included will be client administration, disk maintenance, remote access, remote administration, security, the use of schedulers, and the use of advanced scripting to ease system administration tasks. (4002-421; corequisite: 4002-422 lab) Class 3, Lab 2, Credit 4
- 4002-423 System Administration III
As organizations grow into enterprises and their information infrastructure expand the need for both larger scale solutions to some of those problems as well as different approaches to various processes becomes apparent. This course will examine the issues surrounding several of these areas of lecture and representative solutions in lab as well as discuss the value and vision of policies and procedures. The topics will include: storage, authentication, enterprise administration, clustering and load balancing, thin client support, fault tolerant\high availability services and policies and procedures. (4002-422; corequisite: 4002-423 lab) Class 3, Lab 2, Credit 4
- 4002-425 HCI1: Human Factors
Human Computer Interaction (HCI) is a multidisciplinary field of study concerned with how humans interact with software and hardware interfaces. This course will focus on theories of human information processing, human behavior and their implications for user-centered design of interfaces. Topics include: HCI history, cognitive psychology, user analysis, task analysis, and requirements analysis in the usability engineering process. (Second year standing) Class 4, Lab 0, Credit 4

4002-426 HCI 2: Interface Design & Development

The design of usable interfaces is based on the principles and theories of human computer interaction. This project-based course is focused on the application of the usability engineering process, including analysis, design, prototyping and testing. Additional topics include: what is usability, heuristic evaluation, usability goal setting, interaction design and styles, assessment methods and international user interfaces. Team projects are required. (4002-425 or 2009-323 and 4002-330 or 4002-230 and preferably co-op) Class 4, Lab 0, Credit 4

4002-434 Programming for Digital Media

Scripting is a major tool for digital media development. In this course, students will write programs starting from simple navigational scripts and evolving toward interactive object-oriented solutions to problems from domains such as simulation, gaming, instruction and artificial life. Students will build data structures, lists and implement classes to navigate through screens, implement interfaces and control media. Some projects may require working in groups. The class or instructor may create low-level routines and classes which will be used by students to complete programs of their own design. (4002-330 or 4002-231) Class 4, Lab 0, Credit 4

4002-455 Needs Assessment

Complex problems in modern organizations require an information technologist to systematically analyze problem areas to determine the most effective and cost-efficient solutions. This course builds student skills in two different, yet interacting areas: needs assessment (requirements analysis) and group problem solving. Students use interviewing and problem-solving techniques to uncover the constraints that surround problem areas. Students learn the questions to ask during needs assessment, along with developing the interpersonal skills to conduct these meetings. Emphasis is on the steps in creative problem solving, the basics of meeting planning to maximize group effectiveness and helping a client to focus concerns into a clearly defined problem. (Third year standing and co-op) Class 4, Lab 0, Credit 4

4002-460 Technology Transfer

Technology transfer is an umbrella term that refers to the creation, adoption, and consequences of new technologies in a variety of settings. For example, how does a new idea become implemented in an organization? What are some of the factors that contribute to one new idea being accepted while another is rejected? How do individuals within an organization influence the acceptance of new ideas? When is it wise to "go out on a limb" for a new idea, and when is it wise to wait? How accurately can we predict the success of new technologies? These are the topics that we will explore in this course. (Third year standing and co-op) Class 4, Lab 0, Credit 4

4002-461 Fundamentals of Data Modeling

Students will survey and master several contemporary graphic techniques used in data modeling and data requirements collection and analysis. Conceptual, logical, and physical modeling will be compared and contrasted. Business rule formation and domain identification will be studied. Advanced functional dependency and Domain-Key normal forms will be examined in the context of requirements analysis. Object oriented DBMS concepts and design issues will be surveyed. (4002-360) Class 4, Lab 0, Credit 4

4002-484 Fundamentals of Database Client/Server Connectivity

Students will configure, test, and establish client-server communication and server-server communication with single or multiple database servers. Students will configure and demonstrate successful communication between a database file server and multiple external clients. Similarities and differences among commercially available connectivity packages will be explored. Low-level data and file structures used in the implementation of databases and database indexing will be explored. Programming exercises are required. (4002-360 and 4002-219 or 4002-318) New Studio Format Class 3, Lab 0, Credit 4

4002-485 Fundamentals of DBMS Architecture and Implementation

Students will be introduced to issues in client/server database implementation and administration. Students will configure, test, and establish client-server communication and server-server communication with single or multiple database servers. Topics such as schema implementation, storage allocation and management, user creation and access security, backup and recovery, and performance measurement and enhancement, will be presented in lecture and experienced in a laboratory environment. Students will configure and demonstrate successful communication between a database file server and multiple clients. (4002-360; corequisite: 4002-485 lab) Class 3, Lab 2, Credit 4

4002-486 Implementation of Three-Tier DBMS Applications

Students will implement a three-tier DBMS application. Using a standard DBMS product, students will design and implement a database backend. Students will construct a web server and implement client/web server connectivity. Tools to monitor and measure such an implementation will be developed. Client-side, database server-side, and web server issues associated with such a three-tier implementation will be investigated. Programming assignments are required. (4002-484, 4002-485 and 4002-539; corequisite: 4002-486 lab) Class 3, Lab 2, Credit 4

4002-499 Information Technology Co-op

A cooperative educational experience is available for those students who participate in order to gain industrial experience. Class 0, Lab 0, Credit 0

4002-501 Foundations of 2D Graphics Programming

Use of an advanced graphics API to access hardware accelerated graphics. Discussion of scene graphs, optimizations, and integration with the API object structure. Advanced use of the API calls in production code, to construct environments capable of real-time performance. (4002-434 or 4003-570) Class 4, Lab 0, Credit 4

4002-502 Foundations of 3D Graphics Programming

Use of a graphics API to access hardware accelerated graphics. Discussion of the API scene graph, 3D optimizations, and integration between the 2D graphics mode and a 3D immediate mode implementation. This course builds upon students' previous work and extends it in the construction of a fully functional 3D engine, with library construction for game development. (4002-501) Class 4, Lab 0, Credit 4

4002-510 Fundamentals of Instructional Technology

The world of information technology offers the possibility of transforming the way that instruction is designed and delivered. However, few information technology professionals understand the methods and materials of instructional design. As a professional in information technology, a student may be responsible for designing instruction—either in a business or an educational context. This course enables the student to be able to plan, organize, and systematically develop instructional materials. The course uses an Instructional Systems Design (ISD) model to analyze, design, deliver, and evaluate instruction. (Third year standing) Class 4, Lab 0, Credit 4

4002-512 Interactive Courseware

Computer software that teaches is referred to as courseware. This course was designed to help you make the transition from "general" Instructional Design (4002-722/510) into the actual application of these principles in a computer-based environment. Although the basic principles of instructional design hold true in all media environments, using these teaching and learning principles are somewhat different when developing instruction that will be delivered by computer. This course teaches procedures that have already been successful in the design and development of courseware. (4002-510 and either 4002-330 or 4002-409) Class 4, Lab 0, Credit 4

4002-515 Introduction to Routing & Switching

This course is a laboratory-based course on the establishment of a data stream across the Internet. The focus is on providing a TCP/IP data stream for higher-level services to operate over. It is primarily concerned with the transport and layer and below. Protocol suites other than TCP/IP may be studied. Students will learn how to connect together computers in a network, and then how to connect the separate networks together to form an internetwork. Bridging and switching concepts are investigated (such as the resolution of bridging loops through the appropriate algorithms). Routed and routing protocols and algorithms are studied and implemented. (4002-342; corequisite: 4002-515 lab) Class 3, Lab 2, Credit 4

4002-516 Introduction to Network Administration

An investigation of key network services. Topics include DHCP, DNS, LDAP, NetBIOS and SNMP. As time allows, other related topics such as finger, ph, and whois will be explored. This course involves significant laboratory work. (4002-342 and 4002402; corequisite: 4002-516 lab) Class 3, Lab 2, Credit 4

4002-517 Data Network Management & Security
Network Management architectures including centralized, distributed and hierarchical systems up to the telecommunications network provider interface will be studied. The importance of data network management will be examined through data network management fundamentals including SNMP, CMIP, configuration, performance, fault accounting, and security management. Students will gain an understanding in the areas of intrusion detection, evidence collection, network auditing, network security policy design and implementation as well as preparation for and defense against attacks. The issues and facilities available to both the intruder and data network administrator will be examined and evaluated with appropriate laboratory exercises to illustrate their effect. (0501-507, 4002-515, 4002-516; corequisite: 4002-517 lab) Class 3, Lab 2, Credit 4

4002-518 Visual Basic for Programmers
An introduction to the Visual Basic programming language for experienced programmers. Introductory topics include: the Visual Basic development environment, intrinsic controls, data types, control structures, procedures and functions, arrays, user-defined types, and file handling. Object-oriented programming and design topics are covered, including classes and objects, composition, inheritance, and collections. Programming exercises are required. (4002-219 or 4002-318) Class 4, Lab 0, Credit 4

4002-519 Network Troubleshooting
The ability to cope with the complexity of networks requires keen problem-solving skills as well as the ability to utilize available tools. This course is designed to teach problem-solving skills, the employment of the available tools, and a teamwork (as well as individual) approach to solving problems in complex networks. Students will gain the understanding and experience in the areas of reactive and proactive network problem solving. Emphasis will be on problem-solving skills (emphasis on the application of those skills to network problems) and the dynamics of a team approach to problem solving. (4002413,4002-515; corequisite: 4002-519 lab) Class 3, Lab 2, Credit 4

4002-520 Advanced Switching in Data Communications
This course is designed to provide students with the expertise to optimize network security and throughput through the use of switches. Topics will include spanning tree algorithms, VLANs, VLAN tagging, trunk ports, port aggregation, queueing, Layer 3, Layer 4, Layer 5 (OSI model) switching, Multiprotocol Label Switching (MPLS), and optical switching. (4002-515; corequisite: 4002-520 lab) Class 3, Lab 2, Credit 4

4002-522 Introduction to Network Programming
Network Programming is a course in the writing of simple client/server programs, using the TCP/IP network protocol stack. It works through the establishment of simple connectionless communications, through connection-oriented communications, to multi-client connection oriented communications. The objective is to expose the low-level workings of TCP/IP at the transport layer, and provide the student with experience in writing simple network applications. (4002-219 or 4002-318, and 4002-515; corequisite: 4002-522 lab) Class 3, Lab 2, Credit 4

4002-523 Security of Wireless Data Networking
This course is designed to provide the student with an understanding of the principles and concepts of wireless data network security. Topics include mechanisms for securing wireless data networks including physical layer techniques, filters, applications, and encryption. (4002413; corequisite: 4002-523 lab) Class 3, Lab 2, Credit 4

4002-525 Performance Support Systems
An Electronic Performance Support System (EPSS) is a software technology, designed to give each user what he/she needs when he/she needs it. It is designed to enable skilled performance without training. An EPSS can be defined functionally, by what it does. The job of an EPSS is to help a worker perform his/her job better. Typical components of an EPSS encompass tutorials, drills, simulations and hypertexts, but often include expert systems, help systems, and intelligent job aids. This course examines some of the relevant literature supporting EPSS and provides students with the opportunity to design and develop several different components of a performance support system. (4002-510 and 4002-218 or equivalent) Class 4, Lab 0, Credit 4

4002-527 Digital Audio and Computer Music
Technologies and techniques for producing and manipulating digital audio and computer music are explored. Topics include digital representation of sound, synthesis techniques, digital audio recording and processing, MIDI and real-time performance issues, algorithmic composition, and application of digital audio to multimedia and Web production. (4002-330 and third year standing) Class 4, Lab 0, Credit 4

4002-528 Writing for Interactive Media
As more of our communications are delivered on interactive, non-linear platforms, the information should be developed in ways that take advantage of these technologies. This course will focus on the creation of a variety of different hypermedia/multimedia documents designed, drafted and delivered in hard copy and/or digital form. (4002409) Class 4, Lab 0, Credit 4

4002-529 Introduction to VRML
This course will focus on basic and advanced concepts of 3D environment creation and implementation within the Virtual Reality Markup Language (VRML) implemented on the World Wide Web. Students will work individually and in groups to create VRML environments on their own home pages and in a larger scale group environment. (4002-409,4002-434) Class 4, Lab 0, Credit 4

4002-535 Network-Based Multimedia
This course presents fundamental topics of designing and implementing multimedia on the Internet. Each topic is presented along with the underlying computer technology that supports it and hands-on projects incorporating the concepts. As the technology of interactive multi-media on the Internet changes, this course will present the current practice in preparing multimedia for cross-platform delivery to the growing audience of Internet users. Using the capabilities of current web browser client and http server technology, students will implement interactive multimedia for a variety of applications. (4002-330 and 4002409) Class 4, Lab 0, Credit 4

4002-536 Web Client Side Programming
This course will explore the possibilities and purpose of client side scripting over the Internet. Students will learn to use both native and plug-in technologies to build interactive interfaces that are both usable and effective. Key features that will be addressed are browser compatibility, object reusability (bandwidth issues), and different scripting environments. Programming is required. (4002-409 or equivalent) Class 4, Lab 0, Credit 4

4002-538 Multi-User Media Spaces (MUMS)
The course will focus on the development of interactive applications that use network connectivity to allow multiple users to interact with each other in real time and in a persistent virtual community. The course will integrate multiple technologies dealing with connectivity, database access, server-side logic and object-oriented programming environments. Important Human-Computer Interaction (HCI) issues will be raised around the design and processing of messages and the traffic patterns generated by multi-user messaging. (4002434 and third year standing) Class 4, Lab 0, Credit 4

4002-539 Programming for WWW
The World Wide Web is no longer just linked, static HTML documents. Web pages can be generated dynamically and can interact with a user to modify pages on-the-fly, validate user inputs and entertain. This course is an overview of several forms of programming that are used in the creation of interactive and dynamic web content. This course provides a practical overview of programming in the context of the World Wide Web. It enables students to develop web pages and web sites that incorporate both client-side and server-side programming by installing and modifying existing scripts as well as writing new scripts. (4002409) Class 4, Lab 0, Credit 4

4002-540 Network Design & Performance
This course will examine the design and performance of enterprise wide networks. Students will learn to design a network based on identified needs and analyze the performance of that network. Simulation tools will be used to model network design alternatives and evaluate their performance. WAN technologies such as ATM and Frame Relay will be combined with LAN technologies in the design of an enterprise internetwork. (4002455 and 4002-515) Class 4, Lab 0, Credit 4

4002-545 Advanced Routing & Switching
Advanced Routing and Switching is a course in how core services are provided to build the Internet, and the technologies available to large enterprises to build a large intranet infrastructure. The topology of the Internet is discussed, along with current and emerging technologies for the implementation of that backbone. Topics include: core routers and routing protocols, queuing, layer 2 and layer 3 switching, multicast routing and the MBONE, and accommodating IPV6 and the 6BONE, enterprise-wide backbone routers, VLANs and their use in enterprise-wide networking, special-purpose protocols (e.g., VTP). (4002-515; corequisite: 4002-545 lab) Class 3, Lab 2, Credit 4

4002-549 Usability Testing
This project-based course will focus on the formal evaluation of user interfaces. Topics include: usability test goal setting, recruitment of appropriate users, design of test tasks, design of the test environment, test plan development and implementation, analysis and interpretation of the results, and documentation and presentation of results and recommendations. (4002426 and 1016-319) Class 4, Lab 0, Credit 4

4002-560 New Media Team Project I
The first course in a two-quarter sequence designed to engage the new media major in a "capstone" production experience. The instructors will form student teams that will design and complete a multi-media campaign for organizations selected by the instructors. (Fourth year standing) Class 4, Lab 0, Credit 4

4002-565 New Media Team Project II
The second course in a two-quarter sequence designed to engage the major in a "capstone" production experience. Students continue work to completion of their new media group production project. Each group is required to test their product with a focus group and provide written feedback and analysis. (Fourth year standing and 4002-560) Class 4, Lab 0, Credit 4

4002-570 Windows Programming
The theme of this course is Windows programming with what has become the premier application development language in the PC world, Visual Basic. Students will learn how to write development stand alone applications with windows, dialog boxes, option buttons, check boxes, menus, Windows style Help facilities, and installation (or setup) programs; how to use built in Windows DLLs (Dynamic Link Libraries) such as USER, KERNEL and GDI; and how to use the Windows API (Application Program Interface). They will also experiment with DDE (Dynamic Data Exchange), OLE (Object Linking and Embedding) and simple multimedia applications. In the latter part of the course, students will be introduced to JavaScript and VBScript, two examples of a new class of scripting languages for creating dynamic WWW pages. (4002-518) Class 4, Lab 0, Credit 4

4002-571 Application Programming
This course illustrate advanced programming topics using an object-oriented language. It will build on the material covered in the introductory programming courses. Topics include the use of common programming tools, working with component models, simple graphics programming, application development spanning multiple languages, and security models. Emphasis will be on the development of problem-solving skills. Programming assignments will be required. (4002-219,4002-318, or 4002-714) Credit 4, Studio 5

4002-572 Distributed Application Programming
This course will expose students to advanced programming topics using an object-oriented language. It will build on the material covered in the introductory programming courses. Topics include distributed programming using various APIs and the development of server side applications. Emphasis will be on the development of problem-solving skills. Programming assignments will be required. (4002-219,4002-318 or 4002-714) Studio 4, Lab 0, Credit 4

4002-574 Advanced Applications Programming
In this capstone course, students build a substantial Windows application. They explore advanced topics in areas of interest and can expand upon concepts introduced in the earlier courses in the concentration. Additional topics include a comparative analysis of event-driven programming in the Windows environment, the limits of development tools such as Visual Basic and porting applications between platforms. (4002-570) Class 4, Lab 0, Credit 4

4002-580 Computer System Security
This course proposes to increase the understanding of the student in the areas of liability, exposure, opportunity, ability and function of various weaknesses and forms of attack and the detection and defense of same. The issues and facilities available to both the intruder and administrator will be examined and evaluated with appropriate laboratory exercises to illustrate their effect. (4002-421 and 0501-507 Computer Crime or equivalent; corequisite: 4002-580 lab) Class 3, Lab 2, Credit 4

4002-581 Network Forensics
This course is designed to provide students with the ability to identify and employ tools used for tracking intruders and gathering and preserving evidence of their activities. Students will learn to identify and employ various types of Intrusion Detection Systems (IDS) as well as the tools needed to uncover illegal activities of computer users (deleted and hidden files, cryptographic steganography, illegal software, etc.). Students will learn to employ the activities needed to gather and preserve this evidence to ensure admissibility in court. (4002-515, 4002-516, 4002-580; corequisite: 4002-581 lab) Class 3, Lab 2, Credit 4

4002-590 Seminar in Undergraduate Applied Computing
Current topics and advances in applications of computer technology for undergraduate students. (Permission of instructor and third year standing) Class 4, Lab 0, Credit 4

4002-595 Senior Seminar in Information Technology
Capstone seminar to be taken by graduating students in the information technology curriculum. Topics include recent advances and future impacts in information technology. (Fourth-year standing) Class 1, Credit 1, Lab 0

4002-599 Independent Study
The student will work independently under the supervision of a faculty advisor on a topic not covered in other courses. (Proposal signed by a faculty member) Credit variables -8

Computer Science

4003-203 AP C++
This course is only used for the purpose of transferring in Advanced Placement (AP) credit. Amount of credit (either 4 or 8 credit hours) will depend upon the student's score in the AP exam. Transfer credit of 4 credit hours will be granted for scores representing mastery of the principles of programming. Topics include variables, expressions and assignment, control structures (sequencing, selection and repetition), objects, procedures and functions, parameter mechanisms, recursion, one and two-dimensional arrays. Transfer credit of 8 credit hours will be granted for scores representing mastery of the above principles and basic data structures. These topics would include arrays, records, pointers, dynamic storage allocation, linked lists, stacks, queues, and trees. May not be taken for credit. Credit 4-8

4003-221 Introduction to Comp Science
An introduction to basic topics needed to succeed in Computer Science combined with the course material covered in 4003-231. These topics include general problem solving and computing skills, such as the use of the operating system, text-based and graphical interfaces and the use of tools such as editors and file managers. The course satisfies the prerequisite for 4003-232, Computer Science 2. (Departmental approval required) Class 5, Lab 2, Credit 6

4003-231 Computer Science I
The goal of the course is to introduce you to Engineering Problem Solving (EPS). We do this directly by talking about elements of EPS, including problem decomposition, design and implementation of solutions, testing those solutions and integrating pieces of solutions together. We will use object-oriented technology as a means to an end to design solutions and actually implement them in software. Java is the language used; it is an object-oriented programming language that was designed for developing large systems from reusable components. Programming assignments—labs and post labs—are an integral part of the course. Class 3, Lab 2, Credit 4

4003-232 Computer Science 2
The goal of the course is to introduce you to engineering problem Engineering Problem Solving (EPS) started in Computer Science 1. You will learn how to design a solution to a problem by reusing existing components, and by creating new components using inheritance. Other topics are: exception handling, files/streams, recursion, searching, trees, and threads. We will use object-oriented technology as a means to an end to design solutions and actually implement them in software. Java is the language used; it is an object-oriented programming language that was designed for developing large systems from reusable components. Programming assignments—labs and projects—are an integral part of the course. (C or better 4003-221 OR 4003-231) Class 3, Lab 2, Credit 4

4003-233 **Computer Science 3**
The goal of this course is to continue with the introduction to Engineering Problem Solving (EPS) started in Computer Science 1 and continued in Computer Science 2. You will learn how to design a solution to a problem by reusing existing components, and by creating new components using inheritance. Other topics are: threads, data structures, AWT-Swing, applets, networking, RMI. We will use object-oriented technology as a means to an end to design solutions and actually implement them in software. Java is the language used; it is an object-oriented programming language that was designed for developing large systems from reusable components. Programming assignments - labs and projects - are an integral part of the course. (C or better in 4003-232) **Class 3, Lab 2, Credit 4.**

4003-234 **Accelerated Computer Science I**
An accelerated course that covers material from Computer Science I and II. This course provides the foundation for the object-oriented programming (OOP) paradigm that is used throughout following courses in the curriculum. OOP is discussed conceptually and demonstrated using the Java programming language. Topics include class design and implementation, linear containers, inheritance, exceptions, files and analysis of searching and sorting methods. Students will be introduced to the essential tools needed in their course work. Laboratory programming assignments are an integral part of the course and a larger programming project is assigned in the second half of the course. (Departmental approval required) **Class 3, Lab 2, Credit 4**

4003-235 **Accelerated Computer Science II**
A second accelerated course that covers material from Computer Science II and III. This course continues the data structure coverage begun in Honors Computer Science I. It then introduces many of the contemporary programming techniques in use in current programs. Topics include trees, graphs, multi-threaded programming, thread synchronization, network distributed programming, graphical user interfaces and event-driven programming. Laboratory and project programming assignments are an integral part of the course. (C or better in 234) **Class 3, Lab 2, Credit 4**

4003-263 **Computer Science for Transfers**
This course introduces the student to the object-oriented programming paradigm, the computer science workstation environment and the C++ language. Topics include advanced data structures, template classes and handling exceptions. Students work individually and in small groups on programming assignments, which are an integral part of the course. This course is intended for students with previous programming experience and a background in data structures. Open only to transfer students and students who have received advanced placement credit for 4003-233; not to be taken as a computer science elective. (Departmental approval required) **Class 4, Lab 2, Credit 5**

4003-309 **C for C++ Programmers**
A study of low-level programming techniques in the C language. Pointer techniques and the use of pointers are emphasized. The course covers C operators, native arrays, strings, unions, and the C library. Techniques for implementing polymorphism and generic data types are covered. Programming projects will be required. (This course may not be taken for credit simultaneously with 4003-406. Students who receive credit for 4003-406 may not later take 4003-309 for credit.) (4003-334) **Class 2, Credit 2)**

4003-318 **Scientific Programming**
An introduction to classical algorithms used in the solution of numerical problems encountered in science and engineering. The C language will be introduced as a tool for implementing these algorithms. Topics include an introduction to C, computer number representation and round off error, algorithms for finding roots of nonlinear equations interpolation, numerical differentiation and integration, function approximation and data fitting, solutions to systems of linear equations, and general matrix manipulation. This course is restricted to computer engineering and software engineering students. (4003-334) **Credit 3**

4003-319 **Scientific Applications**
An introduction to classical algorithms used in the solution of numerical problems encountered in science and engineering. The C language will be introduced as a tool for implementing these algorithms. Topics include an introduction to C, algorithms for solving linear algebraic equations, non-linear algebraic equations, interpolation, numerical differentiation and integration, and general matrix manipulation. Programming projects will be required. (4003-334) **Class 4, Credit 4**

4003-334 **Computer Science 4**
A course on design techniques and advanced programming. Topics include the software development life cycle, analysis and design techniques, programming in C++, and implementation strategies for external data techniques. Students will work individually and in small groups on programming assignments, which are an integral part of the course. UML and the C++ programming language will be used. (C or better in 4003-233,263 or 235) **Class 3, Credit 4**

4003-341 **Professional Communications**
An introduction to the types of communication that are part of the life of a computing professional. Topics include analysis of purpose of a document or report and writing effectively for the expertise and interests of the intended audience. Writing assignments will cover reports, specifications and user documentation. Oral reports and presentation skill also are emphasized. Small and large group activities will be used to simulate a wide range of work and communications environments. (4003-233 or 4003-263 as a corequisite) **Class 4, Credit 4**

4003-345 **Computer Organization**
An introduction to computer architecture and assembly language programming concepts and techniques. Topics include boolean algebra, combinational and sequential circuit design, storage mechanisms and their organization, the instruction cycle in a simple CPU, assembly language programming, programming at the device level, and the role of assembly language in understanding the hardware/software interface. Digital logic and software projects will be required. (4003-334,1016-265) **Class 4, Credit 4**

4003-380 **Introduction to Computer Science Theory**
Introduction to the classical and contemporary theory of computation covering regular, context-free and computable (recursive) languages. With finite state machines, pushdown automata and turing machines. Basic concepts of computability theory and NP-theory. (1016-265; 1016-366 as a corequisite) **Class 4, Credit 4**

4003-406 **Systems Programming I**
This course is an introduction to systems programming concepts and techniques. Topics include: the Intel system architecture, its assembly language, the C language, and how to use these tools to interact with the low level hardware and the Unix operating system. (Students who receive credit for this course may not later take 4003-309 for credit.) (4003-334; 4003-352 or 4003-345) **Class 4, Credit 4.**

4003-420 **Data Communications & Networks I**
This course is an introduction to the concepts and principles of computer networks. Students will design and implement projects using application protocols, and will study transport, network, and data link protocols and algorithms. The course also includes an introduction to local area networks, data transmission fundamentals, and network security. Programming projects will be required. (4003-334,1016-351) **Class 4, Credit 4**

4003-440 **Operating Systems I**
A general survey of operating system concepts. Topics include process synchronization, interprocess communication, deadlock, multiprogramming and multiprocessing, processor scheduling and resource management, memory management, overlays, static and dynamic relocation, virtual memory, file systems, logical and physical I/O, device allocation, I/O processor scheduling, process and resource protection. Programming projects will be required. (4003-334; 4003-352 or 4003-345) **Class 4, Credit 4**

4003-450 **Prog Language Concepts**
A study of the syntax and semantics of a diverse set of high-level programming languages. The languages chosen are compared and contrasted in order to demonstrate general principles of programming language design. The course emphasizes the concepts underpinning modern languages rather than the mastery of particular language details. Programming projects will be required. (4003-334; 1016-265) **Class 4, Credit 4**

4003-455 **Artificial Intelligence**
An introduction to the field of artificial intelligence, including both theory and applications. A programming language that allows effective symbolic manipulation is used to demonstrate the capabilities and limitations of the material presented in class. Topics include search strategies and their implementation, logic, networks, frames and scripts, productions, symbolic manipulation and list processing, problem-solving methods, expert systems, natural language understanding, and selections from vision, robotics, planning and learning. Programming assignments are an integral part of the course. (4003-450) **Class 4, Credit 4**

- 4003-456 Expert Systems
An introduction to the issues and techniques employed in expert systems. Topics include a consideration of successful existing systems, control strategies, expert system building tools and environments, knowledge acquisition and uses of expert systems technology. Students will participate in group projects involving both the creation of an expert system and explorations of ways to effectively use such systems. (4003-455) Class 4, Credit 4
- 4003-457 Introduction to Computer Vision
An introduction to the underlying concepts of computer vision and image understanding. The course will consider fundamental topics, including image formation, edge detection, texture analysis, color segmentation, shape analysis, detection of objects in images and high level image representation. Depending on the interest of the class, more advanced topics will be covered, such as image, database retrieval or robotic vision. Programming assignments are an integral part of the course. (Third year standing in computer science) Class 4, Credit 4
- 4003-471 Privacy and Security
This course provides students with an introduction to the issues surrounding security of computer systems and privacy concerns in an increasingly information-based society. The class will consider numerous social issues in computing, including risks and liability involved in using information as well as ethical concerns. Case studies will be used to illustrate both common and historic problems in computer security. Group and individual programming projects will be used to improve understanding of security issues. Students will research a specific area of interest. (4003-420,4003-440) Credit 4
- 4003-480 Formal Languages
Formal language theory and principles. Topics include regular, context-free and context-sensitive grammars, finite automata, pushdown automata and Turing machines, and an introduction to unsolvability and computability. (4003-380) Class 4, Credit 4
- 4003-481 Complexity & Computability
This course provides an introduction to the complexity and computability theories. It starts with an overview of basic complexity classes, with special focus on NP-theory related problems. This is followed by a study of problems complete in NP and PSPACE, the Church-Turing thesis, and undecidability of a selection of classical problems. Some advanced topics in computability, like degrees of unsolvability, the recursion theorem, or Godel's incompleteness theorem will be discussed. (4003-380) Class 4, Credit 4
- 4003-482 Cryptography
The course is devoted to the review of basic cryptographic algorithms, their implementations and usage. Classical encryption techniques and those of Rivest-Shamir-Adleman and El Gamal will be seen in depth, and an overview of several others will be presented. The course also presents authentication schemes and interactive proof protocols. Students will write a term paper, either theoretical based on literature or reporting a student's own implementation or experiments with a chosen cryptographic scheme. Depending on the size of the group, some or all students will give a presentation to the class. (4003-334; 1016-265) Class 4, Credit 4
- 4003-485 Data Base Concepts
Broad introduction to database management systems (DBMS) and the design, implementation and applications of databases. Topics include an overview of DBMS architectures, concepts and implementations of the relational model, SQL, database design and modeling techniques, and issues such as recovery, concurrency, physical implementation concerns and performance and management aspects. Optional topics include: alternative approaches to designing database systems (for example, object-oriented or extended relational systems), distributed databases, database machines, and database interfaces and languages. A database programming project is required. (4003-334) Class 4, Credit 4
- 4003-499 Computer Science Co-op
Computer science-co-op work block. One quarter of appropriate paid work experience in industry, (credit 0). Four quarters of co-op experience are required.
- 4003-506 Systems Programming II
Application of operating system concepts to the design of hardware interfaces for a multiprogramming environment. Laboratory work includes the development of multiprogramming (optionally, multiprocessing) kernel with system call and interrupt handling facilities, and the building of device drivers for a variety of peripheral devices. This course provides extensive experience with those aspects of systems programming that deal directly with the hardware interface. A significant team programming project is a major component of the course. (4010-361; 4003-406; and 4003-440) Class 4, Credit 4
- 4003-515 Analysis of Algorithm
A study of techniques to design and analyze the complexity of algorithms. The course will make students aware of a large number of classical algorithms and their complexity and will introduce the area of NP-completeness. (4003-334; 1016-366) Class 4, Credit 4
- 4003-520 Computer Architecture
An introduction to computer architecture. Includes a survey of computer architecture fundamentals exemplified in commercially available computer systems, including classical CPU and control unit design, register organization, primary memory organization and access, internal and external bus structures, and virtual memory schemes. Alternatives to classical machine architecture, such as the stack machine and the associative processor, are defined, and compared. Parallel processors and distributed systems are also presented, along with an analysis of their performance relative to non-parallel machines. Programming projects are required. (4003-440) Class 4, Credit 4
- 4003-530 Fundamentals of Discrete Simulation
An introduction to discrete simulation modeling. Methods for the design of discrete simulation models are examined, and simulation models are designed and implemented using a general purpose discrete simulation language. Related topics such as the validity and appropriateness of general statistics for the model are covered. Both the theoretical and statistical aspects of modeling are examined. Programming projects are required. (106-352; third year standing in computer science) Class 4, Credit 4
- 4003-531 Parallel Computing I
A study of the hardware and software issues in parallel computing. Topics include an introduction to the basic concepts, parallel architectures and network topologies, parallel algorithms, parallel metrics, parallel languages, network topology, granularity, applications, parallel programming design and debugging. Programming projects will be required. (4003-440) Class 4, Credit 4
- 4003-532 Parallel Computing II
A study of selected topics in parallel algorithm design through the analysis of algorithms used in various areas of application. The course will investigate the interplay between architecture and algorithmic structure and will discuss the effect that these issues have on the complexity and efficiency of parallel algorithms. Programming projects are required. (4003-531) Class 4, Credit 4
- 4003-541 Data Communications & Networks II
This course continues the study of computer networks begun in 4003-420 Data Communications and Networks I, emphasizing design principles and theoretical aspects of networks. Topics include the nature of communications media and signaling methods, analog and digital transmission, data link protocols, protocol proof techniques, routing, broadcasting, multicasting, connection, disconnection and crash recovery protocols, internetworking and security, and network analysis and design using graph theory and queueing theory. (4003-420) Class 4, Credit 4
- 4003-542 Data Communications & Networks III
This course will build on topics developed in 4003-420, Data Communications and Networks I, and 4003-541, Data Communications and Networks II, in a lab setting. Students will be required to design and implement a small computer network addressing issues such as routing strategies, virtual circuits vs. datagrams, data link protocols, and user (presentation) level services. (4003-406 and 4003-541) Class 4, Credit 4
- 4003-542 Ad-Hoc Networks
This course explores server-less ad-hoc networks. Topics include authentication, confidentiality, routing, service discovery, middleware and key generation and key distribution. Programming projects are required. (Data Communications and Networking I)
- 4003-543 Operating Systems II
This course is a more in-depth look at the concepts in Operating Systems I (4003-440). Laboratory work includes implementing components of a pedagogical operating system as a team project through the entire term. Each team will design and implement the software for thread synchronization abstractions, loadable user processes, virtual memory and a file system. An emphasis will be placed on the software engineering of each component as it is added to the overall operating system. (4010-361 and 4003-440) Class 4, Credit 4
- 4003-560 Compiler Construction Lab
A course in the design and implementation of high-level language compilers. Laboratory projects are assigned in the areas of parsing, code generation, code optimization and language design. (4003-580) Class 4, Credit 4

4003-570 Computer Graphics I
A study of the hardware and software principles of computer graphics. Topics include an introduction to the basic concepts: 2-D transformations, viewing transformations, display file structure, geometric models, picture structure, interactive and noninteractive techniques, raster graphics fundamentals, 3-D fundamentals, graphics packages and graphics systems. Students will use and develop a graphics software system based on an accepted graphics standard. Programming projects are required. (Third-year standing in computer science) Class 4, Credit 4

4003-571 Computer Graphics II
This course will investigate the theory of computer synthesis. Seminal computer graphics papers will be used to describe the various components of the image synthesis pipeline and explain, just as in photography, how the path of light in a virtual scene can be simulated and used to create photorealistic imagery. The course will emphasize the theory behind various rendering tools and libraries available for image synthesis. The student will put theory into practice via a programming assignments and a capstone project. Topics will include light and color, three-dimensional scene specification, camera models, surface materials and textures, rendering local, ray tracing, radiosity), procedural shading and modeling, tone reproduction, and advanced rendering techniques. (4003-570 or 4002-502)

4003-580 Language Processors
A course exposing students to issues in the design of language processors and translators. The basic concepts will be presented in conjunction with the design of several such programs. Topics include compilers and interpreters, compiler generators, lexical analysis, abstract syntax trees, syntactic and contextual analysis, and implementation of nested block structure. Programming projects will be required. (4003-450; course given in Java) Class 4, Credit 4

4003-590 Seminar in Computer Science
Current advances in Computer Science. Bridge Courses: Set by instructor. Class 1-4, Credit 1-4

Software Engineering

4010-101 Software Engineering Seminar
Provides first-year students with the skills necessary to succeed at RIT and in the software engineering program. Small group sessions are used to help new students make friends, create a stronger bond with RIT and their program and become acquainted with the campus and its facilities. In addition, students are introduced to the profession of software engineering and to the ethical issues they will face at RIT and throughout their careers. Class 1, Credit 1

4010-102 Freshman Honors Seminar
This course provides an introduction to the Honors program for all freshman GCCIS honors students. The course provides an overview of GCCIS, its program and the requirements for the Honors program at the institute, college and program level. Honors students will hear discussions of the professional and research interests for faculty members from all three departments. Class 2, Credit 0

4010-361 Software Engineering
An introductory course in software engineering, emphasizing the organizational aspects of software development and software design and implementation by individuals and small teams within a process/product framework. Topics include the software life cycle, software design, user interface issues, specification and implementation of components, assessing design quality, design reviews and code inspections, software testing, basic support tools, technical communication and system documentation, and team-based development. A term-long team-based project done in a studio format setting is used to reinforce concepts presented in class. (4003-233 & 4003-334) Class 4, Credit 4

4010-362 Engineering of Software Subsystems
An introduction to the principles at the foundations of contemporary software design. Topics include software subsystem modeling, design patterns, design tradeoffs, and component-based software development, with a focus on application of these concepts to concrete design problems. The relationship between design and related process issues such as testing, estimation, and maintenance are also discussed. (4010-361) Class 4, Credit 4

4010-420 Formal Methods of Specification & Design
Introduction to the development of mathematical models of software systems and the application of such models to the analysis of system properties and verification of design and implementation decisions. Topics include a brief review of logic and set theory, the use of formalism such as Z or VDM, the development of models using the formalism and analysis via simulation or proof of a model's properties. The application of other formalisms, such as state-machines and regular expressions, is also surveyed. (1016-366,4010-362) Class 4, Credit 4

4010-441 Principles of Concurrent Software Systems
Issues and structures common in the construction of concurrent software systems. Emphasis is on fundamentals repeated in the design and development of systems with closely coupled systems concurrently executing components. Topics include modeling, synchronization, and coordination techniques and common architectures for concurrent software systems. Other issues include problem decomposition and analysis of deadlock safety, and liveness. (4010-362) Class 4, Credit 4

4010-442 Principles of Distributed Software Systems
Issues and structures common in the construction of distributed software systems. Emphasis is on fundamentals found in systems of this type. Topics include remote object invocation, middle ware technologies, and common architectural and design patterns. Quality factors will be discussed, including responsiveness, throughput, and extensibility. Team projects are done in a studio format to reinforce concepts presented in class. (4010-362) Class 4, Credit 4

4010-443 Principles of Information Systems Design
Issues and structures common in the construction of information systems. Emphasis is on fundamentals repeated in most systems of this type. Topics include historical review of methods of organizing and accessing information, high-level modeling techniques, performance and security concerns, implications of storing new data types (e.g., sound, pictures) and new dimensions (e.g., time) on information systems architectures. Team projects are required. (4010-362) Class 4, Credit 4

4010-450 Software Process & Product Metrics
Software metrics help a software organization on two main fronts: quality assessment of its process and products, and assessment of its progress toward its main goal—the production of software artifacts. Students are exposed to metrics used in industry to control large software processes. Topics include product and process metrics, personal metrics portfolio, metrics attributes, and resource and time estimation metrics. (4010-361) Class 4, Credit 4

4010-452 Software Verification and Validation
Introduction to a set of principles and techniques that represent the foundation for improving software products. Topics include verification and validation, unit level testing, system level testing, software quality assurance, and software reliability. Team projects are emphasized. (4010-361) Class 4, Credit 4

4010-456 Software Engineering Process
An introductory course to software process and related software project management issues. Emphasis is on the study, use, evaluation, and improvement of the software process. Topics include software maturity framework, software project planning, software requirements management, software quality assurance, risk management and tracking, software process improvement, and an introduction to lightweight processes. (4010-361) Class 4, Credit 4

4010-461 Performance Engineering of Real-time & Embedded Systems
This course provides a general introduction to real-time and embedded systems. It will introduce a representative family of microcontrollers and require students to program on these devices. Fundamental material on real-time operating systems, such as requirements specification, design patterns, scheduling algorithms and priority inversion avoidance will be presented, the features of a commercial real-time operating system will be discussed and used for course assignments. (4010-441 or 4003-440) Class 4, Credit 4

4010-540 Principles of Software Architecture & Design
Examination of the fundamental building blocks and patterns for construction of software systems in the context of a sound design process, forming the foundation for subsequent courses in the curriculum's design sequence. The course emphasizes the study and development of software systems that can best be understood in terms of sequential software architectures and their architectural and non-architectural quality attributes. Exercises and projects are completed in a studio format. (1 co-op, 1 design elective) Class 4, Credit 4.

4010-549 Seminar in Software Design
Emerging topics of relevance in software engineering design. (4010-362)
Credit 1-4.

4010-555 Software Requirements & Specifications
In-depth coverage of the early phases of the software development life cycle commonly called software requirements analysis and specification. Topics include requirements elicitation and definition, requirements prototyping, functional and nonfunctional requirements specification, and legacy systems. Team projects are emphasized. (1 co-op, a process elective) Class 4, Credit 4

4010-559 Seminar in Software Process
Emerging topics of relevance in software engineering process. (4010-361)
Credit 1-4.

4010-561 Software Engineering Project I
The first course in a two-course, senior-level, capstone project experience. Students work as part of a team to develop solutions to problems posed by either internal or external customers. Problems may require considerable software development or evolution and maintenance of existing software products. Culminates with the completion and presentation of the first major increment of the project solution. (Fifth year standing in software engineering, four quarters of co-op, 4010-362, 4010-555, and any two software design electives (4010441, 4010-442,4010443)

4010-562 Software Engineering Project II
This is the second course in a two-course, senior-level capstone project experience. Students submit one or more additional increments that build upon the solution submitted at the end of the first course. Students make major presentations for both customers as well as technical-oriented audiences, turn over a complete portfolio of project-related artifacts and offer an evaluation of the project and team experience. (4010-561) Class 4, Credit 4

4010-598 Honors Research Seminar
The Honors student will work independently under the supervisor of a faculty advisor on a topic not covered in other courses. (4010-362,1 term of co-op)
Credit 1-4

College of Engineering

Index

0301	Electrical Engineering	202
0302	General Engineering	206
0303	Industrial & Systems Engineering	206
0304	Mechanical Engineering	207
0305	Microelectronic Engineering	210
0306	Computer Engineering	212
0307	Quality & Applied Statistics	214

Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100-399); upper division (400-699); or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites and/or corequisites are noted in parentheses near the end of the course description.

Electrical Engineering

0301-205 Electrical Engineering Freshman Practicum
Introduction to the practice of electrical engineering including understanding laboratory practice, identifying electronic components, operating generic electronic instruments, building an electronic circuit (oscillator), measuring and capturing an electronic waveform, schematic entry, modeling and simulation of an electronic circuit (SPICE or equivalent), analyzing a waveform using a commercial software package (MATLAB), and emulating an electronic instrument in software (C programming). This lab course emphasizes a learn-by-doing approach to introduce the student to electrical engineering design practices and tools used throughout his or her undergraduate program and professional career. Lab 3, Credit 1 (F, W)

0301-240 Digital Systems
Introduces students to the basic components used in digital systems and is usually the student's first exposure to engineering design. The flip-flop and its combination into registers and counters are introduced. Programmable devices are surveyed. The laboratory component consists of small design projects that must be constructed and validated by the student. The projects run from traditional combinational logic using SSI chips to small subsystem implementation in a programmable device and EPROMs. Class 3, Lab 2, Credit 4 (F, W, S)

0301-305 Electrical Engineering Sophomore Practicum
Introduction to the practice of electrical engineering and builds on the experience in EE Freshman Practicum, including interpreting a circuit specification, analyzing an electronic circuit, prototyping an electric circuit, measuring and capturing an electronic waveforms, schematic entry of a circuit, and modeling and simulation of an electronic circuit (SPICE or equivalent). An infrared transmitter and receiver are prototyped and built using surface mount technology available through the RIT Center for Electronics Manufacturing and Assembly (CEMA). CEMA provides applied research and technology education as well as an automated surface mount technology (SMT) line. Students design and simulate the circuit according to a very specific circuit architecture and submit the corresponding CAD file to the SMT center. Students trouble shoot the final design and make any revisions to the board on a SMT debug station. Lab 3, Credit 1 (W, S)

0301-346 Advanced Programming for Engineers
Advanced topics in C are discussed. Students learn the basics of object oriented programming (OOP) with an emphasis on C++. Advanced skills of applying pointers will be emphasized throughout the course to improve the portability and efficiency of programs. Advanced skills of preprocessors, generic functions, linked lists and the use of the Standard Template Library will be developed. (4003-319 or equivalent) Class 4, Credit 4, (F)

0301-347 Computer Architecture
The purpose of this course is to expose students to both the hardware and the software components of a digital computer system. It focuses on the boundary between hardware and software operations. Students will learn about a computer system from various abstraction levels from the digital logic gates to software applications. This course will also provide a solid foundation in computer systems architecture. The first half of the course should deal with the major hardware components such as the central processing unit, the system memory and I/O modules. The second half focuses on software components such as the instruction set and the operating system. (0301-240, 4003-319) Class 3, Lab 2, Credit 4 (F, W)

0301-362 Electrical Engineering
This course is designed for non-electrical engineering majors. Introduction to the basic concepts of electrical circuits including AC and DC analysis, network theorems and RCL circuits. Design of simple amplifiers, data conversion and an introduction to electromechanical devices are included in the course. (1017-313,377,306; third-year status mandatory. Class 3, Lab 2, Credit 4 (S, SU)

0301-365 Microcomputer Systems
Initial course in microprocessor based systems. After a review of computer arithmetic, logic operations, number systems and codes, the elements of microcomputer architecture are presented, including a detailed discussion of the memory, input-output, the central processing unit (CPU) and the busses over which they communicate. Assembly language level programming is introduced with an emphasis on enabling manipulation of elements of a microcomputer system. Efficient methods for designing and developing assembly language programs are presented. Concepts of program controlled input and output are studied in detail and reinforced with extensive hands-on lab exercises involving both software and hardware. (0301-240,345,4003-319) Class 3, Lab 2, Credit 4 (S, SU)

0301-381 Circuits I with Lab
Covers basics of DC circuit analysis starting with the definition of voltage, current, resistance, power and energy. Linearity and superposition, together with Kirchoff's laws, are applied to analysis of circuits having series, parallel and other combinations of elements. Norton and maximum power transfer theorems are proved and applied. Practical aspects of the properties of passive devices and batteries are discussed, as are the characteristics associated with battery-powered circuitry. The laboratory component incorporates use of both computer and manually controlled instrumentation including power supplies, signal generators and oscilloscopes to reinforce concepts discussed in class as well as circuit design and simulation software. (0301-205,1017-313, 1016-253) Class 4, Lab 1, Credit 4 (F, S, SU)

0301-382 Circuits II
Covers the fundamentals of AC circuit analysis starting with the study of sinusoidal steady-state solutions for circuits in the time domain. The complex plane is introduced along with the concepts of complex exponential functions, phasors, impedances and admittances. Nodal, loop and mesh methods of analysis as well as Thevenin and related theorems are applied to the complex plane. The concept of complex power is developed. Two-port network theory is developed and applied circuits and interconnections. The analysis of mutual induction as applied to coupled coils, linear ideal and non-ideal transformers is introduced. Complex frequency analysis is introduced to enable discussion of transfer functions, frequency dependent behavior, stability, resonance phenomenon and simple filter circuits. (0301-381) Class 4, Credit 4 (F, W)

0301-453 Linear Systems I
Provides the foundations of signal and system analysis including signal and system description and modeling in continuous-time and discrete-time. Topics include: basic definitions and classification of signals and systems, linearity, time-variance, stability, causality, input-output relationships of linear systems, examples from mechanical systems and electrical circuits, impulse response, convolution, Fourier series, Fourier transforms of continuous-time and discrete-time signals, energy spectrum, and energy spectral density, frequency response, sample theorem, discrete Fourier transform. (0301-382,1016-328,420) Class 4, Credit 4 (S, SU)

0301-473 **Electromagnetic Fields I**
Study of electrostatic, magnetostatic, and quasi-static fields. Topics: review of **vector** algebra, vector calculus and orthogonal coordinate systems (Cartesian, cylindrical, and spherical coordinates), electrostatic fields (Coulomb's law, Gauss's law, the electrical potential, conductors and dielectrics in static electric fields, polarization, electric flux density and dielectric constant, boundary conditions, capacitance, electrostatic energy forces), solution of electrostatic problems Poisson's and Laplace's equations, methods of images, steady electric currents, conduction current density and resistance, static magnetic fields (Ampere's law, the vector magnetic potential, Biot-Savart law, the magnetic dipole, magnetization, magnetic field intensity, permeability, boundary conditions, self and mutual inductance, magnetic energy and forces, Faraday's law of electromagnetic induction). (1016-328,1017-313) **Class 4, Credit 4 (S, SU)**

0301-474 **Electromagnetic Fields II**
Study of propagation, reflection and transmissions of electromagnetic waves in unbounded regions and in guiding structures. Topics: time varying fields, Maxwell's equations, wave equations, uniform plane waves in conductive regions, polarization, the Poynting theorem and power, reflection and transmission at normal incidence from plane boundaries (multiple dielectric interfaces), oblique incidence at plane dielectric boundaries, two-conductor transmission lines (transmission line equations, transients on transmission lines, pulse and step excitations, reflection diagrams, sinusoidal steady state solutions, standing waves, the Smith Chart and impedance matching techniques), TE and TM waves in rectangular waveguides (propagation dispersion characteristics). A few experiments illustrating fundamental wave propagation and reflection concepts are conducted. (0301473) **Class 4, Lab 2, Credit 5 (F, W)**

0301-481 **Electronics I with Lab**
Introduction to electronics and basic principles of small signal analysis of circuits with nonlinear components. The PN junction is introduced, followed by a study of basic junction and field effect transistor function. Operation and applications of the ideal operational amplifier are examined. Primarily concerned with such fundamental semiconductor devices as circuit elements, dwelling principally on diode applications and simple BJT and FET transistor amplifier stages. Study includes rectification and power supply filtering and the basic operation and biasing of bipolar and MOS junction field transistors. Analytical techniques include the development of linear equivalent circuits, load line construction, small signal analysis of single amplifier stages, and waveform prediction. Emphasis on developing skills required for circuit design. Lab in basic design experiments. (0301-381) **Class 3, Lab 1, Credit 4 (F, W)**

0301-482 **Electronics II with Lab**
Continuation of 0301481. Focus on analog electronics, covering multistage amplifiers and the design of operational amplifiers including differential amplifiers, active loads, current mirror and level shifting circuits. Topics include: CMOS circuits, amplifier frequency response, Bode diagrams, effect of feedback on circuit performance, the study of feedback amplifier design, and means of determining open and closed loop behavior. The laboratory continues the integration of the engineering workstation into the electronic design program. The design, simulation, construction and evaluation of a multistage amplifier are required. The evaluation includes DC operating points, transient response, and steady-state frequency response. (0301-382,481) **Class 3, Lab 1, Credit 4 (S, SU)**

0301-514 **Control Systems Design**
A first course in the design of feed back control systems. Conventional design techniques, root locus and bode plots are used to design continuous and discrete controllers. Topics include review of transfer function models of physical systems, second order system response and transient specifications, its relationship to complex poles in S & Z planes (Laplace & Z transforms), effect of additional poles and zeros, steady state error, error constants. Root locus analysis, design of lag, lead and PID controllers (continuous & discrete). Design using frequency response techniques, review of Bode plots, W transform and Bode plots for discrete systems, specifications in discrete controllers using Bode plots. Performance comparison of continuous and discrete controllers. Practical aspects in controller implementations. Matlab used in class and lab. (0301453,554) **Class 4, Lab 3, Credit 5 (S, SU)**

0301-531 **Mechatronics**
Fundamental principles of electric machines are covered. Sensors and actuators are studied. The primary actuators discussed are high-performance electromechanical motion devices such as permanent-magnet EXI, synchronous and stepper motors. Topics in power electronics and control of electromechanical systems are studied. High performance MATLAB environment is used to simulate, analyze and control mechatronic systems. Application of digital signal processors and microcontrollers in mechatronics are introduced. Case studies are covered. (0301-554,474) **Class 3, Lab 1, Credit 4 (F, W)**

0301-534 **Communication Systems**
Provides the basics of the formation, transmission and reception of information over communication channels. Spectral density and correlation descriptions for deterministic and stationary random signals. Amplitude and angle modulation methods (e.g. AM and FM) for continuous signals. Carrier detection and synchronization. Phase-locked loop and its application. Introduction to digital communication. Binary FSK and PSK. Noise effects. Optimum detection: matched filters, maximum-likelihood reception. Computer simulation. (1016-351,0301453) **Class 4, Credit 4 (S, SU)**

0301-545 **Digital Electronics**
Studies the principles of digital electronic circuits with emphasis on MOS (CMOS in particular) and their use in logic circuits. Serves as a prerequisite for digital systems design and VLSI design. Topics include review of basic logic principles, study of MOS devices and their models, basic logic structures using MOS devices, circuit characterization and performance estimation, design structures of logic systems, memory, registers and system timing, bipolar, and BIC-MOS digital circuits. The laboratory portion introduces the student to fabrication of integrated circuits, simulation of digital circuits and design of basic logic circuits using workstations and software packages. (0301-482) **Class 3, Lab 3, Credit 4 F,W)**

0301-554 **Linear Systems II**
Laplace transform, z-transform, rational transfer functions, poles and zeros. Examples of real-world systems, tests for stability, inverse transforms, solutions to differential and difference equations, sampled data systems, frequency response of systems and Bode diagrams, signal flow graphs, filter design, analog Butterworth, Chebyshev and Elliptic filter forms, digital infinite and finite impulse response designs, windowing. Algorithms, FFT and filtering, applications. (0301453) **Class 4, Credit 4 (F, W)**

0301-590 **Thesis**
A research or development project to be carried out under the general supervision of a faculty member. The project need not be of the state-of-the-art type, but a reasonable problem of theoretical and/or experimental investigation. To be arranged with an individual faculty member. **Credit 4**

0301-599 **Independent Study**
A supervised investigation within an electrical engineering area of student interest. (Permission of instructor) **Class variable, Credit variable 14**

0301-605 **Robotic Vision**
An introductory course on computer vision with special emphasis on its use in a manufacturing environment. Develops an understanding of how information obtained from images can be used for industrial automation. Topics include image formation and sensing, effects of lighting, image recognition, binary images, geometrical properties, image segmentation, gray-scale image processing, enhancement, edge detection, 3-D structure, motion analysis, industrial applications. In the laboratory portion, students are required to use and experiment with the set of available image processing algorithms. Students are also required to do a project in which image processing techniques are applied to solve practical problems. (0301-554) **Class 3, Lab 3, Credit 4 (S, SU)**

0301-610 **Analog Electronic Design**
Enhances the student's skills in designing analog circuits. Subjects covered include nonideal characteristics of op-amps, op-amp applications, A/D and D/A conversion, multipliers and modulators, phase-locked loop, frequency synthesis and audio power amplifiers. Students meet in the classroom three hours each week and three hours in the laboratory. The laboratory time is used to discuss and troubleshoot circuits. Students are expected to work on design projects at their own pace outside of class hours. (0301-390, 395, 441, 442) **Class 3, Lab 3, Credit 4**

0301-611 **Semiconductor Devices II**
An undergraduate professional elective course in semiconductor device physics. Coverage of five major topics: (1) semiconductor electronics, including thermal equilibrium carrier statistics, drift and diffusion currents, and carrier mobility; (2) metal-semiconductor contacts, including the metal-semiconductor system band diagram, current-voltage characteristics, and capacitance; (3) pn junctions, including charge, field and potential distributions, and effects of forward and reverse biasing; (4) currents in pn junctions, including current-voltage characteristics, generation/recombination, and charge storage; (5) metal-oxide-semiconductor (MOS) system, including energy band diagrams biasing effects, MOS capacitance, and threshold voltage. (0305-360) **Class 4, Credit 4**

0301-612 **Semiconductor Device III**
Continuation of an undergraduate professional elective sequence in semiconductor device physics. Coverage of four major topics: (1) bipolar junction transistor (BJT) fundamentals, including carrier injection, current gain, modes of operation, Ebers-Moll model; (2) BJT advanced topics, including Early effect, high-level injection, Kirk effect, charge-control model, and small-signal models; (3) MOSFET transistor fundamentals, including charge-control analysis, current-voltage characteristics, threshold voltage, and CMOS; (4) MOSFET advanced topics, including channel-length modulation, sub-threshold current, velocity saturation, scaled MOS devices, drain-induced barrier lowering (DIBL), hot carrier effects and scaling issues. (0301-360 & 611) **Class 4, Credit 4 (W)**

0301-615 **State Space Control**
In this course students are introduced to MIMO systems and their designs using state space techniques. Linear algebra: Vectors, linear independent of vectors, vector space and null space, rank of a matrix eigen values and eigen vectors, transformation of matrices, functions of matrices, matrix polynomials, Cayley-Hamilton theorem state space formulations, canonical forms, controllability and observability, relations between state space and transfer function models, solution of state equations, state space design (pole placement), comparison with conventional design, and introduction to other forms of state space designs. (0301-514) **Class 4, Credit 4**

0301-621 **Microwave Engineering**
Studies the theory and design of microwave components and circuits. Reviews basic EM theory, TEM waves in transmission lines, TE and TM waves in rectangular waveguides, microstriplines and striplines, TE and TM waves in cylindrical waveguides, the scattering matrix description of multiport microwave circuits, waveguide tees, directional couplers and phase shifters, microwave integrated circuit components—branchline couplers, power dividers, hybrid ring couplers and phase shifters, rectangular, cylindrical and coaxial cavity resonators, waveguide and coaxial line filters and waveguide frequency meters, microwave integrated circuit high pass and band pass filters, ferrite components. Laboratory illustrates various microwave component design and measurement techniques. **Class 3, Lab 3, Credit 4 (W)**

0301-622 **Antenna Design**
A design course in antennas which studies fundamental principles of antenna theory and applies them to the analysis and design of antennas. Emphasis is on the design procedures for some practical and popular antenna configurations: e.g., the dipole, thin linear antennas, linear arrays, broadside and endfire and phased arrays, nonuniform amplitude linear arrays, the binomial array and the Dolph-Tschebyscheff array, planar arrays, the Yagi-Uda array, E-plane and H-plane sectoral horns, the pyramidal horn, the parabolic reflector, and microstrip antennas. The student also is exposed to the measurement techniques of antenna characteristics, such as radiation pattern, gain and input impedance, using state-of-the-art equipment. Of primary importance is a project involving the design, construction and testing of an antenna. The project requires a report and a presentation with a demonstration. (0301474) **Class 3, Lab 3, Credit 4**

0301-625 **Modern Photonic Devices & Systems**
This professional elective course introduces students to many of the photonic devices presently used in the photonics revolutions in communications. Topics include the laser, photodetectors, fiber optic communication systems and modulators, as well as several topics from classical optics such as holography, and interference and diffraction. The course includes an occasional laboratory and/or demonstration laboratory. (0301-474) **Class 4, Lab 1, Credit 4**

0301-630 **Biomedical Instrumentation**
Study of fundamental principles of electronic instrumentation and design consideration associated with biomedical measurements and monitoring. Topics to be covered include biomedical signals and transducer principles, instrumentation system fundamentals and electrical safety considerations, amplifier circuits and design for analog signal processing and conditioning of physiological voltages and currents as well as basic data conversion and processing tech-0301631 Laboratory experiments involving instrumentation circuit design and test will be conducted. (0301-381, 382, 481, 482) **Class 4, Lab 3, Credit 4 (F, W)**

0301-631 **Biomedical Sensors & Transducers I**
Biological entities probably represent one of the most difficult environments in which to obtain or generate accurate and reliable signals. This course will discuss the techniques, mechanisms and methods necessary to transfer accurate and reliable information or signals with a biological target. Various biomedical sensor and transducer types including their characteristics, advantages, disadvantages and fabrication will be covered. Discussions will include the challenges associated with providing a reliable and reproducible interface to a biological entity, the nature and characteristics of the associated signals, the types of applicable sensors and transducers and the circuitry necessary to drive them. (1026-360, 0301-381, 382, 481, 482, or 362 with permission of instructor) **Class 4, Lab 3, Credit 4 (F,W)**

0301-632 **Fundamentals of Electrophysiology**
Investigation and study of the concepts and underlying mechanisms associated with electrical signals in mammalian biology and physiology with a significant emphasis on methods, techniques and understanding of electrical potential distribution and current flow derived from circuit analysis. Intended to provide engineers with insight into the relationship between the study of electricity and its applicability to a wide variety of physiological mechanisms ranging from intracellular communication and control to cognitive function and bodily movement. Successful completion of the course will require generation of a significantly in-depth analysis report on some electrophysiological phenomenon or mechanism. (0301-381,382, or 362 with permission of instructor) **Class 4, Lab 3, Credit 4**

0301-633 **Biomedical Signal Processing**
Discussion and study of the methods and techniques that may be optimally employed for the fixed and adaptive processing of information with biological and physiological origin. The challenges and unique features of these types of signals will be discussed and application of known signal processing techniques that accommodate linear, non-linear and stochastic signals for the purpose of analysis, detection and estimation, monitoring and control will be studied. Successful participation in the course will entail completion of at least one project involving incorporation of these techniques in a biomedical application. (permission of instructor or graduate standing) **Class 4, Credit 4**

0301-636 **Biorobotics & Cybernetics**
Cybernetics refers to the science of communication and control theory that is concerned especially with the comparative study of automatic control systems (as in the nervous system and brain and mechanical-electrical communications systems). This course will present material related to the study of cybernetics as well as the aspects of robotics and controls associated with applications of a biological nature. Topics will also include the study of various paradigms and computational methods that can be utilized to achieve the successful integration of robotic mechanisms in a biological setting. Successful participation in the course will entail completion of at least one project involving incorporation of these techniques in a biomedical application, (permission of instructor or graduate standing) **Class 4, Credit 4**

0301-646 **Power Electronics**
The study of a variety of semiconductor devices generally used for purposes other than signal processing, including thyristors, unijunction transistors, opto-couplers, power MOS and IGBTs. Applications stressed are concerned with the use of electrical power for control of lighting, motion and heat. Particular attention is given to calculating power dissipation, heat sinks and thermal management. (0301-545) **Class 3, Lab 3, Credit 4**

0301-647 **Artificial Intelligence Exploration**
The course will start with the history of artificial intelligence and its development over the years. This course will explore a variety of artificial intelligence techniques, and their applications and limitations. Some of the AI techniques to be covered in this course are intelligent agents, problem-solving, knowledge and reasoning, uncertainty, decision making, learning (Neural networks and Bayesian networks), reinforcement learning, swarm intelligence, Genetic algorithms, particle swarm optimization, applications in robotics, controls, and communications. Students are expected to have any of the following programming skills: C/C++, Matlab, Java, or any other high level programming language. **Class 4, Credit 4**

- 0301-650 Design of Digital Systems
Deals with the design of both synchronous and asynchronous digital systems. The accent is on design methodologies for final implementation on programmable logic devices. Design techniques are based on top-down design using ASM charts and bubble diagrams along with microprogramming applications. Students also learn how to rapidly develop digital systems with VHDL. Design strategies for testability are discussed along with their impact on performance. The practical aspects of component interconnection (crosstalk, noise, transmission line effects) with effects on performance are also surveyed. The laboratory portion consists of four distinct projects proposed, designed, simulated (two projects require actual hardware implementation), and tested by the student. The design laboratory is supported by the ALTERA MAX+PLUS II VHDL design tools and EPLD/FPGA programmers. (0301-240, 365) Class 3, Lab 2, Credit 4
- 0301-651 Physical Implementation
A technical elective that introduces students to the fundamental principles of Application Specific I.C. (ASIC) design. Both circuit design and system design are covered. The student also is introduced to CAD tools for schematic capture, placement and routing of standard cells. The projects are designed and simulated using commercial CAD tools. Top-down design using a hardware description language (VHDL) is included. (0301-650) Class 4, Credit 4
- 0301-655 Microcomputer Software I
Discussion of the use of the C Programming language in generating soft ware specifically for microprocessor based systems. The tools and procedures necessary for the organized and efficient development of high-level code for a target microprocessor including compilers, linkers, object code libraries, and symbolic debugging as well as monitor programs and real-time multi-tasking kernel principles will be presented. Programming projects with emphasis on the applications in electrical engineering will be assigned Class 4, Credit 4
- 0301-656 Microcomputer Software II
Introduction to the use if the Java programming language and object oriented programming in generating software for microprocessor based systems in high level language that can be written once to be deployed on different target platforms with a minimum of modification. Details regarding the Java Virtual Machine (JVM), its implementation in hardware and software, Byte-code, trade-offs and optimization in terms of code size and speed as well as issues in debugging and deployment will be discussed. The Unified Modeling language will be introduced as a method of unambiguous description of program specification, design, implementation and testing. Programming projects with emphasis on the applications in electrical engineering will be assigned (0301-655) Class 4, Credit 4
- 0301-662 Neural Networks
Artificial Neural Networks (ANN) is the name given to a broad class of processing algorithms that are loosely based on how the brain processes information. The term "artificial" distinguishes the silicon-based systems from the biological systems (such as ourselves). ANNS are used in numerous applications from manufacturing controls to handwriting recognition to optical visual processing, or in any application that can handle some "fuzziness" in the output. Artificial Neural Networks also form the foundation for artificial intelligence (AI) systems. This course begins with a discussion of what ANNs are and what features define them, then examines a number of the most common neural algorithms and techniques such as backward error propagation ("Back-prop"). Software implementations of the algorithms (requiring C programming skills) as well as hardware implementations (requiring PSPICE simulations) will be discussed. Class 4, Credit 4
- 0301-664 Embedded Microcontrol Systems
Gives the student detailed knowledge of the hardware and software organization of 8-bit microcontroller systems with an emphasis on design. Peripheral interfacing, serial and parallel I/O, including interrupts, are considered. Special attention is given to inter facing microcontroller with the analog world, including the use of A/D and D/A converters. Software organization as well as design tools are discussed. Design case studies of typical microcomputer-embedded systems are examined. (0301-365) Class 3, Lab 3, Credit 4 (F, SU)
- 0301-666 DSP Architecture
Covers both the hardware and software aspects of 32-bit microcomputer systems. The architecture, timing and enhanced instruction sets are discussed. Memory and serial and parallel I/O interfacing techniques, including standard interface chips, are examined. Modular programming concepts and the software tools are introduced. Use of A/D and D/A converters to interface with the analog world is discussed. General purpose personal computers are used to demonstrate key concepts. (0301-365) Class 3, Lab 3, Credit 4
- 0301-674 Fiber Optics: Theory and Coding
Introduction to fiber optics that begins with a review of communication systems and lightwave fundamentals. The study of dielectric waveguides and optical fibers, light-emitting diodes (LEDs), laser diodes and photodetectors (pin and a.p.d) follows. Concludes with a discussion of optical fiber communication systems with special attention to noise sources in optical receivers, bit error rate and power budget. The laboratory component includes experiments selected from these topics: handling and cleaving fiber, numerical aperture, attenuation in optical fiber, coupling light into fiber, single and multimode fiber, laser diode characteristics, properties of photodetectors. (0301-474) Class 3, Lab 3, Credit 4
- 0301-677 Digital Filters and Signals
A continuation of the topics studied in 0301-554. Topics include study of the design methods for digital IIR filters via s-plane transformations, study of design methods for digital FIR filters, including emphasis on the question of linear phase response, a review of the discrete Fourier transform (DFT) and an in-depth study of fast algorithms (FFTs) for implementing the DFT, including radix 2, radix 4 and mixed radix algorithms, quantization effects in discrete systems; an introduction to digital signal processing computer chips and their use in the implementation of digital processing systems, and applications of digital signal processing, including speech processing and two-dimensional image processing. Includes several design projects in the digital signal processing laboratory. (0301-554) Class 4, Credit 4
- 0301-679 Analog Filter Design
A study of the various techniques for the design of filters to meet given specifications. Approximations to the ideal filter characteristic through Butterworth, Chebyshev and other polynomials are discussed in detail. The emphasis is on active network realizations using op amp stages. Topics include review of analysis of op amp circuits and transfer function of networks, magnitude and frequency scaling, ideal filter characteristics, Butterworth, Chebyshev and Bessel-Thompson approximations to the ideal filters, determination of transfer functions to meet given specifications, high-pass to low-pass and band-pass to low-pass transformations, standard op amp circuits for filter realizations, negative impedance converters, generalized impedance converters, and switched capacitor filters. (0301-453) Class 4, Credit 4
- 0301-685 Principles of Robotics
An introduction to a wide range of robotics-related topics including but not limited to sensors, interface design, robot devices applications, mobile robots, intelligent navigation, task planning, coordinate systems and positioning image processing, digital signal processing applications on robots, and controller circuitry design. Prerequisite for the class is a basic understanding of signals and systems, matrix theory, and computer programming. Software assignments will be given to the students in robotic applications. Students will prepare a project, in which they will complete software or hardware design of an industrial or mobile robot. There will be a two-hour lab additional to the lectures. (0301453,345/346) Class 3, Lab 3 Credit 4
- 0301-686 MEMS Design
Microelectromechanical systems (MEMS) are widely used in aerospace, automotive, biotechnology, instrumentation, robotics, manufacturing, and other applications. There is a critical need to synthesize and design high performance MEMS which satisfy the requirements and specifications imposed. Integrated approaches must be applied to design and optimized MEMS, which integrate microelectromechanical motion devices, ICs, and micro-sensors. This course covers synthesis, design, modeling, simulation, analysis, control and fabrication of MEMS. Synthesis, design and analysis of MEMS will be covered including CAD. (4th or 5th year standing for undergraduates, or MS standing) Class 4, Credit 4
- 0301-690 Design Project Management
Training for multidisciplinary studies in project management for leadership of product development and design. Topics include product systems development processes, organization and terms of intellectual property, the business case for product development, defining customer needs, defining systems and module requirements and functions, reverse engineering, benchmarking, concept generation and selection, product portfolios, project and system architectures, and performance modeling. Students use the concepts and tolls discussed throughout the course in a team-based environment with the goal to guide and lead a Senior Project. Class 4, Credit 4

0301-692 **Communication Networks**
A major portion of today's communication takes place over digital networks. This includes communication between people in the form of voice, facsimile (fax) and e-mail, as well as communication between machines. Digital networks are most likely to be the dominant element of communication links of the future. The current effort in ISDN points to such a trend. This course covers key aspects of the structure of present-day digital communication networks. (0301-534) **Class 4, Credit 4**

0301-693 **Digital Data Communication**
Principles and practices of modern data communication systems. Topics include pulse code transmission and error probabilities, M-ary signaling and performance, RF communications link budget analysis, an introduction to channel coding, a discussion of modulation/coding tradeoffs and a discussion of digital telephony. (0301-534) **Class 4, Credit 4**

0301-694 **Information Theory and Coding**
Introduction to the notions of information, source entropy and mutual information leading to the topics of efficient source coding and communication channel capacity. Huffman coding and its variations are discussed in detail. The effects of random channel disturbances are described leading to the requirements for error-detection and error-protection coding. Linear block coding concepts are introduced followed by a description of cyclic codes and their underlying algebraic structure. Other related topics include BCH codes, convolutional codes and maximum-likelihood decoding of convolutional codes. (1016-351; 0301-453,534) **Class 4, Credit 4**

0301-697 **Senior Design Project I**
The first half of a two-course capstone design experience that simulates an industrial setting. Teams of three to seven students pool their knowledge and experience to attack a specific design problem. Emphasis is placed on applying contemporary engineering development models that encourage individual and group accountability through team activities. Activities include group problem solving, design activities and communication skills-oral, written and interpersonal. With faculty guidance, student teams develop creative and innovative design concepts, then study the feasibility of each concept to arrive at an optimum design. A design report and oral review before peers and faculty are required. Electrical engineering components may include performance specifications, functional flowcharts, ECAD schematics and PCB layouts, test simulation results, software flowcharts and development tools. **Class 4, Open Lab, Credit 4 (F,W)**

0301-698 **Senior Design Project II**
The sequel to 0301-697, Senior Design Project I. The design created in part I must be constructed, debugged, evaluated and demonstrated against initial specifications. Hardware and software must be integrated to produce a complete working prototype or solution. Design teams manage unforeseen design issues, team issues, schedule, written and oral presentation of the prototype's design and finally a demonstration of its functionality. During the demonstration, the performance specified in the original proposal will be constructed with the special topics related to design. (0301-697) **Class 4, Open Lab, performance of the operational unit. In this second quarter, lectures focus on professional aspects of engineering and special topics related to design. (0301-697) Class 4, Open Lab, Credit 4 (W,S)**

General Engineering

0302-210 **Introduction to Engineering**
A one credit-hour course for the undeclared engineering student that presents information and exercises to introduce the student to the five engineering curricula offered at RIT. Various aspects of the curricula requirements as well as career opportunities that are available are discussed as they pertain to each major. **Class 2, Credit 1 (F)**

0302-221 **Honors Course I**
This course is for first year engineering honors students. In a sequence of courses during the first two years, honors students learn about the product development process—what questions companies have to answer to determine which products are manufactured over others, and what features to include in the products that are produced. Assigned to small teams, the students work with a local non-profit organization to address issues that they face. In the first year, the teams develop a concept. They have the option to continue with the project through the second year to develop it into a functional prototype. Class times include presentations from outside speakers, a field trip to a local agency, meetings with student's advocate, and group interaction. **Class 2, Credit 0, (F)**

0302-222 **Honors: Multidisciplinary Design I**
This one-credit hour course is for first year engineering honors students. Students continue to participate in a multidisciplinary team project. **Class 2, Credit 1 (W)**

0302-223 **Honors: Multidisciplinary Design II**
This course is a continuation of 0302-222 for first year honors students. Students continue to participate in a multidisciplinary team project. **Class 2, Credit 1 (S)**

0302-224 **Honors Course II**
This course is for second year honors students. Students continue to learn the product development process. Class times include presentations from outside speakers, a field trip to a local agency, meetings with student's advocate, and group interaction. **Class 2, Credit 0 (F)**

0302-225 **Honors: Multidisciplinary Design III**
This course is a continuation of 0302-224 for second year engineering honors students. Students continue to participate in a multidisciplinary team project. **Class 2, Credit 1 (W)**

0302-226 **Honors: Multidisciplinary Design IV**
This course is a continuation of 0302-225 for second year engineering honors students. Students continue to participate in a multidisciplinary team project. **Class 2, Credit 1 (S)**

0302-230 **Honors III**
This course is offered for third year honors students in anticipation of taking the international trip at the end of the winter quarter. Topics related to international business and cultures will be discussed. Guest speakers will give presentations on various international topics of interest. **Class 1, Credit 0 (F)**

Industrial & Systems Engineering

0303-201 **Introduction to Industrial Engineering**
An introductory course in industrial engineering for first-year students. Describes engineering in an overall sense and industrial engineering in particular. Includes an overview of some of the engineering sciences used in industrial engineering such as work measurement, manufacturing, facilities planning, engineering economy, statistics, ergonomics and engineering design. The laboratory portion covers hands-on applications relating to topics covered in lectures and group exercises in creative problem solving in the context of engineering design. **Class 3, Lab 1, Credit 4 (F)**

0303-203 **Freshman Seminar**
Gives first year students an overview of industrial engineering and helps integrate the incoming students into the RIT ISE community. Topics include RIT facilities and career options in engineering, plant tours, and ISE design projects. Also gives the student an opportunity to interact with ISE faculty, upper-division students and other first-year ISE students. **Credit 1 (S)**

0303-204 **Computer Tools for Increased Productivity**
Builds a basic computer competence. Students learn about various computer software programs including computer-aided design (e.g., AutoCAD) and database (e.g., Access) programs. **Class 2, Credit 2 (W)**

0303-302 **Computing for Engineers**
A first course in computer programming for engineers. Involves development of programming skills required in the engineering disciplines. "C++" is the current language of choice. **Class 4, Credit 4 (S)**

0303-343 **Materials Processing**
A study of the application of machine tools and fabrication processes to engineering materials in the manufacture of products. Processes covered include cutting, molding, casting, forming, powder metallurgy and welding. Students make a project in the lab portion of the course. **Class 3, Lab 2, Credit 4 (W)**

0303-401 **Introduction to Operation Research**
An introduction to the optimization methodology of mathematical problem formulation. Investigation of mathematical programming techniques including linear programming and special types of linear programming problems such as the transportation and assignment algorithms. Introduction to integer programming, graph theory, and networks. (1016-331 or permission of instructor) **Class 4, Credit 4(F)**

0303-402 Production Control
A first course in mathematical modeling of production-inventory systems. Topics include: forecasting, aggregate planning, inventory control models, and scheduling. (0303-401,1016-351 or equivalent, or permission of instructor) Class 4, Credit 4 (F)

0303-415 Ergonomics
Physiological and biomechanical aspects of human performance. Principles of physical work and human anthropology are studied to enable the student to systematically design work places, processes, and systems that are consistent with human capabilities and limitations. Topics include repetitive motion disorders, manual materials handling, hand tool design and selection, and job analysis. (1016-351 or permission of instructor) Class 3, Lab 1, Credit 4 (W)

0303-422 Systems & Facilities Planning
A basic course in quantitative models on layout, material handling and supply chain management. Topics include product/process analysis, flow of materials, material handling systems, warehousing, and layout design. Computer-aided layout design package (e.g., Factory CAD, Flow, Plan) is used. Class 3, Lab 1, Credit 4 (W)

0303-481 Management Theory & Practice
Development of the fundamental engineering management principles of industrial enterprise, including an introduction to project management. Internal organization as well as general economic conditions are considered. (Permission of instructor) Class 4, Credit 4 (F)

0303-483 Advanced Production Control
A design course in production control. Each student is asked to design, test and implement a complete production control system for an operating plant. Professional elective. (0303-402) Class 4, Credit 4

0303-503 Simulation
Queuing theory will be introduced. Modeling and computer simulation of stochastic and dynamic manufacturing and service systems are emphasized. A high level simulation language (e.g., ARENA) will be used to model and examine system performance. (0303-302,401,1016-351 or equivalent) Class 4, Credit 4 (F)

0303-510 Applied Statistical Quality Control
An applied approach to statistical quality control utilizing theoretical tools acquired in other math and statistics courses. Heavy emphasis on understanding and applying statistical analysis methods in real-world situations in engineering. Topics include hypothesis and control charts. (1016-351,352 or 0307-361,362) Class 4, Credit 4 (S)

0303-511 Applied Linear Regression Analysis
An applied approach to linear regression analysis utilizing theoretical tools acquired in other math-sat courses. Heavy emphasis on understanding and applying statistical analysis methods in real-world situations in engineering. Topics include analysis of variance and regression. (1016-351, 352, or equivalent) Class 4, Credit 4 (S)

0303-516 Human Factors
Psychological and cognitive aspects of human performance. The human information processing capabilities are studied to enable students to design work places, procedures, products and processes that are consistent with human capabilities and limitations. Topics include the human sensory, memory, attention and cognitive processes; display and control design principles; as well as human computer interface design. (1016-352 or permission of instructor) Class 3, Lab 1, Credit 4 (S)

0303-520 Engineering Economy
Time value of money, methods of comparing alternatives, depreciation and depletion, income tax consideration and capital budgeting. Cannot be used as a professional elective for ISE majors. Non-ISE majors may choose this as a professional elective. Class 4, Credit 4 (W)

0303-525 Manufacturing Engineering
This course is intended to provide broad exposure to various concepts in manufacturing within an integrated framework. This course explores the concepts of product conceptualization, CAD/CAM and solid modeling, GD&T, reverse engineering metrology, DFX, rapid prototyping and tooling, material removal and deformation processes, automation, assembly systems and quality aspects. At the end of the course, students will participate in an actual production run for the product being considered. Modern aspects such as lean manufacturing and design for recycling are included. (0303-343 or permission of instructor) Class 3, Lab 1, Credit 4 (F)

0303-530 Engineering Design
An introduction to engineering design as it relates to the development of systems and products. Topics include: product and systems development processes, organizations and teams, intellectual property, the business case for product development, defining customer needs, defining systems requirements and functions, reverse engineering, bench-marking, concept generation and selection, product portfolios, product and systems architectures, performance modeling and trade studies, and design for "X." Students use the concepts and tools discussed throughout the course in a team-based project. (Fourth-year status) Class 4, Credit 4 (S)

0303-560 Multi-disciplinary Senior Design I
First course in 2-course design sequence oriented to the solution of real-world engineering problems. Multi-disciplinary student teams attempt to define, analyze, design and implement solutions to unstructured, open-ended, multi-disciplinary engineering problems. (0303-530 or permission of instructor) Class 4, Credit 4 (W)

0303-561 Multi-disciplinary Senior Design II
Second course in a 2-course design sequence oriented to the solution of real-world engineering problems. Multi-disciplinary student teams attempt to define, analyze, design and implement solutions to unstructured, open-ended, multi-disciplinary engineering problems. (0303-530, 560 or permission of instructor) Class 4, Credit 4 (S)

0303-599 Independent Study
A supervised investigation within an industrial engineering area of student interest. Professional elective. (Permission of instructor) Class variable, Credit variable

0303-620 Engineering Economy
Time value of money, methods of comparing alternatives, depreciation and depletion, income tax consideration, replacement, retirement and obsolescence, and capital budgeting. Applied project is required. Cannot be used as a professional elective for ISE majors. Class 4, Credit 4 (W)

0303-625 Concepts in Manufacturing Engineering
This course provides an in-depth introduction to the fundamental concepts in manufacturing engineering. Topics include engineering design, computer-aided design, materials and manufacturing processes, programmable automation, computer-aided manufacturing, computer numerical control, modern and adaptive control, robotics, computer-integrated manufacturing, computer-aided process planning, and group technology. The objective is to introduce the student to the major technologies in modern manufacturing systems. The student will gain an understanding of, as well as limited hands-on experience with, the manufacturing technologies needed for a range of production systems from job-shop facility to a continuous flow enterprise. (Requires acceptance into the MML program or permission of instructor) Credit 4 (F)

0303-630 Advanced Systems Integration
Basic concepts and techniques needed to specify, design and implement systems that are computer controlled. Real-time data, process control as related to computer-integrated manufacturing, and information systems topics will be introduced within the context of systems integration. (0303-302 or permission of instructor) Class 3, Lab 1, Credit 4 (S)

Mechanical Engineering

0304-203 Freshman Seminar
Gives the entering first-year student an overview of mechanical engineering and helps integrate the incoming student into the RIT community. Topics discussed include the program of study, the cooperative work experience, and course advising. In addition this course gives the student an opportunity to interact with the faculty, upper-division students and other first-year students in a project oriented environment. Credit 1

0304-212 Introduction to CAD
Design drafting is accomplished using computer-aided drawing techniques on a CAD system. Skills are developed by producing drawings for assigned parts. (0304-211) Lab 4, Credit 2

0304-214 **Engineering Design Graphics**
Emphasis is on technical sketching, visualization, design, and the use of CAD systems for mechanical drawing. Combines the study and practice of manual graphics and desktop sketching along with design graphics using a CAD system. Course goal is to develop design graphics skills that will meet industrial standards, both manually and using CAD systems and software, while at the same time developing spatial visualization abilities and skills. **Class 1, Recitation 2, Lab 2, Credit 3**

0304-312 **Geometric Dimensioning & Tolerances**
The course is based on the ANSI standard for GD & T. Students learn how to properly dimension and tolerance production piece-parts and assemblies using an industry desired dimensioning system. This is a project-based course with student teams designing and dimensioning a small assembly. The students learn how to convert functional requirements into production drawings while reflecting manufacturing realities. Includes instruction in isometric sketching of part applications. (0304-212) **Class 1, Recitation 2, Lab 2, Credit 3**

0304-330 **Statics & Dynamics**
This basic course for nonmechanical engineering students begins with the static equilibrium of particles and rigid bodies under the action of forces. Topics include forces, couples, equilibrium, trusses and friction. This is followed by the fundamentals of dynamics of particles and rigid bodies. Topics include kinematics and kinetics of particles and rigid bodies, work, energy and momentum. Applications will include rotating machines and gear trains. (1017-311; co-requisite: 1016-306) **Class 5, Credit 5**

0304-331 **Mechanics I**
For students majoring in industrial and systems engineering. Statistics: equilibrium, the principle of transmissibility of forces, couples, centroids, trusses, frames, machines and friction. Introduction to strength of materials: axial stresses and strains, statically indeterminate problems, torsion and bending. (1017-311,1016-252) **Class 4, Credit 4**

0304-332 **Mechanics II**
For students majoring in industrial and systems engineering. Topics include dynamics of particles and rigid bodies with an introduction to kinematics and kinetics of particles and rigid bodies, work, energy, impulse momentum and mechanical vibrations. Emphasis is on problem solving. (0304-331) **Class 4, Credit 4**

0304-336 **Statics**
This basic course treats the equilibrium of particles and rigid bodies under the action of forces. It integrates the mathematical subjects of calculus, vector algebra and simultaneous algebraic equations with the physical concepts of equilibrium in two and three dimensions. Topics include concepts of force and moment, trusses, frames, machines, friction, centroids and moments of inertia. (1016-252,1017-311) **Class 4, Credit 4**

0304-342 **Problem Solving with Computers**
Introduces students to personal computers for solving science and engineering problems. Students also learn to interpret and analyze their results and document their solutions. The course covers principles and techniques of computer programming to analyze and solve problems and to document both numerically and graphically the results of the analysis. Programming and analysis of problems are implemented using either a spreadsheet or a symbolic algebra system with supplemental documentation and communication of results using a word processor. (Corequisite: 1016-252) **Class 2, Lab 2, Credit 3**

0304-343 **Materials Processing**
A study of the application of machine tools and fabrication processes to engineering materials in the manufacture of products. Processes covered include cutting, molding, casting, forming, powder metallurgy and welding. Students do a project in the lab portion of the course. **Class 3, Lab 2, Credit 4**

0304-344 **Materials Science**
The structure and properties of metallic, polymeric, composite and ceramic materials as related to structural imperfections, atom movements and phase changes. Develops a basic understanding of the structure/properties relationship in materials and their behavior in service environments. (1011-273, 277) **Class 3, Lab 2, Credit 4**

0304-347 **Mechanics of Materials**
A basic course in the fundamental principles of the mechanics of deformable media, including stress, strain, deflections and the relationships among them. The basic loadings of tension, compression, shear, torsion and bending are also included. Mechanics of Materials Lab (0304-348) is to be taken concurrently with this course. (0304-336; co-requisite: 0304-348) **Class 4, Credit 4**

0304-348 **Mechanics of Materials Lab**
A required laboratory course taken concurrently with 0304-347. Illustrates the mechanical behavior of common engineering materials. Students investigate a material's response to axial, torsional and bending loads. In addition students are introduced to statistical analysis of data, basic experimental techniques, and effective report writing. (0304-336; corequisite: 0304-347) **Lab 2, Credit 1**

0304-359 **Dynamics**
A basic course in the kinematics and kinetics of particles and rigid bodies. Newton's Laws and the theorems of work-energy and impulse-momentum are applied to a variety of particle problems. Systems of particles are employed to transition to the analysis of rigid body problems. Absolute and relative motion are used to investigate the kinematics and kinetics of systems of rigid bodies. Newton's Laws and the theorems of work-energy and impulse-momentum are also applied to a variety of rigid body problems. (0304-336) **Class 5, Credit 5**

0304-413 **Thermodynamics**
A basic course introducing the classical theory of thermodynamics. Applications of the first law of thermodynamics are used to introduce the student to thermodynamic processes for closed and open systems. The Clausius and Kelvin-Planck statements of the second law are then correlated with the concept of entropy and enthalpy to investigate both real and reversible processes and the thermodynamic properties of pure substances. (1016-252,1017-312) **Class 4, Credit 4**

0304-415 **Fluid Mechanics**
Includes the physical characteristics of a fluid: density, stress, pressure, viscosity, temperature, vapor pressure, compressibility. Descriptions of flows: Lagrangian and Eulerian; stream lines, path lines, streak lines. Classification of flows. Fluid statics: hydrostatic pressure at a point, pressure field in a static fluid, manometry, forces on submerged surfaces, buoyancy, standard and adiabatic atmospheres. Flow fields and fundamental laws: systems and control volumes, Reynolds Transport theorem, integral control volume analysis of basic equations for stationary and moving control volumes. Inviscid Bernoulli and the Engineering Bernoulli equation, some applications. Incompressible flow in pipes; laminar and turbulent flows, separation phenomenon. Dimensional analysis: Buckingham's pi-theorem, similitude, model studies. (0304-413; corequisite: 0304-416) **Class 4, Credit 4**

0304-416 **Thermal Fluids Lab I**
This laboratory course pertains to topics covered in Thermodynamics (0304-413) and Fluid Mechanics (0304-415). Each laboratory experiment is designed to quantify the differences between real and ideal systems through rigorous system analysis. Students will work in teams to evaluate various thermo-fluid systems. Extensive analysis is used to calculate system characteristics and to graph and predict system behavior. (0304-413; corequisite: 0304-415) **Lab 2, Credit 1**

0304437 **Design of Machine Elements**
The analysis and theory of machine design in the context of failure theories. Particular emphasis is placed on the design and analysis of machine elements and fatigue. A discussion of engineering professionalism and ethics is also included. (0304-347) **Class 4, Credit 4**

0304-440 **Numerical Methods**
A study of numerical methods to model and solve engineering problems using a computer. Students learn to analyze and interpret the numerical solutions obtained. Topics include roots of algebraic and transcendental equations, linear systems, curve fitting, numerical differentiation and integration, and ordinary differential equations. Applications are taken from students' background in statics, mechanics, dynamics, mathematics and thermodynamics. (corequisite: 1016-318; prerequisite: 0304-342 or corequisite: 0304-441; corequisite: 0304-347) **Class 4, Credit 4**

0304-441 **Computer Tools**
The course covers the use of a personal computer for solving engineering and science problems. This course is intended for transfer (internal and external) students who have not taken the course 0304-342, Problem Solving with Computers. Lab: first three Saturdays. **Credit 1**

0304-500	Study Abroad	0304-604	Design for Manufacture
01 - Mechanical Engineering Independent Study, Credit 1-8		The student learns how to design parts for economical manufacture and how to design assemblies with the optimum number of parts. This project-based course includes lectures on the creative process. The student uses both manual and software techniques to calculate assembly design efficiencies and software techniques to determine part and part tooling costs. Replaces 0304-464. (0304-312,344) Class 4, Credit 4	
02 - Mechanical Engineering Free Elective, Credit 1-8			
03 - Mechanical Engineering Technical Elective - Design, Credit 1-8			
0304-514	Heat Transfer	0304-610	Topics in Mechanical Engineering Design
A basic course in the fundamentals of heat transfer by conduction, convection and radiation, together with applications to typical engineering systems. Topics include one-dimensional steady state and transient heat conduction, radiation between black bodies and gray bodies, correlations for the Nusselt number in forced and natural convection, and an introduction to heat exchanger design by LMTD and NTU methods. (0304-413,415) Class 4, Credit 4		In response to student and/or faculty interest, special courses of current interest and/or logical continuation of regular courses are presented. A design project is required. Class 4, Credit 4	
0304-518	Advanced Computational Techniques	0304-615	Robotics
This extension of Numerical Methods, 0304-440, covers finite element and finite difference techniques and their applications in mechanical engineering (structural analysis, heat transfer, fluid mechanics). (0304-440) Class 3, Lab 2, Credit 4		An applied course in the fundamentals and applications of industrial robots. Emphasis is placed on the use of microcontrollers to construct mobile robots. Topics include microcontroller programming, industrial robot fundamentals, DC servo and stepper motors, encoders, sensors, programming, gripper design, and safety. A major emphasis is placed in a design project involving the design, build, and test of a mobile robot for an application. (Fourth and Fifth-year standing) Class 3, Lab 2, Credit 4	
0304-540	Introduction to Auto Design & Manufacturing	0304-618	Computer-Aided Engineering
An introduction to the design and manufacturing practices employed in typical automotive industries. Design practices that are currently being implemented in industry will be emphasized including the use of computer-aided engineering, software, and statistical analysis. The regularly scheduled lecture periods will include guest lecturers from automotive manufacturers to introduce students to current manufacturing technologies. This course may be used as a free elective. (Fourth-year standing in ME program, registration preference given to students enrolled in the automotive option) Class 4, Credit 4		Introduces the mechanical engineering student to the procedures and techniques used to integrate the computer into the engineering and design cycle. The student is exposed to commercial software used in industry. Topics include solids modeling, finite elements, stress analysis, static and dynamic structural analyses, and heat transfer. A real-world design project is selected from one or more of the topics covered. (0304-437,518) Class 3, Lab 2, Credit 4	
0304-543	System Dynamics	0304-620	Introduction to Optimal Design
This required course introduces the student to lumped parameter system modeling, analysis and design. The determination and solution of differential equations that model system behavior is a vital aspect of the course. System response is characterized in both time and frequency domains. The design of systems or sub-systems is evaluated based on performance criteria, and design modifications are suggested from alternate modeling scenarios. Associated projects introduce students to simulation software. (0304-359, 1016-306,0301-362), Studio Class 6, Credit 5		This course is an introduction to basic optimization techniques for engineering design synthesis. Topics covered include: basic concepts, the general problem statement, necessary conditions of optimization, numerical techniques for unconstrained optimization, constrained optimization through unconstrained optimization, and direct methods. Numerical solutions are obtained using commercially available software. A design project is required. (0304-437,440) Class 4, Credit 4	
0304-550	Transport Phenomena	0304-624	Vehicle Dynamics
A second course in fluid mechanics, integrating concepts of heat and mass transfer. Use of the differential form of the fundamental equations of the conservation of mass, momentum and energy is derived and used throughout. Topics include potential flow, viscous internal plane and pipe flows, external boundary layers, and the convective transport of heat and mass. (1016-318, 0304-415; corequisite: 0304-514) Class 4, Credit 4		Deals with the fundamentals of ground vehicle stability and control. The contribution of tire lateral force, stiffness, and aligning torque to vehicle stability is discussed. Bicycle and four-wheel vehicle models are analyzed for neutral, under and oversteer characteristics. The effects of suspension geometry, chassis stiffness and roll stiffness on stability and handling are analyzed. (0304-543, registration preference is given to students enrolled in the automotive option) Class 4, Credit 4	
0304-551	Thermal Fluids Lab II	0304-626	Automotive Control Applications
A laboratory course based on the materials covered in Heat Transfer I, 0304-514, and Transfer Phenomena, 0304-550. Students perform various experiments of contemporary interest to the fields of heat transfer and transport. Each lab is preceded by a lecture covering an in-depth analysis of the lab experiment. Students are required to work on an assignment related to the experiment using the textbooks and reference material available in the library. After performing the experiments, students perform the required analysis, including error analysis and comments on identifying the sources of error and how to reduce them. Students submit a detailed lab report that is graded on the technical content as well as writing skills. Students completing the Aero option do not need to complete this course. (0304-514, corequisite: 0304-550) Lab 2, Credit 1		Examines several key vehicle control subsystems. Such subsystems include engine sensors and controls, anti-lock brake systems, cruise control and semi-active suspensions. Relevant modeling, computer simulations, and experiments will be performed. (0304-543, registration preference is given to students enrolled in the automotive option) Class 4, Credit 4	
0304-560	Introduction to Aerospace Engineering	0304-630	Senior Design I
Lays the foundation for studies in aerospace engineering. Topics include the history of aviation, basic aerodynamics, airfoils, wings and other aerodynamic shapes, airplane performance, stability and control, propulsion and aircraft structures. This course may be used only as a free elective. (0304-359,415, registration preference is given to students enrolled in the aero option) Class 4, Credit 4		The first of a two-course capstone design sequence. Students work in design teams in an environment approximating an industrial setting. Emphasis is placed on teamwork and on developing good oral, written and interpersonal communication skills. In this course, student teams develop their proposed final design of a mechanical system after identifying possible alternative concepts. The final design must be supported by sound engineering analyses and by engineering drawings necessary to build a prototype. (This course is intended to be taken as a capstone design experience near the conclusion of the student's program of study. Students must have fifth-year standing, completed three co-op blocks and have consent of the department. Students must submit a departmentally approved plan of study for degree completion. Class 4, Credit 4	
0304-599	Independent Study	0304-631	Senior Design II
A student project course encompassing both analytical and experimental work. (Fourth- or fifth-year standing) Credit variable		The second of the two-course capstone design sequence. The same student teams from Senior Design I return to build and test a working prototype of their previously developed final design. Non-working prototypes are not acceptable, and some redesign work may be required to make the system work. Continued emphasis is placed on teamwork and on developing good oral, written and interpersonal communication skills. (0304-630) Class 4, Credit 4	

0304-635 Heat Transfer II
Consists of the numerical solution of heat transfer problems. One- and two-dimensional steady-state as well as transient conduction cases are analyzed. A detailed study of single-phase forced and natural convective heat transfer is presented. Heat transfer during pool boiling, flow boiling and condensation is studied. Design aspects of heat transfer equipment are introduced. The students undertake a major design project. (0304-440,514) Class 4, Credit 4

0304-638 Design of Machine Systems
This is an applied course in the selection of components and integration of those components into electro-pneumatic-mechanical devices and systems. Topics involve all aspects of machine design, including drive components and systems, motion generation and control, and electrical control hardware and strategy. (0304-359,437; 0301-362) Class 4, Credit 4

0304-640 Internal Combustion Engines
An introduction to the operation and design of internal combustion engines. Topics include engine types and cycles, fuels, intake and exhaust processes, emissions and emission control systems, heat transfer and lubrication. (0304-413,514, co-requisite: 550, registration preference is given to students enrolled in the automotive option) Class 4, Credit 4

0304-644 Introduction to Composite Materials
This course is an applied course in the fundamentals and applications of composite materials. Topics covered include constituents of composite materials, fabrication techniques, micromechanical analysis, macromechanical analysis, and the use of composites in design. Some laboratory work will be done, and a major design project is required. (0304-344,347,518) Class 4, Credit 4

0304-652 Fluid Mechanics of Turbomachines
Examines the basic principles applicable to all turbomachinery as well as the consideration of the operating and design characteristics of several basic classes of turbomachinery. Includes a major design project. (0304-415) Class 4, Credit 4

0304-660 Refrigeration & Air Conditioning
A basic course in the principles and applications of refrigeration and air conditioning involving mechanical vapor compression and absorption refrigeration cycles, associated hardware, psychometrics, heat transmission in buildings and thermodynamic design of air conditioning systems. Students are expected to do a design project. (0304-514) Class 4, Credit 4

0304-671 Aerostructures
The principles of deformable bodies as applied to the analysis and design of aircraft and space vehicle structures. Topics include the study of bending and torsion of thin-walled, multi-cell beams and columns; wing and fuselage stress analysis; and structural stability. Strain energy concepts and matrix methods are utilized throughout the course. (0304437, 518, registration preference is given to students enrolled in the aero option) Class 4, Credit 4

0304-672 Dynamics of Machinery
An introduction to the fundamentals and applications of machinery design. Basic concepts such as linkage classification, mobility and motion characteristics are introduced. The kinematic and dynamic analyses of planar lower-pair linkages are carried out using analytical vector methods, and graphical methods. The design and analysis of cams are treated by graphical and analytical methods. Major emphasis is placed on a term project in which a mechanism for specific application is kinematically and dynamically analyzed. (0304-543) Class 4, Credit 4

0304-673 Aeromechanics Laboratory
A companion laboratory course for 0304-671 and 0304-675 illustrating the behavior of advanced engineering structures and aerodynamic principles common to aircraft and spacecraft design. Students investigate the bending and torsion of thin-walled single cell and multi-cell members. Wind tunnel experiments investigate basic concepts of lift and drag on bluff bodies, wing sections and lifting bodies. Boundary layer characterization is simulated on digital computers and investigated experimentally. Structural analysis and design evaluation are also simulated where appropriate. (0304-560; corequisites: 0304-671, 675, registration preference is given to students enrolled in the aero option) Lab 2, Credit 1

0304-675 Aerodynamics
This course presents the essentials of aerodynamic theory. Topics include differential equations of fluid mechanics, airfoil theory, wings of finite span, inviscid potential flows, laminar and turbulent boundary layer. Airfoil design is explored through software. A design project is required. (0304-560 or 0304-550 with instructor's consent, registration preference is given to students enrolled in the aero option) Class 4, Credit 4

0304-678 Propulsion
The fundamentals of propulsion including the basic operating principles and design methods for flight vehicle propulsion systems. Topics include air-breathing engines (turbojets, ramjets, turboprops and turbofans) as well as liquid and solid propellant chemical rockets. (0304-514 and 0304-550 or 0304-560, registration preference is given to students enrolled in the aero option) Class 4, Credit 4

0304-682 Flight Dynamics
This course deals with the three-dimensional dynamics of aircraft, including general aircraft performance, stability and control, and handling qualities. Topics include mathematical development of equations-of-motion describing full range of aircraft motion; aerodynamic forming term coefficient development, quaternion alternative; linearization of nonlinear aircraft models, determination of range, endurance and rate of climb; simulation of aircraft trajectory; static and dynamic stability; aircraft control; and aircraft handling qualities introduction. (0304-543, 560, registration preference is given to students enrolled in the aero option) Class 4, Credit 4

0304-694 Stress Analysis
Extends the student's theoretical, numerical and experimental base of knowledge beyond an introductory level. The state properties of stress, strain and elastic deformation and their relationships are reviewed in detail. Topics from advanced strength of materials and elasticity theory are covered including unsymmetrical bending, shear flow in thin-walled sections, curved beams, torsion in thin-walled tubes, and three-dimensional coordinate transformations. The use of the finite element software presented in 0304-518, Advanced Computational Techniques, is extended to more complex design-oriented problems. Experimental topics include the use of strain gages. A design project is assigned that utilizes numerical and/or experimental methods. (0304-437; corequisite: 0304-518) Class 4, Credit 4

0304-698 Independent Study Design Project
A design-oriented independent study requiring a major design project. (Senior standing) Credit 4

0304-699 Special Topics
In response to student and/or faculty interest, special courses that are of current interest and/or logical continuation of regular courses will be presented. (Permission of the supervising faculty member and the department head required) See instructor for more details. Class 4, Credit 4

Microelectronic Engineering

0305-201 Introduction to Microelectronics
An overview of semiconductor technology history and future trends is presented. The course introduces the fabrication and operation of silicon-based integrated circuit devices including resistors, diodes, transistors and their current-voltage (I-V) characteristics. Laboratory teaches the basics of IC fabrication and I-V measurements. A five-week project provides experience in digital circuit design, schematic capture, simulation, breadboarding, layout design, IC processing and testing. Class 3, Lab 3, Credit 4 (F)

0305-221 Introduction to Microlithography
An introduction to the fundamentals of microlithography. Topics include IC photomasking, sensitometry, radiometry, resolution, contact lithography, projection lithography, photoresist materials and processing, and pattern transfer through etching. Laboratories include mask making, resist materials characterization, pattern transfer, exposure systems, alignment, and overlay. (1011-273) Class 3, Lab 3, Credit 4 (S)

0305-320 Design of Experiments
An introduction to experimental design concepts for microelectronic engineering applications. Topics covered include statistics, SPC, Process Capability Analysis, experimental design, analysis of variance, regression and response surface methodology, and design robustness. Students will utilize statistical software (JMP IN) to analyze case studies and design efficient experiments. (1016-314 or equivalent) Class 3, Lab 3, Credit 4 (W)

- 0305-350 IC Technology
An introduction to the basics of integrated circuit fabrication. The electronic properties of semiconductor materials and basic device structures are discussed, along with fabrication topics including photolithography diffusion and oxidation, ion implantation, and metallization. The laboratory uses a four-level metal gate PMOS process to fabricate an IC chip and provide experience in device design -and layout (CAD), process design, in-process characterization and device testing. Students will understand the basic interaction between process design, device design and device layout. (0305-201) Class 3, Lab 3, Credit 4 (S)
- 0305-360 Introduction to Semiconductor Devices
An introductory course on the fundamentals of semiconductor physics and principles of operation of basic devices for beginning electrical engineering students. Topics include semiconductor fundamentals (statistical physics of carrier concentration, motion in crystals, energy band models, drift and diffusion currents) as well as the operation of p-n junction diodes, bipolar junction transistors (BJT), metal-oxide-semiconductor (MOS) capacitors and MOS-field-effect-transistors (MOSFET). Laboratory demonstrations and SPICE models are introduced. (1017-314) Class 4, Credit 4 (S)
- 0305-460 Semiconductor Devices I
An introduction to the fundamentals of semiconductor materials and the effects of variations in the material properties of the resulting current-voltage characteristics for two terminal devices, namely resistors and diodes. Topics include electron energies in solids, the statistical physics of carrier concentration and motion in crystals, energy band models, drift and diffusion currents, recombination-generation of carriers, continuity equations, and the p-n junction under equilibrium and bias conditions, and metal-semiconductor Schottky and ohmic contacts. Non-idealities associated with real diodes are introduced. Design of integrated two terminal devices and electrical test demonstrations are required. (1017-314) Class 4, Credit 4 (F, S)
- 0305-520 VLSI Design
Introduction to the design of CMOS very large scale integrated (VLSI) circuits. Extensive use of Mentor Graphics software in a networked workstation environment, including homework and design project. Topics include logic design and state machines, schematic capture, electrical simulation, geometrical layout, design and electrical rule checking. Standard cell libraries are used for selected assignments. Emphasis is placed on a further understanding of the fabrication process by discussion of mask layers, rule checks and circuit simulation. (0301-240,482; 0305-350,560) Class 3, Lab 3, Credit 4 (S, SU)
- 0305-525 Optics for Microelectronic Engineering
An introduction to the principles of optics in which reflection, refraction and transmission are explained as a result of interference between the excitation field and the atomic oscillations that result in the emission of spherical wavelets (Huygens Principle). Topics include Fresnel Coefficients, imagery due to refraction at a single surface, simple lenses, ray tracing techniques, apertures, mirrors and thick lenses. Both the paraxial case (ideal imagery) and aberrations in spherical lenses are covered. An introduction to physical optics and the topics of diffraction and interferometry is provided. These topics set the stage for understanding ellipsometers, steppers, microscopes, and other optical instrumentation utilized in IC manufacturing. Lab required. (1017-313) Class 3, Lab 3, Credit 4 (F,W)
- 0305-560 Semiconductor Devices II
An introduction to the physical mechanisms that govern the operation of metal-oxide semiconductor (MOS) capacitors, MOS field-effect transistors, and related devices. Special emphasis is given to the relation between the structural parameters of these devices and their electrical characteristics. Modern structures and small dimension effects are discussed. Device design and SPICE models for these devices are investigated. BJTs are covered after a thorough investigation of MOSFETs. (0305-460) Class 4, Credit 4 (F, W)
- 0305-564 Microlithography Systems
A course covering the physical aspects of lithography. Image formation in optical projection, optical proximity, and high energy systems (DUV/VUV, e-beam/SCALPEL, x-ray, and EUV) are studied. Fresnel diffraction, Fraunhofer diffraction, and Fourier optics are utilized to understand diffraction-limited imaging processes. Topics include illumination, lens parameters, image assessment (resolution, alignment and overlay), phase-shift masking, and resist interactions. Lithographic systems are designed and optimized through use of modeling and simulation packages. Current status of the practical implementation of advanced technologies in industry as well as future requirements will be presented. (0305-221,320,350) Class 3, Lab 0, Credit 3 (S, SU)
- 0305-574 Microlithography Systems Lab
Laboratory to be taken concurrently with 0305-564. Topics emphasize optical microlithography modeling, illumination systems, reticle enhancement techniques, alignment, and optimization of image capture related to focus, exposure and substrate reflectivity. Class 0, Lab 3, Credit 1 (S, SU)
- 0305-599 Independent Study
A supervised investigation within a microelectronic area of student interest. Proposals for the independent study must be approved by the faculty member and department head and submitted prior to registration. Class variable, Credit variable 1-4
- 0305-632 Silicon Processes
The fundamental silicon based processing steps introduced in 0305-350 are expanded upon to cover state-of-the-art issues such as thin oxide growth, atomistic diffusion mechanisms, advanced ion implantation and rapid thermal processing (RTP). Physical vapor deposition (PVD) to form conductive and insulating films is introduced. MOS capacitance-voltage measurement and surface change analysis are studied. These topics are essential for understanding the fabrication of modern IC's. Computer simulation tools (i.e. SUPREM) are used to model processes, build device structures, and predict electrical characteristics, which are compared to actual devices that are fabricated in the associated laboratory. (0305-350,560) Class 3, Lab 3, Credit 4 (F, W)
- 0305-643 Thin Film Processes
This course focuses on the deposition and etching of thin films of conductive and insulating materials for IC fabrication. A thorough overview of vacuum technology is presented to familiarize the student with the challenges of creating and operating in a controlled environment. Chemical Vapor Deposition (CVD) and electroplating technologies are discussed as methods of film deposition. Plasma etching and Chemical Mechanical Planarization (CMP) are studied as methods for selective removal of materials. Applications of these fundamental thin film processes to IC manufacturing are presented. (0305-320,350) Class 3, Lab 3, Credit 4 (S, SU)
- 0305-650 Integrated Circuit Processing Lab
A laboratory course in which students manufacture and test CMOS integrated circuits. Topics include design of individual process operations and their integration into a complete manufacturing sequence. Students are introduced to work in process tracking, ion implantation, oxidation, diffusion, plasma etch, LPCVD, and photo-lithography. Analog and Digital CMOS devices are made and tested. (0305-632) Class 2, Lab 6, Credit 4 (F, W)
- 0305-655 Microelectronic Technologies
An advanced level course on leading microelectronic technologies and their application in logic and memory devices. Topics include submicron CMOS technology, Bipolar and BiCMOS processes, operation and modeling of scaled MOSFETs, electrical performance, reliability issues, and advanced process developments. Principles and process flows for logic and memory technologies such as SRAM, DRAM, EPROMS and flash memory are studied. Students design a CMOS technology for a given channel length and supply voltage and do complete characterization of its off-state leakage; drain breakdown, on-state drive, and speed of operation. (0305-560,632,643,650) Class 4, Lab 0, Credit 4 (F,W)
- 0305-666 Microlithography Materials & Processes
Covers the chemical aspect of microlithography and resist processes. The chemistry of positive (novolac-based) and chemically amplified resist systems will be studied. Topics include the principles of photo polymerization, including synthesis, photo absorption and emission, processing technologies and methods of process optimization. Also, advanced lithographic techniques and materials, including multilayer techniques for BARC, TARC, and silylation are applied to optical lithography. (0305-221,320,350) Class 3, Lab 0, Credit 3 (F, W)
- 0305-676 Microlithography Materials & Processes Lab
Laboratory will be taken concurrently with 0305-666. Materials characterizations and process optimizations will utilize experimental design techniques. Processes to be studied include development rate monitoring. DUV resists, BARC, resist silylation and SEM evaluation of imaged resists and etched structures. Class 0, Lab 3, Credit 1 (F, W)

0305-680 Seminar Research I
A capstone design experience for microelectronic engineering senior students. Students propose a 10-week project related to microelectronic devices design and processing, design of experiments, plan a timetable and write a formal proposal. The proposal is evaluated on the basis of intellectual merit, sound technical/research plan and feasibility. The proposed work is carried through in the sequel course, Seminar/Research II (0305-690). Each student is required to make an individual Web page and a presentation of the proposal. (0305-320,564,632,643) **Class 1, Lab 3, Credit 2 (F, W)**

0305-690 Seminar Research II
A capstone design experience for microelectronic engineering senior students. In this 10-week course, students conduct the projects proposed in the previous course, Seminar/Research I. Technical presentations of the results, including a talk and a poster, are required at the annual departmental conference on microelectronic engineering organized by the department in May. A written paper in IEEE format is required and is included in the conference journal. (0305-680) **Class 1, Lab 3, Credit 2 (S)**

Computer Engineering

0306-200 Introduction to Computer Engineering
Briefly describes the field of computer engineering and provides a frame of reference for the sequences of computer engineering, computer science and electrical engineering courses that appear in the computer engineering curriculum. Topics include an introduction to computers and computing, basic concepts, nomenclature, historical background and some elements of data representation. **Class 1, Credit 1 (F)**

0306-201 Freshman Seminar
Introduces various topics of interest to computer engineering majors, including teamwork and aspects of engineering design. (0306-200) **Class 1, Credit 1 (W)**

0306-250 Assembly Language Programming
An introduction to fundamental computer organization, assembly language programming and input/output techniques of a modern microprocessor system. Covers addressing methods, machine instructions, assembler directives, macro definitions, relocatability, subroutine linkage, data-structures, I/O programming, exception processing and interrupts. The assembly language program design techniques necessary to write efficient, maintainable device drivers are considered. An introduction to basic digital computer organization concepts also is provided. The Motorola MC 68000 microprocessor family of devices is used in most class examples and all required programming projects. (4003-232 and 0306-341) **Class 4, Lab 2, Credit 5 (F, W)**

0306-341 Introduction to Digital Systems
Covers the specification, analysis and design of digital systems. The rapid growth of digital computers, control devices, instruments and communication equipment requires a basic knowledge and general methodology that can be adapted to rapidly evolving changes and constraints. The study of combinational and sequential systems considers the use of standard modules such as decoders, encoders, multiplexers, shifters, ROMs, PLAs, adders, registers and counters. The laboratory provides more insight into the physical and circuit aspects of the design and implementation of digital systems using commercial IC components as well as Mentor Graphics design tools. (0306-200) **Class 3, Lab 3, Credit 4 (S, F)**

0306-351 Hardware Description Language
Presents modern approaches to digital system modeling and description. The course covers traditional schematic description and stresses modern hardware description languages (HDL). The focus is on the VHDL language, however other modeling concepts also are presented. Other topics include explanation and practical use of hierarchical approach to digital system design. The theory is exemplified by practical realizations of digital systems. (0306-341) **Class 3, Lab 2, Credit 4 (W, S)**

0306-381 Applied Programming
An introduction to classical algorithms used in the solution of numerical problems encountered in science and engineering. The C language will be introduced as a tool for implementing these algorithms. Topics include an introduction to C, computer number representation and round off error, algorithms for finding roots of nonlinear equations, interpolation, numerical differentiation and integration, function approximation and data fitting solutions to systems of linear equations, and general matrix manipulation. This course is restricted to computer engineering students. (4003-334 and 1016-306) **Class 3, Credit 3**

0306-451 Digital Signal Processing
This course introduces the student to the basic elements of discrete-time signals and systems and fundamental signal processing techniques, such as FIR and IIR Filtering, the z transform and the Discrete Fourier transform. Theory is strengthened through Matlab based projects and exercises. (1016-306, 331 and 0306-381) **Class 4, Credits**

0306-550 Computer Organization
Provides an understanding of the information transfer and transformations that occur in a computer, with emphasis on the relations between computer architecture and organization. Topics include design levels and their respective primitives, modules and descriptive media, register transfer and micro-operations basic computer organization and design, central processor organization, control unit and microprogramming, memory organization, input-output organization, computer architecture—defining the hardware/software interface, and from architecture to organization (one to many). (0306-250, corequisite 4003-440) **Class 4, Credit 4 (S, SU)**

0306-551 Computer Architecture
Provides the critical tools to quantitatively analyze uniprocessor computer performance. Instruction set architecture alternatives are described and examples are presented of each alternative, such as load-and-store, CISC, stack, etc. Techniques to enhance performance, such as pipelining, cache memory and memory hierarchy, are presented. The use of vector processing, such as is used in supercomputers, is described and analyzed. Finally, the impact of input/output on computer performance is described. (0306-550) **Class 4, Credit 4 (F, W)**

0306-553 Digital Control Systems
Concentrates on the analysis, simulation and design of digital control systems using root locus, frequency response and state variable representation. It also deals with the microprocessor-based implementation of digital filters for control applications. (0306-452,560) **Class 4, Lab 2, Credit 4 (S, SU)**

0306-560 Interface & Digital Electronics
Introduction to some common transducers, transformations from raw measured quantity to transducer output. Instrumentation amplifiers, active filters, analog switching for applications in multiplexers, and sample and hold circuits. The analog-to-digital and digital-to-analog conversions processes. Logic families including TTL, ECL, CMOS, BiCMOS and their interfaces to each other. Mentor Graphics design tools are used to design active filters. (0301-481) **Class 3, Lab 3 Credit 4 (F, W)**

0306-561 Digital Systems Design
Covers the specification, analysis, design and implementation of digital systems. The hierarchical and structured design methodology is introduced. Both synchronous and asynchronous sequential machines are studied. Student designs incorporate MSI/LSI modules, PALS, EPROMS, FPGAs and elements of VHDL. Design for testability is emphasized. (0306-341,351,0301-481) **Class 3, Lab 3, Credit 4 (S,SU)**

0306-599 Independent Study
Allows senior-level undergraduate students an opportunity to independently investigate, under faculty supervision, aspects of the field of computer engineering that are not sufficiently covered in existing courses. Proposals for independent study activities must be approved by both the faculty member supervising the independent study and the department head. (Permission of supervising faculty member and department head required.) **Credit variable 1-4**

0306-620 Design Automation of Digital Systems
Deals with the computer as a tool or aid in the design and creation of digital systems. The VHDL hardware description language is used to specify digital systems on the behavioral, data-flow, register-transfer and structural levels or logic elements levels. Simulation techniques and logic synthesis methods are studied and implemented on VHDL models using tools from Mentor Graphics Corporation. (0306-561) **Class 4, Credit 4 (F, W)**

- 0306-630 Introduction to VLSI Design
An introduction to the design and implementation of Very Large Scale Integration (or VLSI) including NMOS and PMOS devices, CMOS circuits and digital subsystems. The procedures for designing and implementing digital integrated systems will be covered, including the Mead and Conway structured design approach consisting of the use of stick diagramming, scaling of CMOS design rules and techniques for estimating time delays. Emphasis will be placed on the use of static CMOS circuits and regular structures such as programmed logic arrays in custom and standard cell-based designs. The use of workstations with Mentor Graphics design tools for circuit simulation and for physical layouts will be stressed. Laboratory design projects will be required. (0306-561, 0301481 or equivalent) Class 4, Lab 2, Credit 4 (F, S, SU)
- 0306-631 Advanced VLSI Design
A second course in the design and implementation of very large scale integrated (VLSI) circuits and systems. Emphasis will be placed on the design and use of dynamic precharge and precharge-evaluate CMOS circuitry including Domino, NORA and Zipper CMOS logic, and subsystems. Basic requirements of a clocking system and a general clocking strategy for timing design in both static and dynamic CMOS circuits are investigated. Topics on the design and use of a standard cell library in the implementation of large system designs will be covered. The use of workstations with Mentor Graphics design tools and Synopsys synthesis tool suite will be required in laboratory projects leading to the design, VHDL synthesis and testing of an integrated circuit device. (0306-630,730,351) Class 4, Lab 2 Credit 4 (S)
- 0306-654 Computer Engineering Design Projects I
The first part of a capstone undergraduate design projects course in computer engineering. Lecture materials include realtime programming techniques, formulating independent project proposals and a brief introduction to the laboratory tools available in the concluding course. Students undertake a relatively simple, independent design project and formulate a proposal for a more complex electro-mechanical, closed-loop, computer-controlled design project to be completed during the concluding course. (Fourth-year standing in computer engineering) Class 2, Lab 2, Credit 2 (S, SU)
- 0306-655 Projects in Computer Engineering
This capstone design course entails several detailed projects involving the design of hardware and software to exercise students' engineering design creativity and ability to integrate concepts from throughout the curriculum. Some lectures are presented on real-time programming techniques such as interrupt handlers, multitasking concepts, process synchronization, response time considerations, rate monotonic scheduling, input noise reduction and debugging techniques. Other topics are also presented. (Fifth-year standing in computer engineering) Class 3, Lab 3, Credit 4 (F, W)
- 0306-657 Computer Engineering Design Projects II
The conclusion of a capstone undergraduate design projects course in computer engineering. Students will have prepared for the major course project during the previous course and will have done some detailed project analysis over the intervening co-op work period. This course begins with project design reviews presented to the class and selected faculty members. Project performance analysis and reliability will be major metrics. A smaller independent learning experience design project concludes the course. (0306-654) Class 3, Credit 3 (F,W)
- 0306-661 Engineering Design of Software
An advanced course moving the student beyond computer programming to the engineering of complex software systems. At the end of this class, students will learn how to make the right selection of design methodologies or architectures, produce executable structure models that can be verified by computer, formulate a design that meets all functional and performance requirements, and perform trade-off analyses that enhance decision making. Students will work in teams on large-scaled software projects. (4010-361) Class 4, Credit 4 (W)
- 0306-662 Concurrent & Embedded Software Design
This course introduces methods for developing and designing concurrent software and embedded software. Formal logical formulas are used to characterize sets of states and sets of program behaviors. The software is then analyzed by manipulating these logical formulas. Several classical concurrent programming problems such as critical sections, producers and consumers, and resource allocation are examined. Practical examples and exercises are used to illustrate points and evaluate design tradeoffs. (0306-661) (Permission of instructor) Class 4, Credit 4 (S)
- 0306-663 Embedded & Real-time Systems
Conducted in a studio class/lab format with lecture material interspersed with lab work, this course presents a general road map of real time and embedded systems. Microcontrollers used as external, independent performance monitors of more complex real-time systems. Much of the material focuses on a commercial real-time operating system, using it for programming projects on development systems and embedded target systems. Fundamental material on real-time operating systems are presented, including scheduling algorithms, priority inversion, and hardware-software co-design. (4010-361 and 0306-250 or equivalent) Class 4, Credit 4
- 0306-672 Special Topics in Computer Engineering
Topics and subject areas that are not among the courses listed here are frequently offered under the Special Topics title. Under the same title also may be found experimental courses that may be offered for the first time. Such courses are offered in a formal format; that is, regularly scheduled class sessions with an instructor. The level of complexity is commensurate with a senior-level undergraduate/first-year graduate technical course. Class 4, Credit 4
- 0306-675 Robotics
This course is a hands-on seminar style survey of mobile robotics. The development of the field and an overview of the different approaches to mobile robot guidance (knowing where we are and where we want to go), navigation (formulating a plan to get where we want to go) and control (following a desired path) will be given. The emphasis will be on algorithms and techniques. (0306452) Class 4. Credit 4.
- 0306-684 Digital Image Processing Algorithms
This is a first course in digital image processing that emphasizes both theory and implementation. Two-dimensional sampling, transforms, and filtering are introduced and used for image enhancement, compression, restoration, segmentation, and applications in color and video processing. Project assignments involve Matlab implementation of algorithms and paper reviews. (0306-553, 1016-331, fifth-year standing in computer engineering or permission of instructor) Class 4, Credit 4
- 0306-685 Computer Vision
This course covers both fundamental concepts and the more advanced topics in Computer Vision. Topics include image formation, color, texture and shape analysis, linear filtering, edge detection and segmentation. In addition, students are introduced to more advanced topics, such as model based vision, object recognition, digital image libraries and applications. Homework, literature reviews, and programming projects are integrated with lectures to provide a comprehensive learning experience. (0306-553 or permission of instructor) Class 4. Credit 4.
- 0306-694 Data & Computer Communications
Provides a unified view of the broad field of data and computer communications. Emphasis is on the basic principles underlying the technology of data and computer communications. Critical issues in data communication networks as well as the current and evolving standards in computer communication architecture are discussed. The topology, access control and performance of various types of local-area networks are studied in detail. (1016-351, 0306-550) Class 4, Credit 4 (S)
- 0306-695 Advanced Networking
This course covers a set of advanced topics in the networking area. The topics include advanced scheduling algorithms (e.g., WRQ), queue management schemes (e.g., RED), and network security (e.g., cryptography, DOS, key management, firewalls, etc.). In addition, networking programming based on Java (RMI, UDP/TCP socket, etc.) and network simulation using C++ and OPNET will be introduced and carried as course projects. (0306-694 or equivalent, 0306-740,4003-318 or equivalent) Class 4. Credit 4.
- 0306-699 Independent Study
Allows senior-level graduate students an opportunity to independently investigate, under faculty supervision, aspects of the field of computer engineering that are not sufficiently covered in existing courses. Proposals for independent study activities are subject to approval by both the faculty member supervising the independent study and the department head. (Permission of the supervising faculty member and the department head required.) Credit variable 14

Quality & Applied Statistics

0307-315

Statistics for Engineers

Statistics for engineering will study descriptive statistics; probability; measurement techniques. The application of the normal distribution and the central limit theorem will be applied to confidence intervals and statistical inference as well as control charts used in SPC. The topics covered will be related to engineering through use of real world examples. (Grade of C or better in 1016-253 or grade of C or better in 1016-252 and coregistration in 1016-253) Credit 4(F)

0307-361

Probability & Statistics for Engineers I

Statistics in engineering; enumerative and analytic studies; descriptive statistics and statistical control; sample spaces and events; axioms of probability; counting techniques; conditional probability and independence; distributions of discrete and continuous random variables; joint distributions; central limit theorem. (1016-253) Credit 4 (F)

0307-362

Probability & Statistics for Engineers II

Point estimation; hypothesis testing and confidence intervals; one- and two-sample inference; introduction to analysis of variance, experimental design, control charts and measurement studies. (0307-361) Credit 4 (W)

College of Imaging Arts & Sciences

Index

2001	Interdisciplinary Imaging Arts.....	215
2009	New Media Design.....	221
2010	Graphic Design.....	222
2012	Extended Studies: Art, Design.....	216
2013	Foundation Courses.....	215
2015	Interior Design.....	224
2019	Illustration.....	218
2020	Medical Illustration.....	220
2021	Fine Arts Studio.....	221
2035	Industrial Design.....	225
2039	Art History.....	216
2040	Ceramics.....	226
2041	Glass.....	227
2042	Metals.....	227
2043	Textiles.....	228
2044	Wood.....	228
2045	General Crafts Studies.....	228
2046	Crafts Extended Studies.....	229
2060	Fine Art Photography.....	233
2061	Biomedical Photography.....	234
2065	Film and Animation.....	229
2067	Photographic Arts.....	235
2068	Imaging Systems Management.....	239
2076	Imaging & Photographic Technology.....	239
2080	Printing Management.....	241
2081	Printing Technology.....	242
2082	Graphic Media.....	243
2083	New Media Publishing.....	245

Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100-399); upper division (400-699); or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites and/or corequisites are noted in parentheses near the end of the course description.

Interdisciplinary Imaging Arts

2001-555 E.S.P.R.I.T. Production
Students produce a special-interest publication(s), E.S.P.R.I.T., via print and/or electronic methods. They are required to design and build the publication[^] by working beyond normally scheduled class hours. Lectures and hands-on activities enable each student to discover the applications of electronic imaging; interactive publishing; electronic publishing (CD-ROM or Internet); desktop publishing via print, page and screen design; as well as the procedures necessary to provide quality results. Lecturers include faculty from the schools of Photographic Arts and Sciences, Printing Management and Sciences, Art, Design, School for American Crafts and other Institute disciplines as deemed appropriate. (Matriculated senior or graduate-level status and instructor's approval based on student's experience and production team's needs) Credit 4

Foundation

2013-205 Creative Sources
Creative Sources is a lecture series designed to expose students to a broad range of faculty and other creative professionals focusing on topics in the fields of art, design, and craft. The fall quarter will focus on guest speakers from the faculty of the College of Imaging Arts and Sciences. They have been asked to share their experiences regarding personal inspiration and growth and their inherent relationship to their professional and career choices. In addition, weekly presentations will be given regarding specific media, contrasting traditional explorations with the current expectations. The shifting and changing boundaries between two, three and four-dimensional work will be explored through the work of contemporary artists, designers and crafts people. Credit 1

2013-206 Creative Sources
The speakers for the winter quarter will be working professionals in these various fields. They have been asked to share their experiences regarding the media with which they create the discipline in which they work and their own personal careers. In addition, weekly presentations will be given regarding specific media, contrasting traditional explorations with the current expectations. The shifting and changing boundaries between two, three and four-dimensional work will be explored through the work of contemporary artist, designers and crafts people. Credit 1

2013-207 Creative Sources
The speakers for the spring quarter will be working professionals in these various fields. This quarter, speakers have been asked to share their experiences of working with others in the creation of work. In addition, weekly presentations will be given involving collaborative working experiences and processes within the larger art field. The necessity and opportunity of working with others work will be explored through the work of contemporary artists, designers and crafts people. Credit 1

2013-211 Drawing
An introduction to the visualization of form, thought and expression through the drawing process. The study of line and value as they relate to drawing. Gesture, contour, plane, and the motive qualities of line are studied using linear applications of a variety of black and white drawing media. Line is also used to organize and structure drawings, and to create value and texture. One, two, and three point perspective is included in the study of line. The study of value includes ways to create value and how it can be used to describe volume, texture, plane change, weight, and space. Subjects include human figure, skeletal anatomy, man made and nature forms, and perspective. Media will include charcoal, conte, graphite, and ink. Class assignments focus on concept development and critiques of work help students to better evaluate their own work and the work of others while learning a vocabulary related to drawing. Credit 3

2013-212 Drawing
More advanced study of line and value introduced in 2013-211 and an introduction to color. Subjects include human figure and portrait, man made and nature forms, and perspective. Media will include charcoal, conte, graphite, ink, pastel, and color pencil. Class assignments focus on concept development and critiques of work help students to better evaluate their own work and the work of others while learning a vocabulary related to drawing. Credit 3

2013-213 Drawing
The study of color as it relates to drawing using both linear and broad color media. This will include an analysis of the qualities of color, temperature, intensity, and value, and the study of various color schemes. Color will be used to depict volume, space, and weight, and in symbolic and expressive ways. Subjects will include human figure, man made and nature forms, and landscape. Media will include pastel, color pencil, and paint. Class assignments focus on concept development and critiques of work help students to better evaluate their own work and the work of others while learning a vocabulary related to drawing. Credit 3

2013-231 2D Design
The Two-Dimensional Design course is a structured, cumulative introduction to the basic elements of design. Organized to create a broad introductory experience, the course focuses on the development of both visual and verbal vocabulary as a means of exploring, developing, and understanding two-dimensional compositions. Visual comprehension and the ability to organize perceptions are key foundational components to the development of problem solving skills. The fall quarter of Two-Dimensional Design is an introduction to the analysis of visual imagery and the basics of pictorial construction. The principles of organization and relationship are explored through dialogue, experimentation and the use of a variety of achromatic media. Concepts are introduced through lectures, discussions, demonstrations, research, assigned projects, and critiques. Credit 3

2013-232 2D Design
The winter quarter of two-dimensional design is a continued exploration of the elements and principles of design. This quarter focuses on color theory and application and increasingly complex methods of pictorial organization. Concepts are introduced through lectures, discussions, demonstrations, research, assigned projects, and critiques. Credit 3

2013-233 2D Design
The spring quarter of two-dimensional design focuses on the application of the elements, principles and methods of organization explored during the previous two quarters. Historical, cultural, and content driven issues and themes are explored through a variety of media. Concepts are introduced through lectures, discussions, demonstrations, research, assigned projects, and critiques. Credit 3

2013-241 3D Design
Structured assignments develop skills in concept generation, basic form making, and craftsmanship. The sequence has an on-going concern with the issues of idea fluency, content, appropriate execution, and presentation. A fee for expendable materials is required. Credit 3

2013-242 3D Design
Explores wood as a common media, the tools and methods for processing and manipulating it. Credit 3

2013-243 3D Design
Explores plaster as a common media, the tools and methods for processing and manipulating. Credit 3

Art History

2039-225,226,227 Survey of Western Art & Architecture
The subject of this course is the history of western art and architecture, from Prehistoric times to circa 1950. We will examine the form, style, function and meaning of important monuments of the past, and consider these in their historical and cultural context. We will approach these objects in chronological order, for students first need to learn when, where and by whom (whether a people, or a known individual) a given object was produced before they can attempt to determine why the object was made, what it meant in its time and place (as opposed to what it may mean to us today), and whose ideology it served. Once we know how to classify visual information, we may be able to make historical sense of the surviving evidence. Credit 3

2039-300 History of Design
Explores the historical precedents of two- and three-dimensional design, including fine arts, industrial, graphic and environmental design. The course provides a foundation for individual decisions on planning and design to complement and enhance present and future environments. Credit 3

2039-310 History of Crafts
Explores creative thinking and designing in the area of crafts through the ages with special emphasis on clay, fibers, glass, metal and wood. The course highlights the artistic achievements of the craftsmen of the past to enable present students to view their own time in its historical perspective and thereby understand more thoroughly their creative heritage and the efforts of contemporary craftspeople. Credit 3

2039-320 History of Art Criticism
Art criticism from the Renaissance to the present day. A study of what makes art "good" (philosophical theories of art and the aesthetic experience) and what art criticism is and does (types and principles of art criticism). Lectures, reading assignments, and research papers. Credit 3

2039-335 15th Century Art & Architecture in Florence and Rome
Significant 15th century commissions for painting, sculpture, and architecture in Florence and Rome will be studied. Questions for consideration will include: the nature and meaning of the Italian Renaissance, developments in artistic theory and practice, the importance of Antique and Medieval precedents, the increasing attention to the effects of nature, the rising status of the artist, the role of the patron, and the relevance of documents, literary sources and visual precedents for our interpretation of images. (Survey of Western Art & Architecture) Credit 3

2039-345 16th Century Art & Architecture in Florence and Rome
Significant 16th century commissions for painting, sculpture, and architecture in Florence and Rome will be studied. Questions for consideration will include: the nature and meaning of the Italian Renaissance, developments in artistic theory and practice, the importance of Antique and Medieval precedents, the increasing attention to the effects of nature, the rising status of the artist, the role of the patron, and the relevance of documents, literary sources and visual precedents for our interpretation of images. (Survey of Western Art & Architecture) Credit 3

2039-340 Symbols & Symbol Making
A concentrated study of the nature of sign and symbol as visual metaphor paralleling legend, myth, folklore and fairy tale as verbal metaphor; analysis of Freudian and Jungian theories about symbolic/metaphoric communication; and application of the theories to contemporary examples. Designed to help the artist, designer and craftsperson produce more effective visual communication. Credit 3

2039-360 18th & 19th Century Art
The development of the arts in these two centuries in the areas of Western painting, printmaking, sculpture, architecture, and the crafts from 1700 to 1900. Lectures, reading assignments, and research papers. Credit 3

2039-370 20th Century Art
A thematic exploration of 20th century painting, sculpture, and architecture in Europe and the U.S. Lectures, reading assignments and research papers. Credit 3

2039-376 Renaissance Painting in Flanders
The history of Renaissance painting in the Southern Netherlands from the beginning of the 15th century to the end of the 16th century. We will consider the meaning of the Renaissance in Flanders, the observation and recording of natural appearances, "hidden symbolism" and sacramental themes in Early Netherlandish painting, the connections between Flemish, German, and Italian art, the development of new genres in the 16th century, "originality" and "artistic progress." Lectures, reading assignments, and research papers. Credit 3

2039-380 Contemporary Art
A study of painting, sculpture, architecture, drawing, printmaking, performance art, installation art, video art and new media, from 1968 to the present day. Lectures, reading assignments, and research papers. Credit 3

2039-390 Native American Art & Culture
Survey of Native American visual arts within the context of Native American cultures and within a historical and anthropological framework. Native American arts—their roots, traditional expression, and changes with European contact and contemporary expressions—are examined by culture area. Consideration also is given to materials used, techniques of construction, individual and tribal styles, as well as to the meaning and function of various art forms within Native American societies. Credit 3

2039-440 Conceptual Art
Examines the work of those artists who consider the idea or concept behind the work of art to be the principal element of artistic creation. Lectures, reading assignments, and research papers. Credit 3

Extended Studies

2012-201,202,203 Basic Design I, II, III
Study of basic elements of design: line, shape, texture, color, space and their incorporation in design principles as applied to two- and three-dimensional design problems including the graphic arts. Credit 2 per quarter

2012-211,212,213 Basic Drawing & Media I, II, III
This course is an intense study of the fundamentals of drawing and application of media. It is designed to develop a flexible, creative mind capable of interpreting ideas. Specific emphasis is placed on problems confronting the student that has had little or no drawing experience. Credit 2 per quarter

2012-215 Basic Figure Drawing
Drawing from a costumed and nude model. The students make a visual analysis of action and gesture through quick sketches. Short poses gradually extended to longer studies so that the student can develop techniques, skills and the control of media. (2012-211/212/213 or equivalent) Credit 2

2012-217 Color Theory in Art
An opportunity to develop an awareness of and sensitivity to the world of color through slide lectures, class discussion and instructor's evaluation. Emphasis on visual impact of color for traditional and digital applications. (2012-201,202,203 or equivalent) Credit 2

2012-220 Collage
A basic study of the history, materials, and techniques used in collage. Students explore a variety of materials used by past and contemporary artists and then apply these techniques to develop their own work. May be elected more than once for credit. (2012-201/202/203 & 2012-211/212/213 or equivalent) Credit 2

2012-221	Advanced Drawing	2012-264	Business Aspects of Environmental Design
Drawing in a variety of media, including an introduction to line, form, and color as elements of pictorial expression. Organic, inorganic and imaginative stimuli are presented. May be elected more than once for credit. (2012-201/202/203 and 2012-211/212/213) Credit 2		Introduces students to various occupations available to the environmental and interior designer. Instructs them in the use of their artistic and technical skills to obtain employment and establish themselves in the design community. Dealing with clients, vendors, and contractors is also covered. Assignments are structured to meet the personal business needs of each student. Credit 2	
2012-225	Figure Drawing	2012-266	Rendering Techniques I
Drawing from the costumed and nude model for combined action and figure construction. Short poses gradually extended to longer studies for sustained attention to the problem. May be elected more than once for credit.(2012-215) Credit 2		Introduction to the materials and techniques used by designers in rendering interiors, layouts, products, etc. Marker sketching, perspective, shadowing, media selection, and presentation techniques are covered. Suggested for all design students. (2012-201/202/203 & 2012-211/212/213 or equivalent) Credit 2	
2012-229	Portfolio Preparation Workshop	2012-268	Marker Rendering Techniques
Portfolio Preparation is a college level experience for students seeking acceptance into College of Imaging Arts & Sciences art, craft and design programs - those majors that require an art student portfolio for entry-level acceptance. Students will build an expressive portfolio of art; either strengthening an existing portfolio of artwork or building a new portfolio of work that reflects a personal direction using a range of media; and demonstrates a high level of technical competence. Portfolio Prep will build strong concept directions, discuss portfolio presentation and documentation in depth, and direct creative art efforts that meet/surpass entry requirements for professional art and design schools. Credit 2		Students are introduced to marker techniques and materials used in rendering layouts, interiors, products and illustrations. Other mediums are united with marker to develop shadow and highlighting, sketching, and presentation techniques. Credit 2	
2012-231,232,233	Graphic Design I, II, III	2012-274	Illustration
A contemporary approach to design for printed advertising with the emphasis on creative experience. Working knowledge of the field of graphic design, its history, its future, and general practices among current professionals is provided. The role of the graphic designer in the field of communications is explored. (2012-201/202/203 & 2012-211/212/213,2012-246/247/248) Credit 2 per quarter		Fundamentals of visualization and pictorial organization in terms of advertising and editorial illustration. Emphasis on contemporary graphics procedures. May be elected more than once for credit. (2012-215) Credit 2	
2012-241,242,243	Advertising Design I, II, III	2012-276	Calligraphy
The arts and skills of the art director touch on all phases of advertising art from concepts and professional studio procedures to practical approaches in design and production. (2012-201/202/203 & 2012-211/212/213, 2012-246/247/248 recommended) Credit 2 per quarter		Introduction to either the Foundational or the Italic form of lettering. Students explore the history, theory and techniques that have shaped letter forms as we know them today. Emphasis is on developing skills and knowledge through the study of historic and contemporary forms as well as through the use of a variety of tools and materials. Areas studied included majuscules, minuscules, rhythm, spacing, techniques, media, color, design, page layout and either the mechanics of bookbinding or camera-ready art. Credit 2	
2012-246,247,248	Advanced Design & Typography I, II, III	2012-277	Cartooning
The focus of this course provides a comprehensive study of every aspect of designing with type, from typographic history, terminology, classification, syntax and legibility. Theoretical and structural problem-solving techniques will be applied to complete projects using computer-based software/hardware. (2012-201/202/203 & 2012-211/212/213) Credit 2 per quarter		Various cartooning styles are examined, identifying and discussing the factors that make cartoons appealing and effective. The focus of the course is the study and the practice of the principles of cartoon illustration. The importance of obtaining good reference materials and maintaining a file of other cartoon art are stressed. Students complete weekly drawing assignments, covering different elements of cartoon, building in complexity and culminating in the completion of several finished cartoon pieces. (2012-201/202/203 & 2012-211/212/213) Credit 2	
2012-251,252	Interior Design I, II	2012-278	Interpretive Landscape Drawing
Career orientation. Emphasis on practical aspects of the profession. Details of purchasing all furnishings used in a home. Client centered planning and design. (2012-201/202/203 & 2012-211/212/213 or equivalent. Credit 2 per quarter		Students sketch directly from nature on location during field trips. In subsequent studio sessions, compositions translating first impressions using various methods are then developed. Special attention is given to individual approaches and expression. Credit 2	
2012-254	History: Interior Design	2012-279	Human Anatomy for Artist
Historical survey of period decoration and furniture styles from antiquity to the present. Credit 2		Students learn to identify and define the bones and muscles that affect the surface of the human anatomy. The instructor demonstrates how to draw these structures in simplified shapes and forms. The students then apply this information to figure drawing in the class. Credit 2	
2012-256,257,258	Display Design I, II, III	2012-284	Airbrush Techniques
First quarter examines the fundamentals of three-dimensional design. The second and third quarters apply these principles to develop mechanical, graphic and model-making manipulative skills and problem solving approaches used by designers in space planning.(2012-201/202/203 & 2012-211/212/213 or equivalent) Credit 2 per quarter		An opportunity for beginners to develop the basic skills and techniques of painting with an airbrush and for experienced users to enhance their skills. Graphic artists, illustrators and photographers can benefit from this exposure to airbrush techniques and applications through demonstration and experiential learning. Class is limited to 10 students. (2012-201, 202, 203 & 2012-211, 212,213) Credit 3	
2012-259	Commercial Interior Des	2012-286	Introduction to Painting
Students learn to develop a good commercial interior plan giving clear specifications and boundaries. Presentation techniques, client relations and fee philosophy are also discussed through frequent field trips and guest speakers. (2012-251/252 or equivalent) Credit 2		Study of the materials and techniques of painting through use of still life and nature forms. Basic training and foundation for advanced work. (2012-201/202/203 & 2012-211/212/213 or equivalent) Credit 2	
2012-261,262,263	Environmental Design I, II, III	2012-288	Painting
The study of enclosed space, using a variety of materials and the elements of design line form, texture and color to develop living space (2012-201/202/203 & 2012-211/212/213 or equivalent) Credit 2 per quarter		Painting with opportunities for gifted an advanced students to explore media, seek new skills, and develop a new style of expression. The instructor, an accomplished artist, works individually with the student. Models are available on a limited basis. Still life and sketches are used for inspiration. May be elected more than once for credit. (2012-286 or equivalent) Credit 2	

2012-291 **Figure Painting**
Painting from costumed and nude models. The emphasis is on action, structure, gesture, composition, experimental attitudes and techniques. The student is provided with an opportunity to achieve clear understanding of various media in his or her individual search for expression. May be elected more than once for credit. (2012-225 or equivalent) **Credit 2**

2012-292 **Portrait Painting**
Particular attention is given to the development of anatomical understanding. Several media are explained. Emphasis is placed on understanding various aesthetic and craft traditions. Individual attention is supplemented by demonstrations and discussions with the instructor, who is an active portrait artist in the community. May be elected more than once for credit. (2012-215 & 2012-256 or equivalent) **Credit 2**

2012-293 **Watercolor Painting**
Basic study of watercolor media, methods and techniques. Students receive individual as well as group instruction with emphasis on composition, color, and personal expression. Media: watercolor, tempera and casein. May be elected more than once for credit. (2012-211/212/213 or equivalent) **Credit 2**

2012-296 **Introduction to Non-toxic Printmaking**
An introduction to the methods, materials, tools and techniques of printmaking. Prints may include woodcut, etching, engraving, stencil, collographs and lithography. Students are required to pull an edition of prints in one medium. **Credit 2**

2012-376 **Calligraphy Workshop**
Further study in the methods and techniques of calligraphy. Students are able to pursue study in a variety of styles and letterforms in a concentrated manner. May be elected more than once for credit. (2012-276) **Credit 2**

2012-377 **Advanced Cartooning**
This course builds upon the foundation established in Cartooning. The value of gesture drawing is stressed, and an exploration of the many elements of cartooning is made. Assignments are more specific and become more comprehensive in content. Color is used more, and a wide variety of media options are explored. Composition, layout, and attention to detail are stressed. Reference materials are integrated into many of the assignments. Client-vendor relationships, and the pros and cons of freelancing are discussed. (2012-277) **Credit 2**

2012-396 **Printmaking Workshop**
Further study of methods and techniques of etching, lithography and relief printing. Students may concentrate in one print medium. May be elected more than once for credit. (2012-296) **Credit 2**

School of Art

Illustration

**Prerequisite for all 300-level illustration courses:
foundation program or equivalent**

2019-301 **Illustration I**
Illustration core for illustration majors and medical illustration majors in their sophomore year. The students approach major elements of technique, application, and theory in relation to becoming illustrators. Studio sessions involve basic anatomy, design and typography for illustrator, figurative expression, photographic tools, and illustrative technique. Class structure allows demonstrations of process and experimentation and critique with illustrative media. **Credit 3**

2019-304 **Anatomical Figure Draw**
Helps students correlate underlying osseous and muscular anatomy with surface form and structure. Instruction also emphasizes gesture, proportion and balance. Course work requires students to use their figure drawing skills while solving illustration assignments. **Credit 3**

2019-311 **Digital Illustration I**
Digital Illustration I will provide students with methods of conceptualizing, organizing and executing illustrations using the computer. Projects will expose students to various types of digital techniques using vector and raster-based software applications, and a variety of input and output devices for the creation of professional level assignments. The course will emphasize conceptual problem solving methodology and the language of visualization while providing a consistent foundation for digital illustration as it relates to professional illustration production. Color systems, digital terminology, and pre-press file formats will also be covered. (Foundation program Raster and Vector courses) **Credit 3**

2019-342 **Digital Narrative I**
Digital Narrative I will instruct students in use of the digital medium for the purpose of visual storytelling. Importance will be placed on the creation of visual narratives with reference to style, content and interpretation. Assignments will involve vector and raster-based software applications and a variety of input and output devices. Conceptual strategies, production methodologies, narrative composition and color systems will also be covered. (Digital Illustration I) **Credit 3**

2019-345 **Illustration Techniques I**
This course will address the wide array of dry media production techniques. Stress will be placed on developing and enhancing drawing skills, appropriate use of media, artists created photographic reference materials and use of a structured illustration working process. Further emphasis will be placed on creative thinking, a preliminary view of professional practices and improvement of students portfolios (Art & Design Foundation courses) **Credit 3 (F, W, S)**

2019-361 **Dimensional Illustration I**
This course will introduce students to an alternative, three-dimensional style of illustration. Emphasis will be placed on planning, preparation, compositional elements in three-dimensional sculptural form and creative problem solving. Students will be encouraged to explore a variety of materials and techniques to complete projects. (Art & Design Foundation courses) **Credit 3**

2019-363 **Digital Mixed Media I**
This course provides students with the opportunity to explore the creative potential presented through the imaginative combination of both traditional and digital media. Students will be expected to utilize and combine fresh illustrations unrestricted by a singular medium. (Art & Design Foundation courses) **Credit 3 (S)**

**Prerequisite for all 400-level illustration courses:
sophomore illustration core or equivalent**

2019-405 **Figure-Advertising Illustration**
An in-depth introduction to the field of advertising illustration. Emphasis on drawing and painting the figure in a variety of situations and formats common in contemporary advertising. All problems are designed to develop an understanding of the use of visual images for communication in this specialty area. The importance of referencing, deadlines and business concerns for the freelancer are a few of the topics covered in this course. **Credit 3**

2019-406 **Illustrative Design I**
The goal of this course is to familiarize students with professional illustration assignments with the integration of typography, symbols, and other forms of graphic visuals. Assignments will include book and magazine covers, advertisements, and posters; i.e. visuals that, although produced by illustrators, effectively function as total design solutions. The ability to interpret typographic and other non-illustrative components in an illustrative context has become a key to potential employment in our profession. In today's market many career tracli demand that illustrators know how to develop these total solution assignments. **Credit 3**

2019-407 **Advanced Illustration Methods**
Focuses on exploring the different ways in which illustrators utilize reference (photos/life drawing). Students learn to create their own photo reference, learn resourceful ways to find good reference and learn how to combine existing reference with their own to achieve the best possible results. Imaging environments and situations are created by piecing together many different sources. **Credit 3**

2019-408 Publishing-Illustrations
Focuses on the use of illustration in the book-publishing field, starting with the children's book and the history of illustration in children's educational materials. Discusses methods of production that affect the preparation of illustrations, the use of color separations and the organization of text and picture. Looks at special areas, including the illustrated novel and the pop-up book. All aspects of publishing and the techniques used in the field are our subject. Credit 3

2019-409 Symbols in Editorial Illustration
An in-depth introduction to the field of editorial illustration. Emphasis is placed on brainstorming and concepts. Cultural images and symbols are examined and utilized to express ideas. Students are encouraged to expand in a personal direction while effectively communicating specific information from a given article or story. Efficient and effective time and energy priorities are established. Credit 3

2019410 Illustration & Editorial Statements
The illustrator works from texts and develops concepts and statements in visual form. Often these can take the form of a narrative or a visual comment, as in a political cartoon. During class, we investigate the history of editorial art, looking at examples in class, and experiment with our quest for the completion of an artistic vision that embodies a topical subject. Credit 3

2019-415 Computer Application Book Illustration
Using the computer's ability to make color separations and repair work for the printing process, this course emphasizes the development of story ideas and layouts and the creation of cover art for book illustration projects. Credit 3

2019-421 Computer Illustration: Advertisement
Using the computer's ability to generate charts and graphs, this course emphasizes an understanding of the use of visual images for communication in the world of advertising, including product illustration, newspaper media, brochures and promotional campaigns. Credit 3

2019422 Digital Illustration II
Digital Illustration II will provide students with advanced methods of conceptualizing, organizing and executing illustrations using the computer. Through the use of methodology worksheets, the course will emphasize problem solving methods while building on a consistent foundation for digital illustration preparation and production. Projects will allow students to explore advanced digital illustration techniques using vector and raster-based software applications, and a variety of input and output devices. Alternative color systems, output paper surfaces, and pre-press file formats will also be covered. (2019-311) Credit 3

2019423 Digital Editorial I
This course emphasizes on effectively communicating information in a given article or story, from political themes and news stories to plays and poetry. Exploring the computers' ability to make many variations and subtle changes to the images quickly. Credit 3

2019427 Pop-Up Books I
This course will deal with constructing and illustrating pop-up and mechanical books. Students will study painting, preparation, engineering and illustration for production of pop-ups. The course will be divided into a preliminary section of learning basic mechanisms of pup-up books and a second section which allows students to apply knowledge learned in the first section to the illustration and production of their own book. (Sophomore illustration core) Credit 4 (W)

2019-432 Digital Editorial II
Digital Editorial II expands on the principles learned in Digital Editorial I. Importance will be placed on the advanced conceptual interpretation of editorial subject matter, organization of the composition, and with the interjection of humorous, serious, ironic, and other interpretations. Students will apply approaches to creative illustration while closely following reproduction specifications. Students may use vector and raster-based software applications and a variety of input and output devices. Stylistic issues, conceptual strategies, production restrictions, and color systems will also be covered. (2019-423) Credit 3

2019-436 Illustrative Design II
Illustrative Design II applies the principles and methods practiced in Illustrative Design I in more advanced projects. Students will conceptualize, organize and execute illustrations within a design context and explore basic headline writing. Illustrative design II will emphasize the use of complex graphic elements in conjunction with various styles of illustrations. Illustration production methods and terminology will be included. Projects will expose students to various real-world print media assignments that will demand the use of traditional illustration methods as well as computer-based production media. Assignments will stress solutions that are typically managed by art directors and designers. (2019-406) Credit 3

2019-442 Digital Narrative II
Digital Illustration Narrative II expands on the tradition of verbal concepts to pictorial narrative introduced in Digital Illustration Narrative I. Particular emphasis will be placed on illustration sequences including story-line illustration, and thematic series pictorials. Importance will be placed on the digital representation of narrative story telling with reference to style, content and interpretation. Assignments will involve vector and raster-based software applications and a variety of input and output devices. Conceptual strategies, production methodologies, narrative composition and color systems will also be covered. (2019-342) Credit 3

2019-461 Dimensional Illustration II
This course will offer students the option to continue an exploration of three dimensional illustration. Emphasis is placed on drawing skills, planning, preparation, compositional elements of three dimensional sculptural form and creative problem solving. Students are encouraged to explore a singular medium to complete projects in a series presented in a consistent style. (2019-361) Credit 3 (F,W)

Prerequisite for all 500-level illustration courses:
junior illustration core or equivalent

2019-504 Illustration as a Journalist I
Illustration problems that require the student to visually report and record a specific happening or event. These projects will be of longer duration and will consist of several major paintings, many drawings, sketches, notes, and photo-references. This journalistic approach to illustration demands that the students attend the event and select those images that will best communicate the atmosphere of the event. Students are encouraged to sharpen their observations in order to clarify or embellish what might be commonplace to the non-visual observer. Credit 3

2019-505 Contemporary History Illustration
Students are introduced to a sequence of historical events that have had the most lasting effect on 20th century illustration. These events affect the look of illustration and provide a place to begin discussion. The effects on Surrealism, on the one hand, the Social Realism, on the other, represent a swing of the pendulum of narrative and representational art. Studio work incorporates ideas embodied in these and other contemporary art trends. Lectures and illustrated talks compare contemporary art and illustration history. Credit 3

2019-507 Illustration for Books
Explores the basic principles in developing illustrations for books. Composition, conceptualization and storyboard development are covered, as well as finishing art preparation. Emphasis not only on creativity of expression, but also on conceptual and technical experimentation. Work is geared toward books for a variety of age groups and functions. Credit 3

2019-508 Illustration for Promotion
Takes an in-depth look at using illustration for advertising and promotional campaigns. Also looks at the business of marketing oneself as an illustrator. Students develop examples of illustration as advertising and view examples by masters in this field. Lectures focus on the Pricing and Ethical Guidelines published by the Graphic Artists Guild as a text to discuss contracts and career building. Credit 3

2019-510 Personal Focus I
A series of illustration projects in which students are encouraged to investigate topical subjects of their choice. Each student's own creativity, self-expression and visual communication skills are stressed. Emphasis is on clarity of concepts and developmental procedures necessary to work as an illustrator. Credit 3

2019-511 Alternative Materials & Media
Looks at the use of alternative techniques for the illustrator, including dimensional materials and electronic programs. Also looks at specialized areas of illustration, which may include an in-depth look at scientific topics as a subject for illustration. Specialized markets and electronic and digital image making round out the applications studies in this section of Senior Illustration. Class 6, Credit 3

2019-513 Marketing and Business Practices for Illustrators
This course will address the professional practices and issues involved in conducting the business of Illustration as related to both freelance and staff positions. Students will consider setting up a business/studio, marketing their work, self-promotion, finding work, pricing, record keeping, legal rights, taxation and representation. (Junior illustration core) Credit 3

2019-516 Animating Digital Illustration
An introduction to illustrating for multimedia projects by creating computer-generated animations and presentations. Macromedia Director, in combination with other imaging software, will be used to develop these "movies". The Director movies will investigate not only illustrated animation, but also sound, music, color, and special effects. Credit 3

2019-517 The Interactive Illustration
Projects will highlight the integration of interactive interfaces into illustrated Macromedia movies, thus, allowing responses to choices made by the user. Using scripting and branching, in combination with buttons and menu choices, projects will be programmed to allow some control over a movie and navigation through animations and presentations. Credit 3

2019-518 Time-Based Illustration & Design
Illustration and design students will be teamed together to develop multimedia projects, i.e. CD-ROMS, animated advertisements, and kiosk displays. The teams will begin with short problems, culminating in final full-scale electronic projects, which utilize their respective illustrative and design skills to develop strong, unified solutions. Projects will include both passive and interactive projects, which reinforce the students' knowledge time-based authoring tools, such as Macromedia Director, QuickTime Movies or Adobe Premiere. Credit 3

2019-527 Pop-Up Books II
This course will be a continuation of Pop-Up Books I and will deal with constructing and illustration pop-up and mechanical books. Students will select a singular topic and product pop-ups and other mechanical devices relevant to telling the story. Emphasis will be placed on creating multiple devices relying on a single source of energy per page for performance. Emphasis will also be placed on visual continuity throughout the story. (2019-427) Credit 3 (W)

2019-563 Illustration Portfolio Preparation
Illustration Portfolio Preparation is the final preparatory course for the Illustration major. Its purpose is to provide students with information, strategies and guided instruction to organize and create their final portfolio. The course will include individual critique and analysis of work created in prior studio classes and progress to the definition of a career agenda. Projects will be individually assigned based on the quality of each student's body of work and their career intentions. Presentation methods, formatting and stylization will also be addressed. The final culminating project will be a finished portfolio document, students will be instructed in job seeking strategies including interviewing dynamics, resume writing and correspondence. (2019-513) Credit 3

Medical Illustration

Pre-requisite for all 400-level medical illustration course:
sophomore fine arts core or equivalent

2020-401 Medical Illustration Applications
An in-depth study of carbon dust, charcoal and pastel techniques developed for medical illustration. Concentration is on detailed illustrations of human anatomy as a preparation for future courses in anatomical and surgical illustration. Credit 3

2020-404 Computer Applications for Scientific Illustration
Course explores combining drawing and digital imaging as tools for designing illustrations in support of scientific and biomedical instruction. Credit 3

2020-405 Scientific Illustration
Development of range and mastery of scientific line illustration techniques. Coursework emphasizes translation of "site drawings" into "instructional illustrations" designed to be published as line reproductions. Assignments will require students to combine illustrations with typographic elements. Credit 3

2020-406 Anatomic Drawing I
Students are assigned projects to reinforce their knowledge of anatomy while collaborating on dissection and illustration from the cadaver. Problems include oncology from cross sections and x-rays in preparation for surgical and medical/legal art. Mixed media is encouraged. Credit 3

2020-407 Anatomical Illustration: Wet Media Applications
Development of range and mastery of medical wet media illustration techniques. Course work emphasizes transition of anatomical drawing done from dissected cadavers into "instructional anatomical illustrations" designed to be published using halftone and four-color reproduction techniques. Credit 3

2020-408 Computer Applications for Anatomic Illustration
Advanced application of computer hardware and software to create illustrations in support of anatomical instruction. Course work emphasizes translating on-site drawings from student dissections into digital illustrations. Credit 3

2020-409 Anatomic Drawing II
Building on experience gained in Anatomic Drawing I, students are assigned projects to reinforce their knowledge of anatomy while collaborating on dissection and illustration from the cadaver. Problems include oncology from cross sections and x-rays in preparation for surgical and medical/legal art. Mixed media is encouraged. Credit 3

2020-410 Anatomical Illustration Mixed Media
Development of range and mastery of airbrush and mixed media illustration techniques. Course work emphasizes creating illustrations aimed at a variety of medical illustration markets, including medical/legal, editorial and advertising. Credit 3

2020-431 Human Gross Anatomy I
Dissection and the study of the human body are presented with such topics such as developmental comparative and applied anatomy. Emphasis is directed toward osteology, radiographic anatomy. Credit 4

2020-432 Human Gross Anatomy II
The second half of a two-quarter sequence devoted to the study of the human body. Detailed dissection of a human cadaver is supplemented with lectures on the structure and function of the major organ systems. The Winter Quarter begins with a detailed dissection of the head and neck and moves on to the pelvis, perineum, and a lower limb. (2020-431) Credit 4

2020-461 3D Modeling & Animation: Biomedical & Organic Forms I
Course explores modeling and animating three-dimensional forms of providing visual support for allied health instruction. Assignments focus initially on modeling geometric forms to create biomedical subjects (i.e.: human cells, bacteria, viruses etc.). Fundamentals of animation and its use as an instructional media are then presented. Additional modeling techniques and expanded lighting, and rendering procedures are explored. Students create animation explaining cellular event(s) or depicting the anatomy of a human organ for their final assignment. Credit 3

2020-462 3D Modeling & Animation: Biomedical & Organic Forms II
Course employs three-dimensional modeling and animation as a means of providing visual support for biomedical instruction. Assignments focus on constructing models that accurately portray a member of the phylum anthropoda (crustaceans, insects, arachnids). Fundamentals of animation and its use as an instructional media are reviewed. Models are then attached to "skeletons" in order to animate some characteristic action of the chosen species. Forward kinetics, inverse kinetics, and inverse kinetics using a spline handle are compared as means for controlling animation. Credit 3

2020-463 Advanced 3D Modeling & Animation: Biomedical & Organic Forms
Course for students who have taken either three-dimensional modeling and Animation of Biomedical and Organic Forms I or II to develop animations designed to provide health information as a public service displayed on the web. Course material focuses on advance modeling and animation procedures. In addition to technical animation and modeling skills, student projects are expected to demonstrate independent research methodologies. Credit 3

2020-468 Medical Legal Illustration
This course deals with the preparation of support materials for medical litigation –personal injury, medical malpractice, and product liability cases. Students learn to read and interpret medical records including operative reports, discharge summaries, radiographs, pathology and autopsy reports. From these records, students propose effective visual aids to best depict the facts of the case, create preliminary sketches of the proposed exhibits, and then complete the exhibits in a format appropriate for presentation to a jury or arbitrator. Credit 3

Prerequisite for all 500-level medical illustration courses:
junior medical illustration core or equivalent

2020-501 Advanced Medical Illustration
Advanced medical illustration techniques. Graphic design related to illustrative and photographic practice. Lab sessions to be scheduled in operating room facilities. Jointly sponsored by RIT and the University of Rochester. Credit 3

2020-504 Surgical Drawing & Illustration I
This course provides students with the unique opportunity of drawing while observing surgery in local operating suites. Surgical sketches are further developed into final illustrations designed to support instructions. Illustrations created in this course will be produced using traditional and electronic media. (2019-301) Credit 3

2020-505 Surgical Drawing & Illustration II
This course provides students with the unique opportunity of drawing while observing surgery in local operating suites. Surgical sketches are further developed into final illustrations designed to support instruction, editorialize, advertise, and support courtroom presentation. Illustrations created in this course will be produced using traditional and electronic media. (2019-301) Credit 3

2020-506 Computer Animation Medical Instruction
Advanced study of hardware and software applications to support medical instruction. Course introduces students to creating two-dimensional computer animations as support for biomedical instruction. Credit 3

2020-507 Marketing & Business Practices Medical Illustration
Course work prepares students for entry into the medical illustration profession. Topics include writing and designing resumes, cover letters and self-promotional materials as instruments for gaining employment. Additional classroom lectures and demonstrations cover professional ethics, copyrights, contracts and client/illustrator negotiations. Credit 3

2020-508 Medical Illustration Portfolio
Students receive individual assessments of their current portfolio from faculty. Course work supports construction of "exit" portfolios reflecting each student's strengths and interests. Traditional two-dimensional and electronic portfolios are constructed. Credit 3

Fine Arts Studio

Prerequisites for all 300-level courses:
foundation program or equivalent

2021-305 Introduction to Painting
Emphasis is on painting and the development of form, space and expression from a variety of sources, including the human figure. Emphasis on basic techniques, materials and concepts for further study in painting and related media. Introduction to the materials and techniques of permanent painting media. Preparation and execution in both direct and indirect painting methods. Safe handling of artists' materials is stressed. Credit 3

2021-321 Contemporary Drawing
Drawing from the standpoint of being informed, inventive, and contemporary in thought in the use of form concepts and relationships. To encourage freedom of thought, imagination, and inquiry into theory, technology, and the application of drawing as a visual communication. Credit 3

2021-361 Introduction to Sculpture Assemblage
One of the most basic approaches to creating Sculpture, this course involves assembling or bringing together parts/pieces to form a whole. Spontaneous and immediate contact with unique materials, creative processes and the degree of sculptural impact may all be characterized as extremely direct. This straightforward confrontation offers no flashy techniques, seductive material or process or hide behind. Instead, at the onset, basic sculptural manipulation must occur. Credit 3

2021-362 Introduction to Sculpture Figure
This sculpture course investigates the study of human form through the development of sculptured class figures working directly from living models. Emphasis is placed on exploring the following sculptural elements: the underlying three-dimensional structure of the human figure: proportions of the human figure; volume, mass & surface anatomy, gesture; support & balance; figurative spatial relationships; expressive qualities of the human form; use & control of basic material & processes related to figure sculpture. Credit 3

2021-381 Watercolor
Use and control of the technique of water color painting. Exploring watercolor as an illustrative and painting media. Credit 3

Prerequisite for all 400-level fine arts courses: sophomore fine arts courses or their equivalent or permission of the instructor

2021-401,402,403 Fine Arts Studio I
Second year of painting in a three-year degree sequence. Increased development of mastery of painting media and the experience of drawing. Emphasis placed upon individual solutions and expression. Credit 3

Prerequisite for all 500-level fine arts courses: junior fine arts courses or their equivalent or permission of the instructor

2021-501,502,503 Fine Arts Studio II
The third year of advanced studio work completing a major course of study in the fine arts. Concentrated studio production focused upon individual creative solutions. Individual and group presentations of work in an exhibition format is encouraged, as is the development of a visual portfolio of one's work. Advanced drawing incorporated into studio procedure. (2021401/402/403) Credit 3

2021-569 Art Gallery Management
The complex social and cultural role of a fine arts gallery will be explored through actual gallery operations: the installation of experimental and traditional exhibitions, promotion, and marketing for art competitions, student initiatives and special events tailored to RIT and community art audiences. (On site presentations plus arranged hours in laboratory: gallery setting) Credit 3

School of Design

New Media Design

2009-212 3D Form & Space
An introductory course in visualization that extends previous experience and skills to include in third dimension. The course will provide fundamentals for more advanced studies in three-dimensional animation, virtual spaces and multi-dimensional navigation spaces. Manual and digital tools will be used for problem solving. Students will be expected to show evidence of growth in three-dimensional understanding from simple objects to more complex environmental spaces. (New media freshman majors or permission of instructor) Credit 3

2009-213 Elements of Graphic Design for New Media
This course introduces the student to visual communication and the graphic design profession. Through formal studies and perceptual understanding, including aesthetics, graphic form and structure, concept development and visual organization methods, students will design solutions to communication problems. Assignments exploring aspects of graphic imagery, typography, and production will be included. (New media freshman majors or permission of instructor) Credit 3

2009-311 Typography for New Media
A course designed to introduce students to the fundamentals that need to be considered for the creation of text documents, and to provide the students with the terminology necessary to communicate with a client or originator and the manufacturer of the document. (2009-213; new media freshman majors or permission of the instructor) Credit 3

2009-312 Information Design for New Media
Information design for the web and interactive multimedia integrates content with visual indicators. Legibility and clear communication of information and direction is important to the success of graphical user interface design. This course integrates imagery, type, icons, buttons, color, visual hierarchy, and site architecture to design friendly and functional user interfaces. (New media core or permission of instructor) Credit 3

2009-313 Introduction to Computer Imaging
An introduction to the computer as an illustrative tool. Emphasis will be on the application of visual organization methods in the context of electronic media. Exploration of raster and/or vector graphic software programs will serve as the basis in the development of illustrative assignments. (New media core or permission of instructor) **Credit 3**

2009-323 Designing Graphical User Interface
An introduction to designing the interface, both visually and technically, for new media projects and applications. Good interface design allows the user to accomplish a variety of tasks. It should not force a user to look all over for information and buttons. It should allow the user to operate intuitively, with ease of navigation and be entertained at the same time, regardless of the information being communicated. Team-taught lectures, presentations and demonstrations will investigate both the programming and visual communication aspects of developing good interface design. (New media core or permission of instructor) **Credit 3**

2009-401 Advanced Design Networking
This course extends previous networking experience and skills to emphasize advanced visual web design layout skill and the incorporation of time-based vector graphics. The emphasis in this course will be away from programming toward the application of software tools and design concepts related to more visual web page development with interactive, dynamic interfaces. Typical software tools such as, but not limited to, Flash and Dreamweaver will be used. (Completion of new media design sophomore core or permission of instructor) **Credit 3**

2009-402 Emerging Multimedia Design & Imaging Tools
Multimedia developers and designers are called upon to create a variety of interactive and animated pieces. One of the most powerful tools to create dynamic animation is Adobe After Effects. After Effects is used to create TV broadcast animations, instructional animations and high impact logos and introductions. It gets its strength from being able to combine multiple still, motion and sound file formats into one cohesive piece. The strength and limits of the software only stops with the imagination. This course will explore and integrate a number of related software packages including (but not limited to): Adobe After Effects, Peak, QuickTime and 3D applications, as well as conceptual development and production. (Completion of new media design sophomore core) **Credit 3**

2009-403 Dynamic Information Design
A study of the application of Information Design theory and practice to the developing area of New Media. Cartography and iconography will be viewed in the context of web and kiosk use. The delivery of consumer information, using interactive and dynamic media as the vehicle, will be investigated. (Completion of new media design sophomore core or permission of instructor) **Credit 3**

2009-411 Time-Based Imaging for New Media
New media students will develop short animated and interactive multimedia projects, while learning the basics of the time-based authoring software, Macromedia Director and Flash. The students will begin with short exercises, culminating in final larger electronic projects that begin to develop their design and programming skills. Projects will include both passive and interactive components that will support the learning process. (New media freshman core or permission of instructor) **Credit 4**

2009-412 Dynamic Typography
This course will deal with design concepts related to moving type. The impact of type as it moves, rotates, explodes, scales and fades will be considered. Legibility of the message will be studied in relation to this movement. Students will learn how both 2D and 3D type can be manipulated in a time-based manner. (Completion of new media design sophomore core or permission of instructor) **Credit 3**

2009-413 Advanced 3-D Techniques
This course extends previous three-dimensional experience and skills to include advanced 3D effects such as particles, volumetric textures such as fog, and the movement of three-dimensional objects using both fixed cameras and moving cameras. Gravity, wind, and inverse kinematics will also be considered. (Completion of new media design sophomore core or permission of instructor) **Credit 3**

2009-422 History of Computer Graphics
This course will cover the complete history of computer graphics. It will cover its pre-history to date. It will touch on related technology and the growth of the computer industry. The major personalities and their contributions will be covered. The course will trace the use of main frames, micro computers, turnkey systems, the introduction of the personal computer, advent of laser printers, scanning technology, post-script, CAD-CAM, etc. The impact of computers of animation will also be covered. (Completion of new media design sophomore core or permission of instructor) **Credit 3**

2009-501 Dynamic Persuasion Design
An incorporation of commercial practices, such as advertising, editorial design and editorial illustration, with dynamic media. Dynamic media refers to the inclusion of any audio, video, and animation clips that are used in a project. Dynamic media greatly adds to the impact of the message being communicated. The point of message delivery will include the Web, CD's, kiosks and video teasers and trailers. (Fourth year NM major or permission of instructor) **Credit 3**

2009-502 Virtual Entertainment
A course dealing with design and gaming concepts, delivery systems and software for the entertainment industry. Working with 2D and 3D visual concepts, virtual reality, interactivity and sound the student will develop media for the entertainment industry. Environments, characters, gaming strategies, role playing concepts, navigation and feedback will be part of the information presented within the course. (Fourth year NM design & imaging major or permission of instructor) **Credit 3**

2009-511 QTVR & Multimedia Design
This course extends previous multimedia and three-dimensional experience and skills to emphasize advanced multimedia applications that use QTVR as a design tool to interactively explore and examine photo realistic 3D virtual worlds. Attention will be given not only to the mechanics of creating the movies but also to the design, relationship to the other visual elements, and visual communication effectiveness of the movies. (Fourth year NM design & imaging major or permission of instructor) **Credit 3**

2009-542 New Media Team Project I
The first course in a two-quarter sequence designed to engage the new media major in a "capstone" production experience. The instructor will form student teams that will design and complete new media projects sponsored by clients external to the class. (2009-501 or 2083-541) **Credit 4**

2009-543 New Media Team Project II
The second course in a two-quarter sequence designed to engage the new media major in a "capstone" production experience. Students continue to work till completion on their new media group production. Each group is required to test their product with a focus group and provide written feedback and analysis. (2009-542) **Credit 4**

Graphic Design

2010-211 Computer Skills: Raster Imaging
An introduction to basic computer software skills, terminology, and technology as related to raster based computer-imaging software (such as Photoshop). This course provides the skills necessary to use drawing software relative to the design curriculum. The areas of file formats, software tools, image creation, and file output are covered. **Credit 2**

2010-216 Computer Skills: Vector Imaging
An introduction to basic computer software skills, terminology, and technology as related to vector based computer drawing software (such as Freehand and Illustrator). This course provides the skills necessary to use drawing software relative to the design curriculum. The areas of file formats, software tools, image creation, and file output are covered. **Credit 2**

**Prerequisites for 300-level graphic design:
foundation program or equivalent**

2010-301 **Elements of Graphic Design**
Introduction to basic visual communications in the field of graphic design. Lectures will cover graphic design topics and information ranging from typographic terminology and design principles to methods of visual organization. Lectures will often be related to assignments that will be undertaken in the studio where hands on introduction to graphic design studio skills and practices will occur. Through formal studies and perceptual understanding, including aesthetics, graphic form and structure, concept development and visual organization, students will design solutions to communication problems. Assignments will explore aspects of graphic imagery, typography, and layout. Students will refine their computer skills through applications requiring a digital format. **Credit 3**

2010-302 **Typography I**
Introduction to typography in visual communication. Lectures will cover typographic topics and information ranging from communication principles to methods of visual organization. During studio time students will design solutions to assigned communication problems, which will explore aspects of typography and layout as well as concept development and historical research. Students will refine their computer skills through applications requiring a digital format. **Credit 3**

2010-303 **Type & Image**
Introduction to the interaction of type and image in visual communication. Through formal studies and perceptual understanding, including aesthetics, graphic form and structure, concept development and visual organization methods, students will design solutions to communication problems, which will involve both graphic imagery and typography. Students will refine their professional skills through applications requiring a digital format. **Credit 3**

2010-313 **Introduction to Time-Based Design**
This course introduces students to the fundamental principles of time-based graphic design; including forms of narrative, organizing methods, sequencing, composition, visual variables, and motion variables, and the application of these principles to the solution of specific graphic design problems. Projects will include typography and/or imagery components, storyboard planning and computer-based applications as they apply to graphic design problem solving (Completion of 2010-301,302, & 303) **Credit 3**

**Prerequisites for 400-level graphic design:
sophomore graphic design courses or their equivalent or permission of
instructor**

2010-401 **Typography II**
Students expand their understanding of basic typographic principles through advanced applied problems focused on typography as the visual representation of language, typographic hierarchy, formal values (syntax) of letterforms, and the typographic grid as a principle organizing systems for providing meaningful structure. **Credit 3**

2010-402 **Imagery in Design**
Creative problem-solving experiences focus on the selection, generation and use of imagery in graphic design. Design process skills are enhanced as students learn how to explore the dynamics of image content and meaning, composition, color, scale, cropping, manipulation and the integration of imagery with typography. **Credit 3**

2010-403 **Symbols & Icon Design**
The focus of this course is on the principles, theory, and terminology of symbols (primarily pictographic, non-verbal graphic communication) symbol systems, marks of identity, and icon design for computer applications. Also emphasized are the inherent benefits and shortcomings of symbols, the application and use of symbols, and the evaluation or field-testing of graphic symbols to substantiate effectiveness. **Credit 3**

2010-404 **Design for Publication**
Students explore the underlying principles of grid theory, text and display typography, sequence, page layout, and type and image integration as they relate to a range of publication design applications such as instructional materials, brochures, magazines, books, etc. **Credit 3**

2010-405 **Information Design**
Information Design is an area of graphic design concerned with understanding reader and user responses to written and visually presented information. These are highly utilitarian problems in which the functional requirements of design are critical in making data and information understandable and accessible to the user. Principles of language, structure, emphasis, diagrammatic interpretation and the visual display of information are explored in the context of applied problems. **Credit 3**

2010-406 **Environmental Design**
Challenging, applied problems introduce students to the basic functions of environmental graphic design: to assist users in negotiating or "wayfinding" through a space or environment; to identify, direct and inform; to visually enhance the environment; and to protect the safety of the public. **Credit 3**

2010-471 **History of Graphic Design**
This course will be a thematic approach to Graphic Design history and will provide a necessary historical basis for students in this major. The course will involve lectures on design history, pioneering designers, design from other cultures and countries, graphic design artifacts, and the historical context for this design. In addition to lectures, the course will involve guest speakers, videos, participatory exercises and discussion and essay writing, which will build critical thinking skills (Completion of sophomore graphic design major courses) **Credit 3**

**Prerequisites for 500-level graphic design:
junior graphic design courses or their equivalent or
permission of the instructor**

2010-501 **Career Skills & Professional Practices**
The course is divided into two segments. The first half focuses on resume development, cover letters and interviewing practices. The emphasis is on using present level of experience to enter the job market. The second half of the course focuses on beginning a private design practice. This includes the types of legal forms of business, setting up the practice, client contact and sales, client briefings, books and records, professional consultants, working with suppliers, establishing credit. **Credit 3**

2010-502 **Corporate Design**
This course provides an overview of corporate design as an integrated study within the field of graphic design. Past and present corporate design models will give students historical background as well as provide current and future trends. Corporate design analysis, development, application and implementation of identity-based projects will be explored. **Credit 3**

2010-503 **Design History**
To discover the fundamental ideas, form and design principles governing style in design and art movements. Required is the design of a prototype guidebook on style in a design or art movement. Each student will select one movement from the list provided and develop a work plan for the guidebook; which will involve a proposal and outline. Information gathering and research will be followed by copy writing and the collection of illustrations from the selected style. Copy and visuals will be integrated in a dummy sketch, which then will be developed and refined to a high quality comp for the book. The course also includes lectures and weekly presentation and critiques. **Credit 3**

2010-504 **Design Systems**
Advanced problems incorporation research, and development of concepts that lead to applied projects as related to visual design systems. Packaging systems, advertising and promotional campaigns are some of the areas investigated. Human factors as related to consumer preferences and audience response are also integrated. Teamwork on projects is expected. **Credit 3**

2010-505 **Advertising Design**
Advanced creative problem-solving experiences relating to advertising design and developing a selling tool. Course content and projects include advertising assignments, ethics, research methodology and production. Concept development and the use of imagery in advertising are stressed. **Credit 3**

2010-506 **Concept & Symbolism**
Advanced creative problem-solving experiences emphasize development of effective visual concepts and implementation. The focus is on innovation and application of creative concepts using visual symbolism for communicating specific messages to an audience/user. Areas such as promotion, advertising, and marketing are integrated into the projects. **Credit 3**

2010-507 **Design for Marketing**
This course deals with the relationship between marketing and graphic design. It is not a marketing course to teach professional marketing skills and practices but is directed at teaching the graphic designer basic skills and terminology. The goal is to bring into play marketing concepts with design practice, focusing on short- and long-term marketing and design projects. When possible, specific firms are contacted and engaged as client/consultants. **Credit 3**

2010-508 **Photography in Graphic Design**
Advanced creative problem-solving experiences that emphasize learning and exercising skills in the design of projects using typography with photography. The relationship between typography and photographic imagery is examined in order to strengthen control over the resulting communication through design. **Credit 3**

2010-509 **Design Specifications**
Advanced creative problem-solving experiences that deal with the development of design concepts to meet budget specifications and with the working relationships with printers, paper reps, illustrators, photographers, etc. **Credit 3**

2010-510 **Design Applications**
Advanced creative problem-solving experiences that focus on preparations for the design job market. Projects could include work with local clients, a self-promotional booklet (designed and printed), resume revision, portfolio development and practice interviews. Interaction, discussion and student presentations are also part of this course. **Credit 3**

2010-511 **Advanced Information Design**
Advanced problems to further extend students' knowledge and experience with complex information design issues. Problems include: legal documents, business forms, diagrams, transportation maps, statistical information, charts, graphs and tables, instructional materials, way finding systems, and computerized information systems. **Credit 3**

2010-512 **Introduction to Interactive Media Design**
Students are introduced to the ideas, concepts, uses and general principles of interactive media on the computer. Several forms of logic and how they can be used in this design process are explored. Included are several projects to develop the students' understanding of software, logic and aesthetic considerations in this field. Students are expected to complete assigned readings and projects. **Credit 3**

2010-513 **Senior Projects**
Advanced creative problem-solving experiences relating to visual communication imagery in the form of a self-designed project. This is based on a strong emphasis of formal design values and their utilization for the communication of ideas and information. The faculty mentor reviews the project and modifications may be made based on consultation with the student. The project may be thought of as a senior thesis project. (Completion of junior graphic design core) **Credit 3**

2010-514 **Editorial Design**
Explores the role of the graphic designer in developing an appropriate communicative editorial design. Students interpret and develop concepts for the author's text and point of view for each assigned editorial article. Content includes the relationship and use of typography, imagery and layout for editorial impact. Some sections of this course work with the Editorial Photo class on assigned projects to experience the working relationship between the photographer and the designer, particularly in regard to editorial design. (Graphic design senior or permission of instructor) **Credit 3**

2010-518 **Public & Social Service Design**
Gives the graphic design senior professional experience developing and creating visual communications for nonprofit organizations. Through various community service agencies and in cooperation with the United Way Internship Program, students create design projects requiring skill and the ability to develop concepts through production, with emphasis on message content in relation to its audience. With guidance from the instructor, and by closely working with the organizations, students understand and experience client-designer relationships, budget limitations, and time and project management. (Graphic design senior or permission of instructor) **Credit 3**

2010-523 **Senior Internship**
This course exposes students to the professional environment through outside job opportunities in graphic design studios, advertising agencies, corporate communications departments and other acceptable organizations. Students will be working under the guidance of art directors, creative directors, senior graphic designers or marketing communication managers and performing creative work that is educational and meaningful for their short-term academic goals as well as their long-range career preparation (Completion of junior graphic design major courses) **Credit 3**

2010-524 **Portfolio Development & Presentation**
The objective of this course will be to assist the student in developing a professional portfolio and learning how to best present the work that is contained in this portfolio. Evaluation of current work and assessment of strengths and weaknesses of such will determine the specific actions, revisions or generation of new work which need to be undertaken as part of this course. High standards of presentation will be expected as well as objective selection of work for meeting specific career expectations (Completion of junior graphic design major core) **Credit 3**

2010-561 **Introduction to Web Design**
Students are introduced to the planning, design and production of interactive projects that are Web based. Web design concepts and methods in site design, page design and graphic user interface design will be explored. The course will include instruction in producing Web pages and creating interactivity with HTML and Web production software. (Completion of junior graphic design core) **Credit 3**

2010-562 **Advanced Web Design**
Students expand their understanding of Web design concepts and processes through advanced Web design projects, and continue to develop planning, design and production skills for the Web. Advanced and dynamic methods in merging content and interactivity design are introduced. (Completion of junior graphic design core) **Credit 3**

2010-567 **Advanced Interactive Media**
Students expand their understanding of interactive media design concepts and processes through advanced projects. Projects will include advanced concepts and techniques in interactivity design and interface design, and script-writing methods will be introduced. (Completion of junior graphic design core) **Credit 3**

Interior Design

2015-215 **Interior Design Freshman Elective**
Students will be given an overview of the field of interior design and an understanding of the educational requirements and expectations of the interior design major. The career options, required skills, and the creative process as they apply to the field of interior design will be presented through lecture, class discussions, design projects, and periodic interaction with professional designers. **Credit 2**

2015-222 **Design Survey**
Design Survey provides freshmen students with an increased exposure to the fields of graphic design, industrial design, interior design, and new media. It will provide students with an in-depth awareness of the role of design in society, and a designer's ethical and social responsibilities. The course also describes how the design professions are related to one another, yet presents their distinct and differentiated aspects. Objectives include exposing students to a common vocabulary, to increase their awareness of the individual disciplines, and provide exposure to the related contexts, philosophies, and issues. **Credit 2**

Prerequisites for 300-level interior design courses: foundation program or equivalent

2015-305 **Architectural Drawing**
An introduction to interior design through architectural drafting. **Credit 3**

2015-306 **Perspective Rendering**
An introduction to residential interior design and perspective rendering. **Credit 3**

2015-307 **Introduction to Interior Design**
An introduction to interior design with emphasis on basic process, spatial relationships, design conceptualization and development. **Credit 3**

2015-308 **CADD Application**
An introduction to the use of the computer as a tool in the interior design process. Use of the computer is required. **Credit 3**

2015-311 Model Building & Human Dimension
Introduction to design conceptualization through model building; exploration of the impact of human dimensions on interior space configuration; exploration of requirements of a diverse population of users. Credit 3

Prerequisite for 400-level interior design courses: sophomore interior design course or their equivalent or permission of instructor

2015-404 Hospitality Design
The applications of design methods and skills to the design of interior space for hospitality use. Credit 3

2015-405 Applications of Color & Light
Introduction to color and light for spatial development. Credit 3

2015-406 Retail Design
Introduction to designing interior space for retail use. Credit 3

2015-407 Building Construction System
Introduction of building construction systems for interior design. Credit 3

2015-408 Office Design & Planning
Introduction to interior design and planning for office use. Credit 3

2015-409 Interior Specifications
Introduction to specifications with emphasis on planning, construction documents, finishes, fire safety and flammability. Testing standards and liability. In addition, the course introduces the use of sustainable materials and learn how materials effect the health and safety of building occupants. Credit 3

2015-411 Interior Design Elective
An elective offering basic instruction and involvement in design application projects. Each quarter concentrates on a specific topic of design study. Credit 3

Prerequisite for 500-level interior design courses: junior interior design courses or their equivalent or permission of instructor

2015-504 Multistory/Purpose Design
The application of design methods and skills to professional level projects in interior design. Credit 4

2015-505 Building Codes & Regulations
Application projects concerned with building codes, regulations, fire safety, public safety and health, barrier-free design and American with Disabilities. Credit 2

2015-506 Environmental Control Applications
Application projects involving plumbing, heating, ventilation, electrical, vertical transportation and acoustic concerns. Credit 3

2015-507 Healthcare Design
An introduction to designing interior space for health care use. The application of design methods and skills to professional-level projects focusing on health care facilities. Credit 4

2015-508 Interior Design Business Practice
An introduction to professional practices with emphasis on business formation; design marketing, legal and ethical responsibilities. Credit 2

2015-509 Career Planning
Development of a resume, portfolio and job-search techniques with a focus on career planning. Credit 2

2015-510 Working Drawings
Professional interior design projects with an emphasis on the construction sequence and construction documentation. Credit 4

2015-511 Special Projects
Special projects in interior design emphasizing communication skills, theory and methods for the professional. Credit 3

Industrial Design

2035-215 Industrial Design Freshman Elective
Students will be given an overview of the field of industrial design and an understanding of the educational requirements and expectations of the industrial design major. The career options, required skills, and the creative process as they apply to the development of products, packaging, and systems within the field of industrial design will be presented through lecture, class discussions, design projects, and periodic interaction with professionals in the field. Credit 2

Prerequisite for 300-level industrial design courses: foundation program or equivalent

2035-305 Layout Systems
An introduction to the fields of industrial and packaging design. Emphasis is on design conceptualization and development, form and functional studies of packages, graphics and exhibits. Credit 3

2035-306 Technical Drawing
An introduction to drafting in the field of industrial and packaging design. Emphasis is on basic skills in orthographic drawing, O-Datum and decimal, inch dimensioning and engineering drawings. Credit 3

2035-307 Graphic Visualization
Sketching and rendering techniques are developed through exercises that also promote abilities to visualize three-dimensional forms in two-dimensional representations. Credit 3

2035-310 CAD Applications I
An introduction to CAD Application for industrial design that offers instruction in CAD based software as related to three-dimensional object modeling applications. Coursework in computer modeling of solids and surfaces, simple rendering, and computer model documentation is included. (2035-306 or consent of the instructor) Credit 3

2035-311 Modelmaking
An introduction to modelmaking in the field of industrial design. Course work emphasizes skills necessary for three-dimensional design conceptualization and development. Credit 3

2035-312 Concept Design Sketching
Freehand concept sketching technique for the industrial designer. (Foundation program). Credit 3

Prerequisites for 400-level industrial design courses: sophomore industrial design core or their equivalent or permission of instructor

2035-405 Materials & Processes Applications
The acquisition of a technical and theoretical base in industrial design through a formal introduction to materials and processes. Credit 3

2035-406 Consumer Product Design I
The acquisition of a technical and theoretical base in industrial design. Application of communicative and problem-solving skills to comprehensive design projects involving form, processes and materials. Design development of small products through sketches, quick study mock-ups and finished form studies. Credit 3

2035-407 Human Factors Applications
The acquisition of a technical base in human factors for industrial design, emphasizing function and safety. Credit 3

2035-408 Equipment Design
Application of communicative and problem-solving skills to comprehensive design projects involving form, style, function, safety, processes and materials. Design development of tools and equipment through sketches, mock-ups and technical drawings to finished form studies. Credit 3

2035-409 Product Style
The study of style, fashion and graphics as they apply to product form, storage, and distribution. Credit 3

2035-410 Consumer Product Design II
The application of communicative and problem-solving skills to comprehensive design projects. Project emphasis on the consideration of style and fashion in determinants of product form. Credit 3

2035-418 CAD Applications II
Advanced computer modeling and rendering applications for the industrial designer. The emphasis in this course is learning software tools competency through assigned exercises and creative projects. (2035-310 or consent of instructor) Credit 3

2035-442 History of Industrial Design
A study of the industrial design profession, designers and designs from 1920 to the present. Students will analyze designs in terms of style, materials, production, technology, ergonomics and context. (2039-227 or consent of instructor) Credit 3

2035-463 History of Modern Furniture Design
A study of Modern furniture design and its most significant designers. Factors of style, materials, construction and ergonomics are examined in the context of time, place and purpose. (2039-227 or consent of instructor) Credit 3

2035-474 Advanced Computer Modeling Elective
Advanced computer modeling and rendering applications for the designer. The emphasis in this Level 2 and 3 modeling course is learning higher software competency techniques for modeling complex and difficult shapes through assigned exercises and creative projects. The objective is students understanding of the most efficient use of professionally preferred tools for electronic surface modeling in degree 3 and higher B-spline curves and surfaces. (Alais Wavefront surface modeling at level or consent of instructor) Credit 3

Prerequisites for 500-level industrial design courses: junior industrial design core or their equivalent or permission of instructor

2035-506 Design Collaborative
Advanced product development in conjunction with a corporate design program providing technical information, marketing concerns and outside review of students' work. Credit 3

2035-508 Furniture Design
Experience in the design of furniture for a defined market is acquired through a project exercise involving industry collaboration. Credit 3

2035-510 Professional Practice
A review and study of design practices, including contracts, agreements, billings and business procedures. Resume, portfolio development and employment possibilities also are explored. Credit 3

2035-511 Product Development
A special student-interest project in industrial design usually focused on the areas of sports/recreation products or toys. Credit 3

2035-512 Advanced Product Design
The application of design methods and skills to professional-level projects in industrial design. Emphasis is on techniques and competencies common to or expected in the commercial world. Credit 3

2035-513 Career Planning
Resume and portfolio completion with informational interviewing and employment advising. Credit 3

2035-522 Toy Design
Design of a toy or juvenile product in collaboration with industry representatives to provide technical information marketing opinions and professional review of work. (Senior industrial design major or consent of instructor) Credit 3

2035-527 Package Design
The design of packaging for the protection and marketing of goods. Aspects of visual, structural, ergonomic and environmental issues are considered in the design of rigid and flexible containers. (Senior industrial design major or consent of instructor) Credit 3

2035-533 Exhibit Design
Design of trade show and similar exhibits involving structure, graphics, lighting and layout of space. Students will develop concepts into a scale model for presentation. (Senior industrial design major or consent of instructor) Credit 3

School for American Crafts

Ceramics

2040-215 Freshman: Introduction to Ceramics
An introduction course with overview of historical perspective, hands on projects and demonstrations, slide talks, introduction to vocabulary and terminology, and discussion of career opportunities. Credit 2

2040-251,252,253,254 Ceramics Elective
An elementary course in design and techniques in ceramics. Each quarter different techniques are taught, including wheel, handbuilding glaze and decorating. Materials fee required. Credit 3

Prerequisites for 300-level courses: successful completion of foundation program or equivalent or permission of instructor

2040-301 Materials & Processes Ceramics Sophomore I
A course with concentration on the fundamentals of pottery making. The student will design and make utilitarian pottery, with emphasis on form, function and surface decoration. The student will primarily focus on high firing techniques. The students will also study clay materials and chemistry. Credit 6(F)

2040-302 Materials & Processes Ceramics Sophomore II
This course continues to focus on the fundamentals of working with ceramics. The emphasis is working within the vessel format. Primarily students will be working with handbuilding techniques. The students will work at a mid range firing temperature. In the course the student will also learn glaze calculation. (2040-301) Credit 6 (W)

2040-303 Materials & Processes Ceramics Sophomore III
This course investigates the issues involving ceramic sculpture. The students will primarily investigate issues of form and scale. The primary focus of firings will be low fire and raku techniques. In this course the student will also learn the fundamentals of kiln building and firing techniques. (2040-302) Credit 6 (S)

Prerequisites for 400-level courses:
successful completion of all sophomore level courses in ceramics

2040-401 Materials & Processes Ceramics Junior I
A course with concentration on utilitarian ceramics, the fundamentals of pottery making. There will be a focus on the students developing their own aesthetic ideas and independent firing methodology. A continuation of technique development in ceramic making and firing. The students will also work on the connections of their work and ceramics art history. (2040-303) Credit 6 (F)

2040-402 Materials & Processes Ceramics Junior II
A course with continuing concentration of working with the vessel. The student will investigate their own methodologies of making and developing their ideas through using the vessel. There will be an emphasis on historical context and personal expression. (2040-401) Credit 6 (W)

2040-403 Materials & Processes Ceramics Junior III
A course with continuing concentration of developing ceramic sculpture. Working on both large and small scale, and addressing the concepts of presentation. There will be a strong emphasis on developing student's own aesthetics, personal voice and idea. (2040-402) Credit 6 (S)

Prerequisites for 500-level courses:
successful completion of all junior level courses in ceramics

2040-501 Materials & Processes Ceramics Senior I
A course to begin to develop a senior thesis. This is a cohesive body of work centering on a singular theme agreed to by the student and their advisor. Students are required to develop their own clays, glazes, and firing methodology. The students will begin to research information for their written thesis. (2040-403) Credit 6 (F)

2040-502 Materials & Processes Ceramics Senior II
A course where the student will continue to develop their senior thesis studio work. There will be an emphasis on contemporary and historical context for this work, as well as personal glaze and firing development. The student will begin to address the written element of their thesis and developing a body of work for their senior thesis exhibition. (2040-501) Credit 6 (W)

2040-503 Materials & Processes Ceramics Senior III
A course where the senior's final written thesis exhibition is the culmination of their years work. (2040-502) Credit 6 (S)

Glass

2041-215 Freshman: Glass & Glass Sculpture
This is a survey course for students interested in glass as a medium for the artist expression and design application. Topics regarding history, contemporary issues, science and technology of glass are discussed. Students will conceive, design and execute glasswork with engraving, glass blowing, and casting. Emphasis will be placed on the entry level of learning and career opportunities that are available with the material glass. The course includes a visit to the Corning Museum of Glass. Credit 2

2041-251,252,253,254 Glass Elective
A survey course emphasizing furnace glassblowing and stained glass as means of personal expression and appreciation. A portion of the course is a basic investigation of the history, chemistry, techniques and technical aspects of glass. Materials fee required. Credit 3

Prerequisites for 300-level courses:
successful completion of foundation program or equivalent or permission of instructor

2041-301 Materials & Processes Glass Sophomore I
This class will introduce the student to grinding, polishing, lamination and adhesives. Basic solid and blown hot forming will be covered. The student will acquire practical experience with the operation and maintenance of all cold and hot working equipment in the shops. Credit 6 (F)

2041-302 Materials & Processes Glass Sophomore II
This class will continue exploring hot and cold glass techniques. Basic color and bit application in molten glass working will be covered. Sand carving and step blasting will be part of this class as students create a work utilizing lightening techniques for the final presentation of the work. (2041-301) Credit 6 (W)

2041-303 Materials & Processes Glass Sophomore III
The class will introduce the student to techniques of painting and reverse painting on solid, blown and plate glass. Paradise paints, Rouche enamels, and polymers will be used as a painting medium for artistic exploration and for the decorative purposes. Construction and use of plaster molds for blown glass will be introduced as a way to create sculptural elements for a final project. (2041-302) Credit 6 (S)

Prerequisites for 400-level courses:
successful completion of all sophomore level courses in glass

2041-401 Materials & Processes Glass Junior I
The class will introduce the student to sand casting, pate de verre, lost wax casting, billet casting, gravity casting. Alternative forms of model building, mold making with clay and wax for casting glass are part of this course. Annealing cycles and the use of the oven controls will be utilized as the student develops solutions to casting problems. Students will explore the history of casting with glass from ancient Egypt to today. In glassblowing, Graal pick-up and other techniques involving pre-formed blanks or elements will be taught. There will be an emphasis on teamwork and experimentation with new techniques. Options for problem solving include mixed media sculpture and the vessel. (2041-303) Credit 6 (F)

2041-402 Materials & Processes Glass Junior II
Utilizing The Corning Museum of Glass study collection and the Rakow Research Library for glass, students will develop a body of work, which reflects their specific interests with glass. Students may select a concept from the following or develop an alternative topic. Issues include: glass equipment construction, building a studio, public commissions, developing a production series, industrial design for glass, colored glass chemistry, creative resource for a sculpture, art education, the gallery. The student will make a formal presentation related to the research topic. (2041-401) Credit 6 (W)

2041-403 Materials & Processes Glass Junior III
Utilizing The Corning Museum of Glass study collection and the Rakow Research Library for glass, students will develop a body of work, which reflects their specific interests with glass. Students may select a concept from the following or develop an alternative topic. Issues include: glass equipment construction, building a studio, public commissions, developing a production series, industrial design for glass, creative resource for a sculpture, art education, the gallery. The student will make a formal presentation related to the research topic. (2041-402) Credit 6 (S)

Prerequisites for 500-level courses:
successful completion of all junior level courses in glass

2041-501 Materials & Processes Glass Senior I
Independent work produced during this quarter will be of an exploratory nature. Working with the instructor, the students will identify concepts for senior level research based on individual interests and visual exploration. Preparation for graduation requirements including a written thesis, portfolio presentation, artists statement and senior exhibition will be a part of this course. (2041-403) Credit 6 (F)

2041-502 Materials & Processes Glass Senior II
Information developed during the previous course will serve as a foundation for in depth research to be developed during this quarter. A statement describing the nature and intent of the thesis is required before week 2 of this term. The student will refine and develop a body of work for the senior exhibition. The student will submit initial draft of the thesis at the end of this quarter. (2041-501) Credit 6 (W)

2041-503 Materials & Processes Glass Senior III
The student will conclude the senior year with a solo exhibition of their creative work. The specifics of the exhibition including location, installation, opening, invitation announcement, and mailing list will be developed by the senior student. Written thesis, 20-slide portfolio, artists statement and resume will be presented to the department head before graduation. Alternative or additional prerequisites may be required according to the individual necessities. (2041-502) Credit 6 (S)

Metals

2042-215 Freshman: Jewelry/metals
This is an introductory course designed to expose the beginning student to the basics and fundamentals of Jewelry/Metals field as a career path in the field of contemporary crafts. Slide lectures, technical demonstrations, field trips, hands-on experience and critiques will be used. Credit 2

2042-251,252,253,254 Metals Elective
An elective course providing an opportunity for introductory study in metals in the area of either holloware or jewelry. Materials fee required. Credit 3

Prerequisites for 300-level courses: successful completion of foundation program or equivalent or permission of instructor

2042-301 Materials & Processes Metals/Jewelry Sophomore I
This class will introduce the student to basic jewelry hand tools. Ferrous and non-ferrous metals, their composition and working priorities will serve as the primary materials. Credit 6 (F)

2042-302 Materials & Processes Metals/Jewelry Sophomore II
This class will introduce the student to basic machine skills, silver soldering and gem setting. (2042-301) Credit 6 (W)

2042-303 Materials & Processes Metals/Jewelry Sophomore III
This class will introduce the student to basic forming skills for holloware, flatware and jewelry. (2042-302) Credit 6 (S)

Prerequisites for 400-level courses:
successful completion of all sophomore level courses in metals

2042-401 Materials & Processes Metals/Jewelry Junior I
This class will introduce the student to advanced properties of gold as a material and advanced casting and mold-making techniques. (2042-303) Credit 6 (F)

2042-402 Materials & Processes Metals/Jewelry Junior II
This course introduces jewelry and holloware rendering, chasing and repoussé, and tool making. (2042-401) Credit 6 (W)

2042-403 **Materials & Processes Metals/Jewelry Junior III**
This course introduces jewelry and holloware design and production through the use of kumboo overlay technique and acid etching. (2042-402) Credit 6 (S)

Prerequisites for 500-level courses:
successful completion of all junior level courses in metals

2042-501 **Materials & Processes Metals/Jewelry Senior I**
This course concentrates on hollow ware design and production through introducing spinning, advanced hollowware techniques, and rendering. The design and compiling of a professional resume is also a requirement. (2042-403) Credit 6(F)

2042-502 **Materials & Processes Metals/Jewelry Senior II**
This course introduces advanced gem setting and identification, gemstone anatomy, and jewelry mechanisms. Students also begin to pursue the issue of career opportunities by involving themselves in contacting potential employers in a "job search" seminar. (2042-501) Credit 6 (W)

2042-503 **Materials & Processes Metals/Jewelry Senior III**
This course provides the student with individual research in technique and design. The third quarter senior level students are encouraged to assemble a group show of their four year's work; complete a job search, and a professional portfolio including resume, photography, and renderings.(2042-502) Credit 6 (S)

Textiles

2043-251,252,253,254 **Textile Elective**
A basic course in design and techniques in textiles. Each quarter a different area of study is undertaken in quilt making, natural basketry, crochet, soft sculpture or other non-loom textile processes. Materials fee required. Credit 3

Wood

2044-215 **Freshman: Woodworking & Furniture**
This course is designed to introduce the beginning student to the field of wood-working and furniture design. There will be hands-on involvement with the material as well as a look at the career opportunities for a contemporary woods craftsman. Slide talks, technical demonstrations, field trips, design and design review will be some of the ways we experience this area first-hand. Credit 2

2044-251,252,253,254 **Wood Elective**
A non-sequential, elementary course in designing and building wooden projects such as a tray, small box or small table. More choice of project is afforded students who take the course for a second or third quarter. Materials fee required. Credit 3

Prerequisites for 300-level courses:
successful completion of foundation program or equivalent or permission of instructor

2044-301 **Materials & Processes Wood Sophomore I**
This is the first of a three-quarter sequential class covering the fundamental techniques and aesthetics of woodworking. Topics covered include the care and use of hand tools, wood as a material, its basic properties, basic joinery and fundamental techniques of wood fabrication, and finishing. The course includes a machine maintenance program. Credit 6 (F)

2044-302 **Materials & Processes Wood Sophomore II**
This is the second of a three-quarter sequential class covering the fundamental techniques and aesthetics of woodworking. Topics covered include the continued care and use of hand tools, and the introduction of power equipment. Basic joinery and fundamental techniques of wood fabrication are continued using both hand and power equipment, and additional finishing techniques are studied. The course includes a machine maintenance program. (2044-301) Credit 6 (W)

2044-303 **Materials & Processes Wood Sophomore III**
This is the third of a three-quarter sequential class covering the fundamental techniques and aesthetics of woodworking. Topics covered include the continued care and use of hand tools, and the further introduction of power equipment. Basic joinery and fundamental techniques of wood fabrication are continued using both hand and power equipment, and additional finishing techniques are studied. The course includes a machine maintenance program. (2044-302) Credit 6 (S)

Prerequisites for 400-level courses:
successful completion of all sophomore level courses in wood

2044-401 **Materials & Processes Wood Junior I**
This is the first of a three-quarter sequential class covering the intermediate techniques and aesthetics of woodworking. This course addresses the issues of the design and construction of a chair in aesthetics, ergonomics, structure (geometry, triangulation), materials etc. The course includes a machine maintenance program. (2044-303) Credit 6 (F)

2044-402 **Materials & Processes Wood Junior II**
This is the second of a three-quarter sequential class covering the intermediate techniques and aesthetics of woodworking. This course addresses the issues of source material used for inspiration in the design process. It requires the investigation and selection of specific source material to be used to design a specific piece of furniture. Additional techniques are also included. The course includes a machine maintenance program. (2044-401) Credit 6 (W)

2044-403 **Materials & Processes Wood Junior III**
This is the third of a three-quarter sequential class covering the intermediate techniques and aesthetics of woodworking. This course addresses the issues of large solid wood carcass construction, and multiple drawer construction, through the design and construction of a chest of drawers. Additional techniques are also included. The course includes a machine maintenance program. (2044-402) Credit 6 (S)

Prerequisites for 500-level courses:
successful completion of all junior level courses in wood

2044-501 **Materials & Processes Wood Senior I**
This is the first of a three-quarter sequential class covering the advanced techniques and aesthetics of woodworking. This course addresses aspects of wood-working students may wish to pursue after graduation. Students select from a menu of topics including: jigs & fixtures (shaper, router, etc.), industry-related, series, production, outdoor, site specific, multiple seating, multi-media, and sculpture. They then develop a proposal for a body of work that may span more than one quarter. Students may select more than one topic. The course includes a machine maintenance program. (2044-403) Credit 6 (F)

2044-502 **Materials & Processes Wood Senior II**
This is the second of a three-quarter sequential class covering the advanced techniques and aesthetics of woodworking. This course addresses aspects of woodworking students may wish to pursue after graduation. Students select from a menu of topics including: jigs & fixtures (shaper, router, etc.), industry-related series, production, outdoor, site specific, multiple seating, multi-media and sculpture. They then develop a proposal for a body of work that may span more than one quarter. Students may select more than one topic. The course includes a machine maintenance program. (2044-501) Credit 6 (W)

2044-503 **Materials & Processes Wood Senior III**
This is the last of a three-quarter sequential class covering advanced techniques and aesthetics of woodworking. This course addresses aspects of wood-working students may wish to pursue after graduation. Students select from a menu of topics including: jigs & fixtures (shaper, router, etc), industry-related series, production, outdoor, site specific, multiple seating, multi-media, and sculpture. This represents a continuation of the body of work begun in the Fall and Winter quarters. Students may select more than one topic. The course includes a machine maintenance program. (2044-502) Credit 6 (S)

General Crafts Studies

2045-311 **Concept Drawing**
Freehand concept sketching technique for the crafts major. Credit 3

2045-312 **Crafts Technical Drawing**
A one-quarter course covering basic drafting technique as it is used for both design and presentation. Topics covered include use of instruments, lettering, standard conventions, dimensioning, basic layout techniques and formats, orthographic projection, sectioning, auxiliary views, axonometric drawings, measured perspective, comprehensive working drawings and presentation techniques. Credit 3

2045-313 **Crafts Drawing-CADD**
A one-quarter course covering introduction to basic computer assisted drawing and design (CADD) technique as it is used for both design and presentation. Topics covered include introduction to the computer, basic CADD issues, two-dimensional drafting, the three-dimensional environment, associativity of views, generating working drawings, printing, and plotting. Credit 3

2045-511 **Planning a Career in the Crafts**
One of three courses covering topics commonly associated with the operation of a small business in fields related to the fine and applied arts. This one-quarter course covers career assessment, qualitative and quantitative evaluation and assessment of potential career paths through the development of a comprehensive business plan, and employment options. The course includes lectures, group discussions, independent study, studio and business visits, homework, papers and reports, and oral presentations. Each of the three-quarter long courses is structured as an independent unit. Interested students may take any or all of these courses, in any sequence. Credit 3

2045-512 **Crafts Promotional Package**
One of three courses covering topics commonly associated with the operation of a small business in fields related to the fine and applied arts. This one-quarter course addresses promotional issues including portfolio, photography, resume writing, business cards and stationery, marketing, client relations, etc. Students will create their own comprehensive promotional package. The course includes lectures, group discussions, independent study, studio and business visits, homework, papers and reports, and oral presentations. Each of the three-quarter long courses is structured as an independent unit. Interested elective students may take any or all of these courses, in any sequence. Credit 3

2045-513 **Operating a Business in the Crafts**
One of three courses covering topics commonly associated with the operation of a small business in fields related to the fine and applied arts. This one-quarter course addresses day-to-day business operations including such things as marketing, contracts, and other legal issues, record keeping, banking, insurance, taxes, employees, and location and layout of a business etc. The course includes lectures, group discussions, independent study, studio and business visits, homework, papers and reports, and an oral presentation. Each of the three-quarter long courses is structured as an independent unit. Interested elective students may take any or all of these courses, in any sequence. This course is required for all School of American Crafts BFA seniors. Credit 3

Crafts Extended Studies

2046-201 **Ceramics**
This introductory ceramics course combines wheelthrowing and handbuilding techniques with clay. Through a variety of forming methods, students will learn about making all kinds of ceramic objects. Slide lectures will support and introduce projects. May be taken more than once for credit. Credit 2

2046-206 **Metalcrafts/Jewelry**
Emphasis on basic jewelry-making techniques involving sawing, filing, soldering, hand and machine finishing techniques, simple stone setting and more. Design is stressed throughout the course. May be elected more than once for credit. Credit 2

2046-211 **Woodworking**
Explorations in joinery, finishing and use and care of hand tools, and basic procedures in machine woodworking. In this course the development of design skills and technical ability is emphasized. May be taken more than once for credit. Credit 2

School of Film & Animation

2065-201 **Film/Video Production I**
This course combines technical information in motion picture exposure and editing with a theoretical and practical approach to motion picture continuity. Production will be in 16mm (non-sync) format. Students furnish film, processing, and editing supplies. Equipment is furnished. Credit 4 (F)

2065-202 **Film/Video Production II**
A foundation course in editing theory and practice for motion pictures. Emphasis is on identification and concerns of a variety of approaches to the edited image. The student edits digital video format taped projects designed to address specific editorial concerns. Students provide videotape; equipment is furnished by the department. (2065-201) Credit 4 (W)

2065-203 **Film/Video Production III**
This is the third sequential course of three for Freshman Film/Video students. This course introduces the nature and importance of the sound component in creating cinematic works. Students will be exposed to a variety of possible treatments of sound using historical and contemporary examples in cinema. They learn the processes, equipment and techniques, as well as creative and efficient strategies, for multi-track soundtrack creation for both film and video. (2065-201, and 2065-202) Credit 4 (S)

2065-206 **story & Structure**
A discipline specific introductory course designed to introduce first year students to the meaning of "story"; the components of a story, approaches to film structure, and the variety of expressions that a film can take. Credit 2 (F, W)

2065-217 **Digital Video for Multimedia**
Digital video technology democratizes creative moving image editing and manipulation. Broadly the goal of this course is to teach the basic craft of filmmaking using the most currently available digital software/hardware tools. Students will be expected to complete several shooting and editing exercises as well as produce two finished productions. Credit 4

2065-221 **Materials & Processes of the Moving Image I**
Familiarizes the student with the basic technical concepts of film and video making. Students gain an understanding of the technical theory required to work in these media. Credit 2 (F)

2065-222 **Film Language**
A screenings, readings, and writing course designed to give the student the opportunity to trace the development of the techniques and forms of communication in what now constitutes the classic cinema. Credit 4 (W)

2065-243 **Introduction to Portable Video I**
A basic course for non-majors. Emphasis is on videotaping and the use of the medium as an interpretive and expressive medium. A combined theoretical/practical approach to the dynamics of the medium. Two short video projects are required. VHS production and editing facilities are provided by RIT. Students must purchase a minimum of two 60-minute, 1/2" videocassettes. This course does not count as elective credit for F/V majors. Credit 4 (F, W, S)

2065-244 **Introduction to Portable Video II**
In this course the student applies the basic video skills acquired in 2065-243 to the design and realization of mature narrative imagery. Progress is supervised by the instructor through regular screenings and conferences with the student. (2065-243) This course does not count as elective credit for F/V majors. Credit 4 (W)

2065-263 **Single Frame Motion**
This class is intended to give students a thorough, intuitive understanding of animation motion. Emphasis will be towards hands-on exercises without the demands of finished production. Image capture and playback technologies will be immediate so students will see the results of their efforts quickly. The assignments will direct students to shoot pixelation, animation of real objects, cut outs, and pre-made puppets. Credit 2

2065-311 **Video Tools & Technology**
An intensive tools and technology course that allows the student to work in digital video format. Examines the technical concerns of single system portable video production and editing. Production skills in camera work, editing and sound recording are covered. (2065-203) Credit 5 (F, W)

2065-313 **Color Theory in Film & Animation**
This course examines the use of color in animation by first looking at the use of color in single images of animation and then extending that into the use of color over time. Students do simple animation exercises exploring various aspects of color especially focusing on the use of color to support the mood and content of the concept of a film. Credit 2

2065-317 **Advanced Production Workshop: Documentary I**
Students produce short documentary projects in either film or video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio or multimedia. Students are encouraged to experiment with individual style and, while producing their own work, also serve as production planning team and production crew for all other projects. Students complete projects for presentation at public departmental screenings. (2065-311 or 2065-431) Credit 4 (F)

2065-318 **Advanced Production Workshop: Documentary II**
Students produce short documentary projects in either film or video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio or multimedia. Students are encouraged to experiment with individual style and, while producing their own work, also serve as production planning team and production crew for all other projects. Students complete projects for presentation at public departmental screenings. (2065-317) Credit 4 (W)

2065-319 **Production Workshop: Documentary**
Students produce short documentary projects in either 16mm film or video, depending on their prerequisites, or with consent of instructor. Students may work in any medium appropriate to their experience and resources such as: still photo, painting, animation, comic strip, performance, radio or multimedia. Students are encouraged to experiment with individual style and while producing their own work also serve as production planning team and production crew for all other projects. Students complete projects for presentation at public departmental screenings. (2065-311 or 2065-431) **Credit 4 (S)**

2065-327 **Advanced Prod Workshop: Experimental I**
Students produce short projects as experiments in concept, style or technology and are encouraged to take risks, break "rules" and explore their own unique creative potential without fear of grade punishment for being different. Students may work in either film or video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio or multimedia. While producing their own work, students also serve as production planning team and production crew for all other projects. Students complete projects for presentation at public departmental screenings. (2065431 or 2065-311 or consent of the instructor) **Credit 4 (F)**

2065-328 **Advanced Production Workshop: Experimental II**
Students produce short projects as experiments in concept, style or technology and are encouraged to take risks, break "rules" and explore their own unique creative potential without fear of grade punishment for being different. Students may work in either film or video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio or multimedia. While producing their own work, students also serve as production planning team and production crew for all other projects. Students complete projects for presentation at public departmental screenings. (2065-327) **Credit 4 (W)**

2065-329 **Production Workshop: Experimental**
Students produce short projects as experiments in concept, style, or technology and are encouraged to take risks, break "rules" and explore their own unique creative potential without fear of grade punishment for being different. Students may work in either 16mm film or video, depending on their prerequisites, or with consent of instructor. Students may work in any medium appropriate to their experience and resources such as: still photo, painting, animation, comic strip, performance, radio, or multi-media. While producing their own work, students serve as production planning team and production crew for all other projects. Students complete projects for presentation at public departmental screenings. (2065431 or 2065-311 or consent of instructor) **Credit 4 (S)**

2065-331 **Introduction to Animation I**
This class is a survey of basic techniques and aesthetics of animation. Provides training and practical experience in a wide variety of approaches to single-frame motion picture production. Students produce a number of short film exercises utilizing cut out, paint and draw, animation as well as kinestasis. Extensive film screenings illustrate each technique and related aesthetics. (2065-263; JPHQ major or consent of instructor) **Credit 4(F)**

2065-332 **Advanced Animation Tools**
This course in animation techniques and tools provides the student with the training and practical experience necessary for independent operation of animation equipment and the independent production of animated film. A variety of traditional and experimental techniques are explored in depth. These techniques include animation stand as well as three-dimensional animation execution. Students work independently and in-group situations and participate in all phases of animated film production. Students have the opportunity to explore mixed technique approaches, as well as to utilize their experiences in photography, graphic arts, painting, sculpture, and other backgrounds and skills. Screenings of films illustrate a variety of different techniques, style, and production concerns and practices. Proficiency in drawing is not required (2065-331) **Credit 4**

2065-333 **Animation Production**
Provides practice in all phases of single-frame film production. Students produce a short film with sound of their own design. Weekly meetings will discuss and critique the progress and merits of the film. Students will rely only on techniques learned in previous classes. Final film must be screened for the school community. (2065-332) **Credit 4 (S)**

2065-337 **Advanced Production Workshop: Fiction I**
Students produce short fictional projects in either film or video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio or multi-media. Students are encouraged to experiment with individual style, and while producing their own work, also serve as production planning team and production crew for all other projects. Students complete projects begun during the quarter or during the previous quarter in Production Workshop: Fiction II for presentation at public departmental screenings. (2065431 or 2065-311 or consent of the instructor) **Credit 4 (F)**

2065-338 **Advanced Production Workshop: Fiction II**
Students produce short fictional projects in either film or video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio or multi-media. Students are encouraged to experiment with individual style, and while producing their own work, also serve as production planning team and production crew for all other projects. Students complete projects for presentation at public departmental screenings. (2065-337) **Credit 4 (W)**

2065-339 **Production Workshop: Fiction**
In this course students will produce short fiction projects in either 16mm film or video, depending on their prerequisites, or with consent of instructor. Students may work in any medium appropriate to their experience and resources such as: still photo, painting, animation, comic strips, performance, radio, or multimedia. Students are encouraged to experiment with individual style and while producing their own work also serve as production planning team and production crew for all other projects. Students complete projects for presentation at public departmental screenings. (2065-311 or 2065431) **Credit 4 (S)**

2065-342 **Scriptwriting I**
This course is the first in a series of courses on the writing of scripts for theatrical and non-theatrical films and television. This course introduces students to the forms and techniques of writing for dramatic media, including a brief introduction to writing for experimental and documentary films. Throughout the course, students keep a creative journal of ideas and characters to be used in story development. Students are responsible for writing a short film or television script of their own choosing and for completing several brief written exercises in areas such as personal storytelling, character development, dialogue, and plot. **Credit 3**

2065-343 **Scriptwriting II**
This course is the second in a series of courses on the writing of scripts for theatrical and non-theatrical films and television. The class focuses on the scene as the basis of dramatic structure and offers students the opportunity to hone the skills developed in the previous class. Students are responsible for writing a film or television script on a subject of their own choosing and for completing several brief written exercises in areas such as character, dialogue, suspense, subtext, and plot. Class discussion is based on assigned readings, in-class exercises, and in-class reading of student work. (2065-342 Scriptwriting I) **Credit 3**

2065-345 **Acting for Film & Video**
A course in basic acting technique with emphasis on the special problems peculiar to film and video production. The class is taught in conjunction with 2065-347 (Directing the Actor). Class meetings are organized around the presentation of scenes prepared by student actors and directors. **Credit 3**

2065-347 **Directing the Actor**
A course in basic directorial techniques with emphasis on the special problems peculiar to film and video production. Class meetings are organized around the presentation of scenes prepared by student directors. **Credit 3**

2065-350 **Figure Drawing: Animation**
A studio figure drawing class suited specifically to the needs of drawn character animators. Live models will provide frequent short poses revealing stages of movement, center of gravity, dramatic gesture, and specific movement in dance, and sports. Students will draw rapidly and asked to conjecture form from unseen shapes and flowing motion. Frame per frame video will be examined of live model's movement and compared to students' drawings. (At least one figure drawing class or permission of instructor) **Credit 3**

- 2065-352 Animation Pre-Production
Students collect and produce short film ideas and learn to express them in a variety of methods. Short film scripts will be written in a workshop setting and shared with class in critiques. Students will learn how to create digital soundtracks and read digital sound. Students will make animation Bar Sheets for sound/image relationships and timings and Exposure Sheet design. Students will also work with storyboards scanned into the computer and manipulated in time with sound as Animatics as another tool for initializing animation production. (2065-331) Credit 4
- 2065-354 Business of Film & Video
Examines the business aspects of designing, developing and producing film and/or video projects. Emphasis is on development of production projects with interactive problem-solving experiences in which the instructor and students work as a production team. Special attention is given to script development techniques, estimation and management of production costs, location productions, live broadcasts and the cost/quality considerations of film/video production. Specific issues and situations are used as exercises for student problem-solving activities. Credit 3
- 2065-355 Introduction to Film Appreciation
In this course, students view, analyze and critique feature length narrative films, a documentary and animation. Most of the films are selected from the AFI list of the 100 best films. Films are analyzed from various perspectives including plot, technique, cinematography, acting and genre. Credit 4
- 2065-356 History & Aesthetics of the Moving Image: Fiction
An exploration of the history and aesthetics of film. Emphasis is on determining the unique characteristics of the medium, how those characteristics are used as a means of interpretation and expression and their relevance to other kinds of nonverbal image making. (Must be at least a second-year student) Credit 3
- 2065-357 History & Aesthetics of the Moving Image: Documentary
An exploration of the history and aesthetics of film. Emphasis is on determining the unique characteristics of the medium, how those characteristics are used as a means of interpretation and expression, and their relevance to other kinds of non-verbal image making (Must be at least a second-year student) Credit 3
- 2065-358 History & Aesthetics of the Moving Image: Animation
An exploration of the history and aesthetics of film. Emphasis is on determining the unique characteristics of the medium, how those characteristics are used as a means of interpretation and expression, and their relevance to other kinds of non-verbal image making (Must be at least a second-year student) Credit 3
- 2065-361 Introduction to 3D Computer Animation
An introduction to three-dimensional computer animation. The basic principles of animation will be addressed within the context of producing three-dimensional computer animation. Students will produce a series of short 3D computer animations as part of the learning process and then a final short 3D computer animation of their own design. Students will become familiar with a variety of three-dimensional computer animation techniques and applications. (2065-457) Credit 4
- 2065-362 Optical Printing
In this course students will learn motion picture techniques for creating visual special effects through the use of the optical printer. It will cover the basics of materials and methods and the hands-on functioning of the printer. Topics include sizing and focusing, filtration and exposure control, film stocks, fades, dissolves, superimpositions, and mattes. Techniques for hand processing of black and white motion picture film will also be demonstrated. Credit 4
- 2065-364 Film Theory & Criticism
A historical survey of film theory is offered along with the analysis of films using specific critical methodologies. Provides the student with the viewing and discussion skills necessary to understand film as a fine art. Credit 3
- 2065-367 Visual Effects: Cinematography
This course is designed to enhance the student's awareness of the creative possibilities inherent to the motion picture camera by giving them a "real world" work experience, concentrating on group dynamics within a problem-solving environment. The object is to produce a 16mm motion picture visual effects sequence by students working cooperatively with each other within production units, and with each production unit working cooperatively with the others. Students share their projects during weekly production meetings chaired by the instructor. Work with models and miniatures is involved. (2065-203) Credit 4
- 2065-370 Film/Video-Paris, Summer
Provides students with the opportunity to creatively explore and experience film and video production for six weeks in Paris, France. Students study the rich history and prehistory of French (and European) cinema. Study includes weekly screenings of many historical and contemporary film works from the Film Archives at the National Museum of Modern Art in Paris, meetings with French/European filmmakers and historians, museum trips, special film programs at the Cinematheque Francaise and the Videothèque of Paris, and library research. Both traditional and experimental French cinema are examined. Equipment is provided. Students produce works in either or both 16mm film and 1/2" video formats. Open to undergraduates and graduates, majors and nonmajors, with or without production experience. Credit 6
- 2065-371 Miniature Sets & Props
This course gives students hands on experience in all stages of designing and building miniature sets. Common set construction materials will be introduced and proper techniques explained. Students will design and build basic structures with a variety of surface finishes using organic and artificial forms. Students will evaluate the artistic merits of their designs. Examples from architecture and movies will be provided. Realistic sets with a cultural heritage will be considered as well as fantasy environments. Final sets will be completed by the class to be used in following classes. Credit 3
- 2065-372 Introduction to Stop Motion Animation
Explore techniques for producing stop motion animation. Gain familiarity with the use of a variety of materials that may include clay, puppet, foam, latex and more. Develop techniques for making armatures and skeletons and creating joints. Learn how to measure movement from frame to frame. Research and write about a stop motion technique or animator. (2065-331) Credit 4
- 2065-373 Visual Anthropology
We see others as we imagine them to be, in terms of our values, not as they see themselves. This course examines ways in which we can understand and represent the reality of others through visual media, across the boundaries of culture, gender and race. It considers how and why visual media can be used to represent or to distort the world around us. (Sophomore standing) Credit 3 (S)
- 2065-374 Seminar in International Film History
Examines selected, varying film topics in a wider socio-historical context. Seminar themes change each year and may include topics such as post-war German film, films of the Holocaust, Japanese film, surrealist and magic realist film, Soviet film, Native Americans on film, etc. Students are expected to participate actively in the course, via class presentations and discussions. Credit 3
- 2065-376 Dramatic Structure in Film & Television
This course explores the theories of dramatic structure from Aristotle to the present and applies these theories to current and classic dramatic works. The class also explores writing for film and television, including feature film genres, one-hour drama, mini-series, soap opera, and sitcom. A segment on the business of writing covers reader's reports, adaptation of material from other media, and acquisition of rights. (Prerequisites: None) Credit 3
- 2065-377 Physical Expression in Animation, Film & Video
A course in non-verbal communication designed to broaden the creative vocabulary of animators, directors, editors and actors. Through a series of exercises and assignments, the students will experiment with movement principles and gestured language. Analysis of these principles will be used to focus and refine their work during class and towards a final project. Credit 3
- 2065-382 Introduction to Digital Animation
An introduction to the techniques and practice of graphic and animated film production. This course provides training and practical experience in producing 2D animated sequences using off the shelf multimedia software. Students produce a number of short exercises utilizing existing, computer created and non-digital original artwork. Topics include: key frame & 'tweening, cycling, acceleration, squash and stretch, backgrounds, inking, rotoscoping, using sound, masking, multiplane effects and space-to-time. Screenings of professionally made films will illustrate and provide historical perspective. Proficiency in drawing is not required. Credit 4
- 2065-387 Writing the Short Film
A workshop in writing a short film script. The course focuses on story proposal, script treatment, writing and rewriting a short script. (2065-343) Credit 4

- 2065-398** **Film & Video Community Service**
Allows the student to take film or video production experience to the community. Community organizations and groups make contact with film and video majors with the assistance of the faculty community service coordinator for work toward the production of media necessary to the group's outreach, educational or promotional efforts. A final written report, screening of the community project and meeting with the faculty coordinator help the student evaluate the production and the experience. (2065-203) **Credit 4**
- 2065-413** **Senior Project Seminar**
A required course for third-year film/video majors and the prerequisite for 2065-507, Senior Project. Students discuss and generate a written plan for their senior film and/or video projects and select an advisor from among the film/video faculty (2065-432) **Credit 1 (S)**
- 2065-427** **2D Computer Animation I**
This class is intended to give students competency in the prevalent 2D software. An understanding of computer graphic and video theory will be established as the foundation of software use. Raster paint software will be covered as a companion to animation software. Students will learn the structure of raster image and movie files, the paradigm of specific software designs, and issues inherent in common production pipelines. Students will learn specific task oriented operations common in various animation approaches. (2065-331) **Credit 3**
- 2065-428** **2D Computer Animation II**
This class is intended to extend student competency in 2D computer animation software. Object oriented software will be supplemented with plug-ins and paint animation software. A variety of source media including live action video and 3D files will be used. (2065-427) **Credit 3**
- 2065-431** **Introduction to 16mm Sync Sound**
An introduction to all aspects of professional film production. Students produce short projects while learning basic shooting and editorial procedures along with equipment handling and maintenance. (2065-203) **Credit 5**
- 2065-437** **Advanced Animation Workshop I**
Students are given the opportunity to produce, either singly or in small groups, a motion picture with sound using an animation technique or combination of techniques of their own choosing. Students may elect to take this course for one or two quarters, depending upon the dimensions of the project. (2065-427) **Credit 4**
- 2065-441** **Drawing Animation: Dynamics**
Three different courses in drawing for animation are offered. Each course provides a different focus and assumes considerable drawing skill. This course focuses on the dynamics of drawn animation. Students explore the use of acceleration and deceleration, squash and stretch, maintaining volume, anticipation, secondary action, overlapping action, paths of motion, follow-thru, and exaggeration. Weekly assignments consist of rough pencil tests. A variety of examples of drawn animation will be screened in class. Gesture drawing from live models may be included. (Figure in Motion or permission of instructor) **Credit 3**
- 2065-442** **Drawing Animation: Sequences**
Three different courses in drawing for animation are offered. Each course provides a different focus and assumes considerable drawing skill. This course focuses on character animation in a group environment. Students will learn and draw common characters, as well as create and work off of layouts. Students will exchange rolls as key animator, in-between and clean up artists. (Figure in Motion or permission of instructor) **Credit 3**
- 2065-443** **Drawing Animation: Characters**
Three different courses in drawing for animation are offered. Each course provides a different focus and assumes considerable drawing skill. This course focuses on character development for animation of all kinds. Students produce character sheets. They explore different perspectives of the character drawing from the imagination. Some animation will be done to reveal character personality. A variety of examples of drawn animation will be screened in class. Gesture drawing from live models may be included. (Figure in Motion or permission of instructor) **Credit 3**
- 2065-444** **Advanced Scriptwriting**
A seminar in advanced scriptwriting. Problems related to structure, character development, dialogue, rewriting, cultural conventions, genre and style are discussed in detail while students work on a major writing project. (2065-343) **Credit 4 (W)**
- 2065-447** **Experimental Animation Workshop**
Directed towards experimentation and exploration with single-frame motion image making. Students engage in creative conceptual and experimental investigation and processes to discover new expressions and techniques. This activity is not limited to film format, but may include performance, installation, video, computer imagery, fine arts and photographic processes, nontraditional sound presentation, live action and more. Students study past experimental animated works and examine the definition and pretext for the experimental approach, the connections and relationships of experimental works to art and the role of the experimentalist as discoverer and interpreter of new meaning. **Credit 4**
- 2065-452** **Sound Recording**
Specialized information and work in sound to give information and lab work beyond the regular course and to encourage the beginning of vocational-level work in sound. Each student prepares a mixed sound track to professional quality standards. **Credit 3 (F)**
- 2065-454** **Advanced Production Workshop: Scriptwriting I**
This course is for students who have written a one-act screenplay or have completed a sizable portion of a feature length script. Through a combination of class critiques and discussions, conferences, and readings, students will revise and complete their screenplays. (2065-343 or consent of instructor) **Credit 4**
- 2065-455** **Advanced Production Workshop: Scriptwriting II**
The second quarter of a scriptwriting workshop. Students complete and revise the script begun in the first quarter. Required as the second part of a two quarter production class for students in the scriptwriting track. (2065-454) **Credit 4 (W)**
- 2065-457** **Introduction to 3-D Modeling: Animation**
Beginning modeling for animation in 3D software. Students learn modeling techniques which can be used in the 3D animation course. Students learn the techniques of digital cinematography. These skills are used to create and light a 3D environment. (2065-331) **Credit 4**
- 2065-462** **Advanced Sound Recording**
Continuing the work in 2065-452 to include the decision level in the employment of various sound equipment and including more complex work in multi-track recording and mixing. (2065-452) **Credit 3**
- 2065-463** **Advanced Video**
A thorough survey of the state-of-the-art methods and the hardware involved with electronic imaging. Large-format computer editing and field recording, digital frame grabbing and storage, computer imaging and animation are some of the topics covered. (2065-311) **Class 3, Credit 3**
- 2065-466** **Lighting for Film & Video**
This course will present the fundamental principles of lighting for film and video production. The current methods and practices of lighting used in the motion picture industry will be explored through demonstration, lectures, and "hands on" lab assignments. **Credit 3**
- 2065-469** **Digital Video Post Production**
A hands on tutorial in using Avid Media Composer 1000's for Digital Video Post Production. Emphasis is on the three major stages of the process: digitizing/DV file transfer, editing/mixing and writing back to a distributed media. Students learn how to edit, manipulate, add effects, mix and composite their source material into a finished fine-edit product. Students use stock media for the exercises and then produce a short finished production of their own design. (2065-311 or permission of instructor) **Credit 4**
- 2065-473** **Women's Stories, Women's Films**
This course provides an introduction to women's films. Through screening films and class discussion, the course examines the themes and issues of women's narratives and how they function in the medium of film. The hero's journey and traditional narrative structure are contrasted with the heroine's journey and the more personal storytelling style of the feminine. The course also considers differences in films made by women and films made by men about women. During the course, students will have an opportunity to explore their own creativity. **Credit 5 (S)**

2065-478

Introduction to 3-D Character Animation

An introduction to three-dimensional digital character animation. The basic principles of character animation and development will be addressed within the context of producing three-dimensional digital character animation. Students will produce a series of short 3D computer animations of digital characters using inverse kinematics as part of the learning process. Then they will produce a final short 3D digital character animation of their own design. Students will become familiar with a variety of three-dimensional digital character animation techniques and applications. (2065-361 or permission of instructor) Credit 4

2065-498

Film & Video Internship

Provides the students with on-the-job experience in the field of film/video. The student seeks and acquires a school-approved internship position in a business or industry. The working environment provides the forum for learning more about the student's chosen career. A final interview with the internship coordinator assists the student in evaluating the experience. The coordinator should be the faculty member most familiar with the student's internship field. (Permission of internship coordinator) Credits 1-6 per quarter.

2065-507

Senior Project 1

The student develops the pre-production planning and completed all major production work on the senior project, meeting weekly with his or her faculty advisor to discuss and devise production plans, screen rushes and revise production strategies. Course work includes budgeting and production economics; script breakdown, shot lists and visual organization; production scheduling, introduction to unit management; and production strategies. (2065-413 and departmental approval) Credit 6

2065-508

Senior Project 2

Work on the senior project continues into the postproduction process. Course work includes postproduction processes: editing, construction of soundtracks, sound mix, preparation of log for negative cutter and communicating with labs. (2065-507) Credit 4

2065-509

Senior Project 3

Students complete work on their Senior Project creating a release print version or other appropriate publishable material. (Fourth year SOFA student, completed Senior Project 1 & 2) Credit 2

2065-512

Senior Forum 2

This course is intended to accompany and complement the Department's Senior Project 2 course. All students in Senior Forum meet as a group to screen edited works in progress, discuss post-production problems, and to plan jointly for the use of departmental production resources. (2065-507) Credit 2

2065-513

Senior Forum 3

Completes the Senior Project; i.e., on-line editing and/or negative cutting, lab procedures, first trial print, film-to-video transfer, etc., as well as festival entries and distribution. In addition, the course covers producing, crew structure and production management and concludes with practical assistance in job seeking and life after RIT. (Senior standing and completion of Senior Thesis I and II) Credit 2 (S)

2065-550,551,552, 553

Special Topics

A seminar approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally offered in the regular curriculum. Available to upper-level students. Credit variable

2065-599

Independent Study

A student-proposed advanced project sponsored by an instructor. Approval of the proposal by a faculty sponsor and the administrative chairperson of the school. Available to upper-level students with a GPA of 3.0 or greater. Credit variable (F, W, S, SU)

School of Photographic Arts

Fine Art Photography

2060-257

Still Photography I

In the first quarter students become familiar with the 35mm camera, processing and printing. The work is restricted to black-and-white photography. The aesthetics and basic understanding of photographic practice are covered. The second and third quarters deal with more advanced techniques and principles of photography. This series of courses is available for students who are not majoring in photography. Credit 3

2060-258

Still Photography II

A basic studio course for the hobbyist or someone who occasionally use photography in his or her work. Ideas for portraiture are discussed and explored in a natural (rather than commercial) manner, both of one person and then of two people. The idea of self-portrait also is discussed and explored. (2060-257 or a working knowledge of developing film and making black-and-white enlargements) Credit 3

2060-259

Still Photography III

A one-quarter course in which students determine their own theme of expression using black-and-white photographs. (2060-257 or a working knowledge of developing film and making enlargements, 2060-258; permission of instructor) Credit 3

2060-301, 302,303

History & Aesthetics of Photography

Covering the history and aesthetics of photography from 1839 to the present, with special emphasis on the development of photographic seeing, and its related effect on other media. A survey of the numerous processes and how their development affected the image making of their particular period, i.e., daguerreotypes, collotypes, ambrotypes, etc. Slide lectures cover topics from surrealism and documentary to conceptual art and post-modernism. Credit 3

2060-311,312,313

Introduction to Fine Art Photography

The meaning and practice of photography in a fine art context is discussed by the faculty. Students create visual work informed by the lectures and reflective of their own personal interests and experience. During all three quarters, the work of relevant artists is surveyed in slide presentations. The courses may be supplemented by field trips to museums, galleries and artists' studios (Photo I or suitable portfolio) Credit 4

2060-324

Photo Media Survey

Students experiment with 19th century processes such as Vandyke, cyanotype, glenn bichromate, and with image combinations and alterations such as collage, montage, hand coloring, xerox, hand-coated emulsions, etc. Lectures introduce historical perspective on artists using these techniques and also feature demonstrations of various imaging systems and their integration. Credit 3

2060-359

Digital Imaging for Artists

This course is intended for fine art students and others whose primary interest is in digital picture making within the art historical/contemporary art context. Lectures and hands on activities will permit each student to improve their skills and develop their ideation as digital artists/imagemakers. Demonstrations will facilitate learning software techniques and systems of working. Labs will provide 1:1 assistance to students with their technical problems. Slide/electronic image lectures will introduce contemporary and historic work by artists that is relevant to today's picture makers. Students will be expected to produce at least one large-scale digital image during the quarter. Credit 4

2060-363

Avant-Garde & Creative Processes

This course will explore the essence of the myth that the artist is a precursor, a seer and that significant work is art that prepares for the future. Students will study how the major political movements of the twentieth century Capitalist. Democracy, Communism and Fascism give rise to the concept of subversive innovation among the avant-garde in Europe and America. The course will explore the role that photography plays in such avant-garde movements as Dada, Surrealism, Futurism, Photorealism, Pop Art, Conceptual Art, and Abstract Expressionism. Credit 3

2060-401,402,403

Photography as a Fine Art I

The major emphasis is on the individual's learning to identify and articulate a personal response to his or her environment through the medium of photography. Students design their own projects and work under the guidance of the professor. Traditional silver, as well as nonsilver, photography techniques may be utilized. (2060-311) Credit 4

2060-411,412,413

Contemporary Issues

An examination of many thought provoking and/or controversial issues in photography from 1950 to the present through a series of lectures, readings and discussions. Topics covered include post-modernism, genderism, pornography, censorship, altered images, connoisseurship and others. The course format allows review and exploration of such themes as the landscape, the nude, portraiture, conceptual art, trompe l'oeil and so on. Students prepare an oral debate or a written term paper. **Credit 4**

2060-463

Women & Visual Imaging

Students explore the nature of gender, its history and its implications in visual images. Students develop a working knowledge of the roles of women both as subjective content in images and as creators of values and ideas in the visual form. (Third- or fourth-year status) **Credit 4**

2060-464

Art & Censorship

Students will analyze and debate the art and the issues propelling censorship in the arts beginning with the 1989 cancellation of the Mapplethorpe show by the Corcoran Gallery and continuing through the present debates. Students will view and discuss the art works of this period as well as historic art, ideas, and events that have generated censorial conflict. Students will investigate censorship in terms of the underlying, opposing social values that define American culture. (Open to third and fourth year students) **Credit 4**

2060-468

Media Art & Principles Positions

Students will investigate the development of time-based media art and its evolution from photography, sculpture, dance, performance, and writing. Students will explore work of significant contemporary and historic artists through the Media Cafe collection. They will research the various strategies artists developed through the '60s to the present as this new perceptual tool helped create significant social change. At the end of the quarter, students will present portions of their research, papers, and selections from the collection in the Media Cafe during the final week of class. (Open to third- and fourth-year students) **Credit 4**

2060-474

Photographs & the Moving Media

Students taking this tools course will work with still photographs, electronic images, and video footage to create new work that moves across the disciplines of photography and video. Students will use Premiere software to produce work that is photography like video like photography. Students will explore nontraditional narratives, conceptual constructions, fabrication, performance, and installation. They will work with traditional photography processes, electronic media, and projection equipment to create and display their projects. Students will view contemporary work and they will analyze the various strategies artists use to convey their values and ideas. Each student will produce a final project for public presentation in the Media Cafe during the final week of class. (2067-325 is required and 2065-243 is recommended) **Credit 4**

2060-501, 502, 503

Photography as a Fine Art II

Emphasis is placed on the student's setting of goals, selection of assignments and projects and expansion of work on his or her own terms. Lectures and experiences are oriented to encourage awareness of shared concepts in the other arts, goals set by working artists and the relevance of the history of the visual arts to the student's work. (2060-403) **Credit 4**

2060-550,551,552,553

Special Topics

Topics of current or special interest designed to broaden and intensify the students' ability to use photography as a mean of communication and expression. **Credit variable 1-9**

2060-554

Gallery Management

A basic, hands-on course in gallery operation to include gallery management and aesthetics. Course work is done with actual shows in the RIT photo gallery and other galleries where appropriate. **Credit 3**

2060-556

Photo Media Workshop

Photo Media Workshop emphasizes visual problem solving utilizing alternative photographic processes. The first quarter features work with emulsions on various surfaces, the second deals with visual books, and the third quarter covers generative systems including electrostatic, offset printing and other methods of altering images. The course is best when taken in order, but students may join in at any quarter. (2060-324) **Credit 4**

2060-566

Color Photo Workshop

Emphasis is on the creative and aesthetic aspects of color photography and other color imaging systems. Students are provided with an opportunity to explore the variety of ways in which color photographs can be produced, reproduced, sequenced, displayed and preserved. A personal portfolio of work presented as color prints, color transparencies, a slide presentation, an exhibition or as an art book is required for each quarter. (Basic color course) **Credit 4**

2060-574

Archival Photographies

An introductory course surveying current findings in photographic conservation with an emphasis on acquiring and applying skills for archival processing, presentation, transportation and storage of photographic images. Laboratory sessions include research visits and field trips. **Credit 4**

2060-599

Independent Study

Learning experiences not provided by formal course structure may be obtained through use of an independent study contract. **Credit variable 1-9**

Biomedical Photography

2061-201

Biomedical Photography I

2061-201 is the first of a three-quarter sequence of study in the fundamentals of photography, with emphasis on the development of strong photographic skills as they relate to the principles of 35mm camera optics, choosing and using perspective, lighting and related aspects of darkroom skills. Principles of creativity, craftsmanship applied photographic theory as well as visual communication and presentation will be used to support the foundation theme of using cameras as a tool used in problem solving for technical and visual communications. **Credit 6**

2061-202

Biomedical Photography I

2061-202 is the second course of a three-quarter sequence of study in the fundamentals of photography, with emphasis on the development of strong artificial lighting skills as they relate to working in the studio. Principles of creativity, craftsmanship, applied photographic theory as well as visual communication and presentation will be used to support the foundation theme of using 4x5 cameras. (2061-201) **Credit 6**

2061-203

Biomedical Photography I

The third course of a three-quarter sequence of study in the fundamentals of scientific photography, with emphasis on the development of enhanced skills as they relate to working as a scientific photographer. Principles of creativity, craftsmanship, applied photographic theory as used in the presentation subject matter relevant to the life sciences industry will be incorporated as part of the foundation for future biomedical photography experiences where appropriate. (2061-202) **Credit 6**

2061-221

Photo with Digital Technology I

This course explores the traditional experiences found in film photography with the sophisticated tools of the dynamic digital age. Students can experience photography approaches to the conceptual process required for the making of photographs as integral activities through the use of their imaginations, the selection of proper photographic tools and methods as they create visual solutions to assignments. Many of these solutions will include the use of equipment and techniques found in the world digital photography and its technology. Students will be required to produce assignments that require the successful delivery of ideas through pictures in this class. **Credit 4**

2061-301,302,303

Biomedical Photography II

A three quarter sequential course explores approaches and techniques that are required in the production of communication media used in the life sciences industry. The emphasis will be placed on developing skills and approaches used in close-up photography as well as photomacrography. The course uses all formats as well as film & digital capture. In the winter students are exposed to illumination and optical considerations required to use a microscope. This quarter culminates in the production of an educational poster featuring a subject that has been researched using the microscope. Spring investigates the use of electronic flash as a light source found in the life sciences community. Students are exposed to ophthalmic photography, surgical photography, dental photography, environmental and close-up photography. Final project integrates images into an educational poster. (2061-203) **Credit 5**

2061-311 Preparation of Biomedical Visuals I
The first course delivered over a three-quarter sequence will study the basic principles required for the generation of effective visual communication specific to the life sciences industries. The emphasis will be placed on choosing and using the correct technology for visuals including aspects of fundamental design required in such a dynamic delivery environment. Assignments have been designed to emphasize the appropriate techniques for producing visuals, which exhibit effective design necessary for reproduction either using traditional mechanical or electronic methods. Credit 3

2061-312 Preparation of Biomedical Visuals II
This is the second course of a three-quarter sequence designed to study the basic techniques required for the generation of effective visual support materials specific to the life sciences industries. The emphasis will be placed on creation of 35mm slides using copy, duplicating, photomechanical as well as computer graphic methods. Additionally students will be exposed to the operation of various audiovisual equipment. (2061-311) Credit 2

2061-313 Preparation of Biomedical Visuals III
This is the third course delivered over a three-quarter sequence and will study the basic principles for the generation of effective desktop publishing specific to the life sciences industries. The emphasis will be placed on choosing and using the correct technology for visuals including aspects of fundamental design required electronic publishing. Students will specifically be exposed to core principles required to produce electronic pieces including effective resumes, posters, brochures and flyers. Assignments have been designed to emphasize the appropriate techniques for producing these visuals, which exhibit effective typography that is necessary for reproduction using electronic methods (2061-312). Credit 3

2061-316 Digital Media in Biomedical Photography I
Electronic media is quickly replacing traditional photography on many fronts in the life sciences industry. Digital Media in Biomedical Photography is a two-course sequence that explores all aspects of digital media from concept development through production of final product. The course will examine significant issues found in electronic imaging activities driven by budget, hardware, software and production issues. Students will execute practical assignments in the production of educational support materials found in a variety of digital media areas including image capture, processing, hard copy output, and color management. Credit 4

2061-318 Digital Media in Biomedical Photography II
This is the continuation of a two-course sequence that explores digital media from concept development through production of final project. The course will examine significant issues found in electronic imaging activities driven by budget, hardware, software and production issues. Students will execute practical assignments in the production of educational support materials found in a wide variety of digital media areas including: interactivity, on-line documents, digital posters, user interface design, web site production, basic 2D animations, and speaker support materials. Credit 4

2061-354 Basic Ophthalmic Photography
Investigates proper patient management, camera and photographic techniques in ophthalmic photography. Diagnostic evaluation of ocular anatomy and physiology utilizing special cameras is presented. (2061-300 series or permission of instructor) Credit 4

2061-357 Principles & Technology of Photo-Macrography
A condensed course in principles of photo-macrography. It examines the equipment involved with, the technical considerations necessary and the techniques involved in the photography of subjects' 1:1 through 20:1 magnification. Lighting, optics, camera technique and various other considerations are evaluated in theory and practice. (Second-year or higher photographic status) Credit 4

2061-361 Web Design using Photography
Photographers have always communicated visually: the accessibility of the World Wide Web creates a potential audience of millions. This course explores the nature of the World Wide Web, web sites, and the process of designing, building and maintaining these sites for business or other applications. Students will explore the use of images and media as they relate to the Web, including bandwidth and quality considerations. Interactivity, design, structure, viability, and the successful delivery of ideas will be emphasized. Some quarters this course is delivered through distance methodology and culminates in individual student web sites as the course final project. Credit 4

2061-401 Audio Visual Production I
The field of information delivery has changed significantly. This course is designed to explore concepts & software required for the production of desktop multimedia. Students explore concepts of script writing, crafting of educational objectives as well as the production of multimedia. Credit 4

2061-402,403 Advanced Photography in Biomedical Communications
Sophisticated and creative applications of photography serving the needs of the scientific community. Students explore a variety of specialized photographic techniques and a variety of philosophies. Assignments are performed that are similar to those encountered in biomedical and research institutes. (2061-303, basic color course) Credit 4

2061-454 Intermediate Ophthalmic Photography
Intermediate Ophthalmic Photography goes beyond the shooting of retina fundus photographs or posterior segment photography and concentrates on interpretation of fluorescein angiography films and anterior segment photography. Additionally investigates external ocular photography, slit-lamp biomicrography, common corneal anatomy and diseases. (2061-354) Credit 4

2061-455 Advanced Application Ophthalmic Photography
Provides students with clinical experience in ophthalmic photography. Students work off campus in an ophthalmology clinic performing stereo fundus photography, fluorescein angiography, specular biomicrography, slit-lamp biomicrography and goniotography. The educational experience is balanced with the needs and tolerance of each patient involved, and represents an important clinical education necessary for diagnostic imaging. Students are responsible for their own transportation to and from site. (2061-354, 2061-552 and consent of the instructor) Credit 4

2061-463 Photography & the Microscope
This photomicrography course goes beyond the basics of imaging through a microscope. This course investigates the optical enhancement techniques, video recording and motion stopping, as well as specimen preparation in various applications as well as sample preparations. (2061-302 or 2076-412) Credit 4

2061-499 Biomedical Photography Co Op
Provides biomedical photographic communications students with on-the-job experience. The student seeks and acquires a school-approved co-op position in the health care industry. The working environment provides the forum for learning more about the student's chosen career. A final interview with the co-op coordinator assists the student in evaluating the experience. Credit 0

2061-501,502,503 Photography Concentration
Investigating, planning, organizing and producing an audiovisual presentation, a learning package or an informational program for a biomedical communications client. (Completion of Biomedical Photographic Communications AAS degree requirements, at least one upper-division photo elective in media, permission of the instructor) Credit 4

2061-550,551,552,553 Special Topics
A seminar approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally offered in the regular curriculum. Available to upper-level students. Credit variable 1-9

2061-599 Independent Study
A student-proposed advanced project sponsored by an instructor. Approval of the proposal by the department chairperson and the director of the school. Available to upper-level students with a GPA of 3.0 or greater. Credit variable 1-9

Photographic Arts

2067-201,202 Applied Photo I
An introduction to the major in applied photography that will give the student broad experiences in various areas of photography to assist in making program decisions and practicing visual communications. The curriculum emphasizes both craft and visual problem solving. Credit 6

2067-263 Studio Light
A lighting workshop course that uses visual exercises to teach students how to evaluate light conditions outside and control and reproduce those conditions in the studio. (2067-201,202) Credit 5

2067-264 Introduction to Photography for Non-Photography Majors
An introduction to still photography- principles, methods, theory, and practice –for non-photography majors. This course will familiarize the student with the basic skills of still-photography. This is a non-darkroom course designed to introduce the students to the operation of their camera, flash, and accessories; film selection and exposure variables; light, filters, and basic tone control. Photographic aesthetics/composition, history, contemporary artists, professional applications, and other non-technical aspects of photography will be addressed through weekly lectures and critiques of photographic shooting assignments. Students are required to have their own adjustable camera and flash unit. Each student will provide his/her own film and processing. Non-photo majors only. Credit 4

2067-268 Visual Images: Source & Resource
Considers ideas and modes of thinking that can influence the creation of pictures. It is designed around several thematic issues that allow the students to personally and creatively resolve visual problems associated with personal culture and history; photographic and non-photographic images; integration of aesthetics, ethics and values; ways of working; and discipline, structure and inspiration. Students are encouraged not only to think about pictures in a larger context, but also to consider their personal relationships with the act of making photographic images. (Photo I) Credit 4

2067-273 Visual Inquiry
Where do ideas come from, and how do you help them along? How do you solve visual problems, assignments, questions and curiosities? What is your method for coming up with unique visual solutions? This class is for those who like to write and trace ideas and their evolution. A journal is used as a forum for drawing, writing, collages, photographs and other things. We analyze the process we take in order to solve problems (visual and other types). We start with simple posed questions (curiosities) and evolve them into useful solved answers (photographs). Credit 5

2067-278 The Spiritual & Mystical Image
Guides the student toward a tangible perception of a higher self that is compatible with our established perceptions of ourselves as artists. Three major areas to be integrated are self, intellect and spirit. Emphasis on realist and contemporary possibilities and self-discovery through imagination. Credit 5

2067-283 Introduction to Applied & Fine Art Concepts
An interdisciplinary approach to the application of core skills in photography, stressing the similarities and differences between the fine art, advertising and journalism disciplines. The student has the opportunity to work with diverse faculty from these specialties. (2067-201,202) Credit 5

2067-288 Media & Society
This survey of rights and duties of the media professional will look back at the historical and philosophical underpinnings of legal and ethical issues related to professional communication, current laws and ethical practices, and forward to future media technologies and how they might be shaped by these principles. Credit 4

2067-301,302 Applied Photo II
Advanced applied photography in black-and-white and color with emphasis on craftsmanship, problem solving and visual communications. Major technical emphasis and introduction to studio electronic flash and large-format photography. Further emphasis is placed on the development of the student's ability to apply creative thinking and contemporary techniques in executing meaningful and effective photographs. (2067-202) Credit 5

2067-325 Introduction to Electronic Image Photography
Lectures and hands-on activities will permit each student to discover the applications of electronic imaging for still photographers. In addition to photographic lab exercises, there will be lectures and presentations on the basics of these technologies and their applications, integration of the communications fields and an introduction to acquiring and presenting electronic images. Students will be expected to complete both electronic imaging tutorials and photographic assignments. (2067-201, equivalent, or permission of instructor) Credit 4

2067-363 The Zone System & Fine Print
A one-quarter introduction to the fundamentals of the Zone System and the Fine Print, using black-and-white photography. Purpose, technique and aesthetics of the system and printing are the content of the course. Emphasis is on large-format technique. (2067-201,202) Credit 5

2067-364 Art Direction & Copy I
A study of art direction and copywriting with emphasis on conceptual thinking as it applies to the photographic image. Some emphasis is placed on basic hand skills, i.e.; layout, type rendering and paste-up. Marketing principles and career possibilities are covered. (Photo student or permission of instructor) Credit 5

2067-373 Nontraditional Photographic Illustration
An intense exploration of the possibilities for integrating the disciplines and thinking related to art, philosophy, culture and mythology with the production of images for use in advertising and editorial media. The approach is intended to inspire a more spontaneous and emotional form of expression by providing an opportunity to experiment with alternative processes and fine-art methodology in the broad context of commercial applications. (Second-, third- or fourth-year status) Credit 5

2067-374 Nontraditional Darkroom
Students produce a series of nontraditional photographic images while learning to utilize the darkroom as a primary tool in their expression. Course is an introduction to, and exploration of, alternatives to camera/lens photography. Not limited to in-camera paper negative photography, it also explores a variety of nontraditional photographic processes. Challenges the student to "leave the photographic tradition of representation and enter a broader area of creative control." (2067-201,202) Credit 5

2067-378 Photojournalism: Color Seminar
An exploration of the aesthetic and technical evolution of color in photojournalism. Students research the work of contemporary photojournalists, experiment with a variety of color films to identify potential applications and complete a series of shooting assignments. Personal portfolios of color photographs are produced by the students. (Second-, third- or fourth-year status) Credit 5

2067-379 Photojournalism: Newspaper
For students in, or curious about, a career in newspaper photojournalism. The content is both theoretical and practical. Students are required to shoot according to newspaper standards and needs on a weekly basis. In addition, students have the opportunity to "shadow" photographers and editors from the Gannett newspapers. Shooting sports, spot news, features and special essays are part of the course. Special processing and printing skills are covered as well as specialized camera and lens handling techniques. An excellent opportunity for those seeking to improve portfolio for newspaper internship possibilities. (Permission of instructor) Credit 5

2067-383 Hand-Held Electronic Flash
Flash photography provides a means of consistent and precise exposure control in the most demanding of lighting situations and/or in rapidly changing environments where many exposures of different views are necessary. Course is an introduction to the application and aesthetics of hand-held electronic flash photography for students wishing to further their knowledge, understanding and experience with hand-held electronic flash for small-format photography. Students produce a series of commercial or personal images while learning to use flash as an aesthetic tool. Students are required to have their own flash units. (2067-201,202) Credit 5

2067-388 Picture Editing & Layout
Image selection, usage and design for the printed page. Using images from sources other than your own photographs, we discuss picture selection relative to context and desired impact and how to effectively design the page(s) upon which the image(s) exist(s). Techniques such as scaling, proportion and sizing are related to page design. We discuss typography and its function with photos, including captions and block text. Students lay out a number of assignments from single pages to essays of varying length. A variety of picture sources is used. A student need not use his or her photos in this course. (Second-, third- or fourth-year status) Credit 5

2067-393 Beginning Underwater Photography
An introduction to underwater photography for second- through fourth-year students. The equipment and techniques necessary to successfully complete an underwater shooting assignment with both black-and-white and color films are covered. The curriculum emphasizes the technical and aesthetic aspects of visual problem solving in an alien environment. The underwater landscape, aquatic creatures, human models and still life set up are some of the themes explored. A field trip to the dive site is at student expense. In lieu of the field trip a special project with student/teacher agreement can be substituted. (2067-201, 202, 208; must be certified Open Water Diver; instructor approval required) Credit 5

2067-394 **The Electronic Collage**
In this course students will combine, collage, and manipulate their own and public domain images to create new images which may be personal and/or commercial. The computer will be used most frequently as the tool for expressing ideas, however, images will be merged by means of more traditional methods as well. This is a shooting course, students will make new and original images in addition to utilizing their own previously created images and public domain images. (2067-325) Credit 4

2067-401 **Photojournalism I: Photo as a Narrative**
This course will explore the use of the photographic image in narrative, documentary and editorial form. Issues of public need and publication will be addressed. The emphasis during the first quarter of photojournalism is a personal one. It is simply about the photograph. It is about the act of photographing; and it is about being a photojournalist (2067-302 or equivalent) Credit 5

2067-402 **Photojournalism I: Editorial on Location**
This course is about photographing editorial assignments, on-location. The assignments will have special technical controls required to strengthen the student's skills of photographing people on location. Particular emphasis will be placed on the control of color and lighting. The editorial assignments are designed to be appropriate for major mass-market general news and special interest consumer publications. In addition, it is expected that these assignments would satisfy the requirements of many of the major picture agencies both in the USA and foreign markets. (2067-302 or equivalent) Credit 5

2067-403 **Photojournalism I: Photography for News Media**
This is a course about photojournalism with specific emphasis on photography for a daily metropolitan newspaper. Students will be required to photograph according to newspaper standards and needs on a weekly basis. This photography will include: spot news, general news, features, sports, editorial portraits, and photo essays. Aspects of journalism such as story ideas, research and visual execution will be addressed. Students will be required to write captions for all photographs and to generate text to support photo essays. The legal and ethical issues of photojournalism will be researched (2067-402 or equivalent) Credit 5

2067-411,412 **Advertising Photography I, II**
A course in visual problem solving with photography. Studio and other controlled environments are stressed. Advertising and editorial solutions and applications are explored. The skills involved with both product rendering and concept illustration are covered. (2067-302) Credit 5

2067-431 **Photography Business Management**
A one-quarter business survey course for all applied department students, but required for advertising photography majors. This course will cover business concepts necessary for the operation of a small studio or freelance business on a practical level, beyond the basics covered in Advertising I & II. Job search methods, self-promotion, bookkeeping, and legal aspects of business will be addressed. (Advertising Photography major or by instructor permission) Credit 3

2067-451 **Advertising & the Fine Arts**
This course will examine aspects of different traditions, styles and movements of the fine arts: painting, sculpture, dance, and theater. We will look at how these disciplines relate to images created for editorial and advertising art. The class will use these art forms to draw on for inspiration for the images we produce for this class, both photographic and non-photographic. Field trips to local museums, theater, and concerts will be funded by the individual students. (2067-412) Credit 5

2067-453 **On Location Photography**
Covers the techniques and equipment necessary to complete an "on-location" assignment for a corporate report, brochure or audiovisual presentation. Students are encouraged to meet professional standards while developing a strong personal point of view. (2067-302 or equivalent) Credit 5 (SU)

2067-457 **Propaganda & Photography**
PROP-A-GAN-DA, N. The particular doctrines or principles propagated by an organizational or concerted movement. The dissemination of information from a particular point of view. Course examines photographs and films that have very often shaped our view of the world and explores the positive and negative effects of such images. The period from the Crimean War to the present is covered. Special emphasis is placed on World War II, where propaganda was used in the extreme for both good and evil. Still photographs, including those in the professor's collection, are studied, some of which are "faked" photographs. A larger question studied is "Why were these photographs faked?" Included in lectures are the historical and cultural forces behind the work. Credit 4

2067-458 **Food**
Instruction covers basic means and methods of preparing a food photograph: shopping for the proper ingredients; consultation and working the prop and food stylists/chefs/home economists; how the approach to a food photograph differs from other photographic assignments. Students learn the basic methods of preparing food for photography as opposed to food for eating. Assignments range from simple raw-ingredient shots to pour shots to building a sandwich to making a salad. (Third- or fourth-year status) Credit 5

2067-460 **Personal Document**
A combination studio and location class that introduces the student to the concepts of using personal experience and lifestyle as information and inspiration towards image making and taking. A variety of issues are dealt with, such as public and personal events, cultural, social, personal and intercultural symbols. The written word and its effect and influence on the photograph are covered. Layout and presentation and their effect on the audience the work is designed to serve are included. (2067-302, or permission of instructor) Credit 7 (SU)

2067-461 **Editorial Photography**
The editorial photography course is an investigation into images that are created to illustrate magazine articles. Students will have the option of working with still life, people, location, documentary, and/or fashion photography. Current events will be discussed for "picture possibilities". Emphasis will be placed on producing multiple or sequential images that relate to social and political issues. Historical and contemporary studies of layout and style will be examined. (2067412) Credit 5

2067462 **Portraiture I**
Lectures are devoted to discussion of the current portrait approaches in commercial, documentary and fine art photography. Because a successful portrait requires a synthesis of aesthetic and technical skills, the technical elements of portraiture-including camera, lighting, background and posing are discussed and demonstrated. Students work primarily with studio strobes and are encouraged through weekly assignments and critiques to apply what they've learned. Credit 4

2067-463 **Portraiture II**
Encourages the student to develop a personal approach to portrait photography through a term-long, self-directed project. Critiques are held weekly to provide feedback on work in progress. (2067-462) Credit 4

2067-464 **Contemporary Portrait Photography**
Brings together the skills of the first two terms and encourages the student to develop a personal approach to portrait photography through a term-long, self-directed project. Credit 4 (S only)

2067465 **XI-Summer Advertising Core**
Advertising and editorial projects are required assignments in this course. Also required as class assignments are projects of personal artistic expression. This course gives a student an opportunity to learn and build a portfolio of work at an intensified rate with daily (Monday through Friday) association with the instructor. Each student will have personal use of a studio for the entire course duration. Marketing techniques and analysis of the student's portfolio are included. (Completion of second year or instructor's permission) Credit 10 (SU)

2067468 **Self-Promotions & Business**
Contemporary marketing and business issues for free-lance photographers are the principal subjects and include calculating a creative fee, client negotiations, invoicing and copyright for assignment and stock photography, and client research methods for photographers. Students will create self-promotion materials, including mailers, business cards and letterheads. (Junior or senior status or instructor's permission) Credit 4

2067469 **Environmental Portraiture**
A course involving the selection of various persons as subjects and learning of their skills and specialties. The student interviews subjects, defines what they do and where they do it, and designs a photograph that shows the viewer the subject's job or avocation and the environment in which the subject operates. Credit 5

2067471 **Advertising & Design Photography**
This course teams photographers and graphic designers in the production of advertising layouts/campaigns, posters and brochures. Students have the option of working with still life, people, location, and/or fashion photography. Current advertising campaigns will be discussed and analyzed. Emphasis will be on producing multiple or sequential images. Historical and contemporary studies of layout and style will be examined (Advertising Photography major or by instructor permission) Credit 5

2067-473 **Portfolio Development**
Designed for third- and fourth-year students who are ready to present themselves and their work to potential employers. Weekly assignments move the students closer to their stated goals. To begin this course students must be able to answer two career-related questions: what is it they wish to do, and where do they wish to do it? **Credit 5**

2067-475 **Digital Photography**
Hands-on activities will permit each student to investigate the applications of applied digital and hybrid photography. In addition to studio, location and laboratory exercises, there will be presentations on trends in contemporary imaging. Students will be expected to capture images using both digital and film-based cameras, process digital images, create picture files and participate in project-related critiques, (available to senior, junior or graduate students, pre-requisite 2067-325 or equivalent, or instructor's approval) **Credit 5**

2067-478 **Architectural Photography**
An image-making course for advanced students with a specific interest in architectural exterior and interior photography. Assignments are designed to emphasize the development and exploration of professional techniques and styles. (Completion of second year courses or permission of instructor) **Credit 4**

2067-481 **Publication Research & Planning**
This course is designed to provide students an opportunity to define and design a special interest publication and its publication staff (creative team and production team). We will research publication design, staffing, cost estimating, planning, recruitment, and concept development. Students will be expected to both build a publication model and its staff requirements. **Credit 3**

2067483 **Introduction to Fashion Photography**
This is a course that provides advertising students basic experience in fashion photography. Students will be taught the concepts, aesthetics, and processes of fashion work, casting and directing the model, studio and location shooting, ethics (especially with regard to women's issues). Digital imaging, including both capture and post production, will form an integral part of the course. (Applied Photo II) **Credit 5**

2067488 **People Illustration/Studio**
Advanced study of people photography focusing on the development of the photographic and social skills of the studio photographer. Learning to orchestrate the tangible and emotional studio environments is a major goal of the course. Studio lighting, camera techniques, and the selection and direction of models are the subjects of lectures, demonstrations and assignments. Many of the course assignments are open ended, which gives the student freedom to generate independent projects. (2067411,412 or permission of instructor) **Credit 5**

2067-493 **Problems & Projects/Still Life**
The still life as a medium for creative expression and visual experimentation. The tools and techniques particular to the still-life photographer are investigated and demonstrated. The special manipulations possible-choice of lighting, perspective, camera angle, surface propping, set rigging, multiple exposure, front projection and other esoteric techniques-are discussed, demonstrated and applied to assignments. Projects are in a practical vein, relating to actual typical problems that are part of a working studio's daily life. Assignments investigate the overlapping relationships of fine art, editorial and commercial still-life photography. Large- and small-format cameras may be used; assignments are done both in and out of the studio. **Credit 5**

2067498 **Picture Researching**
Introduction to current practices, procedures, techniques and resource employed in picture researching for collections, exhibitions, publications, motion pictures and television. Students explore the ways pictures are used in communications, establish what pictures are needed for specific projects, discover how they may be found (or produced) and make arrangements to obtain reproduction rights. A case history in picture researching and a personal picture researching project are produced by each student. (Third- or fourth-year status) **Credit 5**

2067-512 **Visual Media Capstone**
Students will submit a proposal for a major project incorporating their visual media focus as well as photography. Faculty from two disciplines will sponsor the research and development of the final project. This activity will be a demonstration of the student's capabilities in their chosen areas of study. The project will be designed, developed and completed during the quarter. Completed projects will constitute a substantial portfolio piece. (12 credits of visual media focus). **Credit 4**

2067-550,551,552,553 **Special Topics**
Advanced topics of current or special interest, varying from quarter to quarter, selected from the field of professional photographic illustration. Special topics announced in advance. (Not offered every quarter. Consult coordinator of the professional photographic illustration program.) **Credit variable**

2067-554 **Advanced Digital Photography**
This lecture and laboratory course gives the advanced student of electronic photography an in-depth look at the tools and techniques of electronic imaging systems. Students pursue research projects in either the visual communications or technical aspects of electronic photography. The student's final project is self-defined. (2067475 or permission of instructor) **Credit 4**

2067-563 **Senior Thesis Photography & Design**
Brings together graphic design and photography students. The students are expected to create a small campaign on a subject of their choice. The purpose of the course is to establish a collaborative atmosphere between the two groups and to introduce them to the process of work on the outside. Teams set up during the sixth or seventh week of the winter quarter. Enrollment is limited. (Fourth-year status and permission of instructor) **Credit 5**

2067-564 **Advanced Color Seminar**
Portfolio preparation course concentrating on the shooting, structure and presentation of a body of work. Completion of a four-part thematic assignment and three individual photographic assignments are required. All assignments are nonspecific in nature, allowing the student the freedom of his or her own direction. As part of the course requirements, each student chooses an appropriate portfolio format and begins to show a portfolio. (Fourth-year standing or instructor's permission; 2067412 or instructor's permission) **Credit 4 (W, S)**

2067-572 **Advertising Workshop**
A course structured to emulate the daily operations of a professional photographic studio. Only those students who seriously aspire to be professional photographic illustrators should enroll. The assignments are specific and vary from straight commercial to advertising illustration. In addition, the student is encouraged to specialize in the direction of his or her own natural abilities and interests. (2067411 or faculty approval). **Credit 5**

2067-573 **Mac Workstation Instrument & Maintenance**
Trains students to install and maintain Macintosh-based imaging workstations. Selected components of hardware and software maintenance are taught. Students receive hands-on instruction in the use and installation of peripheral devices, virus checking and disk maintenance software, system and application software installation, and safety procedures. Methods of hardware operation and optimization are included. (Survey of Computer Science 0602-200, Beginning Electronic Photography 2067-454, instructor approval [significant experience with Macintosh]) **Credit 3**

2067-574 **Portfolio Seminar Illustration**
Provides an opportunity to reshoot and refine existing ideas, create new images and develop self-promotion materials. Emphasis is on presentation, editing and organizing a personal portfolio. Interviews, your first job, defining the marketplace/commercial photography, billing/pricing and how to take charge of your career in photography are a few of the topics discussed. Students have an opportunity to share their work with professional designers, art directors and photographers. **Credit 5**

2067-582 **Production Photography**
Production Photography is the storytelling side of professional illustration. Assignments for the course will include recreating historical events, inventing futuristic scenes, creating believable period pieces—all with an emphasis on narrative illustrations. In the process we'll introduce the skills, concepts, and preparation required to shoot still life and model photography in the studio and on location. Students work as production teams to simulate the professional production environment. (2067411,412 or instructor permission) **Credit 5**

2067-599 **Independent Study**
A student-proposed advanced project sponsored by an instructor. Approval of the proposal by the department chairperson and the director of the school. Available to upper-level students with a GPA of 3.0 or greater. **Credit variable 1-10**

Imaging Systems Management

2068-401 **Photography Image Production Systems**
Introduction to photographic print production systems, principles of operation and quality control. Systems introduced include minilab and production color printers. Color printing theory, tone reproduction, color theory, RA-4 and C-41 processes quality control and production problems are addressed in this course. (Laboratory Science 2076-211) **Credit 4**

2068-402 **Digital Image Production Systems**
Introduction to digital image processing and production systems and their operation and control. Through theory and laboratory production problems students will learn the basic principles of scanning, film recording, digital color printing, image data storage, and transmission and image database management. (2076-211) **Credit 4**

2068-403 **Custom Image Services**
Introduction to custom photographic printing techniques, including enlargements, printing of color transparencies including duratrans, internegatives and slide duping; and image restoration via digital techniques. (2068-402,421) **Credit 4**

2068-421 **Photography Processes & Quality Control**
A variety of analytical methods of studying the chemical and physical factors required to obtain data, adjust and maintain photographic processing systems in a control status are explored through theory and experiment. Students also are introduced to the tools and techniques of statistical process control and quality management to document and find solutions for problems. (Science with lab, 1016-319) **Credit 4**

2068-423 **Statistical Quality Control**
The basic concepts of quality control and the role of applied statistics are addressed using examples from the photographic and graphic arts industries. Examples include the use of such statistical tools as process capability studies, conformance to specification analysis, control charts, and attribute and acceptance sampling plans. (2068-513) **Credit 4**

2068-464 **Color Transparency Process Techniques**
The fundamentals of a slide duping, internegatives from slides and reversal processing for small laboratories are addressed in this course. The emphasis is placed on establishing a quality control system including densitometry, chem mix, control charts, chemical control, use of quality control computers, and the operation of several types of processing equipment. **Credit 4**

2068-499 **Imaging Management Co-op**
Provides the student with industry experience in the photo processing and imaging industry. Department staff assists the student with placement. **Credit 0 (F, W, S, SU)**

2068-501 **Finance for Imaging Management**
Financial analysis for imaging and managers. Project costing, financial analysis, time value of money, project evaluations, evaluating leases and other methods of financial analysis are applied to management issues in imaging industry business (0101-301,0106-320,2068-513,1016-319) **Credit 4**

2068-502 **Imaging Services Market Projection**
Production project studies of marketing imaging services, this course will enhance the student's ability to integrate marketing, visual communication design and project management techniques. A variety of marketing and production problems that require the broad range of their technical imaging and marketing management skills will be planned and executed by the students in this course (2068-501,0105-363) **Credit 4**

2068-511 **Imaging Systems Techniques**
Introduction to the theoretical and practical principles of the operational components used in imaging laboratory production systems. The objective is to achieve an understanding of the electrical, optical and mechanical components of photographic and digital production systems in order to develop skill in basic diagnostic procedures and equipment repair. (2068-403) **Credit 2**

2068-513 **Operations Management for Imaging Services**
This course will give the student the background necessary to address workflow analysis, facilities layout, production costing and planning, scheduling, project management, forecasting and inventory management issues in an imaging service operations through lectures, case studies and projects (2068-402,0102430,0101-302) **Credit 4**

2068-550,551,552,553 **Special Topics**
A seminar approach offered on demand when adequate numbers of students and a faculty member agree to study a subject not normally offered. Credit variable (F, W, S, SU)

2068-599 **Independent Study**
A student-proposed advanced project sponsored by an instructor. Approval of the proposal by department chairperson and director of the school. **Credit variable 1-10 (F,W,S,SU)**

Imaging & Photographic Technology

2076-200 **Photography I-JPHT/JPBH**
An intensive 10-week summer course for students entering the transfer programs in biomedical photographic communications and photographic technology. This is the minimum photographic education needed to gain entry to second-year standing and replaces 2061-201, 202, 203 and 2076-201, 202, 203. Since this course is such an intensive offering, previous photographic experience is highly advisable. **Credit 12 (SU)**

2076-201,202,203 **Photography I**
An intensive three-quarter sequence concentrating on the fundamentals of black-and-white and color photography. Small-, medium- and large-format cameras are utilized as problem solving tools beginning with 35mm and 4x5 in the first quarter. Professionally equipped upper-class studios are used all three quarters as well as black-and-white labs and color printing in the third quarter. Principles of creativity, craftsmanship, visual communication, presentation, preproduction planning and postproduction analysis are taught. Concepts learned in Materials and Processes of Photography are put to practical application in this class. **Credit 4 (F, W, S)**

2076-210 **Materials & Processes of Photography**
An intensive 10-week summer course for students entering a transfer program in biomedical photographic communications or imaging and photographic technology. Replaces 2076-211, 212, 213. (Either this course or the 2076-211, 212, 213 sequence is also a requirement in the professional photographic illustration program.) **Credit 6 (SU)**

2076-211,212,213 **Materials & Processes of Photography**
Basic study of the technology of photography, with the emphasis on applications to real photographic problems. Among the topics studied are image formation and evaluation, photosensitive materials, exposure, processing, tone reproduction, visual perception, color theory, variability, quality control and photographic effects. An approved independent study project is required. **Credit 3 (F,W,S)**

2076-301 **Photographic Sensitometry**
This is a course about quantitative photographic image quality. The photographic imaging system from light source to output will be investigated, component-by-component, for the effects each has on system image quality. Students will characterize the image quality of various photographic components, such as exposure, film, paper and processing. Input-output relationships for each component subsystem will be investigated. Component responses will be collectively used to determine system image quality (based on tone reproduction). Related topics, radiometry, photometry and color sensitometry will also be covered. (2076-201,202,203; 2076-211,212,213) **Credit 4**

2076-302 **Photographic Chemistry**
Provides both a fundamental and advanced treatment of the photographic process at the molecular level. Light-sensitive emulsion chemistry and formulation, latent image theory and the associated dynamic processes, as well as developer formulation and mechanisms of chemical action, will be treated. Extension and comparisons to solid state and digital imaging processes and materials are investigated. An intensive laboratory component will emphasize application of concepts covered in lectures. (2076-211,212,213) **Credit 4**

2076-303 **Photographic Optics**
Provides both fundamental and advanced treatment of the optical processes related to image formation. Particular emphasis on photographic lenses and their element design, as well as mechanical considerations. Treatment will extend to reflective and fiber optics in the context of imaging and communications applications. An intensive laboratory component will emphasize application of classroom concepts. (2076-211,212,213,1016-204,1017-211,212,271, 272) **Credit 4**

- 2076-311** **Color Photo Design**
Exploration of color images through the application of visual elements principles and attributes, including the key and quality of light in the making of photographs. Color contrast and rendition, and comparison of rendition with different photo materials. **Credit 4**
- 2076-312** **Color Printing Theory**
Introduction to color theory and the exploration of color processes utilizing practical laboratory procedures and photographic color reproduction processes. Supports lectures and readings on applied color theory relating to both color photography and its applications. Important topics, in addition to color materials and processes, include color vision, psychological aspects of color, color terminology, and color measurement and specification. **Credit 4**
- 2076-313** **Color Measurement**
Equipment and methods used for the measurement of color are discussed and demonstrated in the laboratory. Topics covered include light sources, radiometry, spectrophotometry, color order systems, color difference formulas and reproduction of color. **Credit 4**
- 2076-381** **Introduction to Photography for Publication**
An introduction to the use of photography in specialized publications in science, industry, business and education. Skill-building assignments to improve competence and an introduction to the problems of the art director, editor, printer, layout person and writer form the basis of the course content. (2067-302,2076-312 or the permission of instructor) **Credit 4**
- 2076-382** **Photoelectronics Workshop**
Introductory hands-on course on basic photo electronic devices. Emphasis on understanding circuits, and learning basic electronic symbols, and principles while constructing project. Several assembly techniques will be introduced. **Credit 3**
- 2076-401** **Systems Design for Graphic Presentation**
Study of the hardware and software needed to effectively design computer graphic images. Workstation labs provide hands-on experience with MS-DOS and Mac computer platforms. (2076-203) **Credit 3**
- 2076-454** **Holography I**
Introduction to holographic and diffractive imaging. Lectures and demonstrations cover the materials, processes and applications of the fundamental types of holograms. Laboratory investigations provide hands-on experience with the construction and playback or transmission, reflection and white-light holograms. (Algebra and physics) **Credit 4**
- 2076-455** **Applications of Holography**
Gives the student a range of experiences in the production and evaluation of holograms as applied to scientific and engineering problems. Instruction is given in both the theoretical and practical aspects of holographic interferometry and nondestructive testing as well as holographic optical elements, computer-generated holography and coherent optical processing. The student is expected to have previous experience in basic display holography. (2076-454) **Credit 4**
- 2076-461** **Photographic Instrumentation Seminar**
The student is exposed to a variety of technical, industrial and/or applied photographic experiences in order to gain a fuller understanding of the scope of photography and its applications. Simplified approaches to photographic instrumentation applications are emphasized. Photographic topics are discussed that emphasize scientific and technical applications where photography functions as a tool of measurement and visualization of events that are beyond the range of normal photographic equipment. **Credit 4**
- 2076-464** **Reversal Color Printing**
A one-quarter course on reversal color printing procedures, printing and processing. Students gain proficiency in using reversal print material. (2076-312 or permission of the instructor) **Credit 3**
- 2076-470** **Summer Nature Photography**
Students learn the fundamentals of professional nature photography as exhibited by such magazines as Audubon and National Wildlife. Topics include selection and care of equipment, use of strobes, adapting to adverse weather conditions, sales of photographs, copyright law, free-lancing and more. Students are required to spend several hours per week shooting in natural environments. (2076-201,202,203 or permission of instructor) **Credit 4 (SU only)**
- 2076-471,472,473** **Nature Photography**
Students learn the fundamentals of professional nature photography as exhibited by such magazines as Audubon and National Wildlife. Topics include selection and care of equipment, use of strobes, adapting to adverse weather conditions, sales of photographs, copyright law, free-lancing and more. Students are required to spend several hours per week shooting in natural environments. (Photo I, or instructor permission) **Credit 4**
- 2076-479** **Introduction to Scientific & Technology Photography**
Introduction to special or unusual methods particularly useful in technical, scientific or research photography. Emphasis on the student's development of innovative solutions to a set of photographic problems. Firsthand experience is encouraged by participation in simulated and simplified approaches to more complex specialties. **Credit 4**
- 2076-481** **Advanced Color Printing I**
This course advances the student's basic knowledge of color printing and assists in the preparation of a color portfolio. Students print their own portfolio-quality images using one or a combination of color-printing avenues. Students can print from negative using RA-4 processing and from transparencies using R-3 or the state-of-the-art P-4 Ilford process. The instructor works with each student to tailor his or her portfolio. **Credit 4**
- 2076-482** **Advanced Color Printing II**
This course provides advanced study in color techniques and theory in relation to quality and creative use of photographic materials. The student may choose a section for intensive study such as the dye transfer process, quality control methods in printing and processing and special masking. (2076-312 or equivalent and permission of the instructor) **Credit 4**
- 2076-483** **Advanced Color Printing III**
This course provides advanced study in color techniques and theory in relation to quality and creative use of photographic materials. The student may choose a section for intensive study such as the dye transfer process, quality control methods in printing and processing and special masking. (2076-312 or equivalent and permission of the instructor) **Credit 4**
- 2076-486** **Photo Scanning Systems**
The student receives instruction and makes photographs related to the ever-increasing application of scanning imaging systems in industry, especially as these relate to industrial, scientific and technical applications. Simplified and experimental equipment is demonstrated and used. Primary emphasis is on demonstrating a thorough understanding of the imaging processes and controls at work in systems such as peripheral, photo finish, strip enlarging and panoramic recording methods. (Upper level Photo Technology majors or by permission of instructor) **Credit 4**
- 2076-487** **Special Effects Photography**
A course for practicing photographers and students in which photographic effects beyond those encountered in everyday situations in illustrative, commercial and advertising photography are discussed and practiced. Among the topics covered are stroboscopic, peripheral, scanning, high-speed flash, matte box and combination flash/tungsten photographic techniques. (For upper-division SPAS students) **Credit 4**
- 2076-491** **Introduction to Digital Imaging**
Exploration of the technology, theory and application of digital image processing equipment and procedures, particularly in relation to photographic processes. Principles of input, output and computer processing techniques are covered. Applications such as contrast enhancement, edge sharpening and smoothing are included. (2076-210,213, and 321 or 0602-208) **Credit 4**
- 2076-492** **Electronic Sensitometry**
This is a course about electronic image quality. The student will work with and characterize the image quality for various electronic I/O devices such as scanners, electronic cameras, printers and other display devices. The electronic imaging system - from light source to output will be investigated, component-by-component, to discover the effect each component has on total system image quality. Input-output relationships for each component subsystem will be investigated, and the component responses will be collectively used to determine system image quality. (2076-211/213,2076-491) **Credit 4**
- 2076-499** **Imaging & Photographic Technology Co-Op**
Provides students with on-the-job experience in the field of imaging and photographic technology. The student seeks and acquires a school-approved co-op position in business or industry. The working environment provides the forum for learning more about the student's chosen career. A final interview with the co-op coordinator assists the student in evaluating the experience. **Credit 0**

2076-501 Introduction to Research
Prepares the student for their senior research project. Covers basic research methods, including experimental design, unobtrusive evaluation and selection of an appropriate statistical treatment for the research to be conducted. Chi-square, two-tailed t test, linear regression and nonparametric statistics are taught as pertinent evaluation tools. (Senior status or permission of department chair) Credit 3

2076-503 Non-conventional Imaging Systems
A survey of imaging methods and imaging systems not normally encountered in other technical photography courses, including UV, IR, 3D, holography, electrophotography, x-ray and nonsilver applications. (Upper level Photo Technology majors or by permission of instructor) Credit 3

2076-511 High-Speed/Time-Lapse
The theory and practice of photographic systems designed to permit analysis of events of very short or of extended duration. Included are operational characteristics of time-lapse cameras, sequencing and timing control devices, time magnification relationships. Also, characteristics of intermittent and rotating prism cameras, rotating mirror and drum cameras, synchronization system and timing controls and high-speed flash and spark gap systems. Students gain experience not only in the use of the basic equipment but also in proper planning, set-up and data reduction techniques through a series of practical experiments. (Upper level Photo Technology majors or by permission of instructor) Credit 3

2076-550,551,552,553 Special Topics
A seminar approach offered on demand when adequate numbers of students and a faculty member agree to study a subject not normally offered. Available to upper-level students. Credit variable

2076-560 Color Photo Workshop
A creative color workshop with the goal of producing visually effective color photographs. The student is free to choose from a large variety of assignment suggestions to structure a program individually as an independent study. Besides creativity, principles are produced on color transparency material. The last two weeks can be spent color printing for those wishing this experience. Students are expected to furnish their own small- or medium-format cameras and supplies. Large-format cameras and chemicals are furnished. Color film and paper expenses can be expected to run as high as \$75 to \$100. (Some previous photographic experience required. Registration limited; permission of the instructor) Credit 9 (SU)

2076-572 Scanning Electron Microscopy
A proficiency-oriented course designed to train students to operate and take photographs with a scanning electron microscope (SEM). Emphasis is on understanding and optimization of the instrumental and photographic parameters associated with the SEM. (2076-211, 212, 213 and 2076-303 OR 2061-403 or consent of instructor) Credit 4

2076-580 Imaging & Photographic Technology Senior Project
A two-quarter sequence of formal research investigation in areas of applied, technical or scientific photography, involving camera and/or laboratory-computer work. Project topics are selected and approved in course 2076-501. The course requires students to plan, organize and execute a research project under the direction of a faculty adviser. Students are responsible for the technical content, experimental design, statistical analysis, accountability for accuracy and the integrity of the investigative process for the project. Requirements for completion of the course are an evaluation of experimental results and a formal written research paper; may include a formal oral presentation. (2076-501) Credit 2

2076-599 Independent Study
A student-proposed advanced project sponsored by a faculty member. Approval of the proposal by the department chairman and the school director required. Available to upper-level students with a GPA of 3.0 or higher. Credit variable

School of Print Media

Printing Management

2080-010 Co-Op Orientation
Lectures will provide the fundamentals or job searching strategies using Tiger Job Connection and other tools. Students will have the opportunity to register for and use Tiger Job Connection to facilitate on-line job searching. Students will apply the theory of effective interviewing by the use of mock interviews. Students will apply the theory of effective resume writing by producing an approved resume for conventional and electronic dissemination. Guest speakers and SPM Senior class student panels will be used to enrich the learning experience. Credit 0

2080-301 Printing Financial Controls
Plant accounting systems covered as a tool for improving production management decisions. Topics include accounting's general philosophy and structure, inventory, equipment, job cost, standard cost and analysis of variance, budgeting and control techniques. Credit 4

2080-302 Business Planning for Graphic Media
This course is designed to provide students with an understanding of graphic media business planning, specifically business, marketing and production plans. Credit 4

2080-357 Magazine Writing & Design
A discerning look at what goes on in the competitive world of magazine publishing. An overview of the history, the business side and the production side of the magazine industry. The first part of the course is devoted mainly to writing techniques and the second to design techniques. Credit 3

2080-361 Women in Graphic Media & Publishing
A presentation of various topics related to issues specific to women in the graphic media and publishing industries. Topics have been selected that will prepare students to address the organizational and social challenges that exist in the industry structure. These challenges are due to the result of the long-term demographic make-up of these industries. As more women are obtaining key positions in graphic media and publishing, they are finding few role models available for support. Therefore an integral part of the course will focus on industry demographics, legal implication, gender communication issues and perspectives from women in graphic media and publishing. Credit 3

2080-371 Estimating Practice
A detailed study of the practice of estimating that provides the student with the understanding that the final price of a printed job is the result of a series of planning decisions made during the estimating process. Development and the use of production standards and hourly rates are analyzed to determine their importance in the pricing structure of printed materials. Credit 4

2080-372 Digital Printing Marketing Concepts
This course is a presentation of topics relating to strategic marketing practices in the digital printing environment. Customer relationship marketing, digital print markets and market applications are discussed. With special emphasis given to the creative aspects of digital printing. Credit 3

2080-376 Introduction to Magazine Publishing & Management
A survey course that gives the student insights into the editorial, production, management, fulfillment and distribution processes vital to the success of any magazine. Leaders from the magazine publishing industry are invited to present 3-hour guest lectures on a major aspect of their profession. Graduates of the printing program who have attained prominence within the industry are often guest speakers, encouraging interaction between current and former students. Credit 3

2080-383 Economics of Production Management
Microeconomic study of factors in printing production systems. Supply and demand theories are applied to printing system inputs and outputs. Credit 4

2080-387 Supervision in the Graphic Arts
An elective course that studies the problems to be encountered in the proper supervision of employees in a non-union shop. Subjects covered are the nature of the employment relation, hiring, motivation and training, discipline, firing, layoffs, and plant closures. Credit 4

2080-421 **Labor Relations in the Graphic Arts**
A study of the organization of the United States labor force through the impact of national legislation and the construction of the same by United States Supreme Court and National Labor Relations Board decisions. Study includes rights of employees, their free choice of representation, duty of fair representation, right to strike and future modification of the field. **Credit 4**

2080-471 **Computer Estimating Systems**
A continuation of 2080-371 in which more complex jobs are estimated, including some on the web offset press. An introduction to the use of the computer in estimating; comparative estimates are made and graphed to determine optimum printing quantities for press size, imposition and cost. An analysis of computer estimating systems provides a guide to selection and use of these systems. (2080-371) **Credit 4**

2080-499 **Printing Co-Op**
Provides students with on-the-job experience in the graphic communications industry. The student seeks and acquires a school-approved co-op position in business or industry. The working environment provides the forum for learning more about career choices within the industry and gives the student the opportunity to test his or her skills in a competitive environment. A final report on the student's work experiences must be submitted to the co-op coordinator. **Credit 0**

2080-501 **Legal Problems in Publishing**
A comprehensive review of United States Supreme Court decisions as they relate to the unique rights granted to the graphic arts industry. Cases cover Article I, Section 8 of the United States Constitution and the First and other amendments. **Credit 4**

2080-502 **Systems Planning**
This course is designed to provide an introduction to fundamental problem-solving skills and planning strategies. This course will provide students with the opportunity to further their knowledge in statistics and to apply it to problems in their field of study. The students will experience how numbers can help in the planning stage of a project/system. Additionally, tools will be explored that help running a project/system. **Credit 4**

2080-550,551, 552, 553 **Special Topics in Printing**
A management, or management-related, course used to present and investigate on a "one-time" basis special topics not normally covered in the curriculum. Guest lecturers, such as industry leaders, as well as regular faculty conduct this course. Subject to be covered is announced in advance. **Credit variable 1-4**

2080-581 **Legal & Ethical Conduct of Printing Business**
A study of the legal and ethical implications faced by printing companies when involved in making day-to-day and long-term business decisions. Students become acquainted with current printing business ethics, as well as the various laws regulating competition in the printing industry marketplace. Students are shown the impact their various business decisions will have upon their companies, coworkers and themselves. **Credit 4**

2080-591 **Sales in Graphic Arts**
Explores economic, psychological and sociological bases of selling, with emphasis on customer and salesmen interplay as well as techniques and practices of creative salesmanship in graphic arts companies. Benefits both students considering a career in sales and those who will otherwise work with salesmen, either by supporting their company's salesmen in plant action or by buying from outside salesmen. **Credit 4**

2080-592 **Marketing in Graphic Arts**
Key concepts and issues underlying the practice of marketing in graphic arts industries are discussed by the class. Discussion is encouraged to develop predisposition to use marketing rather than to merely acquire facts about marketing. **Credit 4**

2080-599 **Independent Study**
Student selects and develops, with approval from a faculty sponsor, an independent study project of his or her own design. Project and amount of credit assigned must have final approval from the director of the School of Printing Management and Sciences. (Generally seniors with qualifying GPA) **Credit 1-5**

Printing Technology

2081-358 **Calligraphic Forms**
An introduction to the basics of calligraphy; exercises in use of broad edge pen to develop primary forms of Italic, Roman Capitals and Uncial letter styles. Evolution of letterforms. Consideration of historical origins of letters, use of basic tools, understanding of methods and disciplines stressed. **Credit 3**

2081-359 **Bookbinding**
The introduction of digital printing processes has created the need to bind single or small quantities or printed products. This course is an introduction to the many different binding options ranging from saddle-stitched pamphlets to hardcover books, as well as the wide range of materials available. Contemporary procedures of finishing on-demand publications are part of this course. Students are encouraged to bring with them some personal projects for binding. No prerequisites are required. However, good manual dexterity is desired. **Credit 3**

2081-361 **Introduction to Book Production**
Introduces the student to the many-faceted role of the production manager in a book publishing firm. Production's role throughout the publishing cycle from manuscript to bound books is examined, and detailed emphasis is placed upon determining production and purchasing requirements for producing a variety of books, including trade books, textbooks, juveniles and special editions. **Credit 3**

2081-363 **Introduction to Book Design**
Intended to give the student an understanding of how a book designer functions within a book publishing firm. Emphasis is placed upon the many factors involved in book design decisions, including the important relationship between book design and book production in producing a readable, functional book. (2081-255) **Credit 3**

2081-364 **Flexographic Process**
A fundamental course based on the principles and practices of the flexographic printing process. Emphasis is placed on the elements of the technology from artwork, plates, platemaking, inks and presswork. Lab offers hands-on work centered around platemounting, ink formulation and presswork. Students print on a wide variety of presses. (2082-321,322) **Credit 3**

2081-366 **Digital Imposition & Image Assembly**
Until recently preparing images for printing was done by manually combining individual films to produce the desired final printed result. Nowadays digital imposition is commonly used. Yet digital imposition by computer is more complex than merely learning to use software designed for the task. A thorough knowledge of the principles involved with manual image assembly, imposition fundamentals as well as printing processes and bindery procedures is required to successfully master digital imposition. This course will integrate all these aspects to give a true perspective of digital imposition. **Credit 3**

2081-367 **Lithographic Processes**
This course details the equipment, materials, and people that create printed products with the lithographic printing process. Topics include the press and image carrier, and their interactions with ink, fountain solution, and paper. Lectures and discussion provide the theory and hands-on labs provide the practical experience. (2082-321,322) **Credit 3**

2081-372 **Printed Book in America from 1640**
Traces the main currents in the development of the printed book in America by closely examining the books themselves. In addition, close study of the lives and works of the great printers, their equipment and available technology, and their aesthetic viewpoints is undertaken to determine their impact on their times and their relevance for today. **Credit 3**

2081-373 **Art of the Printed Book, 1455-1955**
Presents masterpieces of the printer's art from the past five centuries. The lives and works of great European printers from Gutenberg to Mardersteig are examined, and their historical impact on Western civilization discussed with a view toward determining a new perspective for today's graphic artisan and book printer. **Credit 3**

2081-386 Gravure Process
Building upon concepts of the gravure process learned in 2081-254, this course expands on the theories and practices of the gravure process including both cylinder imaging and press work and involving information on related techniques, equipment, materials and supplies. Includes lectures, class discussions, demonstration and laboratory exercises involving chemical etching of cylinders, electronic engraving of cylinders and four-color printing on a four-unit web press. Students gain experience in trouble shooting press problems through the use of a state-of-the-art computer-based gravure press simulator. (2082-321, 322) Credit 3

2081-409 Color Separation Systems
A study of basic color theory, materials and methods used in the printing industry for the reproduction of color originals. Emphasis is placed on color separation systems and the requirements for producing good-quality color. Topics include the major separation methods, color proofing, electronic color scanning, production methods, quality color and an introduction to color electronic prepress systems. Credit 3

2081-414 Web Offset
An analytical study of the technological developments in web offset. Emphasis on the interrelationship of procedures, materials and equipment. Practical laboratory projects on a commercial four-unit perfecting web offset press. (Materials & Process I & II or Litho Process) Credit 3

2081-416 Quality Control in Graphic Arts
Offers a practical approach to quality printing with emphasis placed on quality concepts, process capability study, process control, and defect prevention. Examines specifications and recommend practices, which exist in the printing and publishing industry. Discusses the importance of management commitment and involvement in understanding the need for change and making quality improvement programs work. Credit 3

2081-454 Print Finishing Management
Planning for successful print finishing requires in-depth knowledge of production phases from design through prepress planning, press, bindery and distribution. Emphasizes cost-effective planning and management, based in part on an awareness of the mechanical limitations involved in print production and in a contemporary print-finishing environment. (2082-207,208) Credit 3

2081-458 Ink & Color
Theory of light and color; basic theory of process color and corrections; theory and applications of CIE color system; color matching systems; theory and applications of various ink systems; correlation of ink properties with applications, with emphasis on relationships of ink to paper and press; study of ink problems and their correction. Credit 4

2081-464 Advanced Flexography
An advanced course in the principles and practices of the flexographic printing process. Expanded lab time allows students to explore all phases of flexographic technology in greater depth. Students perform all operations necessary to print a large variety of substrates on all lab presses. Course includes class field trip and plant tours (2081-364) Credit 4

2081-486 Advanced Gravure Process
Building upon 2081-386, this is an advanced laboratory and technical course embracing the theories and practices of the gravure printing process. Classes include such new course content as electronic image processing, color proofing systems, quality assurance testing for packaging printing, press-side color testing, press design concepts and the economics of the gravure process. Includes lectures, laboratory exercises, guest speakers and plant tours. (2081-386) Credit 3

2081-550,551,552,553 Special Topics in Printing
Presents and investigates technological topics that normally are not covered in the regular curriculum on a one-time basis. Guest lecturers such as industry leaders as well as regular faculty are used to conduct this course. Topics to be covered are announced in advance. Credit variable 1-4

2081-561 Desktop Prepress Systems
Presents how PostScript-based desktop publishing technology is used as a front end to graphic arts prepress systems through an intensive study of the PostScript language and the algorithms used to convert PostScript programs into physical images. Students who take this course gain a deep understanding of how a modem desktop publishing system works and how to approach the task of establishing efficient workflows between clients who are originating work on desktop systems and the printer who deals with it in digital form. Credit 3

2081-562 Color Perception & Analysis
This course addresses principles of human color perception and how color is communicated by samples and measured quantitatively. It explores the role of visual perception in art appreciation and subjective quality assessment. Students will learn how to use digital tools to specify color from design to print for printing and publishing applications. (Basic desktop publishing: Photoshop, QuarkXPress, InDesign, etc. software competency and technical writing literacy) Credit 4

2081-572 Electronic Color Image & Control
An analytical study of color reproduction systems will give data to consistently produce good-quality color reproduction. Requirements and capabilities of electronic prepress integrated color systems are studied to help in the design and management of a color system, whether it be in-house or part of a network. (Grade of B or higher in 2081-409) Credit 3

2081-573 Typographic Workshop
Allows a student to create and solve typographic problems of their own choice. Complete freedom is given, and experimentation is encouraged, giving students opportunities to satisfy their own objectives. Credit 4

2081-577 Test Target & Evaluation in Graphic Arts Imaging
Introduces the student to theories and practices of film-based as well as digital test targets for purposes of calibrating and characterizing components and, thereafter, to optimize the color reproduction process. Fosters the understanding and selection of appropriate test targets, such as microlines, halftone patterns, and pictorial images, along with color measurement tools for calibration and characterization of control settings in prepress and press operations. Discusses the role of test targets in graphic arts technology standards. (2081-416 and 2081-562 or instructor's approval) Credit 3

Graphic Media

2082-201 Graphic Media Perspectives
This course introduces students to the graphic and new media industries by studying the history, culture, technology, markets and workers in these industries. It establishes a basic understanding of the current technologies by examining the industry and businesses that employ them. Students will gain a comprehension of the businesses and roles that exist in the various industries and see an overview of industry structures and the effect of new media. Credit 3

2082-207 Design Parameters in Graphic Media
Students will take a pragmatic approach to graphic design and production by building on their skills and knowledge from Typography & Design and Digital Image Capture to develop projects for specific production processes. The fundamentals of media development and design will be emphasized for students to gain a better understanding of the variables implicit in production workflows. Production planning, tone reproduction, and color workflows will be discussed for e-media and print media publishing. Projects will allow students to optimize their work for specific publishing requirements as well as to optimize images and workflows for repurposing documents. (2082-221) Credit 4

2082-208 Digital Workflow
This course will allow students to develop a more cohesive understanding of digital workflow and the underlying responsibilities and decisions in preparing files for publishing. It will present real-world applications of digital workflows and include preflighting, font management; file compression, raster and vector file requirements, PDF workflow, networking and telecommunications, and advanced trends. It will provide students with the opportunity to develop critical thinking and problem-solving skills when dealing with workflows that link design/creative and production/publishing of a workflow in a cross-media environment. (2082-207) Credit 4

2082-211 Application of Typography & Design
This course is designed to introduce students to the typographic and design fundamentals that need to be considered for the creation of documents in print and electronic form. Students will learn the language of information formatting and develop documents utilizing typographic standards and pragmatic design. Publishing projects involve collaboration between creative, production, and marketing personnel. This course will sensitize students to the creative aspects of the process. Credit 4

2082-417 Database Publishing
This course introduces students to the technologies and workflows for database creation and management for the publication of print and new media. Topics include the process of building databases comprised of information and digital assets, building databases that support publishing business activities, building databases that produce targeted products, and employing database technology for personalized publications. (Junior status) Credit 3

2082-428 Advanced Multimedia Publishing
This course will advance and refine techniques used in Multimedia Publishing. This course will provide students with the opportunity to further their knowledge in interactive, dynamically published documents. Advanced concepts explored will include multimedia scripting, interactive publishing workflows and interactive navigation for publishing. Advanced features of multimedia publishing software tools will be featured. (Multimedia Publishing, 2082-228) Credit 3

2082-501 Industry Issues & Trends
This course presents a detailed analysis of the critical trends and issues related to the graphic media publishing industry. It provides an in-depth look at key technologies as well as business, environmental and regulatory issues. This course provides a capstone experience that contributes to the student's fuller understanding of the graphic media publishing industry. This course prepares students for successful careers by providing insights into the nature and scope of the major challenges facing industry managers and leaders. (Senior status) Credit 4

2082-513 Graphic Media Project in Management
This course covers the creation, tracking, and management of cross-media publishing production. Topics such as project planning, choosing a target audience, story-boarding, prototyping and testing and designing for delivery mediums will be discussed. In-depth exploration of media integration, project production and materials organization will be covered. Students will examine case studies, plan potential projects, work in groups, create one or more prototypes of projects, and do other related activities. (Senior status) Credit 4

2082-518 Group Production Workshop I
This is the first of a two-course sequence designed to engage Graphic Media Publishing students in a group capstone production experience. The students will form teams that will design and complete projects sponsored by external clients. This course involves a project that spans two quarters. (2082-513) Credit 3

2082-523 Group Production Workshop II
This is the second of a two-course sequence designed to engage Graphic Media Publishing students in a group capstone production experience. The students will form teams that will design and complete projects sponsored by external clients. This course involves a project that spans two quarters. (2082-513 & 2082-518) Credit 3

New Media Publishing

2083-201 New Media Perspectives
This course introduces students to the graphic and new media industries by studying the history, culture, technology, markets and workers in these industries. It establishes a basic understanding of the current technologies by examining the industry and businesses that employ them. Students will gain a comprehension of the businesses and roles that exist in the various industries and see an overview of industry structures and the effect of new media. Credit 3

2083-206 Imaging for New Media
Imaging for New Media addresses the skills and competencies necessary to create and manipulate digital images. This course introduces students to the creation, acquisition, production and manipulation of raster images. Credit 4

2083-211 New Media Publishing
This course surveys the development of New Media in the publishing industry. Technological developments are placed in context with traditional operations and emerging demands for changes in methods of content creation, design, storage, management, programming, distribution, economics, marketing, ethics, and the regulatory environment. The course introduces the student to frameworks for understanding, explaining, and analyzing new media publishing. (Restricted to New Media majors) Credit 3

2083-317 News Production Management
New media publishing technologies production from a holistic viewpoint is examined. This is a course that brings together all the elements of new media publishing technologies such as various computer platforms, digital photography and other multi-media content (rich-media content) and distribution mechanisms. This is the micro companion to the macro digital news systems management. This course focuses on the management of these elements rather than the specific technologies. The lecture portion focuses on the specific application of managerial principles to new media production while the lab portion is based on group production exercises. Credit 3

2083-323 Multimedia Strategies
This course is designed to explore all of the available mass media and customized communications technology options for effectively reaching consumers. It will explore advertising, personalized direct mail, the Internet, call centers and direct client interface via Internet chat sessions. The emphasis will be on development of the right mix of marketing communications techniques and the use of high volume printing, personalized digital printing, the Internet, and customer data bases to drive both new business and customer retention. (Sophomore status) Credit 4

2083-332 Introduction to Interface Design
Lectures, presentations and demonstrations will investigate both the technical, aesthetic and economic aspects of good interface design. Good interface design allows the user to accomplish a variety of tasks. Students learn to create an effective interface that becomes intuitive, with ease of navigation and a sense of security for the user. Alternative and nontraditional interface designs will be explored. Credit 3

2083-346 Digital Workflow Fundamentals
New Media students will take a pragmatic approach to graphic design and production by building on their skills and knowledge from Typography for New Media and Imaging for New Media to develop projects for specific production processes. The fundamentals of media development and design will be emphasized for students to gain a better understanding of the variables implicit in production workflows. Production planning and color workflows will be discussed for e-media and print media publishing. Projects will allow students to optimize their work for repurposing documents. (2009-311, 2083-206) Credit 4

2083-402 Multimedia Law
An investigation of the effect of digital communications technologies upon the evolution of basic legal principles of freedom of the press and intellectual property, as well as the related issues of government regulation of technology, competitive business practices, and taxation. Credit 3

2083-412 Digital News System Management
This course surveys the breadth and links of both conventional and digital news outlets but concentrates on magazine, newspaper, and online news services. The lectures focus on the various models, values, skills, and general management systems used in the industry, imparting the fundamental planning knowledge required of all managers in the news business. This course prepares the student for a more advanced co-op experience in a complex digital news organization. Credit 4

2083-541 New Media Project Management
This course covers the creation, tracking, and management of cross-media publishing production. Topics such as project planning, choosing a target audience, story-boarding, prototyping and testing and designing for delivery mediums will be discussed. In-depth exploration of media integration, project production and materials organization will be covered. Students will examine case studies, plan potential projects, work in groups, create one or more prototypes of projects, and do other related activities. (Senior status) Credit 3

2083-542 New Media Team Project I
The first course in a two-quarter sequence designed to engage the new media major in a "cap tone" production experience. The instructor will form student teams that will design and complete a multi-media campaign for organizations selected by the instructors. (2083-541) Credit 4

2083-543 New Media Team Project II
The second course in a two-quarter sequence designed to engage the new media major in a "capstone" production experience. Students continue work to completion of their new media group production project. Each group is required to test their product with a focus group and provide written feedback and analysis. (2083-542) Credit 4

College of Liberal Arts

Index

0501	Criminal Justice	246
0502	Language	248
0503	Foreign Languages	250
0504	Literature	254
0505	Fine Arts	258
0507	History	261
0508	Science, Technology & Society	263
0509	Philosophy	265
0510	Anthropology	266
0511	Economics	267
0513	Political Science	269
0514	Psychology	272
0515	Sociology	274
0516	Social Work	275
0519	Interdisciplinary—Aerospace	278
0520	Interdisciplinary—Liberal Arts	279
0521	Public Policy	279
0522	Women's Studies	279
0523	American Studies	281
0535	Communication	281
0550	Honors Courses	283

Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100-399); upper division (400-699); or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites and/or corequisites are noted in parentheses near the end of the course description.

Criminal Justice

0501-201 Seminar in Criminal Justice
Covers the principles of the criminal justice system including the relationship between system components, their effectiveness, and theories of operation and reform. Consideration is also given to specific problems within the branches of the criminal justice system. This seminar course involves extensive reading, writing and discussion. It acquaints students with key resources for criminal justice research. Required course for criminal justice majors. Class 4, Credit 4 (offered regularly)

0501-307 Investigative Techniques
To familiarize the student with the different types and forms of physical evidence that a technician is likely to encounter in the investigation of the crime scene and related innovations to the criminal justice system. Students will learn the primary methods used in crime scene, evaluation, search, recording and collection of physical evidence. Basic techniques of crime scene management, photography, drawing and reporting will be instructed. Finger print and firearms identification as well as serology and trace evidence will be studied. Class 4, Credit 4 (offered annually)

0501-400 Criminology
A survey of the field of criminology with emphasis on major forms of contemporary crime, definition of crimes and criminality, theories of criminality, the extent of crime, criminal typologies and fundamental aspects of the social control of crime. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. Class 4, Credit 4 (offered regularly)

0501-401 Research Methods I
This course is the first of two courses designed to provide students with a foundation in social science research methods. Through lecture, discussion and activities associated with a research proposal, the different methods of conducting research are presented. Stress is on issues of deducting hypotheses from theoretical frame works, variable construction, experimental design, sampling methodology and the techniques and methods of data collection. Students will formulate a written research proposal that details a research question and the research design appropriate for addressing that question. Required course for criminal justice majors. (Junior status, two math and computer course requirements) Class 4, Credit 4 (offered annually)

0501-403 Field Experience
Internship practicum for all pre-service criminal justice students. Gives the student first-hand experience in the field of criminal justice in an appropriate organization that meets the needs of the student's career objectives. Students are closely supervised at selected organizations, developing their pre-professional skills while learning the organization's programs and methods. The student also is required to attend a seminar that runs concurrently with field work. Required course for criminal justice majors. (Senior status) Class variable, Credit 8 (F,W)

0501-405 Major Issues in the Criminal Justice System
Focuses on contemporary issues and topics not otherwise distinctly incorporated in established criminal justice courses. Concentrates on student discussion and interaction surrounding required readings on topics such as deviance, crime prevention, issues in the prosecution/court system, deterrence, female criminality and computer applications. Recent examples: art, theft and fraud; crime and justice in the community; international crime; legal controversies in the law, seminar in sexual violence; stress in the CJ system; substance abuse; terrorism and hostage taking; legal research. Professional elective course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. (Junior or senior status) Class 4, Credit 4 (offered regularly)

0501-406 Technology in Criminal Justice
Develops understanding of theories, management processes, organizational capabilities and social implications related to invention, innovation, adoption, implementation, use maintenance and diffusion of criminal justice technologies. Many categories of technology are considered, including tools and techniques used for: communications and records-management, transportation and traffic management, apprehension and detention of suspected offenders and criminals, crime scene investigations and laboratory forensics, telephonic and physical surveillance, and weapons and special assault and protection tactics. Students also consider the role of industry, government, and user groups in the historical development and legal/ethical use of specific technologies including less-than-lethal. Special attention is given to information technology, which increasingly, are becoming the basis for innumerable criminal justice practices. Class 4, Credit 4 (offered annually)

0501-409 Legal Rights of the Offender
Presents an in-depth study of the substantive and procedural law as it affects convicted offenders. Considerable attention is devoted to the study of constitutional rights and privileges, how they apply to convicted offenders and the methods employed to secure these rights. Conviction and its consequences are explored, as is the sentencing process. The rights of prisoners, probationers and parolees are reviewed. In addition, the various remedies for enforcement of these rights are discussed, including direct appeals, collateral attacks and a variety of postconviction remedies. Intended for students who wish to pursue a career in law enforcement, corrections, probation, parole or law. However, students interested in some other aspect of criminal justice that deals with convicted offenders may find this course useful. Professional elective for criminal justice majors. (Junior or senior status) Class 4, Credit 4 (offered occasionally)

0501-410 Management in Criminal Justice
Presents the history and development of the principles of management and organizational theory as they have been applied to the field of criminal justice. This developmental evaluation is followed by a presentation of principles and philosophies of agency administration that have been effective in business, industry and government, with the intention of discussing their applicability throughout the criminal justice system. Required course for criminal justice majors. (Junior or senior status) Class 4, Credit 4 (offered annually)

0501-412 **Social Control Developmental Behavior**
A professional elective for criminal justice majors interested in the major themes explaining the phenomena of deviance: how it is created and labeled through the process of definition and social sanction. Emphasis is on that type of behavior which elicits societal response in the form of criminal or civil action and on deviance from the perspective of the deviant who may be placed under some form of legalized social control. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-413 **Civil Disobedience & Criminal Justice**
A survey of the philosophy and history of civil disobedience, civil disobedience as a political tactic, differentiation between civil disobedience and "ordinary crime," civil disobedience and "noncriminals," civil disobedience with the criminal justice system and the role of riot commissions. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered periodically)**

0501-415 **Domestic Violence**
For social work students, criminal justice students and professionals who are interested in examining the problems related to domestic conflict and violence. Included is a study of the dynamics of violence as reflected in child abuse, incest, marital rape, spouse and parental abuse, and violence among siblings. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-440 **Juvenile Justice**
This course examines the concepts, theories and environmental influences of juvenile offenders, the impact of the judicial system, control and corrections on juvenile justice. The course also examines the role of forces in the system including police, courts, community resources and treatment. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered regularly)**

0501-441 **Corrections**
Introduction to the basic organizations of the correctional system, their functions and performance. Prisons, and jails, as well as probation and parole agencies, are discussed with the context of historical and contemporary philosophy. Attention also is focused on decision-making functions, the role of various personnel within the correctional system and the population of offenders within it. Strategies for rehabilitation and their effectiveness are surveyed. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. (0501-400) **Class 4, Credit 4 (offered annually)**

0501-443 **Law Enforcement in Society**
The social and historical origins of the various police systems; police culture, role and career; police in the legal system; social and legal restraints on police practices; police discretion in practice; police and community; police organization and community control mechanisms. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. (0501-400) **Class 4, Credit 4 (offered annually)**

0501-444 **Concepts in Criminal Law**
Concepts in Criminal Law deals with the substantive and procedural criminal law. Emphasis will be placed on various concepts of criminal law and practice; how ideas, laws and community perception influence the criminal justice system. Characteristics of crimes against people and property will be examined; including: the nature of criminal conduct, intent, and causation. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective (0501-400) **Class 4, Credit 4 (offered annually)**

0501-445 **Minority Groups & the Criminal Justice System**
The goal of this course is to enlighten as well as sensitize the student and future professional on issues of minorities and criminal justice system. This course will investigate the role played by racial minorities—African Americans, Native Americans, Hispanic Americans, and Asian Americans—at each level of the criminal justice system in the United States of America. The experience of African Americans will be emphasized since this group has been the subject of more extensive research by criminologists and criminal justice practitioners. Professional elective course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0501-446 **Women & Crime**
Deals with women as criminal offenders and as victims of crime, focusing upon theories about women in crime, types of crimes committed, patterns of criminality and the treatment of women offenders. Also examines the role of women as law enforcement officers, judges, lawyers and correctional officers in the criminal justice system. Professional elective for criminal justice majors. Part of the criminal justice concentration and minor, and the women's studies concentration and minor. May also be taken as an elective. Cross-listed with women's studies, 0522-446. **Class 4, Credit 4 (offered occasionally)**

0501-456 **Courts**
This course provides students with an understanding of the recognized functions of courts in the American criminal justice system. Jurisdiction, policies and procedures of courts in the administration of criminal justice, including trial and appellate courts, will be discussed. Courts will be examined at the local state and federal levels. Required course for criminal justice majors. Part of the criminal justice concentration and minor. May also be taken as an elective. (0501-400) **Class 4, Credit 4 (offered annually)**

0501-460 **Current Issues in Criminal Justice**
This course involves year long participation in, and written critique of, a designated set of lectures, roundtables and presentations on topics covering current issues in criminal justice. The goal is to engage students in discussion of current issues with their peers and with experts in the field. Students must sign up in the criminal justice office for fall, and register for the course in the spring quarter. May be taken up to 4 times. Professional elective for criminal justice majors. (0501-400) **Class 2, Credit 2 (offered occasionally)**

0501-505 **Corporate & White Collar Crime**
An examination of the extent and character of white collar crime with special emphasis upon business and professional deviance. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-506 **Evidence**
Provides the student with an awareness of what types of evidence are admissible in a criminal trial. Includes a comprehensive analysis of the most frequently used rules of evidence. There are readings and discussions pertaining to the nature of real, testimonial, hearsay and circumstantial evidence. Examines rules concerning the cross-examination of witnesses, exceptions to the exclusion of hearsay evidence, the burden of proof, the provinces of the judge and of the jury, legal presumptions and the exclusion of illegally obtained evidence. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-507 **Computer Crime**
This is a non-technical course that provides definitional, theoretical, and operational context for understanding computer-based competition, conflict and crime in the information age. Students study the history, nature and extent of computer-related crime, as well as differing types of computer criminals, their motivations, and the methods they use to threaten, attack, compromise or damage physical and cyber assets. The course considers legal and regulatory environments and the impact these have on policies and practices related to ethics in the management of information security, data encryption, privacy, and numerous other special topics. Also considered are the interrelated roles and responsibilities of law enforcement agencies, the managed computer-related crime, provide information security and privacy protections, and assure critical information infrastructure protection. Part of the criminal justice concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered regularly)**

0501-510 **Interview & Counseling in Criminal Justice**
Instructs the student in the various accepted contemporary dynamics of interviewing and counseling criminal justice and related human service clients. Issues discussed revolve around counseling and supervision strategies and conflicts among agencies, between administrators and staff, and clients. Presents both the practical and theoretical aspects of these issues as well as devotes attention to surveying prospective counseling strategies for accomplishing desired behavioral change. Required course for criminal justice majors. (Junior or senior status) **Class 4, Credit 4 (offered annually)**

0501-511 **Alternatives to Incarceration**
Analyzes possible sentencing options available to the criminal courts as well as pre-adjudicatory alternatives for both adults and juvenile offenders. The variety of dispositions evaluated include probation, parole, halfway houses, work-release, study-release, prison furloughs, pretrial release, pre-probation alternatives (fines, suspended sentences, conditional discharge and a variety of diversion programs). Special emphasis is placed on a critical evaluation of the alternatives as they compare to the more traditional methods of handling offenders. Field trips and guest lecturers from nontraditional programs are typically included in the course. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-517 **Comparative Criminal Justice System**
Examines, in a comparative analysis, the criminal system and the penal methods of Europe and the United States. Major emphasis is given to the issues of intent, criminal responsibility, individual and public interests, purposes and modes of prevention, repression and punishment, methods of trial, punishment and pardon. Professional elective course for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-518 **Criminal Justice & the Community**
Examines the goals and objectives of agencies operating within, or directly related to, the criminal justice system in relation to mutual expectations, the community and the agency, in the delivery of services. Emphasis is on intergroup responsibilities in exploring strategies to reduce conflict in the solving of public problems within the sphere of the criminal justice system. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-522 **Victimless Crime**
Familiarizes the student with many of the implications and ramifications of efforts to control "victimless" crimes. Discussions concentrate on the illegal activity associated with prostitution, gambling, homosexuality, drug use and pornography. The social, moral, legal and practical consequences of legalizing such activities are examined and evaluated. Professional elective for criminal justice majors (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-523 **Crime & Violence**
Focuses on the outbreak and increase of violent crime and criminal trends in the United States as one of the more serious realities in this century. In addition to an historical review, contemporary problems are explored, covering such topics as violence in the streets, terrorism, riots, vigilantism and the role of various criminal justice agencies in attempting to control these problems. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-526 **Seminar in Criminal Justice & Public Policy**
A critical analysis of some of the current issues, problems and concerns in the area of law enforcement; emphasis on basic police functions in regard to the courts, corrections and the community. Conflicts between theory and practice are examined and analyzed, and future trends in law enforcement are explored. Required course for criminal justice majors. (0501-443, junior status) **Class 4, Credit 4 (offered occasionally)**

0501-528 **Theories Crime & Criminality**
A comprehensive survey of historical and contemporary theories of the causes of crime. Included are theories that derive from biological, psychological, sociological, geographic, economic, and political perspectives. Development of criminological theory reviewed; fundamental distinctions between classical and positivist theories and between theories of crime and criminality discussed. Required course for criminal justice majors. (0501-201) **Class 4, Credit 4 (offered occasionally)**

0501-529 **Public & Private Safety**
Examines, through survey techniques, the complex problems confronting business and industry in the protection of assets. The use of electronic and non-electronic anti-intrusion systems and other hardware is examined and evaluated. Safety and accident prevention, health hazard prevention methods, and fire prevention and control also are examined. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-536 **Seminar in Security**
For seniors completing criminal justice degree requirements with a concentration in security. Focuses on critical issues, problems and concerns in the area of security that are not otherwise covered directly or in depth in established security courses. Topics are expected to vary from offering to offering. Professional elective for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered occasionally)**

0501-541 **Research Methods II**
This course is the second of two courses designed to provide students with a foundation in social science research methods. Through lecture, discussion and activities associated with a research project, emphasis is placed on the creation of null hypotheses, identification of the relationships among variables, establishment models, and analysis of data using both parametric and non-parametric statistics. The required research projects typically include data gathering and coding procedures, entry of the data to a file, the use of application software (e.g. SPSS, MINITAB, SAS) and preparation of a final report. Required course for criminal justice majors. (0501-400) **Class 4, Credit 4 (offered annually)**

0501-542 **Honors Research**
For students interested in research applications beyond basic scientific analysis and design. Included in the course are advanced statistical techniques of criminal justice data and qualitative field methods. Three projects are required. First, an analysis of a multi-group design experiment must be performed using an available criminal justice database. Second, an ongoing qualitative field study must be completed utilizing classical observation methodology. Third, the student must complete a draft of a formal research proposal for a sponsoring agency. A group field visit to the research foundation is included in this assignment. The course is in seminar format and includes case discussion and method critiques. Only students who have taken scientific methodology and research methods should apply to this course. Professional elective for criminal justice majors. **Class 4, Credit 4 (offered annually)**

Language

0502-100 **Basic Writing**
This course develops minimal entry-level college writing competencies prerequisite for Writing and Literature I. The credits earned do not comprise part of the student's normal liberal arts general education curriculum, nor may the course be substituted for Writing & Literature or English Composition. **Class 3, Credit 3 (offered quarterly)**

0502-110 **Written Communication I**
This first course in a two-quarter basic writing course sequence for NTID supported students develops the writing skills necessary to complete Writing and Literature I and II successfully. It serves students who need additional time to meet RIT's freshman writing competency requirements as well as students who need to develop skills prerequisite to Writing and Literature I. It focuses on the conventions of expository essay writing and critical reading. Registration by permission of the Department of Liberal Arts Support. A grade of "C" or better in this course is required for students to register for Written Communication II. **Class 4, Credit 4 (offered regularly)**

0502-111 **Written Communication II**
This second course in a two-quarter basic writing course sequence for NTID supported students develops the writing skills necessary to complete Writing and Literature I and II successfully. It serves students who need additional time to meet RIT's freshman writing competency requirements as well as students who need to develop skills prerequisite to Writing and Literature I. It focuses on research paper writing using primary and secondary source materials, introduces the conventions of persuasive writing and reinforces the conventions of expository essay writing presented in Written Communication I. Registration by permission of the Department of Liberal Arts Support. **Class 4, Credit 4 (offered regularly)**

0502-301 **College Writing**
This course sequence develops minimal college-level writing competencies. The credits earned, however, may not comprise part of the student's normal liberal arts curriculum. Furthermore, this sequence may not be substituted for Writing and Literature I or II. **Class 1, Credit 1 (offered annually)**

Note: 0504-225 and 226, *Writing and Literature I and II*, are prerequisites for all upper-division language courses.

0502-443 Written Argument
All fields and professions require us to present arguments to support a point of view. So students of all subjects need to know how to make claims, provide evidence, explore underlying assumptions, and analyze counter-points. In this course, students will learn about the elements of reasoning. Students will identify the argument in a piece of writing, assess whether an argument is successful, and recognize particular means of argumentation. Students will also study the difference between argumentation and persuasion. Throughout the course, students will practice both argument and persuasion in their writing, and analyze examples of argument and persuasion in various texts that may be from academic, political, and scientific fields. Part of the writing studies concentration and may be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered quarterly)

0502-444 Technical Writing
Provides knowledge of and practice in technical writing style; audience analysis; organizing, preparing and revising short and long technical documents; designing documents using effective design features and principles, and format elements; using tables and graphs; conducting research; writing technical definitions, and physical and process descriptions; writing instructions; and individual and group editing. Required course for communication majors and may be taken to fulfill a writing studies concentration and communication minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered quarterly)

0502-445 Evolving English Language
What makes the English language so difficult? Where do our words come from? Why does Old English look like a foreign language? This course surveys the development of the English language from its beginning to the present to answer such questions as these. Designed for anyone who is curious about the English language or the nature of language change. May be taken as a professional elective for communication majors. Part of the writing studies concentration and communications minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)

0502-449 Worlds of Writing
This course offers a diverse range of written assignments, including personal narrative, research and analysis, oral histories, documentary studies, and literary interpretation. Accompanying the written assignments are selective readings on the life adventures of a famous physicist, investigations into the Challenger explosion, documentary narrative, oral history and photography on the world of work, holocaust survivor memoirs in comic book form, selected short stories and poems as well as videos and other media. The course focuses on the social context of language, on issues of representation, and how language shapes our understanding of reality. Part of the writing studies concentration. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)

0502-451 Creative Writing: Poetry
An exploration of the techniques of writing poetry in both open and closed forms. Professional elective for technical communication majors. Part of the creative writing minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)

0502-452 Creative Writing: Prose Fiction
An exploration of some of the most important contemporary techniques of prose fiction in the short story form. May be taken as a professional elective for communication majors, part of the creative writing minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)

0502453 Advanced Creative Writing
Students who have completed Creative Writing or who have satisfied the instructor (normally by presentation of a writing sample) of their readiness to undertake the course are given an opportunity to explore in depth a literary genre, subject or theme chosen by the individual student in conference with the instructor. The acceptability of the student's project is determined on the basis of its intrinsic literary merit and its potential value to the student's development as a writer. May be taken as a professional elective for communication majors. Part of the creative writing minor. May also be taken as an elective. (0504-225 and 226 or equivalent, 0502451 or 452 or equivalent) Class 4, Credit 4 (offered twice annually)

0502455 Writing the Self & Others
"To know oneself better through others and to know others better through oneself" is one writer's view of the ultimate aim of education and is an appropriate description of the intent of this course on focused autobiographical writings and modest oral history projects. This course emphasizes the reflective process of memoir writing, moving from short exercises into longer, peer-reviewed papers, as well as the constructive aspect of oral history through listening, transcribing, and editing. Students also read from culturally diverse published memoirs and oral histories, study theoretical concepts of narrative and oral history, view photographs and films. Our purpose is to expand, through writing, an awareness of the complexities of such old human practices as telling and listening to stories about our lives. Part of the writing studies concentration; also may be taken as an elective. Class 4, Credit 4 (offered annually)

0502456 Rhetoric of Science
Galileo was not only one of the world's most important scientists, but also one of the world's most talented writers. Darwin was the master of metaphor. Barbara McClintock has made corn the most interesting vegetable in genetics research. In this course, students will read the writing of the most influential scientists-rhetoricians who have had to persuade both professional and public audiences of the validity of their science. We will trace the history of the "scientific paper" from the Royal Society to contemporary journals and look at students' favorite figures and texts in the history of science, ongoing controversies in contemporary scientific debates, and the representation of science in popular culture. Part of the writing studies concentration and may be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)

0502457 Language Variation & Identity
In this course we will examine language variation resulting from regional and social factors (gender, race, ethnicity and class). We will also explore the ways in which language is tied to our identity and marks our place in society as a result of such variation. Focus topics will include dialects of American English, language and gender, bi/multilingualism, attitudes towards non-standard and standard varieties of English, and related language policy (e.g. the movement to declare English our national language, Ebonics). Part of the writing studies concentration. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)

0502459 Creative Nonfiction
This course is an intensive workshop in writing creative nonfiction. Students will explore the principles and techniques of creative non-fiction through critical analysis of published works addressing personal, social, political, and/or cultural issues. Students will write in a number of creative nonfiction formats, (memoir, the personal essay, travel writing, the science essay, nature writing, sports writing, and other kinds of nonfiction prose). Students will explore a full range of creative nonfiction possibilities, but will also be able to focus on a particular area of interest. Weekly workshops are held for the discussion of student work in progress. Part of the writing studies concentration and the creative writing minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)

0502460 Science Writing
Artificial Intelligence, Chaos Theory, Space Radiation. . . If science is to successfully move from the lab or the field to the public and popular press, it will need to be divulged by writers who can make information accessible. A good science writer crafts specialized material into clear and compelling—even "poetic" prose. This course will not teach students to write scientific research papers, but will teach students to convey complex scientific research for a non-specialist audience—without misleading readers or making a spectacle of the science. Students will also read award-winning pieces of scientific journalism and watch what happens when scientific ideas enter popular culture venues. Part of the writing studies concentration and may be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)

0502-560 Special Topics
A focused, in depth study of a selected topic in writing. Specific topics vary according to faculty assigned. May be taken as part of the writing studies concentration or the creative writing minor, depending on the topic offered. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered occasionally)

Foreign Language

0503400 American Sign Language I
This is the first course in a three-course sequence. This sequence is a study of the origins, nature, and development of American Sign Language (ASL) and its variants, as used by the deaf population of North America. Integral to the courses is a study of the linguistic structure of ASL and the nature of signing as a linguistic modality. Prerequisite for the ASL concentration. May also be taken as an elective. Class 4, Credit 4 (offered regularly)

0503405 Arabic I
Arabic I, in the World Languages program, introduces students with no prior knowledge of the language both to Gulf Area Arabic and to modern standard Arabic. Arabic I builds the foundation skills in speaking, listening, reading, writing, and culture, with the emphasis on conversation. Arabic I or equivalent proficiency is the prerequisite for the Arabic language/culture concentration. May also be taken as an elective. (Permission of World Languages coordinator required.) Class 3, Credit 4 (offered regularly)

0503408 Beginning Chinese I
This course is designed for beginners, with little or no prior study of Chinese. The course introduces students to the sounds, basic sentence structures, and the writing system of Mandarin Chinese. Pinyin, the phonetic translation system for students, is taught and required throughout the course. Students learn to read and write Chinese characters. Emphasis is on developing listening and speaking skills, as well as building a vocabulary based on the ideographic Chinese characters. Chinese I is a prerequisite for the Chinese foreign language/culture concentration. May also be taken as an elective. Class 4, Credit 4 (offered annually)

0503412 Beginning German I
Beginning German I is the first course in a three-course sequence. The sequence provides students without prior exposure to the language with a sound basis for learning German as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills, with an emphasis on oral proficiency. The sequence also acquaints students with contemporary culture and life in the German-speaking countries. This course may be taken as the prerequisite for the German language/culture concentration; the German language/culture and the German language minors; and may also be taken as an elective. No prerequisite. Class 4, Credit 4 (offered regularly)

0503420 Beginning Japanese I
This is the first course in the first year sequence designed for students with no prior exposure to Japanese. It provides a sound introduction to the language as it is spoken and written today. A strong emphasis is placed on oral proficiency and the appropriate use of language in Japanese society. Hiragana and Katakana syllabaries are also taught for written communication. The course is a prerequisite for the Japanese Foreign Language/Culture concentration and minor. It is also a prerequisite for the KIT/RIT summer program in Kanazawa, Japan. The course may also be taken as an elective. Not open to students with prior Japanese instruction. See instructor for placement. Class 4, Credit 4 (offered regularly)

0503424 Russian I
Russian I, in the World Languages program, builds the foundation skills in speaking, listening, reading, writing, and culture, with emphasis on conversation. For students with no prior experience in the language. Russian I or equivalent proficiency is the prerequisite for the Russian language concentration. May be taken as an elective. (Permission of World Languages coordinator required.) Class 3, Credit 4 (offered regularly)

0503425 Russian II
Russian II, in the World Languages program, focuses on the development of functional competence in speaking, listening, reading, writing, and culture, with emphasis on conversation. Part of the Russian language/culture concentration. May be taken as an elective. See World Languages coordinator if this is your first RIT Russian course. Class 3, Credit 4 (offered regularly)

0503426 Russian III
Russian III, in the World Languages program, works on further development of functional skills in speaking, listening, reading, writing, and culture, with emphasis on conversation. Part of the Russian language/culture concentration. May be taken as an elective. See World Languages coordinator if this is your first RIT Russian course. Class 3, Credit 4 (offered regularly)

0503427 Russian IV
Russian IV, in the World Languages program, continues with intermediate-level development of functional skills in speaking, listening, reading, writing and culture, with emphasis on conversation. Part of the Russian language/culture concentration. May be taken as an elective. See World Languages coordinator if this is your first RIT Russian course. Class 3, Credit 4 (offered regularly)

0503428 Russian V
Russian V, in the World Languages program, continues with more intermediate-level work in all skills, including conversation, with increased work in reading and writing. Part of the Russian language/culture concentration. May be taken as an elective. See World Languages coordinator if this is your first RIT Russian course. Class 3, Credit 4 (offered regularly)

0503429 Russian VI
Russian VI, last of a six-course sequence in Russian language in the World Languages program, does advanced-intermediate level work in all skills, including conversation, with increased work in reading and writing. Part of the Russian language/culture concentration. May be taken as an elective. See World Languages coordinator if this is your first RIT Russian course. Class 3, Credit 4 (offered regularly)

0503430 Beginning Spanish I
Beginning Spanish I is the first course in a three-course sequence. This sequence of courses provides students with a basic foundation in all skills in Spanish (speaking, listening, reading, writing, culture) through intensive practice in a variety of media. Course I is for true beginners, and it (or an equivalent proficiency) is a prerequisite for courses II and III. This course may be taken as the prerequisite for the Spanish language/culture concentration and the Spanish language/culture and Spanish language minors. May also be taken as an elective. See instructor for placement in the appropriate course. Class 4, Credit 4 (offered regularly)

0503435 Beginning French I
Beginning French I is the first course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning French as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. The sequence also acquaints students with contemporary culture and life in the French-speaking countries. This course may be taken as the prerequisite for the French language/culture concentration; the French language minor; and also may be taken as an elective. Class 4, Credit 4 (offered regularly)

0503440 American Sign Language II
This is the second course in a three-course sequence. This sequence is a study of the origins, nature, and development of American Sign Language (ASL) and its variants, as used by the deaf population of North America. Integral to the course is a study of the linguistic structure of ASL and the nature of signing as a linguistic modality. Part of the ASL concentration. May also be taken as an elective. Class 4, Credit 4 (offered regularly)

0503441 American Sign Language III
This is the third course in a three-course sequence. This sequence is a study of the origins, nature, and development of American Sign Language (ASL) and its variants, as used by the deaf population of North America. Integral to the course is a study of the linguistic structure of ASL and the nature of signing as a linguistic modality. Part of the ASL concentration. The course may also be taken as an elective. Class 4, Credit 4 (offered regularly)

0503445 Arabic II
Arabic II in the World Languages program focuses on the development of functional competence in speaking, listening, reading, writing, and culture with emphasis on conversation. Part of the Arabic language/culture concentration. May be taken as an elective. See World Languages coordinator if this is your first Arabic course at RIT. Class 3, Credit 4 (offered regularly)

0503446 Arabic III
Arabic III in the World Languages program works on further development of functional skills in speaking, listening, reading, writing, and culture, with emphasis on conversation. Part of the Arabic language/culture concentration. May be taken as an elective. See World Languages coordinator if this is your first RIT Arabic course. Class 3, Credit 4 (offered regularly)

- 0503-447 **Arabic IV**
Arabic IV in the World Languages program continues more intermediate level development of functional skills in speaking, listening, reading, writing, and culture, with emphasis on conversation. May be part of the Arabic language/culture concentration. May be taken as an elective. See World Languages coordinator if this is your first RIT Arabic course. Class 3, Credit 4 (offered regularly)
- 0503-448 **Arabic V**
Arabic V, in the World Languages program, continues more intermediate level work in all skills, including conversation, with increased work in reading and writing. May be part of the Arabic language/culture concentration. May be taken as an elective. See World Languages coordinator if this is your first RIT Arabic course. Class 3, Credit 4 (offered regularly)
- 0503-449 **Arabic VI**
Arabic VI, last of the six-course sequence in Arabic language in the World Languages program, does advanced-intermediate work in all skills, including conversation, with increased work in reading and writing. Part of the Arabic language/culture concentration. May be taken as an elective. See World Languages coordinator if this is your first RIT Arabic course. Class 3, Credit 4 (offered regularly)
- 0503-451 **Beginning Chinese II**
This course follows Beginning Chinese I. Knowledge of Pinyin is required. The focus continues to be on developing listening and speaking skills, with an increasing emphasis on reading and writing in Chinese ideographic characters. Chinese II is part of the Chinese concentration and also may be taken as an elective. (0503-408) Class 4, Credit 4 (offered annually)
- 0503452 **Beginning Chinese III**
This course completes first-year level Chinese, continuing work in listening and speaking, and increasing work in reading and writing Chinese characters. Pinyin is also used. By the end of the first year of coursework, students will have studied 800 Chinese characters. Chinese III is part of the Chinese concentration and also may be taken as an elective. (0503-451) Class 4, Credit 4 (offered annually)
- 0503-453 **Intermediate Chinese I**
This course begins the second-year level of Chinese study. Knowledge of the Pinyin system is required for the purpose of pronunciation. The course continues to focus on developing communication skills (speaking and listening), with an increasing emphasis on reading and writing in ideographic characters and expanding vocabulary. Includes study of culture. Part of the Chinese concentration, and may be taken as an elective. (0503452) Class 4, Credit 4 (offered annually)
- 0503454 **Intermediate Chinese II**
This course continues the second-year level study of Chinese. Grammar structures will be reviewed. Communication skills (speaking and listening) are the focus, and special emphasis will be given to expanding vocabulary and reading and writing characters at some length. Pinyin study for pronunciation practice continues. Includes study of culture. This course is part of the Chinese concentration, and also may be taken as an elective. (0503453) Class 4, Credit 4 (offered annually)
- 0503455 **Intermediate Chinese III**
Following Intermediate Chinese II, this course continues the grammar review, the focus on communication skills (speaking and listening), expansion of vocabulary, and more lengthy reading and writing of characters. Pinyin study for pronunciation practice continues. Includes study of culture. By the end of the second year of coursework, students will have studied 1600 characters. This course is part of the Chinese concentration and also may be taken as an elective. (0503454) Class 4, Credit 4 (offered annually)
- 0503-464 **Beginning French II**
Beginning French II is the second course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning French as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. Students study contemporary culture and life in the French-speaking countries. This course is part of the French language/culture concentration; the French foreign language minor; and also may be taken as an elective. Class 4, Credit 4 (offered regularly)
- 0503-465 **Beginning French III**
Beginning French III is the third course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning French as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. Students also study contemporary life and culture in the French-speaking countries. This course is part of the French foreign language/culture concentration; the French foreign language minor; and also may be taken as an elective. Class 4, Credit 4 (offered annually)
- 0503-466 **Intermediate French I**
Intermediate French I is the first course of a three-course sequence at the intermediate level. Prerequisite is one year of college level French or its equivalent. This sequence provides students with the tools necessary to increase their ability to function in French. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. This course is part of the French foreign language/culture concentration; the French foreign language minor; and also may be taken as an elective. Class 4, Credit 4 (offered annually)
- 0503-467 **Intermediate French II**
Intermediate French II is the second course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in French. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. This course is part of the French foreign language/culture concentration; the French foreign language minor; and also may be taken as an elective. Class 4, Credit 4 (offered annually)
- 0503-468 **Intermediate French III**
Intermediate French III is the final course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in French. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. This course is part of the French foreign language/culture concentration; the French foreign language minor; and also may be taken as an elective. Class 4, Credit 4 (offered annually)
- 0503-469 **Advanced French I**
This course emphasizes active spoken language use. Other skills will also be used, such as reading, writing, and listening but primarily as helps for developing conversational ability. Attention will also be given to grammatical accuracy in conversation. By the end of this course, with consistent effort and attendance, the student should be able to communicate about topics routinely encountered in Francophone cultures. This course is part of the French concentration and minor. May also be taken as an elective. Class 4, Credit 4 (offered annually)
- 0503-470 **Advanced French II**
This course emphasizes active spoken language use. Other skills will also be used, such as reading, writing and listening, but primarily as helps for developing conversational ability. Attention will also be given to grammatical accuracy in conversation. By the end of this course, with consistent effort and attendance, the student should be able to communicate about topics routinely encountered in Francophone cultures. This course is part of the French concentration and minor. May also be taken as an elective. Class 4, Credit 4 (offered annually)
- 0503-472 **Beginning German II**
Beginning German II is the second course in a three-course sequence. The sequence provides students without prior exposure to the language with a sound basis for learning German as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. The sequence also acquaints students with contemporary culture and life in the German-speaking countries. This course is part of the German foreign language/culture concentration; the German language/culture and German language minors. May also be taken as an elective. (0503-412) Class 4, Credit 4 (offered regularly)

0503-473 **Beginning German III**
Beginning German III is the third course in a three-course sequence. The sequence provides students without prior exposure to the language with a sound basis for learning German as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. The sequence also acquaints students with contemporary culture and life in the German-speaking countries. This course is part of the German foreign language/culture concentration; the German language/culture and the German language minors. May also be taken as an elective. Class 4, Credit 4 (offered regularly)

0503-474 **Intermediate German I**
Intermediate German I is the first course of a three-course sequence at the intermediate level. Prerequisite is one year of college-level German or its equivalent. This sequence provides students with the tools necessary to increase their ability to function in German. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. This course is part of the German foreign language/culture concentration; the German language/culture and German foreign language minors; and also may be taken as an elective. It is required for international business majors concentrating in German. Class 4, Credit 4 (offered annually)

0503-475 **Intermediate German II**
Intermediate German II is the second course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in German. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. This course is part of the German foreign language/culture concentration; the German language/culture and German foreign language minors; and also may be taken as an elective. It is also required for international business majors concentrating in German. Class 4, Credit 4 (offered annually)

0503-476 **Intermediate German III**
Intermediate German III is the third course in a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in German. Communicative activities, contemporary texts, vocabulary study, and grammar are used to expand all communication skills, especially oral proficiency. This course is part of the German foreign language/culture concentration; the German language/culture and German foreign language minors; and also may be taken as an elective. It is required for international business majors concentrating in German. Class 4, Credit 4 (offered annually)

0503-477 **Contemporary German Culture**
This course examines the role of culture as manifested in every day and face-to-face interactions. Students will observe and discuss German customs, attitudes, values, and patterns of behavior in their native setting. Course is offered only as part of the Marburg Summer Study Program. Registration is limited to program participants. May be taken as a German concentration or minor culture course or as a Liberal Arts elective. Class 4, Credit 4 (offered occasionally)

0503-478 **Advanced German I**
This course is the first of the three-course sequence at the advanced level. It provides advanced students of German with the tools necessary to refine their speaking, writing, reading and listening skills. The course includes a study of advanced grammar. Literary and non-literary texts will be read and analyzed. The course is part of the German language/culture concentration; the German minors; and it may also be taken as an elective. (0503-476) Class 4, Credit 4 (offered annually)

0503-479 **Advanced German II**
This course is the second of the three-course sequence at the advanced level. It provides advanced students of German with the tools necessary to refine their speaking, writing, reading, and listening skills. The course includes a study of advanced grammar. Literary and non-literary texts will be read and analyzed. The course is part of the German language/culture concentration; the German minors; and it may also be taken as an elective. (0503-476) Class 4, Credit 4 (offered annually)

0503-501 **Advanced German III**
This course is the last of the three-course sequence at the advanced level. It provides students of German with the tools necessary to refine their speaking, listening, reading and writing skills. The course includes a study of advanced grammar. Literary and non-literary texts will be read and discussed. A study of the contemporary German-speaking world is included. This course is part of the German concentration, the German minors, and may also be taken as an elective. Class 4, Credit 4 (offered annually)

0503-480 **Beginning Japanese II**
This is the second course in the first-year sequence. It provides a sound introduction to the language as it is spoken and written today. A strong emphasis is placed on proficiency and the appropriate use of language in Japanese society. Students continue to learn how to use language in real-life situations for different communication purposes. The course is a prerequisite for the KIT/RIT summer program in Kanazawa, Japan. It is part of the Japanese foreign language/culture concentration and minors and may also be taken as an elective. Students must know Hiragana and Katakana to take this course. (0503-420 or equivalent proficiency) See instructor for placement. Class 4, Credit 4 (offered regularly)

0503-481 **Beginning Japanese III**
This is the third course in the first-year sequence. It provides a sound introduction to the language as it is spoken and written today. A strong emphasis is placed on proficiency and the appropriate use of language in Japanese society. Students continue to learn how to use language in real life situations for different communication purposes. In addition to Hiragana and Katakana syllabaries, students learn approximately 50 Kanji in this course. The course is a prerequisite for the KIT/RIT summer program in Kanazawa, Japan. It is part of the Japanese foreign language concentration and minors, and may also be taken as an elective. (0503-480 or equivalent proficiency) See instructor for placement. Class 4, Credit 4 (offered regularly)

0503-482 **Intermediate Japanese I**
This is the first course in the second-year sequence designed to give students more advanced instruction and practice in the skills of speaking, reading, writing, and comprehending contemporary Japanese. A strong emphasis is placed on proficiency through reading, writing and speaking activities. Students learn cultural information and practice using the language in real life situations in Japanese society. Approximately 50 new Kanji are introduced. The course is a prerequisite for the KIT/RIT summer program in Kanazawa, Japan. It is part of the Japanese concentration and minors, and may also be taken as an elective. (0503-481 or equivalent proficiency) See instructor for placement. Class 4, Credit 4 (offered annually)

0503-483 **Intermediate Japanese II**
This is the second course in the second-year sequence designed to give students more advanced instruction and practice in the skills of speaking, reading, writing and comprehending contemporary Japanese. A strong emphasis is placed on proficiency. Through reading, writing, and speaking activities, students learn cultural information and practice using the language in real life situations in Japanese society. Approximately 90 new Kanji are introduced. The course is a prerequisite for the KIT/RIT summer program in Kanazawa, Japan. It is part of the Japanese foreign language/culture concentration and minors. May be taken as an elective. (0503-482 or equivalent proficiency) See instructor for placement. Class 4, Credit 4 (offered annually)

0503-484 **Intermediate Japanese III**
This is the third course in the second-year sequence designed to give students more advanced instruction and practice in the skills of speaking, reading, writing and comprehending contemporary Japanese. A strong emphasis is placed on proficiency through reading, writing and speaking activities. Students learn cultural information and practice using the language in real-life situations in Japanese society. Approximately 90 new Kanji are introduced. The course is part of the Japanese foreign language/culture concentration and minors. May also be taken as an elective. (0503-483 or equivalent proficiency) See instructor for placement. Class 4, Credit 4 (offered annually)

0503-488 **Advanced Japanese I**
This course provides advanced students of Japanese with training in all four language skills. Students will practice oral communication with a high degree of proficiency in various social settings. They will also receive training in reading semi-authentic materials with the help of a dictionary and in writing for a specific purpose, such as news reports and critical essays. The course is part of the Japanese foreign language/culture concentration and minors. (0503-484 or equivalent proficiency) Class 4, Credit 4 (offered annually)

0503-489 **Advanced Japanese II**
This course provides advanced students of Japanese with training in all four language skills. Continuing Advanced Japanese I students will practice oral communication with a high degree of proficiency in various social settings. Students will also receive training in reading semi-authentic materials with the help of a dictionary and in writing for a specific purpose such as news reports and critical essays. The course is part of the Japanese foreign language/culture concentration and minors. (0503- 488 or equivalent proficiency) Class 4, Credit 4 (offered annually)

0503-490 **Beginning Spanish II**
This is the second course in the Beginning Spanish sequence continuing through the basic language structures, vocabulary, situations, and emphasis on past tenses. Course II is part of the Spanish language/culture and Latino/Latina/Latin American concentrations. It is part of the Spanish language/culture and Spanish language minors. It may also be taken as an elective. Course II or equivalent proficiency is a prerequisite for Course III. See instructor for placement. **Class 4, Credit 4 (offered regularly)**

0503491 **Beginning Spanish III**
This is the third course in the Beginning Spanish sequence continuing through the basic structures, vocabulary & situations, and expanding practice in all skills. Emphasis on the subjunctive mood. Course III is part of the Spanish language/culture concentration and the Latino/Latina/Latin American concentrations. It is part of the Spanish language/culture and Spanish language minors and also may be taken as an elective. Course III or equivalent proficiency is a prerequisite for the Intermediate Spanish courses. See instructor for placement in the appropriate course. **Class 4, Credit 4 (offered regularly)**

0503-492 **Intermediate Spanish I**
This is the first course in the Intermediate Spanish sequence. Intermediate I (Fall) emphasizes tourist survival situation dialogues, grammar review and culture. The intermediate courses continue the study of Spanish on a more advanced level and include intensive work on speaking, writing, reading, listening and culture. The basic skills learned previously are now put into practice. The courses may be taken in sequence or separately. These courses are part of the Spanish language/culture concentration and the Latino/Latina/Latin American concentration. They are also a part of the Spanish language/culture and Spanish language minors. They also may be taken as an elective and are required for international business majors concentrating in Spanish. (0503491 or equivalent proficiency) See instructor for placement in the appropriate course. **Class 4, Credit 4 (offered annually)**

0503493 **Intermediate Spanish II**
This is the second course in the Intermediate Spanish sequence. Intermediate II (Winter) emphasizes professional vocabulary in the student's major field of study, business correspondence (letters), grammar review and culture. The intermediate courses continue the study of Spanish on a more advanced level and include intensive work in speaking, writing, reading and listening. The basic skills learned previously are now put into practice. The courses may be taken in sequence or separately, may count towards the language component of a Spanish concentration, a Latino/Latina/Latin American concentration; a Spanish foreign language minor; and also may be taken as an elective. They are required for international business majors concentrating in Spanish. (0503-491 or equivalent proficiency) See instructor for placement in the appropriate course. **Class 4, Credit 4 (offered annually)**

0503494 **Intermediate Spanish III**
This is the third course in the Intermediate Spanish sequence. Intermediate III (Spring) emphasizes conversation and composition along with grammar review and culture. The intermediate courses continue the study of Spanish on a more advanced level and include intensive work in speaking, writing, reading and listening. The basic skills learned previously are now put into practice. The courses may be taken in sequence or separately; may count towards the language component of the Spanish foreign language/culture and the Latino/Latina/Latin American concentrations; the Spanish foreign language minors; and also may be taken as an elective. They are required for international business majors concentrating in Spanish. (0503491 or equivalent proficiency) See instructor for placement. **Class 4, Credit 4 (offered annually)**

0503496 **Advanced Spanish I**
This is the first third-year course for advanced students of Spanish. It aims to develop and refine student's listening, reading, speaking, and writing skills within a distinctive Hispanic cultural framework, which will include literary texts and visual materials. Instruction is entirely in Spanish. Prerequisite is successful completion of Intermediate Spanish III or equivalent (See instructor for placement if this is your first RIT Spanish course.) This course is part of the Spanish concentration and minors, Latino/Latina/Latin American concentration, and may be used as an elective. **Class 4, Credit 4 (offered annually)**

0503497 **Advanced Spanish II**
This is the second third-year course for advanced students of Spanish. Prerequisite is successful completion of Advanced Spanish I or equivalent (See instructor for placement if this is your first RIT Spanish course.) This course is part of the Spanish concentration and minors, Latino/Latina/Latin American concentration, and may be used as an elective. **Class 4, Credit 4 (offered annually)**

0503499 **Advanced Spanish III**
This is the third third-year course for advanced students of Spanish. Prerequisite is successful completion of Advanced Spanish II or equivalent. See instructor for placement if this is your first RIT Spanish course. This course is part of the Spanish concentration and minors, Latino/Latina/Latin American concentration, and may also be used as an elective. **Class 4, Credit 4 (offered annually)**

0503-500 **Advanced Japanese III**
This course provides advanced students of Japanese with training in all four language skills. Students will practice oral communication with a high degree of proficiency in various social settings. They will also receive training in reading semi-authentic and authentic materials with the help of a dictionary, as well as training in writing for a specific purpose, such as news reports and critical essays. Part of the Japanese foreign language concentration and minors. (0503-484 or equivalent) **Class 4, Credit 4 (offered annually)**

0503-510 **Languages in Japanese Society**
This course aims to introduce students to modern Japanese society, its rich cultural heritage, and the use of Japanese language that reflects the societal norms. It provides students with a fundamental, yet diverse knowledge of Japanese culture and Japanese language use. The course work will include lectures, readings, discussions, and working with multi-media resources. No prerequisites. Knowledge of Japanese language helpful but not necessary. Part of the Japanese language/culture concentration; the Japanese language/culture minor; and may be taken as an elective. **Class 4, Credit 4 (offered annually)**

0503-521 **Beginning Italian I**
Beginning Italian I is the first course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning Italian as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. The sequence also acquaints students with contemporary culture and life in Italy. This course may be taken as the prerequisite for the Italian concentration and minors. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0503-522 **Beginning Italian II**
Beginning Italian II is the second course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning Italian as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. Students study contemporary culture and life in Italy. This course is part of the Italian concentration and minors. May also be taken as an elective. (0503-521) **Class 4, Credit 4 (offered annually)**

0503-523 **Beginning Italian III**
Beginning Italian III is the third course in a three-course sequence. The sequence provides students without prior knowledge of the language with a sound basis for learning Italian as it is used today in its spoken and written forms. The goal of the sequence is proficiency in communication skills with an emphasis on oral proficiency. Students also study contemporary life and culture in Italy. This course is part of the Italian concentration and minors. May also be taken as an elective. (0503-522) **Class 4, Credit 4 (offered annually)**

0503-524 **Intermediate Italian I**
Intermediate Italian I is the first course of a three-course sequence at the Intermediate level. The prerequisite is one year of college level Italian or its equivalent. This sequence provides students with the tools necessary to increase their ability to function in Italian. Communication activities, contemporary texts, vocabulary study and grammar are used to expand all communication skills, especially oral proficiency. This course is part of the Italian concentration and minors. May also be taken as an elective. **Class 4, Credit 4 (offered annually)**

0503-525 **Intermediate Italian II**
Intermediate Italian II is the second course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in Italian. Communication activities, contemporary texts, vocabulary study and grammar are used to expand all communication skills, especially oral proficiency. This course is part of the Italian concentration and minors. May also be taken as an elective. (0503-524) **Class 4, Credit 4 (offered annually)**

0503-526 Intermediate Italian III
Intermediate Italian III is the final course of a three-course sequence at the intermediate level. This sequence provides students with the tools necessary to increase their ability to function in Italian. Communication activities, contemporary texts, vocabulary study and grammar are used to expand all communication skills, especially oral proficiency. This course is part of the Italian concentration and minor. May also be taken as an elective (0503-525) Class 4, Credit 4 (offered annually)

0503-530 Portuguese I
Portuguese I, in the World Languages program, builds the foundation skills in speaking, reading, writing, and culture, with emphasis on conversation. For students with no prior experience in the language. May be taken as an elective. Permission of World Languages coordinator is required for registration. Class 3, Credit 4 (offered regularly)

0503-532 Portuguese II
Portuguese II is the second course in the beginning year of Portuguese. Prerequisite is Portuguese I (0503-530) or equivalent proficiency. This course continues presentation of work in the basic skills of speaking, listening, reading, writing and culture, including work on past tenses. Emphasis is on conversation. May be taken as an elective. See World Languages coordinator if this is your first RIT Portuguese course. Class 3, Credit 4 (offered regularly)

0503-533 Portuguese III
Portuguese III is the third course in the beginning year of Portuguese. Prerequisite is Portuguese II (0503-532) or equivalent proficiency. This course advances work in the basic skills of speaking, listening, reading, writing and culture, including work on the subjunctive mood. Emphasis is on conversation. Longer passages will be practiced in all skills. May be taken as a Liberal Arts elective. See World Languages coordinator if this is your first RIT Portuguese course. Class 3, Credit 4 (offered regularly)

0503-534 Portuguese IV
Portuguese IV is the first course in the second year, intermediate-level Portuguese. Prerequisite is Portuguese III or equivalent proficiency. This course includes intensive grammar review along with increasing work in conversation, composition and culture. Intensive practice in all skills (speaking, listening, reading, writing, culture). May be taken as an elective. See World Languages coordinator if this is your first RIT Portuguese course. Class 3, Credit 4 (offered regularly)

0503-535 Portuguese V
Portuguese V is the second course in the second-year, intermediate-level Portuguese. Prerequisite is Portuguese IV or equivalent proficiency. This course continues intensive grammar review along with intensive work in conversation, composition and culture, with work in all skills. May be taken as an elective. See World Languages coordinator if this is your first RIT Portuguese course. Class 3, Credit 4 (offered regularly)

0503-536 Portuguese VI
Portuguese VI is the third course in the second-year, intermediate-level Portuguese. Prerequisite is Portuguese V or equivalent proficiency. This course will continue intensive work in conversation, composition, and culture including authentic materials and longer readings. May be taken as an elective. See World Languages coordinator if this is your first RIT Portuguese course. Class 3, Credit 4

0503-595 Special Topics: Foreign Languages
Study of a topic or area in one of the foreign languages or cultures not normally offered in any other concentration or minor course. Part of the foreign language/culture concentration and minor, and may also be taken as an elective. Class 4, Credit 4 (offered occasionally)

Literature

0504-225 Writing & Literature I
The first course of a two-quarter eight-credit sequence designed to develop student proficiency in written composition, critical reading, and critical thinking. Students read, study and write about representative narratives, as well as nonfiction forms such as essays, letters and autobiographies. The course develops the language skills needed to understand and interpret literature, and to write clear, accurate, and effective prose. Students must take both quarters in sequence. Class 4, Credit 4 (offered quarterly)

0504-226 Writing & Literature II
The second course of a two-quarter sequence designed to develop student proficiency in written composition, critical reading and critical thinking. Students read, study, and write about representative poems and dramas as well as nonfiction forms such as essays, letters and autobiographies. The course develops the language skills needed to understand and interpret literature and to write clear, accurate and effective prose. Students must take both quarters in sequence. Class 4, Credit 4 (offered quarterly)

0504-325 Honors Literature
This Honors core course in Literature will examine a set of literary texts from disciplinary or interdisciplinary perspectives, using contemporary theoretical and critical approaches. The specific focus of each section will be indicated in the sub-title of the course and will reflect both a particular scholarly interest and expertise of the professor and an area of literary study that Honors students will find intellectually engaging. This course is conducted in seminar format, class enrollment is limited to 16, and each student is expected to participate fully in seminar discussions and in the oral and written presentation of his/her scholarly research. The specific course description for each section of Honors Literature is reflected in the instructor's syllabus. Honors Literature fulfills one of the four Honors core requirements in the RIT Honors Program. Class 4, Credit 4 (offered twice annually)

Note: 0504-225 and 226, Writing and Literature I, II are prerequisites for all upper-division literature courses.

0504-440 Drama & Theater
Drama as a genre and theater as a performing art. Intensive study of a least one major playwright or period complements a general survey of drama/theater from ancient Greece to modern Broadway. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered occasionally)

0504-441 The Art of Poetry
Emphasizes the enjoyment and study of poetry with primary attention to major poetry in English. Part of the literary and cultural studies concentration and minor and the creative writing minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)

0504-442 The Short Story
A study of a collection of short stories with critical commentary in order to provide source materials on the nature and development of this genre. Part of the literary and cultural studies concentration and minor and the creative writing minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually; not offered in 2004-2005)

0504-443 The Novel
A close reading and analysis of several novels selected to show the range of narrative techniques, methods of characterization and plot construction, and styles representative of the genre. Part of the literary and cultural studies concentration and minor and the creative writing minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)

0504-444 Film as Literature
Examines the nature of narrative in both film and literature, the various aspects of adaptation of literature into film and the relationship between social reality and storytelling in documentary film, utilizing a non-technical approach to the study of film. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)

0504-447 Special Topics: Literature
A focused, in-depth study and analysis of a selected advanced topic in literature. Specific topics vary according to faculty assigned. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)

0504-448 Biographical Literature
Students develop skills to critically read one of the 20th century's most popular literary genre: the various forms of biographical literature. The course distinguishes between biographical and autobiographical literature and asks students to examine and critique the strengths and weaknesses of various forms. Selections attempt to explore lives lived within a variety of cultures. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered occasionally)

- 0504-450 Ibsen: Family & Society
Reading and/or viewing plays of Henrik Ibsen, the father of modern drama, enables attentive examination of values and structures of modern society that form and formulate the lives of women and men. Ibsen argues that the possibility of individual freedom and creativity can only be won by seeing beyond and acting in spite of formidable forces. The texts and films are analyzed for visual, as well as verbal, information. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0504-451 Chaucer
A close reading of the major poetry of Geoffrey Chaucer and The Pearl poet in modern English translation and a brief introduction to the history of the English language. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0504-452 James Joyce
Careful study of three of James Joyce's major works: *Dubliners*, *A Portrait of the Artist as a Young Man* and *Ulysses*. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0504-454 Shakespeare: Tragedy
A generous sample of Shakespeare's tragic and romantic plays is investigated to reveal literary excellence and theatrical power. Reference is made to his poems; to the sources of his plays; to the world of Shakespeare's time, its intellectual preconceptions, political stresses and religious rivalries; and to the theatre and its traditions. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-455 Shakespeare: Comedy/History
Several of Shakespeare's comedy and history plays are read and analyzed to reveal their literary excellence and theatrical power. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-456 Dostoyevsky
A study in the style, themes and purposes of one of the world's greatest novelists. At least one long novel is read, along with several shorter works. The writer is studied in the context of 19th century Russia and for the implications his works and life continue to have for 20th century Western culture. Part of the Russian foreign language/culture concentration and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered every other year)
- 0504-457 Tolstoy
A study in the style, themes and purposes of one of the world's greatest novelists. At least one long novel is read, along with several shorter works. The writer is studied in the context of 19th century Russia and for the implications his works and life continue to have for 20th century Western culture. Part of the Russian foreign language/culture concentration and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered every other year)
- 0504-458 Walt Whitman
In 1967, the Nobel Laureate poet Pablo Neruda said, "We live in a Whitmanesque Age." This course attempts to show Whitman as the "representative man" of his time and to assess the validity of his claim that he initiated the poetry of democracy. It also considers his living and influential presence in our time. Students read Whitman's poetry and some of his (unjustly neglected) prose; selected works by his contemporaries, such as Tennyson and Longfellow; and some works by our contemporaries, such as Neruda and Allen Ginsberg. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-459 Toni Morrison
Through reading and discussion of Toni Morrison's novels and feminist and African American critical theory, this course will allow students to follow the development of Morrison's art and to approach her work from alternative critical perspectives. Particular attention will be paid to the role of narrative in African American culture and to Morrison's understanding of its literary, historical, and political function. Part of the literary and cultural studies concentration and minor and the women's studies concentration and minor. May also be taken as an elective. Cross-listed with women's studies, 0522-459. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0504-460 Modern Poetry
A close examination of the poems of important English and American poets of the 19th and 20th centuries, including several living poets. Part of the literary and cultural studies concentration and minor and the creative writing minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)
- 0504-461 Latin American Literature
Reading short stories, novels, poetry, and essays, as well as viewing films of modern Mexico and Central and South America reveals a literature and culture wherein the mythic functions as an integral part of the modern world view and the poetic functions as a political power. The impressive vitality of modern Latin American literature can be attributed to its indigenous roots and to its branches that, stemming from a common language and a shared continent, overarch national boundaries and political regimes to form an international literary community. Part of the Spanish language/culture concentration and minor, the Latino/Latina/Latin American concentration and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-462 Literature & Technology
A study of the relationship between literary expression and technology through primarily (though not exclusively) 19th and 20th century literature. Reading a variety of literary forms from different historical contexts and perspectives, we reflect on authors' responses to the fears and hopes engendered by developing technologies. Through assigned readings, writings, supplementary media, and oral histories, we investigate the impact of technology on our sense of what it means to be human. May be taught with an American Studies focus. Part of the literary and cultural studies concentration and minor; the science and technology studies concentration; and the science, technology and environmental studies minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-464 Myth, Legend & Folklore
Scholarly investigation into the rationale, origins and sources of myths, legends and folklore of the western world and the effect these primary forms have had on our literature. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-465 Viking Myth & Saga
Reading the myths, sagas and folktales of the Viking world reveals the values of a people that created the world's oldest extant democratic society. Both women and men fiercely defend their honor and freedom, willing to risk death rather than to bow in submission. The sagas are analyzed as compelling narrative structures and as documents of a culture that continues significantly to shape western civilization. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0504-466 Early Black Writers
The seeds of African American letters were planted in slavery and bloomed in the Harlem Renaissance of the 1920's. In this course students research and discuss the major contributors to that legacy, a list of writers that includes Phyllis Wheatley, Paul Laurence Dunbar, Ida B. Wells, William Wells Brown, Langston Hughes, and Zora Neale Hurston, Countee Cullen and Claude McKay. Part of the literary and cultural studies concentration and minor, and the minority relations concentration. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-467 Black Writers Today
From the Black Arts Movement of the 1960's to Hip Hop, this course explores African American writers who inspired a civil rights and cultural revolution. Among the authors are Gwendolyn Brooks, Amiri Baraka, Sonya Sanchez, Gil Scott Herron, Maya Angelou, Rita Dove, Charles Johnson, Kevin Powell, Tupac and KRS-One. Part of the literary and cultural studies concentration and minor, and the minority relations concentration. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-468 Literary Representations of America
A study of the various ways this nation has been portrayed by authors since its founding. Although the emphasis will be on 19th and 20th century American literature, in all its genres, attention may also be paid to international writers' perspectives on America, as well as visual and musical portrayals. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered occasionally)

- 0504-469 **New American Literature**
Walt Whitman described America as a "teeming nation of nations." Such diversity has not always been represented in American literature. This course explores the contested and complex cultural history of the United States. Beginning with the idea of "discovering" an inhabited land, we examine issues of identity, migration, difference and work in literature presented in historical context. The emphasis is on underrepresented voices in writings by African American, Caribbean, Puerto Rican, Chicano/a, Native and Chinese Americans. This course looks at both the struggle and the possibilities of forging a genuinely democratic literary tradition. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-471 **Irish Literature**
This course, which is multicultural in approach, will survey the wealth of Irish literature from ancient Celtic sagas to contemporary poetry and fiction. The course will focus on selected early texts (in translation) as well as on selected works of nineteenth- and twentieth-century writers. We will study particular poems, short stories, plays, novels, and essays in the context of Irish history and culture. Part of the literary and cultural studies concentration and minor. May also be taken as an elective (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-473 **Patterns in Poetry & Mathematics**
This is a team-taught course offered by the College of Liberal Arts & the College of Science. The course explores the patterns and themes that link poetry and mathematics and studies how analogy has been used in both for explanation, expression, description, discovery and invention. We'll read primary texts from both math and poetry, as well as writings in which the two fields are discussed in relation to each other. The course material will also draw on contemporary interdisciplinary research. Beginning with simple patterns of rhyming and counting, we will go on to study how poetry and math employ analogy, metaphor, sequences and repetition, proof and contradiction. Special areas of focus include the relationship between closed form and creativity, the influence of fractional geometry on poetry, and the ways in which poets and mathematicians have conceived of infinity over the centuries. Part of the literary and cultural studies concentration and minor. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually; not offered in 2004-2005)
- 0504-474 **British Romantic Literature**
This course examines the poetry, prose and drama written by British authors during the tumultuous and vibrant period beginning with the onset of the French Revolution in 1789 and ending with the ascension of Queen Victoria in 1837. It was during this period that England experienced the change from an agrarian society in which power began to shift, and from which a more democratic and egalitarian society began to emerge. All of the changes and shifts in society are reflected in the literature of the period, making it one of the richest and most varied periods in English history. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually; not offered 2004-2005)
- 0504-476 **Immigrant Voices in American Literature**
This course examines literary treatments of immigration to and migration across the US. Students will read novels, poems, and plays, and view films by and about the experiences of Chicanos, Caribbean immigrants, European immigrants, Asian Americans, and other immigrant communities. The course may also explore texts dealing with the displacement of Native Americans, the shifting and ambiguous US/Mexican border, and the Great African American Migration. Students will read a selection of essays on the history and politics of immigration. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-477 **Survey of Italian Literature**
This course traces Italian literature of a particular time period. Readings may include novels, short stories, poetry, plays, and essays representative of the time period, with attention to literary trends and to cultural and historical influences. All readings will be in English translation. Part of the Italian concentration, the Italian language/culture concentration and minor and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered twice annually)
- 0504-478 **Arab American Literature: First Wave**
A study of fiction, poetry and memoirs written by early, mainly Christian Arab American immigrants to the US (1870-1924) and their children, with additional attention to writing about Arabs and Arab American by non-Arabs. Emphasis will be given to literary expressions of the Arab American experience, particularly the nature of Arab identity; the difficulties involved in claiming Americanization and simultaneously affirming Arab cultural heritage and identity; the significance of family, religion, community, and language to first- and second-generation immigrants; and the effects of Orientalism upon Arabs and Arab Americans. Part of the literary and cultural studies concentration and minor, and the Arabic language/culture concentration. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0504-479 **Latino Experience in Literature**
This course presents an overview of the Latino experience in the United States, examining representative works of Hispanic writers. Major Latino groups will be studied (Cuban, Chicano & Mexican Americans, Dominican Americans and Puerto Ricans living in the U.S.). The emphasis is on the interplay between each of these groups, the main society and their place of origin. Special attention will be given to the issues of migration and assimilation. Part of the Spanish and Latino/Latina/Latin American concentration and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-480 **Women in Literature**
Concentrates on literature by women, about women, primarily from the early 19th century to the present. Considers the aspirations, frustrations and achievements of women as documented by themselves, as well as the perceptions and representations of women in literature by male writers. Works are examined for their literary value as well as their documentation of broader feminist issues. Part of the literary and cultural studies concentration and minor and the women's studies concentration and minor. May also be taken as an elective. Cross-listed with women's studies, 0522481. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-484 **Literature & Religion**
Exploration of the complexity of religious experience, both personal and cultural, as it is portrayed by writers from biblical times to our own day. The literature is supplemented by readings from such disciplines as psychology, philosophy, history and theology. Part of the perspectives on religion concentration and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504-485 **Global Literatures: Planetary Extremities and Extremisms**
This course will consider some of the key historical forces that have been bringing the globe's inhabitants into contact with and awareness of one another. Under the auspices of cultural expression, we will examine a host of artistic and popular forms that link different parts of the global world system: possible primary texts include TV programs and commercials, film, animation, music, visual art, literature and new media. Course "readings" will be determined through class input. Lectures and scholarly readings will supplement our examination. Attendance and participation are heavily weighted. Students will also write two papers, a graded draft and present their work in-class. Part of the literary and cultural studies concentration and minor. May be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)
- 0504487 **French Black Africa & Caribbean Reading** (in English translation) short stories, novels, plays, poems, and essays of modern French-speaking writers from sub-Saharan-Africa and the Caribbean, as well as viewing films by French-speaking directors, enable an exploration of the richness, variety, and vitality of written and filmic art composed in a shared global language. Such a focus also reveals the profound tensions arising from highly contested constructions of culture and identity as they are shaped in and by that very language and as they are formed and reformed by the African diaspora. Part of the French foreign language/culture concentration, and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered annually)

0504-490 **Autobiography: Outlaw Narratives**
According to poet James Merrill, we live in the age of "me-moir." At least in American culture. But what happens to the quarrel between truth and fiction, to the almighty "I", as we move outside of England and America? What "outlaw" forms of language and representation do a street fighter from Morocco, a Soweto social worker or an AIDS diarist use to write the self? How do international sex workers, a New Zealand filmmaker, and the author of *The English Patient* redefine the boundaries of family, nation, class, and gender? Expect to encounter visual autobiographies from art, photography and film, as well as projects in the classroom and in the community. Part of the literary and cultural studies and women's studies concentrations and minors. (0504-225 and 226 or equivalent) Cross-listed with women's studies, 0522484. **Class 4, Credit 4 (offered annually; not offered 2004-2005)**

0504491 **Modern Italian Poetry**
We will study Italian poetry from the late 19th through the 20th centuries within a cultural and historical context, examining in particular the influences operating between modern Italian poetry and modern poetry in English. Students will read a variety of poems in translation and will have at least one dual language text. When possible, class discussion and lectures will be supplemented by guest lectures on topics such as Italian art, design, and history; viewing of Italian films; and attendance at Italian cultural events. Students do not need any knowledge of the Italian language in order to take this course. Part of the Italian concentration, the Italian language/culture minor and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually; not offered 2004-2005)**

0504492 **Native American Women's Experience**
This course examines the unique status of Native American women in tribal and Euroamerican societies. Given the gender complementary construction of many tribal communities, Native women long enjoyed a status and power not found in Europe, but this equality has been altered in many tribes as a result of colonialism. We will study how Native women have responded to assaults on the "feminine principle," as Paula Gunn Allen terms it, and how they have sought to rebuild tribal communities along the lines of traditional values. We will examine the following themes in Native women's lives: tribal gender roles, nation, community, family, class, work, race, sexuality, disability, culture-bearing, environment, land, health, and representation. Part of the literary and cultural studies concentration and minor and the women's studies concentration and minor. May also be taken as an elective. Cross-listed with women's studies, 0522492. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually)**

0504493 **Maps, Spaces & Places**
This course begins with a meditation on the language of maps and mapmaking, exploring the paradox that in order to present a useful and truthful picture, an accurate map must tell lies. Among our questions: How do certain interests come to be embodied in mapmaking? How do literary works imaginatively construct space as locale? As world or nation? In what ways do mapmaking and power mutually reinforce various kinds of social authority, but deny others? How can we begin to think about race, class, gender and sexuality, and Western culture in terms of the authority asserted in space and spatial configurations? Critical readings will include the work of cultural geographers, cartographers, novelists, filmmakers, and poets from around the globe. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually)**

0504494 **Pan-Indian Native American Literature**
This course examines Native American literature from the end of the Indian Wars, as demarcated by the massacre at Wounded Knee, through the relocation and termination eras to just before the Native-American Renaissance. During these years, we witness the emergence of a pan-Indian identity that results in part from colonial policies, such as boarding schools, and results in intertribal political coalitions, such as the Society for American Indians. This course focuses upon the literatures generated from this shift in Native consciousness and asks students to consider issues of identity formation. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-495 **Contemporary Native American Literature**
1968 marks the beginning of an era referred to by Kenneth Lincoln as the "Native American Renaissance." Beginning with the publication of Scott Momaday's *House Made of Dawn*, we begin to see the emergence of a substantial body of texts commonly recognized by dominant standards as a "literature." This course seeks to contextualize these late 20th century works in their individual tribal and larger pan-Indian traditions, noting the earlier literary traditions that inform them. We will consider texts commonly conceived of as "metropolitan," as well as those that firmly reject mainstream expectations of literature. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually)**

0504496 **Women in the Hispanic World: The Politics of Identity Formation**
This course explores the contributions to history, literature, art and politics by prominent Spanish American women. We will look at writings and paintings by these women, read critical essays about their work, and view four films inspired by them. This course is part of the Spanish concentration and minor, the Latino/Latina/Latin American concentration, and the literary and cultural studies minor and concentration. May be taken as an elective. Cross-listed with foreign language, 0503-595. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-498 **Editing Literary Magazine**
Supervision on all aspects of creating a literary and art magazine, with emphasis on writing and editing skills. Hands-on practicum focusing on production of the student-designed magazine, *Signatures*, RTT's oldest continuous literary publication. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-500 **Italian Literature: Special Topics**
The focus of this special topics course will be determined by the instructor's interest and strength. The course might focus on a particular author, work, genre or time period in Italian literature; or rather, it might be thematically organized. Readings may include novels, short stories, poems, plays and essays representative of the time period, author, or thematic focus with attention to literary trends and cultural and historical influences. All readings will be in English translation. The course is part of the Italian concentration, the Italian language/culture minor, and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-510 **The View from Paris**
From Charles Baudelaire and Marcel Proust to Assia Djebar and Dai Sijie, modern and contemporary French writers view France and the impact of its global presence from the dominant cultural platform that metropolitan Paris affords. Part of the French foreign language/culture concentration and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-524 **Contemporary Film**
A study of contemporary world films, to be drawn from those presently showing in the Rochester area theaters. Emphasis is on both technical and aesthetic aspects of the films. Part of the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually)**

0504-545 **Deaf Literature**
The major focus of this course is "the image of the deaf" and "the deaf experience" as depicted in literature. The course attempts to define "deafness" and the cultural roles it plays in both texts by deaf authors and texts about deaf persons, as well as to examine particular literary forms related to the deaf experience. Thus, attention is also given to studying poetry that is created in American Sign Language (ASL), a language primarily used by the deaf American community. This course is a part of the American Sign Language concentration and the literary and cultural studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) **Class 4, Credit 4 (offered annually)**

Fine Arts

0505-213 **Fine Arts: Visual Arts**
Students develop ability in perceiving worth in objects of art through consideration of fundamental concepts in painting, sculpture and architecture, involving analysis, interpretation and principles of aesthetics. **Class 4, Credit 4 (offered quarterly)**

0505-214 **Fine Arts: Musical Arts**
An introduction to music as a fine art. Students develop skills in listening, evaluation and analysis through an examination of music's forms, constituent elements, and stylistic and historical development. **Class 4, Credit 4 (offered quarterly)**

0505-215 **Fine Arts: Film Arts**
This course will develop students' skills in viewing, analyzing, interpreting and evaluating the art of cinema through an examination of film technology, history, aesthetics and style. **Class 4, Credit 4**

0505-216 **Fine Arts: Theater Arts**
The course will develop students' skills in viewing, evaluating, and analyzing the art of the theater through an examination of its constituent elements, aesthetics, and stylistic and historical development. **Class 4, Credit 4**

0505-325 **Honors Fine Arts**
Satisfying the Fine Arts core requirement. This course introduces students to the idea, the practice & the evaluation of the visual, the musical, and the dramatic arts (music, theater, film, painting, sculpture, and architecture). The course is organized and taught by a team of Fine Arts faculty, in a format that combines lecture, discussion, and practice. The topic of Fine Arts is treated in three integrated ways: theoretical, experimental-analytic, and program-critical. Students will be expected to read, view, listen to, discuss, research, write about, and create works of art. **Class 4, Credit 4**

0505-401 **RIT Singers**
RIT's primary choral group performs vocal works dating from the Middle Ages to the present. There is one major performance per quarter and several smaller events throughout the year. Contact Professor Edward T. Schell, Music Director, for information about participating. **Class 1, Credit 1**

0505-402 **RIT Philharmonia**
The RIT Philharmonia performs three major concerts per year of standard orchestral repertoire. In addition, students from the Philharmonia have the opportunity to play in a variety of chamber ensembles. Participation is by audition. Contact Dr. Michael Ruhling for information. **Class 1, Credit 1**

0505-403 **RIT Concert Band**
The RIT Concert Band is a large instrumental ensemble which performs a wide body of literature including traditional marches, wind ensemble pieces, musical medleys and orchestral transcriptions. The group rehearses once a week for two hours in the music room (A128) of the Student/Alumni Building. Students participating in the course are eligible for one credit hour applied toward their individual concentration. The group performs at least one formal concert per quarter as well as several special events throughout the academic year. The group is currently under the direction of Dr. Jonathan Kruger. **Class 1, Credit 1**

0505-404 **RIT World Music Ensemble**
A multi-cultural ensemble of instrumentalists, singers, and dancers organized to explore and perform a variety of music and dance from cultures around the world. The cultures to be studied will be dependent on enrollment. Participants native to the represented cultures will be enlisted to assist in the teaching of basic performance practices and concepts. Enrollment is open to all students, faculty, and staff, who are competent instrumentalists, singers and/or dancers from both Western and non-Western traditions. Auditions will be held to assess proper placement. Contact Dr. Carl Atkins for information. **Class 1, Credit 1**

0505-405 **RIT Jazz Ensemble**
This performing ensemble will provide the opportunity for students to become familiar with and perform a variety of musical styles associated with American Jazz. These will include Swing, Blues, Fusion, Dixieland, Samba, Bossa-Nova, Ballad, Be-Bop and Ragtime. As an experiential outcome of such study, the group will prepare a significant assortment of musical compositions for public performance. **Class 1, Credit 1**

0505-420 **Applied Music**
Students will receive private instrumental or voice lessons and participate in studio performance opportunities. **Credit: 1 hour per quarter**

0505-430 **20th Century Art**
The subject of this course is 20th century painting, sculpture and architecture in Europe and the United States. Focus will be upon the images and ideas that have interested 20th century artists and architects, instead of proffering yet another chronological survey of the subject. Thus, those who need to brush up on the history of 20th century art will have to consult standard surveys of art history—such as Gardner, Janson, Hartt, Stokstad, or Honour and Fleming—or more comprehensive surveys of 20th century art—such as Arnason, Jacobus and Hunter or Lynton. Part of the art history concentration and minor, and the American artistic experience concentration. Cross-listed with CIAS. **Class 4, Credit 4**

0505-431 **Topics in Baroque Art**
This course will focus upon Italian artists working in Rome from circa 1590 to circa 1660. Although we will explore painting, sculpture and architecture in this particular sequence and more or less chronologically, we will often have the chance to consider how these media coalesce to create an overwhelming visual experience. We will pay particular attention to major commissions given to Annibale Carracci, Michelangelo da Caravaggio, Gianlorenzo Bernini and Francesco Borromini, as we seek to define the nature and meaning of the Roman Baroque. Part of the art history concentration and minor. Cross-listed with CIAS. **Class 4, Credit 4**

0505-432 **Renaissance Painting: Flanders**
This is the study of the history of Renaissance painting in the Southern Netherlands from the first half of the 15th century to the end of the 16th century. We will examine such problems as: the meaning of the Renaissance in Flanders, the observation and recording of natural appearances, "hidden symbolism" and sacramental themes in Early Netherlandish painting, the connections between Flemish, German and Italian art, the development of new genres in the 16th century, "originality" and "artistic progress". The Master of Flemalle, Jan van der Goes, Hans Memling, Gerard David, Quinten Metsys, Hieronymus Bosch, Joachim Patinier, Pieter Aertsen and Pieter Breughel the Elder, are among the artists to be studied. Part of the art history concentration and minor. Cross-listed with CIAS. **Class 4, Credit 4**

0505-433 **15th Century Art & Architecture of Florence & Rome**
The subject of this course is 15th century painting, sculpture and architecture in Florence and Rome. We will approach this material in a more or less chronological order as we focus upon a series of important commissions. Questions for consideration will include: the nature and meaning of the Italian Renaissance, developments in artistic theory and practice, the importance of Antique and Medieval precedents the increasing attention to the effects of nature, the rising status of the artist, the role of the patron, and the relevance of documents, literary sources and visual precedents for our interpretation of images. Part of the art history concentration and minor and the Italian concentration and minor. Cross-listed with CIAS. **Class 4, Credit 4**

0505-434 **16th Century Art & Architecture of Florence & Rome**
The subject of this course is 16th century painting, sculpture and architecture in Florence and Rome. We will approach this material in a more or less chronological order as we focus upon a series of important commissions. Questions for consideration will include: the nature and meaning of the Italian Renaissance, developments in artistic theory and practice, the importance of Antique and Medieval precedents, the increasing attention to the effects of nature, the rising status of the artist, the role of the patron, and the relevance of documents, literary sources and visual precedents for our interpretation of images. Part of the art history concentration and minor. **Class 4, Credit 4**

0505-435 **Russian Art—10th through 20th Century**
This course will trace the evolution of Russian Art from the adoption of Christianity in 988 to the end of the 20th century through the Gorachev's Perestroika and to the present day. The course will highlight major historical events and artistic schools/works which contributed to creating the unique phenomenon of Russian culture. The course embraces such major art forms as architecture, painting, and sculpture as well as elements of decorative and folk art. Part of the art history concentration and minor. Cross-listed with CIAS. **Class 4, Credit 4**

- 0505-436 Women's Stories, Women's Films
 This course will provide an introduction to women's films through an exploration of narrative structure in films made by women. Through film screenings and class discussion, the course will examine the themes and issues of women's narratives and how they are presented in the medium of film. The hero's journey and traditional narrative structure will be contrasted with the heroine's journey and the more personal story telling style of the feminine. The course will also examine differences between films made by women and films made by men about women. The course will introduce the work of feminist film critics and consider the relevance of those theories to women's roles in current films. In addition, the course will view women's story telling in a context of feminine mythology and women's psychology. Part of the women's studies concentration and minor. Cross-listed with CIAS, 2065-553; and women's studies, 0522-436. Class 4, Credit 4
- 0505-441 American Architecture
 A survey of American architecture from the seventeenth century to the present. Stress is placed on a visual as well as historical and social analysis. Part of the American artistic experience concentration, the art history concentration and minor and may also be taken as an elective. Class 4, Credit 4
- 0505-442 Music in the U.S.
 A survey of music in the United States from the time of European colonization to the present. Particular emphasis is placed upon the question of what makes music distinctively "American." Part of the American artistic experience concentration and the music concentration and minor. May also be taken as an elective. Class 4, Credit 4
- 0505-443 Images of American Life
 Students examine images of American life in the 19th and 20th century in the visual arts, particularly photography, to analyze and evaluate the influences of American political, social and cultural events on imagery and perception. Part of the American artistic experience concentration, and the art history concentration and minor. May also be taken as an elective. Class 4, Credit 4
- 0505-444 American Painting
 A survey of the style and meaning in American paintings from the colonial limners to contemporary artists. Centers on what distinguishes painting of the colonies and of the United States from its European counterpart. Part of the American artistic experience concentration, the art history concentration and minor and may also be taken as an elective. Class 4, Credit 4
- 0505-445 Issues in American Art
 A comprehensive overview of American attitudes and philosophies as they have shaped and been embodied in our artistic heritage. Emphasis is placed on American art from 1850 to the present. Part of the American artistic experience concentration, and the art history concentration and minor. May also be taken as an elective. Class 4, Credit 4
- 0505-446 American Film
 Students develop an understanding of theories, styles and trends in American film through a historical and sociological study of the medium. Part of the American artistic experience concentration, the art history concentration and minor and may also be taken as an elective. Class 4, Credit 4
- 0505-447 American Musical Theater
 Survey of the development of American opera and the American musical theater, highlighting representative works, composers, librettists and performers of both the "cultivated and vernacular traditions." Part of the American artistic experience concentration: the music concentration and minor and also may be taken as an elective. Class 4, Credit 4
- 0505-448 20th Century American Music
 Survey of both the cultivated and vernacular traditions of American music in the 20th century, taking into account its political, social and historical frameworks. Part of the American artistic experience concentration; the music concentration and minor and also may be taken as an elective. Class 4, Credit 4
- 0505-449 Music Theory I
 For the student who has basic musical literacy (ability to read music notation). In addition to the writing of melody, two-part counterpoint and four-part harmony, some attention is given to the analysis of form & style. Part of the music concentration and minor. May be taken as an elective. Class 4, Credit 4 (offered occasionally)
- 0505-450 Music & the Stage
 A historical and cultural survey of collaboration between the arts of music and theater, focusing on a selection of significant creative products that combine music and drama. Included are works by Shakespeare, Monteverdi, Moliere, Mozart-DaPointe, John Gay, Beethoven-Goethe, Wagner, Puccini, Brecht-Weill, and Berstein, spanning the genres of Renaissance tragedy and comedy, opera seria, opera buffa, ballad opera, incidental music, romantic drama, Italian opera, music-drama, epic theater, cabaret, vaudeville, and musical comedy. Part of the music concentration and minor and may also be taken as an elective. Class 4, Credit 4
- 0505-452 Special Topics in American Art
 A critical examination of issues and/or artistic developments in American art. The topic may have been briefly covered in another concentration course. Provides a unique opportunity to expose the student to an in-depth analysis of one selected aspect of America art. Examples of likely topics are: American landscape painting; American portraiture; pop art of the '60s; jazz; Robert Venturi and post-modern architecture in America; criticism and theory; or other topics dealing with American painting, sculpture, architecture, music and film. Part of the American artistic experience concentration and also may be taken as an elective. Prerequisites, if any, are determined by the instructor. Class 4, Credit 4 (offered occasionally)
- 0505-453 Theater in the U.S.
 A broad survey of theater in the United States, designed to acquaint students with the main figures, companies, plays, productions and stylistic currents that have defined the American stage since the Revolution. Emphasizes the native and multicultural features of our theater's development, while taking due note of the influences from Europe. Also introduces students to some of the impulses, both traditional and avant garde, that have characterized the American theater since mid-century. Part of the American artistic experience concentration and also may be taken as an elective. Class 4, Credit 4
- 0505-454 Orchestra Repertoire & History
 A survey of the history and development of the orchestra and its repertoire from the Baroque to the present, focusing on works commonly performed by American orchestras. In conjunction with concert attendance requirements, special attention is given to works performed by area orchestras. In addition, various business, legal, cultural and artistic aspects of the modern American orchestra are addressed. Part of the American artistic experience concentration; the music concentration and minor; and may also be taken as an elective. Class 4, Credit 4
- 0505-455 Survey of Jazz
 This course will survey the development of American Jazz music, highlighting representative composers and performers and significant works. Particular attention will be drawn to the multi-racial influences on the creation of jazz music and its relationship to American culture as a whole. This course is part of the the American artistic experience concentration; the music concentration and minor; and may also be taken as an elective. Class 4, Credit 4
- 0505-456 Topics in Music History
 This course is a study of various aspects of music in different historical environments with emphasis on analogies between music and the other arts. Part of the music concentration and minor. May be taken as an elective. Students may register for course only with permission of the instructor.
- 0505-457 Contemporary Drama, Theater & Media
 This course will examine some recent trends in American drama and theater, focusing largely on the apparent influence of television and other mass media on playwriting and performance conventions from the past two decades. Some earlier work will likely come in for some brief consideration so as to provide a context within which more recent work may be viewed. Central to the course will be an examination of how traditional models of playwriting and performance rooted in casually-oriented narrative have been abandoned or at least undermined by a number of contemporary American theater artists. The course will survey a range of plays and performances that in terms of structure reflect some of the representational practices of post-1980 American television programming, and that in terms of content resonate with some of the concerns voiced about the sociological, psychological and epistemological influences of television. Part of the American artistic experience concentration and may also be taken as an elective. Class 4, Credit 4

0505-458

Modernist European Theater

This course will provide an overview of several major movements associated with modern European drama and theater, with a survey of various plays associated with those movements. These plays will be situated within appropriate historical contexts to illuminate the significance of the works. Emphasis will be placed on how the various plays and movements, while employing similar devices and conventions, nonetheless differ from each other in tenor and content and in the end, toward which they were directed. May be used as an elective. **Class 4, Credit 4**

0505-459

Era of Haydn & Mozart

Many of the characteristics of art music up to the present day have their beginnings in the late eighteenth century. This course explores the creation and performance of music within the context of European cultural, political and artistic ideals from 1740 to 1800, with particular attention given to the works of Haydn and Mozart. Part of the music concentration and minor; the German language/culture concentration and minor; may also be taken as an elective. **Class 4, Credit 4 (offered occasionally)**

0505-461

World Music I

A course designed to explore selected music cultures of North America, South America, and Africa, through an examination of their musical, sociological, philosophical and aesthetic values. The primary goal of the course will be to expand understanding of, and perceptions about music, both outside and within Western cultural traditions. The methodology will involve using traditional techniques of music analysis and "comparative musicology" along with special techniques for listening to and analyzing non-Western music, in an examination of musical elements, music-making processes, instruments, the functions/purposes of music in various cultures, and selected readings from allied disciplines. Students will have opportunities for experiential (hands-on) activities, depending on size and make-up of the class. Part of the music concentration and minor and may also be taken as an elective. **Class 4, Credit 4**

0505-462

World Music II

This course will explore selected music cultures of India, Asia, East Asia, and Central/Southeastern Europe, through an examination of their musical, sociological, philosophical, and aesthetic values. The primary goal of the course will be to expand understanding of, and perceptions about music, both outside and within Western cultural traditions. The methodology will involve using traditional techniques of music analysis and "comparative musicology," along with special techniques for listening to and analyzing non-Western music, in an examination of musical elements, music-making processes, instruments, the functions/purposes of music in various cultures, and selected readings from allied disciplines. Students will have opportunities for experiential (hands-on) activities, depending on size and make-up of the class. Part of the music concentration and minor and may also be taken as an elective. **Class 4, Credit 4**

0505-463

Survey of African-American Music

This course is a survey of the history of African American music through an examination of the major forms of music making and dance developed among African Americans in the United States from the early 17th century to the present. A brief introduction to West African cultural characteristics, especially music and dance, as well as discussion of the African diasporas in the New World will serve as background for this survey. Part of the music concentration and minor; the American artistic experience concentration; and may be taken as an elective. **Class 4, Credit 4**

0505-464

Blues Personal & Social Commentary

A course designed to explore the African American folk form known as the Blues. While tracing the history of this unique form frames the course, particular emphasis is placed on understanding the Blues as a window into the personal lives of those who perform it, and viewing the Blues as a vehicle for social commentary. Part of the music concentration and minor; the American artistic experience concentration; and may also be taken as an elective. **Class 4, Credit 4**

0505-468

Art of India & Southeast Asia

A survey outlining the development of art in India and Southeast Asia examining the philosophical circumstances that distinguish eastern artistic traditions. There is opportunity for each student to pursue special interest in depth. Part of the art history and Japanese language/culture concentrations and minors; the Chinese language/culture concentration; and may also be taken as an elective. **Class 4, Credit 4**

0505-469

Art of China, Korea & Japan

A survey outlining the development of art in China, Korea and Japan, examining the philosophical circumstances that distinguish eastern artistic traditions. There is opportunity for each student to pursue special interest in depth. Part of the art history concentration, the art history minor, Chinese foreign language concentration, the Japanese foreign language concentration, and may also be taken as an elective. **Class 4, Credit 4**

0505-470

American Popular Song

This course will survey the American popular song and its composers and performers, taking into account the political, social and historical perspectives reflected in this commercial part of the vernacular music tradition. The course is part of the American artistic experience concentration, the music concentration and minor, and may be taken as an elective. **Class 4, Credit 4**

0505-480

Women & the Visual Arts

Examines the image of women in the visual arts and the role of women as image makers. Major topics include the variety of images of women, the evolution & change of these images over time, media images (as differentiated from fine art images) of women, images of women by women and by men, women's images and the issues of their relationship to the images made by men, the nude and pornography, history of women artists, selected women artists and their work, relation of their work to the art of the period, current issues and status of women artists. Part of the women's studies concentration and minor, the art history concentration and minor and may also be taken as an elective. Cross-listed with women's studies, 0522-480. **Class 4, Credit 4**

0505-481

Oriental Art

A survey outlining the development of art in India, China and Japan, examining the philosophical circumstances that distinguish Eastern artistic traditions. There is opportunity for each student to pursue special interests in depth. Part of the Chinese and Japanese foreign language/culture concentration, the art history concentration and minor and may also be taken as an elective. **Class 4, Credit 4**

0505-482

Beethoven

Introduction to the music of Beethoven in the psychological, political and philosophical contexts that gave it shape and force. Using the classical style of Haydn and Mozart as background, focuses on the development of the "Dionysian" personality in Beethoven's compositions and the creation of the sublime in music. Part of the German language/culture and the music concentrations and minors, and may be taken as an elective. (0505-459) **Class 4, Credit 4**

0505-483

Bach & the Baroque

A study of Johann Sebastian Bach, his life and times, and his music in the context of Baroque styles and aesthetics. Compositions from each of the major periods of his creative life are examined and discussed, particularly as they serve the social and religious purposes for which they were written and as they reveal the psychology of so-called "Rhineland mysticism." Part of the German language/culture and the music concentrations and minors, and may be taken as an elective. **Class 4, Credit 4**

0505-484

Romanticism in Music

Survey of the rise of German Romanticism from Beethoven to Strauss in the context of the development of 19th century musical styles in general. Part of the German language/culture and the music concentrations and minors, and may be taken as an elective. **Class 4, Credit 4**

0505-485

Music Theory II

For the student who has completed Music Theory I or a comparable program of study. In addition to the continuing study of melodic construction and development, thematic development in two-part counterpoint, four-part harmony, and analysis of form and style, emphasis is placed on the development of individual musical skills. Part of the music concentration and minor and also may be taken as an elective. (0505-449) **Class 4, Credit 4**

0505-486

German Theater & Drama

A broad survey of German-language plays and theater styles since 1800 (all materials in English translation). Chief focus is on the dramas and theater practice of Bertolt Brecht (*Threepenny Opera*, *Mother Courage and Her Children*, *Good Person of Szechwan*, *Life of Galileo*, *The Caucasian Chalk Circle*). Emphasis is given also to developments in German theater through the period of the Berlin Wall (erected 1961, demolished 1989), and in the first decade after Germany's reunification. Class method includes practical experimenting with theatrical presentation. Course may be used for German Language/Culture minor, and as an elective. **Class 4, Credit 4**

0505-487 Art of Islam
A survey of artistic traditions (to include architecture, decorative arts, art of the book and painting) from the seventh century onwards in countries from Asia, Africa, and Europe that were influenced by the religion of Islam. There will be an opportunity for each student to pursue special interests in depth. This course is part of the Arabic foreign language/culture concentration, the art history concentration and minor and may also be taken as an elective. Class 4, Credit 4

0505-502 Shakespeare the Dramatist
This is a course in Shakespeare's drama that emphasizes five plays as potential theatre productions. Studying five or six plays representative of the different acknowledged types of Shakespearean drama (comedy, tragedy, history, problem comedy, romance), students gain a broad understanding of the character and range of Shakespeare's poetic-dramatic art. Experimenting on selected production activities, they acquire a practical appreciation of Shakespearean drama's theatrical potency, of the original staging conventions, and how each type of play makes particular generic demands on both the reader and spectator. Augmenting the reading and practice work is a term research project focused on the history of a single play's staging interpretation. May be taken as an elective. Class 4, Credit 4

History

0507-301 History: Modern America
An analysis and interpretation of main themes in United States history from the Civil War/Reconstruction Era (1865-1877) through contemporary America. Class 4, Credit 4 (offered quarterly)

0507-302 History: Modern European
The course is an analysis of the political, social, economic, cultural and military events that have characterized the history of Europe from the modern period to the 20th century. Emphasis will be given to the ideas, events, movements and developments that have shaped the civilization of Europe and have contributed to the transformation, development and enrichment of other civilizations. One of the major goals of the course is not only to convey factual knowledge about the history of Europe from the modern time to the 20th century, but to provide the historico-intellectual framework from which emerges the interconnection between European civilization and the rest of the world. Class 4, Credit 4 (offered quarterly)

0507-325 Honors History
Like the department's core course, "History: Modern American," this course will examine the political, social, cultural and economic development of the American people in the modern period, and study the United States in its foreign relations. The difference is that this course will do so by focusing on a specific theme or topic, to be chosen by the instructor, announced in the subtitle, and developed in the course syllabus. Class 4, Credit 4

0507-401 American Women: Colonies to 1848
This course considers the history of American women from the colonial era to the Seneca Falls convention. We will examine the experience of women of different races and classes across the country, looking at Puritans in Massachusetts and at planter's daughters in the Carolinas; at female slaves in the deep South and at mill workers in the urban North. We will investigate the impact of the American Revolution upon women, and we will also trace the emergence of the women's rights movement, culminating in the convention at Seneca Falls. Part of the history concentration and the American history minor. May be taken as an elective. (0507-301, 0507-302 or equivalent) Cross-listed with women's studies, 0522-401. Class 4, Credit 4 (offered occasionally).

0507-402 American Women: 1848 to Today
This course considers the history of American women from the Seneca Falls Convention to the present. We will trace the impact of the first women's rights convention and follow the story of the struggle for the vote. We will also consider the role of women in other important nineteenth-century reform movements, including abolition, temperance, spiritualism, and progressivism. We will also look at the varied experience of women in the twentieth century, from birth control to second wave feminism to coeducation. Part of the history concentration and the American history minor. May also be taken as an elective. (0507-301, 302 or equivalent) Cross-listed with women's studies, 0522-402. Class 4, Credit 4 (offered occasionally)

0507-440 U.S. Social & Intellectual History
Examines main themes in U.S. social history immigration, ethnicity, urbanization and major themes in intellectual history; the question of national character; salient facets of American ideas and institutions and leading historio-graphical assessments of the American experience. Part of the history concentration. May be taken as an elective. Class 4, Credit 4 (offered occasionally)

0507-441 20th Century American Diplomatic History
An examination of the major events and forces which shaped American diplomacy from the opening years of the 20th century to the immediate post-World War II era. Part of the history and global studies concentrations; the history of modern world minor; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-442 Contemporary Middle East
Analyzes the making of the contemporary Middle East from the rise of Islam to the present with special emphasis on the patterns of political development in the 20th century. Part of the history, international relations and foreign language/culture concentrations; the history of the modern world and international relations minors; and also may be taken as an elective. (0507-301,302 or equivalent for history concentration; 0513-211, 214 or equivalent for international relations concentration) Class 4, Credit 4

0507-443 European Social & Intellectual History
An analysis of social events and intellectual movements in Europe since 1600. Part of the history concentration; the European history minor; and also may be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-444 Strategy & Diplomacy of Europe
Investigates the origins and outcomes of the two World Wars with special emphasis on the conflicting strategies and secretive diplomacy adopted by the European Great Powers between 1871 and 1945. Part of the history and international relations concentrations; the European history and international relations minors; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-445 Modern Latin America
Survey of the historical development of the Hispanic and Portuguese areas of the Americas from independence to the mid-20th century. The movement towards independence, the problems that emerged during the nineteenth century of forming unified nations and the problems of modernization in the twentieth century are all covered. The histories of selected countries are used to illustrate these issues. Part of the history, Spanish language/culture, and Latino/Latina/Latin American concentrations. Also part of the Spanish language/culture and history minors. May be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-446 Europe Since 1945
The course analyzes the major changes that have affected Europe since 1945. The primary focus in this course will be on the political and economic process of European integration from the Organization for European Economic Cooperation to the Treaty of Maastrich; from the Single Market to the single currency; from the Common Market to the transatlantic cooperation between the European Union and the United States; from Detente and Perestroika to the new relations between the European Union and the Eastern European countries; from Keynesian neocapitalism to economic globalism and the new partnership between the European Union and the countries of the Mediterranean, the Middle East, Africa, Latin America and Asia. Part of the global studies and history concentrations, and the European history and history of the modern world minors. May be taken as an elective. Class 4, Credit 4 (offered occasionally)

0507-447 U.S. History Since 1945
An analysis of the major themes characterizing post-World War II United States history. Investigates the specific characteristics of America as a modern state. Selected themes include intellectual, cultural, political and military aspects. Part of the history concentration, the American History and the history of the modern world minors. May be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-448 History of Russia to 1917
A study of the historical context and development of Russian society and the factors leading to the emergence of the Soviet regime. Part of the history concentration; European history minor; and also may be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)

- 0507-449 History of Russia Since 1917
A study in depth of the Bolshevik revolution, the rise of Stalin, industrialization and collectivization, the terror and the purges, the process of de-Stalinization under Krushchev and his successors, and current developments in Russia. Part of the history concentration; European history and history of modern world minors; and also may be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-450 Stalin, Mussolini and Hitler
A study of the European states and peoples in the inter-war period, the diplomatic & military history of World War II, the reconstruction of Europe, the Cold War, detente and contemporary Europe. Part of the history concentration. May also be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-451 Local History
Students study the lives of Americans in various communities (such as families, working, ethnic and political communities) from 1850 to the present. Part of the history concentration and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-453 U.S.-Latin American Diplomatic History
The emphasis is on analyzing the United States' relations with Latin America from independence to the present. Part of the history concentration; Spanish language/culture minor; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-456 U.S. & Third World Revolution
One of the dominant features of the 20th century has been the revolution of rising expectations in the countries of the Third World. Students study the underlying causes of these revolutions and the reaction of the United States government to this revolutionary ferment in Latin America, Asia and Africa. Part of the history concentration and also may be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-457 History of American Popular Culture
American myths, icons, heroes and institutions as represented in American popular culture from the late nineteenth century to the present. Examines the history of popular entertainment and the mass media in the United States. Part of the history concentration and also may be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-460 Revolutionary Leaders of Latin America
In this course three movements are studied: the rise of Juan Peron in Argentina in the 1940s, Fidel Castro's revolution in Cuba and Salvador Allende's electoral victory in Chile in 1970. By studying these three "revolutionary" movements, the student comes to an understanding of the historical perspective and nature of social discontent in Latin America. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-461 The Renaissance World
The thematic study of the Renaissance in Europe from 1300 to 1600. The course explores the art, literature, philosophy, society and institutions of the Renaissance that have contributed to the revival of the western culture and heritage. Part of the history concentration and also may be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-462 Civil War & Reconstruction
A course which examines the Civil War Era (1850s-1870s) from military, social and political perspectives. Students will consider the causes of the war, its development between 1861 and 1865, and some of its consequences in American society during the Reconstruction era. Prerequisite: Modern American or Modern Europe or permission of instructor. Part of the history concentration, the American history minor; and also may be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-463 Deaf History
Traces the history of the deaf community in a transatlantic context. The history of deaf education in the west will be examined in detail. The historical development of the American deaf community will be given special attention. The distinctive culture of the American deaf community, together with its language and literature, will also be considered. Part of history concentration; American history minor; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-464 American Environment & Character
Students will study the ways in which American thought, culture and politics have been shaped by the environment, including the natural features of the physical landscape (mountains, rivers, oceans), and the technological features (dams, bridges, railroads, highways). The course will focus on a range of topics, such as land-use concepts, western expansion, the technological domination of nature, and conservation and environmental politics. Part of the history and environmental studies concentrations; science, technology and environmental studies minor; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-465 Survey of African Am History
This course examines the history of African Americans from the colonial era through the twentieth century. Students will consider a variety of themes: the Middle Passage, the creation of slave cultures, resistance to enslavement and the rise of free black communities, emancipation, civil rights struggles in the twentieth century, and several other topics. Part of the history concentration, and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-466 American Slavery, American Freedom
This course examines debates over the institution of slavery and the meaning of freedom in antebellum American society. Students will study the history of enslavement in American society before the Civil War, including such topics as the creation of slave culture, slave rebellion, and relations between masters and enslaved people. In addition, students will study movements against slavery by abolitionists, politicians and free black activists. Part of history concentration, and also may be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-467 Disabilities in American History
This course considers the issue of disability in American Life. We will examine a variety of disabilities within different historical contexts, including literary, cinematic, and cultural in order to answer the following questions. What is disability? Who decides? Can a condition be considered a grave disability in one culture but go nearly unnoticed in another? Is a disability a biological or a social construction? What can we learn by considering these issues from a disabled point of view? May be taken as an elective and is also part of the American history minor. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-483 Christianity in the West
Traces the development of Christian thought in the broad historical context of Western Civilization. Concentrates on major movements and outstanding personalities. This history of Christian thought is examined against the background of economic, political, social and intellectual currents. The study sheds light on both the conflicts within and the criticisms from outside the Christian tradition. Part of the perspectives on religion concentration and the history concentration; also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-485 Foundations of Asian Civilization
A study of the Confucian/Buddhist world in East Asia, focusing on China and Japan, their origins and cultural characteristics. Part of the foreign language/culture concentrations and the history concentration. May also be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-486 20th Century China & Japan
An examination of social, political, economic and intellectual developments of China and Japan in the 20th century with an analysis of how these two Asian powers have reached their respective significant status in the contemporary world. Part of the foreign language/culture concentrations & the history concentration; also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0507-487 Communist China
An analysis of the main characteristics of Chinese Communism, its native roots, Marxist/Leninist elements and Maoist innovations. Also examines the causes for the rise of Communism in modern China, the context and process of its development, as well as contributions and problems Communism brought to the Chinese people. In addition, China and the world are examined. Part of the foreign language/culture and history concentrations; the history of modern world minor; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

Science, Technology & Society

0507-488 Modern Germany
A study of Germany in the 19th and 20th centuries, beginning with the unification of Germany in 1871 and tracing the political evolution of the nation to the present. Special emphasis is placed on the rise of Nazism. Pertinent social and cultural factors are considered as well. Part of the history, international relations, and foreign language/culture concentrations and the German language/culture, European history, history of modern world, and international relations minors. It also may be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-489 Japan in Modern World
An examination of social, economic, political and intellectual developments of Japan in the nineteenth and twentieth centuries with an analysis of how Japan has reached such a significant status in the contemporary world. Part of the foreign language/culture and history concentrations; the history of modern world minor; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-490 History of Mexico
The historical development of Mexico, including the colonial period, independence movement, the liberal-conservative class and the revolution of 1910. Part of the Spanish language/culture and history concentrations; part of the Spanish language/culture minor; and also may be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-492 Selected Problems in Black History
A seminar approach to the thought of key black leaders (Washington, Garvey, King) and the study of civil rights and black-power movements. Part of the minority relations concentration and the history concentration; also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-494 Immigration & Ethnicity
Explores the personal and collective experience of immigrants from colonial through contemporary America. Emphasis upon the specific aspects of migration from Africa, Europe, Latin America and Asia. Part of the minority relations and history concentrations, and the American history minor. May also be taken as an elective. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-495 The Civil Rights Movement in 20th Century U.S. History
Examines the social and legal history of civil rights in the U.S. with particular attention to the demonstrations of the 1950s and 1960s and the philosophy of the Rev. Dr. Martin Luther King Jr. Compares his views with those of the recent Black Power Movement. Part of the minority and history concentrations; the American history and history of modern world minors; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-496 African History
Provides an overview of African history and politics in three phases: pre-colonial times, colonialism and the postcolonial era. Part of the history, global studies and minority relations concentration; the history of modern world minor. (0507-301,302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-497 Biography: History
The course will examine the psychological motivations of individuals and groups which have influenced American History. The result will allow for a reinterpretation of the American Family, Society and Politics. However, the psychological motivations will be examined in the context of economic, political, ideological and other social forces. The goal is to show how these elements interrelated to change American society over time. This course is part of the history concentration and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-498 Modern France
This course surveys the important events that formed French society, culture and politics from 1789, the outbreak of the Revolution, to the present. Topics range from the legacy of the Revolution and the cascade of short lived regimes begun in 1799,1815, 1830,1848, 1852, and 1870, to urban planning, colonialism, art, literature, religion, and the experience of three German invasions. This course will be valuable to students interested in French history, language, politics, or society, or any student who plans to visit France. Reading knowledge of French is helpful but not required. Part of the history concentration, modern history minor, and French foreign language concentration. Class 4, Credit 4

0508-211 Science, Technology and Values
This course explores the concepts and effects of science and technology in society, analyzes the relationship between science and technology, examines how each has come to play a major role today, and looks at how science and technology have affected and been affected by our values. This course also considers the environmental aspects of science and technology. Science and technology are often assumed to be value free, yet people, guided by individual and societal values, develop the science and technology. In turn, the choices people make among the opportunities provided by science and technology are guided by their individual values. Class 4, Credit 4 (offered quarterly)

0508-325 Honors Science, Technology & Society
Like the department's course, "Science, Technology and Values" this course will explore value issues relating to science and technology. It will also consider the societal and environmental aspects of science and technology. The main difference is that this course will focus on a specific theme or topic that may emphasize science and values, technology and values or the environmental aspects of science or technology. The theme or topic will be chosen by the instructor announced in the subtitle, and developed in the course syllabus. Class 4, Credit 4

0508-440 History of Science
An introduction to the historical study of science, emphasizing the origins, character, and development of western science and its social, economic, and cultural contexts. The course features the physical sciences, with secondary coverage of the life sciences. Part of the science and technology studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. Class 4, Credit 4

0508-441 Science & Technology Policy
Examines how local, state, Federal and international policies are developed to influence innovation, the transfer of technology and industrial productivity in the United States and other selected nations. Part of the science and technology studies concentration; the science, technology and environmental studies minor; and the public policy concentration and minor. May also be used as an elective. Class 4, Credit 4

0508-442 History of American Technology
An examination of the cultural context of American technology and its influence on American social, economic, political, and cultural institutions from the time of first contact between Native Americans and Europeans to the present. Part of the science and technology studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. Class 4, Credit 4

0508-443 Face of the Land
A case study in the relationship of technology and society, focusing on the interaction of land, people and technology. By considering the natural land-forms of the United States and other countries as appropriate, students see how the nature of land determines its value. As technological innovations are made and introduced, old relationships with the land are altered, sometimes irreversibly. Through this study students have a concrete example of the positive and negative effects of technology on the social structure. Part of the science and technology studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. Class 4, Credit 4 (offered occasionally)

0508-444 Social Consequences of Technology
Modern society is increasingly based on technology. With each advance due to technology, unanticipated problems are also introduced. Society must define and solve these problems or the advances may be diluted or lost. In this course we study several interactions between technology and the world in which we live. We investigate how various technologies developed and compare the expected effects of the new technologies with the actual results. Part of the science and technology studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. Class 4, Credit 4

0508-445 Biomedical Issues: Science & Technology
A study of the impact of science and technology on life, our view of life and of the value issues that arise from this impact. Part of the science and technology studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. Class 4, Credit 4

- 0508-446** **Makers of Modern Science**
Approaches the history of science through studying biographies of modern scientists. Modern science is understood to be science from the Scientific Revolution of the sixteenth and seventeenth centuries to the present. Emphasis will be on recent scholarship devoted to analyzing science in context, i.e., the way it actually develops through the lives of individuals in particular social and political contexts. Part of the science and technology studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. **Class 4, Credit 4**
- 0508447** **Special Topics in Science & Technology Studies**
Offered periodically in the science and technology studies concentration. Topic and specific content and methods vary from year to year or term to term. Allows examination of a special problem or area relevant to the other courses in this area of study. Part of the science and technology studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. **Class 4, Credit 4**
- 0508-449** **History of Women in Science & Engineering**
Using biographical and social-historical approaches, this course examines the history of women's involvement in science and engineering since the birth of modern science in the seventeenth century; the historical roots of gender bias in the western scientific enterprise; and the influx of women into science and engineering since the mid-to-late twentieth century. Part of the science and technology studies and women's studies concentrations; the science, technology and environmental studies and women's studies minors; and also may be taken as an elective. Cross-listed with women's studies, 0522-449. **Class 4, Credit 4**
- 0508-450** **History of Chemistry**
This course surveys the history of chemistry from antiquity to the present. Emphasis will be placed on developments since the Renaissance; on changing views of how matter is structured and how different substances react (or fail to react); and on the political, social, and cultural contexts that influenced the rise of a new chemical concepts and practices. Part of the science and technology studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. **Class 4, Credit 4**
- 0508460** **Introduction to Environmental Science I**
Three-quarter sequence offered in student's first year that presents an integrated approach to the interrelated, interdisciplinary principles of environmental science through the study of the earth's ecosystems. Throughout the sequence, the focus will be on sustainability as the foundation for environmental problem solving. Cross-listed with College of Science. Required course for the Environmental Science degree program. Part of the environmental studies concentration; the science, technology and environmental studies minor; and may also be taken as an elective. **Class 4, Lab 4, Credit 4**
- 0508461** **Introduction to Environmental Science II**
Continuation of Introduction to Environmental Science I (0508-460). Cross-listed with College of Science. (0508-460 or permission of instructor) **Class 2, Lab 4, Credit 4**
- 0508-462** **Introduction to Environmental Science III**
Continuation of 0508-461. Cross-listed with College of Science. (0508-461 or permission of instructor) **Class 2, Lab 4, Credit 4**
- 0508463** **Great Lakes I**
Beginning course in a three-quarter sequence that continues the integrated presentation of the interrelated, interdisciplinary principles of environmental science through an in-depth study of the Great Lakes Ecosystem. Throughout the sequence, the focus will be on sustainability as the foundation for environmental problem solving in the Great Lakes. To demonstrate the interdisciplinary methodology of environmental science, elements of government/political science/policy, ethics, economics, sociology, history, and engineering will be embedded in the scientific matrix used to present this course to the students. Course cross-listed with College of Science. Part of the environmental studies concentration; the science, technology and environmental studies minor. **Class 2, Lab 4, Credit 4**
- 0508464** **Great Lakes II**
Continuation of 0508-463. Cross-listed with College of Science. Part of the environmental studies concentration; and the science technology and environmental studies minor. **Class 2, Lab 4, Credit 4**
- 0508465** **Great Lakes III**
Continuation of 0508-464. Cross-listed with College of Science. Part of the environmental studies concentration; and the science, technology and environmental studies minor. **Class 2, Lab 4, Credit 4**
- 0508481** **Introduction to Environmental Studies**
Makes students aware of the environmental consequences of modern technology by investigating to what degree various technological systems conflict with the basic ecological principles. Part of the environmental studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. (Course not open to environmental science majors) **Class 4, Credit 4**
- 0508482** **Energy & the Environment**
Students look at the current situation with its environmental implications and try to determine how we got here, why we got here and where we may be able to go in the next 20 to 50 years. We look at the nature, uses and relative importance of our sources of energy, high technology and low or appropriate technology, hard energy paths and soft energy paths. We look especially at the role of government policy in the energy area. Part of the environmental studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. **Class 4, Credit 4**
- 0508483** **Environmental Values**
We seek to identify, interpret and trace the values associated with concern for the environment and the factors that induced change in these values. Concern with the environment is not a new concept; its history reaches to ancient times, but the values related to this concern have drastically changed. Understanding environmental values helps one become a better prepared participant in the environmental decision making. Part of the environmental studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. **Class 4, Credit 4**
- 0508-484** **Environmental Policy**
Public compliance with environmental regulations has become increasingly complicated as a result of many laws and regulations instituted since the mid 1960s. Students study the consequences of major environmental legislation and regulations and examine the actions of both citizens and the corporate sector as they comply with these laws. They also focus on the economic and social implications and value of environmental regulation and enforcement and identify current developments in the area. Part of the environmental studies; American politics; and the public policy concentrations and minors. May also be taken as an elective. **Class 4, Credit 4**
- 0508487** **Special Topics in Environmental Studies**
Offered periodically in the environmental studies concentration. Topic and specific content and methods vary from year to year or term to term. Allows examination of a special problem or area relevant to the other courses in this area of study. Part of the environmental studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. **Class 4, Credit 4**
- 0508-488** **History of Ecology and Environmentalism**
This course explores the history of ecological science, from the eighteenth century to the present, and it features the political use of ecological ideas in environmental debates, from the nineteenth century to the present. We investigate how social and political ideas have influenced ecological science, how ecological concepts have influenced Western politics and society, and how different generations of ecological researchers have viewed their role in society. Part of the environmental studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. **Class 4, Credit 4**
- 0508489** **History of Environmental Sciences**
This course surveys the history of the environmental sciences from antiquity to the present. The environmental sciences include those sciences that deal with the Earth's physical and organic environments, ranging from geology and biology to evolutionary theory and ecology. A prominent theme is the influence of social, religious, and political ideas on theories of how the Earth and its plants and animals have evolved. Part of the environmental studies concentration; the science, technology and environmental studies minor; and also may be taken as an elective. **Class 4, Credit 4**
- 0508-520** **Historical Perspectives on Science & Technology Seminar**
This course is an upper-level undergraduate seminar that explores how recent generations of historians have studied, interpreted, and debated the development and influence of science and technology. Each offering of the seminar will focus on a particular topic or historical era. Students will read pivotal texts with the goal of discussing the quality of the research and trends in historical interpretation. (Any two of the History of Science or Technology courses approved by the department) Part of the science and technology studies and environmental studies concentrations; the science, technology and environmental studies minor; and also may be taken as an elective. **Class 4, Credit 4**

0508-540 **Science and Technology Policy Seminar**
Students in the course will apply the skills, concepts, and methods they learned in a prerequisite course to a contemporary science and technology policy topic. Topics may vary from year to year or term to term. Part of the science and technology studies and public policy concentrations; the public policy and science, technology, and environmental studies minors; and also may be taken as an elective. (0508-441,0508-484 or 0521-400) **Class 4, Credit 4**

Philosophy

0509-210 **Introduction to Philosophy**
An introduction to some of the major problems, methods and insights of philosophy with readings from both classical and contemporary sources. **Class 4, Credit 4 (offered several times annually)**

0509-211 **Introduction to Ethics**
An introduction to moral philosophy through an analysis, comparison and evaluation of some main theories that have been offered as systematic ways of making moral decisions, and through discussions of contemporary moral problems. **Class 4, Credit 4 (offered several times annually)**

0509-213 **Critical Thinking**
An introduction to philosophical analysis, especially as it may be applied in contexts other than professional philosophy. **Class 4, Credit 4 (offered several times annually)**

0509-217 **Ethics in the Information Age**
Technological advances in creating, storing, sending, and monitoring information have created new ways in which ethical problems can arise. We shall explore the ethical issues that arise regarding privacy on the internet, the commodification of data, hacking, ownership of computer-related items such as software and web pages and so on. **Class 4, Credit 4 (offered several times annually)**

0509-440 **Philosophy of Religion**
A critical examination of a number of important issues connected with religion. These include the nature of religion itself, the existence of God, the problem of evil and questions about the language we use when we talk and write about religion. Part of the philosophy and the perspectives on religion concentrations and the philosophy minor. May also be taken as an elective. **Class 4, Credit 4 (offered biannually)**

0509-441 **Logic**
An introduction to the basic principles of logic. The main emphasis is on symbolic or formal logic, but some attention may be paid to informal logic as well. Part of the philosophy concentration and minor. May be taken as an elective. **Class 4, Credit 4 (offered biannually)**

0509-442 **Philosophy of Art & Aesthetics**
Introduces students to thinking philosophically about the nature of art and its relation to other human experiences. Among the topics considered are the aesthetic experience, the relation between morality and art, ugliness in art and truth in art. Part of the philosophy concentration and minor. May also be taken as an elective. (0509-210,211,213 or equivalent) **Class 4, Credit 4 (offered biannually)**

0509-443 **Philosophy of Science**
An examination of the nature of the scientific enterprise; possible discussion topics include the presuppositions of science, its logic, its claims to reliability, and its relationships to society and to problems of human values. Part of the philosophy concentration and minor, science and technologies studies concentration and science, technology and environmental studies minor. May also be taken as an elective. (At least one prior course in either philosophy or one of the natural sciences, physics, chemistry, biology.) **Class 4, Credit 4 (offered biannually)**

0509-444 **The Great Thinkers**
Introduces students to the thought of some of those philosophers who have been most influential in the history of ideas. An attempt is made to cover in some depth the works of one or more of those "Great Thinkers." Students will begin to recognize the enduring nature of some of our most pressing problems, as well as the intellectual foundation of proposed solutions. Part of the philosophy concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered biannually)**

0509-445 **Social & Political Philosophy**
An examination of some of the main problems of social and political philosophy through analysis, comparison and critical examination of various views concerning the natures of individuality and society, the relations between them and the dependence of one on the other. Part of the philosophy concentration and minor. May also be taken as an elective. (At least one prior course in philosophy, political science or sociology) **Class 4, Credit 4 (offered biannually)**

0509-446 **Philosophy of Law**
An introduction to philosophical analysis centering on the nature, extent and justification of law; the nature of legal thought; and the problems and theories of justice. Part of the philosophy concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered biannually)**

0509-447 **Contemporary Moral Problems**
This course examines ethical questions that arise in the course of day-to-day individual and social life. While some consideration will be given to the ethical theory and its application to such questions, emphasis will be on practical issues. Examples of typical questions to be examined are capital punishment, euthanasia, abortion, the treatment of animals, corporate responsibility and so forth. Part of the philosophy concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered biannually)**

0509-448 **Philosophy of Peace**
An introduction to some of the philosophical dimensions of the search for world peace, including the elements that would constitute a just and lasting peace, nations as moral entities, justice and national self-interest, force and violence, the morality of the use of force, peace-making and peace-keeping groups. Part of the peace studies and philosophy concentration and philosophy minor. May also be taken as an elective. **Class 4, Credit 4 (offered biannually)**

0509-449 **Special Topics**
A critical examination of issues in some area of philosophy not covered in other philosophy courses. Examples of likely topics are metaphysics, the philosophy of language or the philosophy of love. Part of the philosophy concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered biannually)**

0509-450 **Seminar**
Examines some area of philosophy at an advanced undergraduate level. The area examined will vary from year to year. The seminar is designed especially for those whose interest in philosophy goes beyond the requirements of the Liberal Arts curriculum. Part of the philosophy concentration and minor. May also be taken as an elective. (Two courses in philosophy or permission of the instructor) **Class 4, Credit 4 (offered annually)**

0509-451 **Professional Ethics**
This course critically examines ethical issues that arise in professional life. The course will examine not only the general relationship between ethics and professional life, but the particular consequences of ethical considerations within the student's own profession. Part of the philosophy concentration and minor. May also be taken as an elective. **Class 4, Credit 4 (offered biannually)**

0509-452 **Philosophy of Technology**
Technology is a ubiquitous and defining force in our world. The course will investigate how our conceptions of technology have emerged within philosophy, as well as the role technology plays in shaping how we live and how we reflect upon questions of meaning and value in life more generally. Technological modes of understanding, organizing and transforming the world shape our relationships with others, with ourselves and with nature at fundamental levels. We will explore how these modes have emerged and why they emerged so predominantly within a western social and intellectual context. Part of the philosophy concentration and minor and part of the public policy major. May also be taken as an elective. **Class 4, Credit 4 (offered biannually)**

0509-453 **Environmental Philosophy**
A variety of different decision procedures may be and have been used to determine what we ought to do regarding environmental issues. Each alternative can determine what is reasonable and moral, and assessing them presents theoretical problems. We examine each in terms of morality, examine their presuppositions and consequences, determine whether we can assess them, and if so, how. Students begin to learn to be conscious of and assess the decision procedures that are often buried in policy recommendations regarding particular environmental problems. Part of the philosophy concentration and minor and the public policy major. May be taken as an elective. **Class 4, Credit 4 (offered biannually)**

0509-454 Feminist Theory
This course will introduce students to the foundations of feminism in political theory, and it will critically explore how feminist concepts can be expanded to take account of class, race, and sexuality. We will examine the differences between the categories of sex and gender and the ways in which feminist understandings of human experience have modified traditional philosophical accounts of reality, knowledge, morality, and justice. Part of the philosophy concentration, the philosophy minor, the women's studies concentration and minor. May also be taken as an elective. Cross-listed with women's studies, 0522-406. Class 4, Credit 4 (offered biannually)

0509-455 Theories of Knowledge
Epistemology, or the theory of knowledge, examines how we come to know what we know. This course covers historical and contemporary approaches to the question of what knowledge is, what makes a belief true, and how beliefs are justified. Philosophical skepticism, the position that we actually know nothing at all, will also be discussed, as will possible responses. Other topics may include feminist epistemology, naturalism, the internalism/externalism debate, and the application of epistemology to other fields. Part of the philosophy concentration and minor. May also be taken as an elective. Class 4, Credit 4 (offered biannually)

0509-456 Ancient Philosophy
This course examines the origin and development of Western philosophy in ancient Greece from Thales in the 6th century down to at least the 4th century B.C., concentrating on the central ideas of the pre-Socratics, the Sophists, Socrates, Plato and Aristotle. Some attention might also be given to the Hellenistic philosophers (Epicureans, Stoics and Sceptics). This was a period of remarkable intellectual creativity in philosophy, mathematics, medicine, rhetorical theory, aesthetics and cosmology. Questions to be considered are: What are the nature and limits of knowledge? Is knowledge even possible? What is the nature of language? How reliable is perception? What is the true nature of reality? What is the origin and nature of the material world? Is moral knowledge possible? What is the nature of happiness, and what sort of life would make people happy? Part of the philosophy concentration and minor. May also be taken as an elective. Class 4, Credit 4 (offered biannually)

0509-457 Modern Philosophy
This course examines the history of modern philosophy, from Descartes through Kant. It concentrates on the development of modern thought, examining the concepts of mind, body, and causation among others. This period marked the beginning of modern science, with a rich ferment of ideas, and the philosophy of the period is essential to understanding modern science as well as contemporary problems about consciousness, mind/body interaction, causation, and so on. Questions to be considered in this course are: What can we know? How do we come to know what we can know? What is the scope and what are the limits of our knowledge? What is the nature of reality? Do we have access to reality? How is causal interaction possible, if at all? Does God exist, and if so, how do we know and what relation does God have to the world? Part of the philosophy concentration and minor. May be taken as an elective. Class 4 Credit 4 (offered biannually)

0509-458 Philosophy of Mind
The Philosophy of Mind is a fairly large category. It includes issues of metaphysics, epistemology, logic, psychology, aesthetics, logic, linguistics, cognitive science, artificial intelligence and biology, to name a few. Here are some typical questions which writers in the philosophy of mind often find interesting: Is there an ontological difference between minds and bodies? (That is, do they represent 2 metaphysically distinct categories of things in the universe?) Could there be minds without bodies? Can I know that I have a mind? How do I come to know that? Are there other minds in the universe? Can I be conscious of my own consciousness? Can other things have the kinds of experiences which I have? Part of the philosophy concentration and minor. May be taken as an elective. Class 4, Credit 4 (offered biannually)

0509-459 Philosophy of Social Science
This course examines the methods, foundations, assumptions and purposes of the social sciences. In particular, it will examine the ways in which "science" and "non-science" are distinguished, as well as the similarities and differences between the social and natural sciences. Special attention will be paid to the ways in which both Anglo-American and European philosophical traditions approach the social sciences. Other topics may include the role of values in social scientific inquiry, the processes of explanation and theory confirmation in the social sciences, the relative virtues/vices of microanalysis and macro analysis in the social sciences, and the role of various conceptions of interpretation and meaning in the social sciences. Part of the philosophy concentration and minor. May be taken as an elective. Class 4, Credit 4 (offered biannually)

0509-460 East Asian Philosophy
This course is an introduction to the origin and development of the philosophical traditions of China, Tibet, and Japan through a consideration of selected thinkers, schools, and classic texts of Buddhism, Daoism, Confucianism and Zen. Questions of metaphysics, epistemology, and ethics are emphasized with reference to the nature of reality and the person, social harmony and self-realization, causality, right action and enlightenment. Comparisons may also be made with western philosophers, both contemporary and classical. Part of the philosophy concentration and minor and part of the international studies minor. May also be taken as an elective. Class 4, Credit 4 (offered biannually)

0509-461 American Philosophy
This course examines the contributions of American philosophers from the colonial era to the present day. From the New England Transcendentalists of the 19th century to the Pragmatism and Neo-Pragmatism of the 20th and 21st, American philosophy has responded to the demands of a pluralistic, ever-changing society. Because American philosophy is a reflection of American culture, it has also offered a unique perspective on perennial philosophical problems in ways that have differed sharply from dominant forms of European philosophy. Authors may include Ralph Waldo Emerson, Henry David Thoreau, Frederick Douglass, Susan B. Anthony, C.S. Pierce, Jane Addams, William James, Black Elk, John Dewey and Richard Rorty. Part of the philosophy concentration and minor. May also be taken as an elective. Class 4, Credit 4 (offered biannually)

0509-462 Contemporary Philosophy
This course examines developments in philosophy since 1900. During this time philosophy evolved along with science, politics, and the arts. In some cases philosophy responded to new discoveries and theories while at other times it precipitated movements that had far-reaching effects. A range of philosophical approaches may be discussed, including postmodernism, positivism, critical theory, existentialism, feminist theory, neopragmatism, and phenomenology. The connections among different approaches will also be addressed. Part of the philosophy concentration and the minor. May also be taken as an elective. Class 4, Credit 4 (offered biannually)

Anthropology

0510-210 Cultural Anthropology
A study of the nature, method and scope of human culture, the patterns of thought and behavior with which mankind makes decisions, criticisms, choices and judgments in order to satisfy the needs of life and experience. Class 4, Credit 4 (offered quarterly)

0510-325 Honors Cultural Anthropology
This course is designed to explore the fundamental insights into human behavior developed by anthropologists through participant observation and cross-cultural analysis. Students will be immersed in these methods through reading selected ethnographic monographs and viewing appropriate related ethnographic documentary films. This course may be organized according to different themes in different academic terms. For example, in one term it may focus on the ethnography and ethnology of foreign societies; in another on impacts of global capitalism; or on a particular theoretical approach such as cultural materialism. Class 4, Credit 4

0510-440 Cultures in Globalization
Change in all subsystems of human culture is the norm on the planet earth as its human inhabitants begin the 21st century and a new millennium. In particular, the stress and strain that accompany change challenge traditional life ways among both tribal and peasant societies in the developing world. The change is driven by many factors including global and local population growth and by the expanding world capitalist system through which technology is transferred and the culture of consumption is spread to the most remote corners of the globe. This course presents an anthropological perspective in which both historical and cross-cultural approaches to study of cultural dynamics are emphasized. Part of the sociology concentration; the Latino/Latina/Latin American concentration; the sociology/anthropology minor and also may be taken as an elective. (0515-210, 0510-210 or equivalent) Class 4, Credit 4

0510-441 American Culture: Anthropology of U.S.
Call them Nacirema American backward. This course takes an anthropologist's eye view of the "Nacirema" way of life now; what they say and think about themselves and how they actually act; their myth, ritual, music, humor, religion, class structure, regional subcultures and ethnic groups. Part of the sociology concentration and also may be taken as an elective. (0510-210 or permission of instructor) Class 4, Credit 4 (offered occasionally)

0510-442

Cultures of Latin America

This course provides an introduction to the societies of Latin America and the Caribbean from a historical and cultural perspective. We begin with an overview of the ancient indigenous cultures, then consider the motivations for patterns of Spanish and Portuguese invasion and colonialism. We consider how the colonial past is reflected today in ethnic inequalities, economic vulnerability, and social unrest. We examine how Latin Americans struggle to compete on the global market, consider industrial development, the growth of cities, religious protest, the changing role of women and men, and grassroots social movements. Through a few case studies, we examine environmental protection in the Amazon, power in everyday life in Nicaragua, and the impact of globalization in Mexico. Part of the Latino/Latina/Latin American, Spanish foreign language/culture, and sociology concentrations. May be taken as an elective. **Class 4, Credit 4**

0510-443

Immigrants in the U.S.

This course examines cultural, social, economic, and political issues concerning immigrants in the United States. We examine the processes that encourage international migration, historical trends of immigration, the kinds of jobs that immigrants fill, cross-cultural miscommunication, the construction of transnational communities, patterns of circular migration, the impact of migration on the sending nation, and current debates on immigration law, bilingual education, and multi-culturalism. Part of the sociology concentration. (0510-210 or 0515-210 or equivalent) **Class 4, Credit 4**

0510-444

Social Movements in a Global Economy

This course focuses on the intertwining of economies in North and South America, the impacts on workers and peasants, and the creative responses of social movements. We examine trends including the movement of industrial work overseas, consequent deindustrialization in the US, international labor migration, and the export of the neoliberal economic agenda. We examine the impacts of these trends on people in North and South America and the creative responses of worker peasant, and neighborhood movements. Part of the sociology concentration and the sociology/anthropology minor. (0510-210 or 0515-210 or equivalent) **Class 4, Credit 4**

0510-483

Anthropology of Religion

Provides students with a basic understanding of how religion operates as an integral part of any society. In order to demonstrate this, the institution of religion is studied from a cross-cultural, anthropological perspective. Emphasis is on primitive and peasant societies. Part of the perspectives on religion concentration and also may be taken as an elective. **Class 4, Credit 4 (S)**

0510-501

Anthropology Research Methods

Exposes students from a variety of backgrounds to an alternative means of understanding human behavior through the methods of the cultural anthropologist and demonstrates that variations in cultural patterning exist in our presumably homogeneous society. The primary emphasis is involvement of students in the actual observation of human behavior and collection of data in a subculture of their own selection in the Rochester area. **Class 4, Credit 4 (offered occasionally)**

0510-502

Introduction to Archaeology

An introduction to archaeology that covers theory and methodology of archaeology, as well as an overview of world prehistory. The first part of the course (theory and method) will examine such issues as: how archaeologists know where to dig, why they choose specific sites, what evidence they collect, and how they use their evidence to reconstruct the past. The second part (world prehistory) will examine the human story from the earliest hominids to the relatively recent, historical past, and will focus on the examination of several important issues: how did people come to inhabit nearly the entire globe and how they made the transition from wandering foragers to agricultural, urban, literate members of state level societies. **Class 4, Credit 4**

0510-505

Cultural Diversity

Diversity of cultures is a pervasive fact of life in America in the second half of the 20th century. The dynamics of intergroup relations will have a profound impact on American economic, social, political and cultural life in the 21st century. Approaches diversity as an asset; an individual's appreciation for this diversity depends upon replacing a mono-cultural with an intercultural perspective. We are striving to reach a point where we not only celebrate diversity, but take it for granted at the same time. Consequently, the content emphasizes directed observations as an approach to developing more relativistic attitudes. Diverse techniques, from simulation to field experience, are used in order to assist students in understanding and adjusting to diversity. **Class 4, Credit 4**

Economics

0511-200

Foundational Seminar in Economics

This course is designed to introduce new students in the Economics program (freshmen and external and internal transfers) to the applications of Economic analysis in academic, business, government and the not-for-profit sector. Students will be exposed to the research and consulting activities undertaken by academic economists as well as a discussion of the career outcomes of the alumni of the RIT Economics program. **Class 1, Credit 1**

0511-301

Principles of Economics I

This is the first course in a two-quarter sequence designed to introduce the student to the basic principles of economics. This course will focus on basic economic concepts and macroeconomics. Topics of primary interest include economic methodology, the economizing problem, capitalist ideology, supply and demand, national income accounting, income determination, inflation, money, and the role of government in the economy. Other topics in basic economics will be selected by the instructor. **Class 4, Credit 4 (offered quarterly)**

0511-325

Honors Economics

This course introduces the student to some of the central concepts of economics. Potential topics include the division of labor, the marginal principle, utilitarianism, equilibrium determination, survey of market structures, welfare analysis, private and public goods, the role of government in the economy, opportunity cost and path dependency. The course concludes with a discussion of modern economic practice and the future of the profession. **Class 4, Credit 4**

0511-401

Principles of Economics II

This course is the second course in a two-quarter sequence designed to introduce the student to the basic principles of economics. This course will focus on microeconomics. Topics of primary interest include market structure, supply and demand analysis involving elasticity, the theory of cost in the short and long run, perfect competition, monopoly, monopolistic competition oligopoly, marginalist distribution theory, the labor market, and general equilibrium analysis. Other topics in microeconomics will be selected by the individual instructor. Required course for economics majors; option for minors and concentrators in economics; and also may be taken as an elective. (0511-301) **Class 4, Credit 4 (offered quarterly)**

0511-440

Urban Economics

Urban economics is the application of economic analysis to spatial relationships in densely populated (urban) areas. The first part of the course develops economic models that explain the location behavior of consumers and businesses in cities. The second part is issue oriented, applying the insights gained in the first part to a number of urban problems. Part of the economics concentration and also may be taken as an elective. (0511-301 and 401) **Class 4, Credit 4**

0511-441

Economics of Human Resources

The microeconomic study of human resources encompasses aspects of human involvement in the production & distribution of goods and services. Potential topics are labor force participation, economics of employment discrimination, primary and secondary education, higher education, distribution of income and wealth, poverty and income maintenance, manpower planning, and microeconomic analysis of the work/leisure decision. Part of the economics concentration and also may be taken as an elective. (0511-301 and 401) **Class 4, Credit 4 (offered occasionally)**

0511-442

Contemporary International Economic Problems

Prepares the student to deal with foreign exchange market, international trade decisions, the macroeconomic effects of trade on domestic economics, and the effects of domestic business fluctuations on international trade and finance of each country. Though basically a theory course in economics, emphasizes the applied aspects of international trade and finance. Part of the economics concentration and also may be taken as an elective. (0511-301) **Class 4, Credit 4 (offered occasionally)**

0511-443

Current American Macroeconomic Problems

An in-depth analysis of selected macroeconomic problems such as economic growth, inflation and business cycles. The primary focus is consideration of current macroeconomic theory and policy application in the context of the U.S. economic problems, e.g., tax-based incomes policies, wage-price controls. Part of the economics concentration and also may be taken as an elective. (0511-301 or equivalent) **Class 4, Credit 4 (offered occasionally)**

- 0511-444 Public Finance
A study of the economics of the public sector. Topics include, but are not limited to: taxation and public expenditures and their effect on the allocation of resources, distribution of income, and employment; market failure; public goods; the economics of public choice; and the application of public finance principles and normative questions to public economic issues. Part of the economics concentration and also may be taken as an elective. (0511-301 and 401 or equivalent) Class 4, Credit 4
- 0511-445 Survey of Economic Thought
A survey of the various schools of thought that have developed in economics from the late eighteenth century up to the present. Representative economists from each of the major schools (Classical, Marxian, Neo-Classical, Keynesian, Monetarist, etc.) are studied. Part of the economics concentration and also may be taken as an elective. (0511-301 and 401 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0511-448 Economics of Less Developed Countries
Introduction to the economic problems of less developed countries (LDC). Students study the historical causes of underdevelopment gap between developed and underdeveloped countries and the theories and the policies aimed at accelerating the rate of growth in LDC. In addition, the role of international organizations in the economic development of LDC is discussed. Part of the global studies and economics concentrations. May be taken as an elective. (0511-301 and 401 or equivalent) Class 4, Credit 4
- 0511-450 Benefit-Cost Analysis
Explores the use and abuse of benefit-cost and related analytical techniques commonly encountered in economic policy making. Many expenditure and regulatory programs of governmental agencies now are routinely evaluated in a benefit-cost or cost-effectiveness framework, and debate about policy decisions increasingly draws upon benefit-cost findings. Yet, application of benefit-cost analysis often attracts much controversy, in part because of disagreements about how to conduct such analysis and about the role that economic efficiency should play in societal decisions. The mechanics, power and limitations of this form of analysis form the primary elements of the course. Required course for economics majors; part of the economics minor and concentration; and also may be taken as an elective. (0511-301 and 401 or equivalent) Class 4, Credit 4
- 0511-452 Monetary Analysis & Policy
The study of monetary behavior and the role of monetary institutions in the modern economy. Includes consideration of monetary theory, the development and current characteristics of monetary institutions in the American economy and the use of the tools of monetary analysis to evaluate alternative monetary policies. Concludes with an evaluation of the neo-Keynesian and Monetarist positions. Required course for economics majors; part of the economics concentration and minor; and may be taken as an elective. (0511-301 and 401 or equivalent) Class 4, Credit 4
- 0511-453 Intermediate Microeconomic Theory
Helps develop the tools of analysis utilized in contemporary economics to study the process of price formulation in a capitalist society. Topics covered include the theories of consumer behavior, cost and production, alternative market structures and the pricing of factors of production. Required course for economics majors; part of the Economics concentration and minor; and also may be taken as an elective. (0511-301 and 401 or equivalent) Class 4, Credit 4
- 0511-454 International Trade & Finance
Introduces the students to the theory and practical issues of the export/ import markets, the international flow of capital and international investment decisions. In addition, students study the foreign-exchange and the Euro-dollar markets and the investment opportunities in them. The role of multinational corporations in international trade and finance also is discussed. Required course for economics majors; part of the economics concentration and minor; and may be taken as an elective. (0511-301 and 401 or equivalent) Class 4, Credit 4
- 0511-455 Intermediate Macroeconomic Theory
The central question of macroeconomics is the determination of output, employment and prices. This course develops models that incorporate behavioral assumptions concerning consumption, investment and the role of money and their relationship to macroeconomic variables. Required course for economics majors. Part of the economics concentration and minor. May also be taken as an elective. (0511-301 and 401 or equivalent) Class 4, Credit 4
- 0511-456 Industrial Organization
The study of the structure, conduct and performance of contemporary American industry. Involves the application of the tools of microeconomic analysis and empirical evidence to aid in understanding the behavior of modern industry. In addition, the course considers the historical determinants of contemporary market structure and the public policy measures designed to preserve a competitive market structure. Required course for economics majors. Part of the economics concentration and minor. May also be taken as an elective (0511-301 and 401 or equivalent) Class 4, Credit 4
- 0511-457 Applied Econometrics
Provides students in the economics program with an opportunity to develop their skills in applied regression analysis. Covers the various regression models, estimation techniques, data preparation and transformation, and the interpretation of regression results. Particular emphasis on the dangers of misuse of regression techniques. Required course for economics majors. Part of the economics concentration and minor. May also be taken as an elective. (0511-301 and 401 or equivalent, 1016-319 or equivalent, 1016-226 or equivalent) Class 4, Credit 4
- 0511-458 Economic Forecasting
Introduction to one of the major functions contemporary economists perform economic forecasting. Students are exposed to alternative theories and the manner in which economists in both the private and public sectors use these frameworks of analysis, data and quantitative methods to generate economic forecasts. Required course for economics majors. Part of the economics concentration and minor. May also be taken as an elective. (0511-301 and 401 or equivalent, 1016-319 or equivalent, 1016-226 or equivalent) Class 4, Credit 4
- 0511-459 Managerial Economics
A further elaboration of the elementary principles of economic analysis in Principles I & II. Particular emphasis is on the application of these principles to the decision-making process of the firm. Required course for economics majors; part of the economics concentration and minor; and also may be taken as an elective. (0511-301 401 or equivalent) Class 4, Credit 4
- 0511-460 Mathematical Methods: Economics
Develops the mathematical skills used by the applied economist in computer-based research. Exercises and research projects for the course are chosen to illustrate the kind of problems actually dealt with by the contemporary applied economist. Required course for economics majors. Part of the economics concentration and minor. May also be taken as an elective. (0511-301 and 401 or equivalent, 1016-226 or equivalent) Class 4, Credit 4
- 0511-461 Seminar in Applied Economics
A senior-level course emphasizing applications of economic analysis and quantitative methods to economic decision making. Cases are drawn from both the private and public sectors of the economy. Required course for economics majors. Part of the economics concentration and also may be taken as an elective. (0511-301 and 401 or equivalent) Class 4, Credit 4
- 0511-462 Honors Independent Research
This course is designed to allow Economics students who are in the Honors Program to conduct their own independent research under the guidance of a faculty mentor. Prior to enrollment in this course, the student must submit a research proposal and the name of the proposed faculty mentor to the Economics Department for approval. Once approved the faculty mentor in consultation with the student will determine the number of credit hours (1-4) which will be assigned for the course. The completed research project will be presented at the annual Liberal Arts Undergraduate Research Conference. Class 4, Credit 4
- 0511-463 Directed Research in Economics
This course is designed to allow Economics students to pursue research under the direction of an Economics faculty member. Prior to enrollment in this course, the student must submit a research proposal to the proposed faculty sponsor and the Economics Department for approval. Once approved the faculty sponsor in consultation with the student will determine the number of credit hours (1-4) which will be assigned for the course. The completed research project will be presented at the annual Liberal Arts Undergraduate Research Conference. Class 4, Credit 4

- 0513-450 State and Local Politics
This course is a study of politics and government on the state and local levels, and the relationships between these levels and the federal government. The course's major objective is to give the student a sophisticated understanding of these aspects of the political process. The first focus is on the federal system of government, including the interdependence of the three levels. The course continues by examining the state level followed by a focus on local government. A final topic is policy-making, including revenues and expenditures, which again illustrate the interrelationship of the three levels. Option for minors and concentrators in American politics. Also may be taken as an elective (0513-211,214 or equivalent) Class 4, Credit 4
- 0513-451 The Legislative Process
Examines the role of the legislature in the U.S. political process. The primary emphasis is the study of the U.S. Congress, but some attention also is directed to state legislatures. Topics studied include elections, party organization, committees, interest-group activities and executive-legislative relations. Option for minors and concentrators in American politics. Also may be taken as an elective (0513-211,214 or equivalent) Class 4, Credit 4
- 0513-452 The American Presidency
A study of the role of the presidency in the American political system. Among the topics considered are the nomination and election process, evolution, expansion and limitation of presidential powers, factors in decision making and the various leadership functions performed by the American Presidency. Option for minors and concentrators in American politics. Also may be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4
- 0513-453 American Foreign Policy
A study of the formulation and execution of American foreign policy, including the examination of the instruments, procedures and philosophies shaping the development and implementation of foreign policy. Part of the international relations, global studies, and peace studies concentrations; the international relations minor; and also may be taken as an elective. (0513-211, 214 or equivalent) Class 4, Credit 4
- 0513-454 Political Parties & Voting
Political parties are a crucial part of the democratic process, as are elections. Parties and elections serve as a critical link between citizens and their government, as parties and candidates promote policies favored by voters. This course studies parties, their history, their future and their role in the democratic process. Overall emphasis is on the degree to which parties perform or fail to perform as a link between citizens and government. Part of the American politics minor and concentration; may be used as an elective. (0513-211,214 or equivalent) Class 4, Credit 4
- 0513-455 Politics & Public Policy
A study of the politics of the policy process covering these basic questions: How do public problems get to the agenda of government? How does government formulate policy alternatives? How does government legitimate public policy? How does government implement public policy? How does government evaluate public policy? Part of the American politics and public policy concentrations and minors. May be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4
- 0513-456 The Judicial Process
The focus of this course is the intersection between law and politics. We concentrate of the structure and functions of the Supreme Court of the United States within the federal courts system. Particular attention is devoted to justices as personalities, how they are recruited, how they influence each other, political forces that influence what they do, the manner in which they fulfill institutional roles and the social impact of their judicial decisions. Moreover, attention will be given to the emergence of the institutional identity of the Court, the political struggles between the Supreme Court, lower courts, other governmental bodies and the full range of political interests in the country. Finally, there will be an overview of how academic scholars view and explain decision-making by the Supreme Court. (0513-211,214 or equivalent) Class 4, Credit 4
- 0513-457 Constitutional Law
This course provides an introduction to Constitutional Law by examining the Supreme Court's attempt to resolve constitutional disputes between the federal government and the states (federalism); and between the different branches of government (the separation of powers). The course will study carefully the text of the Constitution, the intention of the Founders, and the interpretation of the Court in landmark cases that have defined American Constitutional Law. These cases will be studied both chronologically and thematically. Students will learn how to prepare a Langdellian brief in order to analyze the court's legal reasoning. In addition, the course will examine critically the proper extent of the judicial power in our Democratic Republic. Part of the American politics concentration and minor; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4
- 0513-458 American Political Thought
Provides a general overview of the political ideas, concepts, issues and principles which taken together compose the stream of American political thought. Examines major controversies, which have marked the developing body of the literature by examining the contributions of major political thinkers. Part of the American politics minor and concentration; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4
- 0513-460 Constitutional Rights & Liberties
This course provides an introduction to the Supreme Court's legal and political reasoning on civil rights and liberties—that is, the fundamental individual rights of a free society contained in the Bill of Rights. Particular emphasis will be placed on the First Amendment as the cornerstone of a free society guaranteeing religious liberty and the right to free speech. The course will also examine how the Court has balanced constitutional rights and liberties in the First, Fourth, Fifth and Sixth amendments against the need for enhanced national security. Part of the American politics concentration and minor and may also be used as an elective. (0513-211,214 or equivalent) Class 4, Credit 4 (F, S)
- 0513-461 Introduction to Comparative Politics
Provides a mode of analysis for the study of political systems. Basic concepts of political science are utilized to present a descriptive and analytical examination of various political systems that can be classified as western democracies, communist or third world. Particular attention is paid to the governmental structure, current leadership and major issues of public policy of those selected political systems under review. Part of the international relations, American politics and global studies concentrations; the international relations minor; and also may be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4
- 0513-481 Women in Politics
A study of feminist thought as it applies to the political, economic and social status of women and how it has been expressed through the women's political movement. Students study a number of public policies as they apply to and affect women and examine the opportunities for women to participate in the political process. Part of the American politics concentration and minor. May be taken as an elective. Cross-listed with women's studies, 0522-482. (0513-211, 214 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0513-482 African-American Politics
This course presents politics in America from perspectives of African Americans. The operant premises of this course are: one, that race has been the most important cleavage in American life and, secondly, that the quest to enjoy the fruits of democracy has been a continuous struggle and an elusive goal for African Americans. Issues associated with race certainly have provoked crises in American life and politics from the founding of the Country. Part of the American politics minor and concentration; may be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4
- 0513-484 Government & Politics of Africa
The course examines the influence of historical, cultural, economic and social factors on the pattern of politics in Sub-Saharan Africa. Focus is directed to the challenges of economic modernization and development; national integration; the promotion of a vibrant and liberal civil society; democratization and stability. Part of the international relations concentration and minor; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4

0513-485 Politics through Fiction
This course involves reading several works of fiction that will serve as the foundation for exploring several issues in American politics. The works of fiction will provide a pedagogical approach that is uncommon in the discipline of political science and will offer students perceptive insights into the examination of past and present political behavior. By viewing the world through fictional political actors, students will be privy to their beliefs, values and deliberations. The selected novels will also show clearly the dynamic force of social and political consequences that flow from political events and behavior. Part of the American politics concentration and minor; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4

0513-486 Comparative Politics in Latin America
This course examines domestic and international challenges to the establishment of stable democracies in Latin America. The decades long battle against narco-terrorism in Columbia, Marxist revolutionaries in Peru, widespread corruption at most levels of government throughout the region, and legacies of dictatorial military regimes all make Latin America a difficult place for democracy to take root. Compounding these problems are increasing environmental degradation in connection with rising global trade, and massive economic debt to international lenders. Emphasis on civil-military relations, political institutions, social and international factors. Part of the international relations concentration and minor. May also be taken as an elective. (0513-211, 214 or equivalent) Class 4, Credit 4

0513-487 International Law & Organizations
The study of international law and organizations is the study of international cooperation and governance. We cover a variety of theoretical and substantive topics including the theories of international law and organizations, the historical development of international organizations, how these organizations work in practice, and whether they are effective. We concentrate on the United Nations and the role and usefulness of nongovernmental organizations. Several of the substantive issues discussed are interstate violence and attempts to address humanitarian concerns, globalization, and the environment. This course or War and State is the required class for the international relations minor; Part of the international relations concentration. May be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4

0513488 War and the State
Explores the enduring reality of war through an analysis of regional and global conflicts since the establishment of the modern international system. Key concepts include deterrence, appeasement, offensive-defensive military strategies, and international balances of power. These will be applied to several historical cases to explain why wars occur and how they might be avoided. This course or International Law and Organizations is the required class for the international relations minor; part of the international relations concentration; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4

0513489 Political Violence:
Terrorism, Insurgencies and Political Order
This course examines the causes, methods, and responses of non-state groups attempting to establish new political orders. The combined use of violence with the tactic of terror distinguishes these groups from others seeking political change. Special attention will be given to national and international efforts attempting to resolve such conflicts. Part of the international relations minor and concentration; may also be taken as an elective. (0513-211, 214 or equivalent) Class 4, Credit 4

0513-490 International Political Economy
Examines the interplay between states and markets, and the interaction of the world economy and international politics. We study the nature of political economy, the major ideologies and approaches, and specific topics include trade, investment, debt, and financial markets and the impact of globalization on the human condition and the environment. Part of the international relations minor and concentration; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4

0513491 The Search for Peace: The Middle East Peace Process
A study of the main approaches to conflict resolution through a focus on the Arab-Israeli peace process. The discussion will include theories of conflict and conflict resolution, peace studies, negotiation, the role of external powers, and mediation. The course will explore the theoretical topics through a critical examination of the Israeli-Palestinian conflict, beginning with Jewish settlement in Ottoman Palestine in the 1880s to the present peace process. Part of the international relations concentration and minor; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4

0513492 Religion and International Politics
Religion has been a common element in global politics. This course will address fundamental beliefs of various religions, the use of religion to explain or justify foreign policies, the role of evolving interpretations of texts to justify war or promote peace, and how religious leaders attempt to mitigate conflict and support justice? The course will analyze the historical and contemporary roles of religious beliefs and organizations with respect to war and peace, civil conflict, national identities, the legitimacy of governments, human rights, democracy, conflict management, and conceptions of world order. Part of the international relations minor and concentration; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4

0513493 Global Politics and the Environment
Considers the relationship between political systems and the development of global environmentalism. International trade, colonial legacies, poverty, and population growth will be examined in the context of national decision-making and transnational influences. The course examines established democracies in the West and Japan, post-communist transitional countries in Eastern Europe, and developing countries in Asia and Africa. Topics include oil dependence, nuclear energy, alternative fuels, stratospheric ozone depletion, climate change, deforestation, and species loss. Part of the international relations minor and concentration; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4

0513494 Comparative Public Policy
As modernization theorists predict, industrial and post-industrial societies tend to face similar public policy issues in such areas as public education, health care, public transportation, public housing and the protection and preservation of the environment. However, the political responses to these challenges have varied in significant ways in different states. Many states have developed extensive welfare state systems while some have put more emphasis on market-based solutions. The course seeks to explore and analyze the factors that explain these differences and assess the extent to which the different approaches succeed in meeting these policy challenges. Part of the international relations minor and concentration; may also be taken as an elective. (0513-211, 214 or equivalent) Class 4, Credit 4

0513495 Revolutions and Political Change
Revolutions aim to effect and often result in fundamental changes in a society's basic social, economic and political structures. They are also accompanied by violence, in some cases, civil war. Thus, they raise complex normative questions. The course provides students with a theoretical and historical understanding of three types of 20th century revolutions: classical social and ideological (Russian, Chinese, Cuban, Iranian, Nicaraguan); anti-colonial (Vietnam, Algeria, Angola and Mozambique) and anti-communist (the Soviet Union and Eastern Europe). The course also involves assessments of the achievements and failures of revolution in terms of their own goals as well as other normative values. Part of the international relations minor and concentration; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4

0513496 Government and Politics in East Asia
This course examines the East-Asian countries using the following comparative criteria as the organizing guidelines: modern political history of the country, political economy and development, governance and policy-making, representation and participation, major domestic and foreign policy issues. Prospect of the countries in the 21st century are analyzed and discussed. Part of the international relations minor and concentration; may also be taken as an elective. (0513-211,214 or equivalent) Class 4, Credit 4

0513-514 Theories of Political Systems
This course will examine the human quest for personal and political order. It will provide a critical introduction to some of the most influential and epic political thinkers who have shaped our world, and whose profound legacy continues to do so today. The continuity and divergence between these political philosophers and their respective traditions will be examined throughout the course. Each political philosopher will be examined in terms of the enduring questions of cosmology, human nature, justice, the good society, politics, the state, democracy and legacy. In each case, students will be asked to consider what standard each thinker offers to guide and judge political life. Particular emphasis will be placed on exploring the relationship between education and politics. Class 4, Credit 4

0513-599 Independent Study
A student may register for an independent study project subject to the approval of the faculty sponsor, student's department, the academic committee of the college of liberal arts and the dean of the college of liberal arts and providing that she or he has a minimum GPA of 2.7 at time of application. An independent study project is not a substitute for a course. It enables the interested student and his or her faculty sponsor to coordinate their efforts on subjects and topics that range beyond the normal sequence of course selection. Credit variable (offered annually)

Psychology

0514-201 Freshman Seminar
Acquaints students with career opportunities available to psychology majors, assists in exploration of individual career goals and aids students in planning a curriculum strategy that will match their goals. Required course for freshman psychology majors. Class 1, Credit 1

0514-210 Introduction to Psychology
Introduction to the scope and methodology of psychology. Topics include aims, methods, neuroscience, sensation, perception, learning, memory, intelligence, motivation, normal and abnormal personality, and social psychology. Required course for psychology majors. Class 4, Credit 4 (offered quarterly)

0514-325 Honors: Current Trends in Psychology
A state-of-the-art survey of major subfields in psychology, the scientific study of behavior and mental processes. Topics include the biological basis of behavior, perception, learning, memory, intelligence, emotions, social relations, personality and psychopathology. Besides textbook reading, students will read and discuss current publications on each topic we explore. Class 4, Credit 4

0514-350 Psychological Statistics
This course will cover descriptive and inferential statistics. Special attention will be given to psychological applications, conceptualization, and interpretation of statistics, computer-assisted data-analysis and reporting of results. This course should be taken prior to higher-level psychology courses, especially experimental psychology and track courses. Required course for psychology majors. Class 4, Credit 4

0514-400 Experimental Psychology
An introduction to the logic of experimental research and application of the scientific methods to the study of behavior. Emphasis on stating empirically testable hypotheses, designing and conducting experiments, and writing research papers in APA style. Required for psychology majors (0514-350) Class 4, Credit 4

0514402 Research Methods
An introduction to the logic of various research methods and the application of scientific methods to the study of behavior. Emphasis will be on a wide range of research designs and techniques including surveys, correlational designs, quasi-experimental designs, as well as true experimental designs. Students will learn to write research papers in APA style. Required for psychology minor. (0514-210 or equivalent) Class 4, Credit 4

0514-440 Childhood & Adolescence
Explores human development from conception through adolescence. The developmental approach provides the opportunity to integrate many areas of psychological research such as cognition, personality, perception, social interaction and moral development as they apply to human development. Required course for psychology majors. Part of the psychology concentration and minor; may also be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-441 Humanistic Psychology
Examines the major assumptions, theories and implications of "growth" or humanistic psychology. Students study human beings as dynamic, complex creatures who shape themselves and their world through the choices they make each day and whose best hope for realizing their individual and collective potential is an accurate understanding of what human persons need to grow psychologically and what societal conditions seem to foster such growth. Institute elective for psychology majors. Part of the psychology concentration and also may be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-442 Adulthood & Aging
Encompasses the psychology of the span of life from young adulthood through the middle years. The developmental approach, presented in an interdisciplinary framework, provides a systematic orientation to the study of the individual during early adulthood. Institute elective for psychology majors. Part of the psychology concentration and also may be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-443 Cognitive Psychology
This course examines how people perceive, learn, represent, remember and use information. Contemporary theory and research are surveyed in such areas as attention, pattern and object recognition, memory, knowledge representation, language acquisition and use, reasoning, decision making, problem solving, creativity, and intelligence. Applications in artificial intelligence & human/technology interaction may also be treated. Part of the psychology concentration and minor; may also be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-444 Social Psychology
Gives a general overview of those areas of social psychology currently under the most intensive investigation and likely to be of most interest to the student, including nonverbal communication, attraction, aggression and group effects. Required course for psychology majors. Part of the psychology concentration and minor; may also be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-445 Psychology of Perception
Covers topics of all sense modalities with emphasis on visual perception. Traces what happens to the physical stimulus as our sensory systems analyze it to produce complicated perceptions of the world around us. Many complex perceptual phenomena draw upon explanations at the physiological, psychological and cognitive levels. Institute elective for psychology majors. Part of the psychology concentration and minor; may also be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-446 Psychology of Personality
Examines the strengths and weaknesses of the major psychological theories of personality. Methods of assessing personality, research and applications of theory to real-life situations are included in the evaluation of each theory. Required course for psychology majors. Part of the psychology concentration and minor; may also be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-447 Abnormal Psychology
Examines the major categories of mental disorder not only from the descriptive point of view, but also in terms of the major theoretical explanations of the causes of disorder. The major treatment modalities also are covered. Required course for psychology majors. Part of the psychology concentration and minor; may also be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-448 Industrial & Organizational Psychology
Consideration of principles as well as application of current research in industrial psychology, with particular reference to personnel selection, training, motivation, morale, performance appraisal, leadership and communication. Required course for psychology majors. Part of the psychology concentration and minor; may also be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-449 Behavior Modification
Students learn the skills of changing their behavior by controlling their environment and the consequences of their behavior. Institute elective for psychology majors. Part of the psychology concentration and minor; may also be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-451 Psychology of Motivation
Surveys basic motivational concepts and provides a fair representation of many different areas of motivational research, relating these to each other where possible. Institute elective for psychology majors. Part of the psychology concentration and also may be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4 (offered occasionally)

0514453 Death & Dying
This course will view death from a social-psychological perspective. After dealing with topics such as the leading causes of death, attitudes toward death, suicide, and American funeral practices, it will focus on such questions as how people can better cope with their own mortality and that of loved ones, and how people can help others face death, and help themselves and others during periods of bereavement. Part of the psychology concentration and also may be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-480 Psychology of Women
Examines the relevance and applicability of present psychological theory and research to the understanding of the development and behavior of women. Major topics covered include psychological and biological sex differences, psychological theories of women's development, the relationship between female personality development and various sociocultural factors, women's place in society, women and their bodies, and women and mental health. Part of the women's studies concentration and also may be taken as an elective. Cross-listed with women's studies, 0522-483. Class 4, Credit 4 (offered occasionally)

0514-483 Social Psychology of Religion
Examines religions as cultures that, like other "ways of life," face the task of attracting or creating new members, maintaining their loyalty, providing them with a coherent world view and satisfying their basic needs. Suggests how psychological processes such as identity information, attribution, self-actualization, brainwashing, conflict, denial, projection and repression may be applied and misapplied in efforts to understand religious belief and behavior. Part of the perspectives on religion concentration and also may be taken as an elective. Class 4, Credit 4

0514-530 Attention & Pattern Perception
One of the most formidable bottlenecks in human information processing is the limitation of attention. This course surveys contemporary theory and research on selective and divided attention with an emphasis on laboratory research and its relevance in such applied areas as display layout and driving. Cross-modal attention and attention for action are covered, as is the relationship between attention and conscious awareness. This course also surveys Gestalt and contemporary cognitive approaches to object recognition. Required information processing track course for psychology majors. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-531 Language & Problem Solving
Perhaps the most significant cognitive capacity of human beings is their use and understanding of language. This course examines the structure of language and its relationship to thought, and surveys contemporary theory and research on the comprehension and production of spoken and written language. Applications such as artificial speech recognition are discussed. The course also surveys the psychological literature on reasoning and problem solving and examines attempts in artificial intelligence to simulate human performance in these areas. Required information processing track course for psychology majors. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-532 judgment & Decision Making
Explores judgment and decision-making processes and focuses on the social and cognitive aspects of complex information processing. Topics include selective perception, memory and hindsight biases, framing effects, heuristics and biases, social influences, group processes and common errors. Required information processing track course for psychology majors. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-533 Learning & Memory
This course reviews current research within a larger historical perspective. It presents the multistore or modal model of memory with an in-depth examination of the evidence used to support the model. Baddeley's Working Memory model is presented in some detail to illustrate how theorists explain the huge amount of information we have about memory performance. It also includes topics such as memory structures, levels of processing, implicit and explicit memory, schemas, signal detection theory and global memory models. Theories of learning are clearly meaningful for the study of memory. With the new developments in connectionist models of learning, theories of learning again assume importance in scientific study. Required information processing track course for psychology majors. May be taken as an elective. (0514-210, 350,400) Class 4, Credit 4

0514-540 Visual System
As the basis to study visual perception, this course introduces electromagnetic waves as visual stimuli, structure of the eye, and visual pathways in humans, vertebrates, and some non-vertebrates. The materials covered span basic optics, biology, physiology, and psychophysics. The functional and behavioral consequences of the visual system such as uneven distribution of photoreceptors in the retina, receptive field of cells, and neural plasticity are also considered. Required for psychology majors in the visual perception track. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-541 Color Perception
Explores human color perception from the psychophysical perspective with knowledge in optics, neurophysiology, and color science. Among the topics covered are theories of color vision, basic colorimetry, congenital and acquired color vision deficiencies, and evolution of color vision. Required for psychology majors in the visual perception track. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-542 Spatial Vision & Pattern Perception
Traditional psychological views of organization of spatial vision such as Gestalt psychology and optical array are elaborated and connected to recent development of studies in spatial vision and pattern recognition. Techniques include electrophysiology, psychophysics, and brain imaging. Required for psychology majors in the visual perception track. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-543 Depth & Motion Perception
This course surveys such topics as monocular and binocular depth cues, size and shape constancy, stereopsis, direction perception, apparent motion, structure-from-motion, heading perception, and self-motion. Gibsonian approaches to perception are contrasted with more traditional indirect perception approaches. The physiological bases of depth and motion perception are covered, as are practical applications of work in the area. Required visual perception track course for psychology majors. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-544 History & Systems
Course provides background to the development of current psychological perspectives. It examines beliefs, practices, achievements and limitations of various systems of psychology from Greek times through to the late 20th century. Part of the psychology concentration and minor. May be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-545 Brain & Behavior
Introduction to the neurobiological basis of cognition and behavior. Topics include hemispheric specialization, localization of function, brain injury, neuropsychological testing, and functional neuroimaging. Emphasis is on higher brain functions, such as language, memory, and visuospatial processing, with an evolutionary perspective. Laboratory work focuses on EEG correlates of attention and cognition. Part of the biopsychology track for the psychology degree program. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-546 Right Brain, Left Brain
A comprehensive introduction to hemispheric specialization, including clinical and scientific relevance of brain asymmetry. Topics include localization of function, split-brain procedures, neuropsychological testing, interhemispheric interactions, and functional neuroimaging. Emphasis is on higher brain functions such as language, memory, and visuospatial processing, in an evolutionary context. Laboratory work focuses on lateralized tachistoscopic designs to investigate normal language function. Part of the biopsychology track for the psychology degree program. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-547 Brainwaves & Behavior
Introduction to the study of human EEG, also known as brainwaves. EEG analysis is the original functional neuroimaging technique for visualizing brain activity in healthy and patient populations during cognitive tasks. Advances in functional neuroimaging have triggered a revolution in research on the biological bases of cognition, emotion, and psychiatric disorders. This course provides a forum in which students can learn about recent EEG findings and applications. Methods for evoking brain activity and how to analyze EEG data as well as the limitations of neuroimaging results will be explored. Part of the biopsychology track for the psychology degree program. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-548 Biological Bases of Mental Disorder
A comprehensive introduction to the biological foundations of schizophrenia, depression, autism, bipolar disorder, Tourette's syndrome, and other mental disorders. Topics include neuropsychological testing, etiology, and structural and functional neuroimaging. Laboratory work will focus on language and cognitive function in one or two of these disorders. Part of the biopsychology and clinical psychology tracks for the psychology degree program. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-549 Clinical Psychology
The purpose of this course is to provide an overview of the field of clinical psychology. The course is designed for upper-level undergraduate students interested in learning more about this specific field. Students will learn about the primary tasks of a clinical psychologist, including fundamentals of assessment, clinical research, conceptualizing problems, and psychotherapy. In addition, students will learn about the educational and professional behavior, and controversial issues within the field. Part of the clinical psychology track for the psychology degree program. May be taken as an elective. (0514-210, 350,400) Class 4, Credit 4

0514-550 Psychological Testing
This course will explore the theories, methods, and applications of psychological testing. The advantages and drawbacks of psychological testing in general, and selected tests in particular will be emphasized. The use of tests in clinical and other applied areas of psychology is based on several assumptions. First, assessment is apt to be more useful if based upon reliable and valid information. Second, improving one's knowledge of tests will help students to gather meaningful information about people and environments. Third, it is desirable to design intervention plans based on accurate assessment data, and to use data to evaluate intervention outcomes. In a practical sense, a primary objective of this course is to help students develop some preliminary assessment skills and improve their knowledge about assessment techniques and tests. Part of the clinical psychology track for the psychology degree program. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-551 Research in Clinical Psychology
This course will explore the theory and methods used to evaluate interventions in the field of clinical psychology and related human services. Topics to be covered will include within subjects/single subjects experiments, between-subjects experiments/clinical trials, and general program evaluation. Two primary objectives are to help students develop an appreciation for the importance of scientific evaluations of psychotherapy and other interventions and to develop skills for evaluating the efficacy of clinical interventions. Part of the clinical psychology track for the psychology degree program. May be taken as an elective. (0514-210,350,400) Class 4, Credit 4

0514-597 Senior Project in Psychology
This course is intended for students in the psychology major to demonstrate independent, experimental research expertise. Students are guided by faculty advisors in conducting experimental research on an issue of their choice. Students design the method, run subjects, and analyze the results of their study. Students write up the project in APA format. Passing this write-up qualifies the students for the writing requirement in psychology. Because Senior Project is the culmination of a student's scientific research learning experience in the psychology major, it is expected that the project will be somewhat novel, will extend the theoretical understanding of their previous work (or of the previous work of another researcher), and go well beyond any similar projects that they might have done in any of their previous courses.(0514-210,350,400) Class 4, Credit 4

Sociology

0515-210 Foundations of Sociology
Introduces students to the way sociologists interpret social reality, the major elements of the field and the most important research findings. Included are such topics as cultural differences and ethnocentrism, socialization, social statuses and roles, group dynamics, social institutions, stratification, collective behavior. Class 4, Credit 4 (offered quarterly)

0515-325 Honors Sociology
This course is designed to explore the fundamental insights into social behavior developed by leading historical and contemporary scholars in the field of sociology. Students will learn fundamental concepts and theories through immersion in the classics of sociological thought, the writings of giants in the field from Marx and Weber to Goffman and William Julius Wilson. The course will be organized in a seminar format in which student participation is required. Class 4, Credit 4

0515-406 Introduction to Qualitative Policy Analysis
This is a course in the practical aspects of doing theoretically informed qualitative social research. Special attention will be given to the processes by which research problems are formulated, research designs selected, data gathered and interpreted, and inferences and conclusions drawn. Through example, illustration, and application, specific research skills will be simulated using case studies. Cross listed with public policy, 0521-406. Class 4, Credit 4

0515-413 Urban Problems & Urban Policy
This course analyzes social and spatial characteristics of cities and considers reasons for urban development, ecological factors, types and network of settlements, and urbanism as a way of life. It also examines the issues of neighborhoods, suburbia "ghetto" enclaves, metropolitan regions, urban social and political structures, planning and urban policy. Part of the public policy concentration and minor. May be taken as an elective. Class 4, Credit 4

0515-441 The Changing Family
This course examines the essential concepts and theories fundamental to the social science of family studies. It analyzes family systems with reference to gender role, participation in the workplace, marital relationships and communication between parents and children. The course also focuses on ways in which changes in the economy and technology have influenced the form of the family, and men's and women's work. Part of the sociology concentration; the sociology/anthropology minor; and also may be taken as an elective. (0515-210,0510-210 or equivalent) Class 4, Credit 4

0515-442 The Urban Experience
This sociology course analyzes social and spatial characteristics of cities and considers reasons for urban development, ecological factors, types and networks of settlements, and urbanism as a way of life. Also examines the issues of neighborhoods, subareas, ghetto enclaves, metropolitan regions, urban social and political structures, problems, services and planning. Part of the sociology concentration and also may be taken as an elective. (0515-210,0510-210 or equivalent) Class 4, Credit 4

0515-443 Sociology of Work
This course analyzes continuity and change in the way work is organized, performed and experienced within national and global contexts of the economy, politics and technology. It focuses on the relationship between the social and technical organization of work, including such aspects as displacement, union-management relations, safety, skill and the experience of work as satisfying or alienating. It also examines the interplay of race, ethnicity, class and gender with work, and the interplay of work with other social settings, such as family life, leisure and education. Part of the sociology concentration; the sociology/anthropology minor; and also may be taken as an elective. (0515-210,0510-210 or equivalent) Class 4, Credit 4'

0515-444 Social Change
This course describes and applies competing explanations for major transitions in a variety of institutions, including the economy, work, politics, family and education. These transitions are seen within historical and global contexts, but the interplay of these changing social structures with individual experience is explored as well. Topics include economic, racial and gender stratification, culture, labor-management relations, and the source and consequences of technological change. As future professionals in technical fields, students will learn to understand, assess, and manage social change rather than to simply react to it. Part of the sociology concentration; the sociology/anthropology and social welfare policy minors; and also may be taken as an elective. (0515-210,0510-210 or equivalent) Class 4 Credit 4

0515-446 Sociology of Health
A survey of the sociological aspects of health and illness. Some areas of study will be the definition, causes (etiology) and cure of disease in various societies and social groups. Also included is a discussion of the epidemiology of disease, access to and delivery of health care in contemporary U.S. society, problems of patient care, and the study of mental illness and death and/or dying. Part of the sociology concentration and also may be taken as an elective. (0515-210 or 0510-210 or equivalent) Class 4, Credit 4 (offered occasionally)

0515-447 Women, Work & Culture
Broad sociological issues affecting women, work and culture are a result of the emerging global economy and technological revolution. The course will consider how the process of gender socialization is complicated by the way in which gender intersects with racial, class, ethnic, sexual, and other identities. This course will present the major theoretical perspectives employed in sociology and women's studies and consider how they relate to the study of women, work and culture. This course is part of the sociology concentration and minor and may be taken as an elective. Cross-listed with women's studies, 0522-447. (0515-210,0510-210 or equivalent) Class 4, Credit 4 (offered occasionally)

0515-448 Minority Group Relations
Deals with the principal concepts and research findings of those who have studied racial and ethnic minorities and their relations. Taking into account the growing body of theory and data on the dynamics of ethnic prejudice and discrimination, the course is concerned with the subcultures of minorities; the nature of prejudice and discrimination; the etiology, patterns and consequences of intergroup conflict; and the reactions of minorities to differential and discriminatory treatment. Concepts such as assimilation, amalgamation and desegregation are analyzed as forms of conflict resolution. Part of the sociology and the minority group relations concentrations; may also be taken as an elective. (0510-210,515-210 or equivalent) Class 4, Credit 4

0515-449 Population & Society
Study of demographic variables of mortality, fertility and migration as they affect the rise and quality of population. Part of the sociology concentration and also may be taken as an elective. (0510-210 or 0515-210 or equivalent) Class 4, Credit 4 (offered occasionally)

0515-451 Transfer Technology & Globalization
This course provides an understanding of theoretical perspectives, directions, processes and consequences of transfer of technology from modern to developing societies. It also examines the diffusion of technologies, that is, the process through which they spread from their initial sources into various national and international organizations (e.g., multinational firms, factories, communities, and homes). The course also analyzes the consequences of conventional technological transfers and the need for appropriate technology for developing countries. Part of the sociology and public policy concentrations and minors. May also be taken as an elective. (0515-210, 0510-210 or equivalent) Class 4, Credit 4 (offered occasionally)

0515-482 African American Culture
Analyzes past, present and future social policies, programs and practices from their actual and predictable effects on black people. These analyses and solutions include particular emphasis on how the black community has been forced to develop mechanisms for coping with the debilitating effects of poverty, environmental deprivation and institutional racism. Presents a systematic means of facilitating change in people's attitudes and behaviors. Part of the minority relations concentration and also may be taken as an elective. Class 4, Credit 4

0515-483 Hispanic American Culture
The study of the social experiences and conditions of Hispanic Americans and the degree to which they have been assimilated into the mainstream dominant culture. Various Hispanic groups are studied with the goal of defining and outlining their differences and similarities. The Puerto Ricans in the Northeast and the Mexican Americans in the Southwest are specifically selected for analysis. Helps students to better understand the problems faced by Hispanic Americans by looking at specific socio-economic indicators such as their access to health care, job opportunities, educational institutions and the degree to which Hispanics have "progressed" in the U.S. Part of the minority relations concentration, the Latino/Latina/Latin American concentration and also may be taken as an elective. Class 4, Credit 4

0515-506 Social Inequality
A survey course that examines different dimensions of stratification in the U.S. and elsewhere. Explanations for the existence of inequality are addressed at individual, group and institutional levels. (0515-210,0510-210 or equivalent) Class 4, Credit 4 (offered occasionally)

0515-507 Complex Organizations
Analyzes the structure and dynamics of a wide variety of social organizations (government bureaucracies, corporations and voluntary groups). Topics include theories of organization, organizational processes, technological impact, and organizational change and development. An examination of the internal operation of large organizations includes sources of power and authority, modes of communication and division of labor, as well as tension, stress and strain. Class 4, Credit 4 (offered occasionally)

0515-508 Aging & Society
Considers concepts, issues and research techniques in the behavioral and biological aspects of aging. Examines the interaction of group processes in the family and community that influence society's attitudes toward the aging process. Further examines the cultural, environmental and institutional changes as they relate to an increasing population of older people. Class 4, Credit 4 (offered occasionally)

0515-509 Social Policy
An examination of social policy formulation in a variety of contexts from local government to national government. Special attention is given to the strategies, choices and priorities in the formulation of social policy. Deals with historical development of social policies, including the issues of health, aging, poverty, family and children. Also examines the question of how social values and economy influence policy development. Class 4, Credit 4 (offered occasionally)

0515-515 Social Policy & Aging
Course work is organized around culture and values as context for policy formulation. Special attention is given to the process of policy analysis and implementation. Several specific policy areas are examined: social security and income maintenance, health and long-term care, work and retirement, social services and the aging network, housing and living arrangements for the elderly, and the role of the family and the elderly. Class 4, Credit 4 (offered occasionally)

0515-524 Applied Sociology
Provides the student with useful sociological knowledge applicable to solutions of practical problems. The inventory of problems is not fixed beforehand, and the specific course content reflects the problems either already encountered by students or very likely to represent a significant portion of their anticipated professional concern upon graduation. (Permission of instructor) Class 4, Credit 4 (offered occasionally)

0515-529 Deaf Culture in America
An introductory survey of culture among various groups of deaf people in the United States. Students study the scholarly literature dealing with these groups and have contact with members of this community. Familiarizes students with the characteristics of deaf culture as well as general perceptions of deafness and the deaf community within the dominant hearing society. Students should come to recognize and appreciate this segment of American cultural diversity. (0515-210,0510-210 or equivalent) Class 4, Credit 4

0515-569 Human Sexuality
This course is sex positive in its approach to the study of human sexual behavior. It focuses upon basic physiology, sexual awareness, sexual development throughout the life cycle, sex roles, sexual myths, legal and social issues, premarital and marital sexual behavior, and alternative sexual choices. Frequently these issues raise questions of sexual attitude and value, and these are examined and clarified. Class 4 + 2-hr. weekly seminar, Credit 4 (offered occasionally)

Social Work

0516-210 The Professional Social Work Role
This course explores social work as a profession, the various fields in which social workers practice, and the differing philosophies of human services and social work approaches. Also covered are strategies for developing self-awareness and professional self-assessment. Required course for social work majors. Class 4, Credit 4 (F, W)

0516-212 Self Awareness in Helping Role
This course develops students' helping skills in essentially three broad areas: 1) skills in noticing or observing; 2) observing one's professional use of self in the helping relationship and evaluating the appropriateness of such behavior; and 3) observing the client and evaluating the effect one's response has on her or him. Students are expected and required to increase their awareness skills, and this course offers an opportunity for students to focus on and practice using awareness skills. Further, this course introduces students to personal and professional skills which are necessary in developing an understanding of their beliefs, prejudices, emotions, and the affect their beliefs have on the clients with whom they interact. The course is intended to help students integrate professional ethics and values with their personal ethics and values to be a better social worker. Required course for social work majors. Class 4, Credit 4 (W, S)

0516-218 Technology & Social Work
This course covers most of the technology literacy requirements for graduation from the social work program. Students must take this course during their first or second matriculated quarter and will be expected to utilize computers and other relevant technology immediately in other courses. The course focuses on broad areas of information technology applications to social work: general computer literacy skills, E-mail skills, word-processing basics, technology and confidentiality, accessibility to technology, internet skills, and presentation software. Required course for social work majors. Class 2, Credit 2 (F, S)

0516-306

Cultural Immersion I

This two-day immersion experience calls upon hearing and deaf students to capitalize on the unique intercultural environment of the RIT Social Work Program as a spring board for understanding dynamics and principles applicable to culturally competent interaction across the whole range of ethnic and multi-cultural interaction settings. Communication tasks, group assignments, social interactions and cross-cultural simulations will be the bases for observation, reflection, articulation, and discussion about the nature of interactions among hearing and deaf participants. Students will formulate a set of principles for respectful and sensitive cross-cultural interaction, discuss how those principles might apply to other cross-cultural settings, and generate a written plan for implementing those principles with persons of a cultural background definably different from his or her own. Course cannot be taken for Liberal Arts credit. **Class 4, Credit 4 (F)**

0516-340

Deafness: Fundamental Aspects

This course provides the student with a basic understanding of deafness. The overview includes how we hear, techniques for diagnosis, the etiology of deafness, as well as a historical perspective on how education for the deaf has developed with its various philosophies. Language acquisition and modes of communication are explored, as well as the social, psychological and vocational development of deaf persons. Elective for social work majors. (Third-year standing) **Class 4, Credit 4 (offered every other year)**

0516-341

Psycho-Social Implications of Deafness

The purpose of this course is to provide the student with an in depth examination of the psychological implications of deafness for the individual. The various systems with which the deaf individual interacts, as well as within which she/he interacts, will be examined for their relevance to the development and functioning of the individual. The course also examines how the individual and these systems impact and influence each other. These systems will include family, school, service delivery systems and society. Elective for social work majors. **Class 4, Credit 4 (offered on sufficient demand)**

0516-342

Deafness: Intervention Strategies

This course helps build skills in applying the knowledge base developed in the prerequisite course to case situations. Students demonstrate collection and recognition of pertinent information and development and implementation of appropriate intervention plans. Legal and political issues as well as methods of assessing local resource networks are considered. Professional roles and intervention goals are discussed as they relate to interfacing systems, including individual, family, school, medical, mental health, rehabilitation and employment. Elective for social work majors. (Third-year standing) **Class 4, Credit 4 (offered every other year)**

0516-354

Human Behavior in the Social Environment I: Preadolescence

Human Behavior in the Social Environment is a three-course sequence designed to give students a basic knowledge of human development over the entire life cycle. Students study the biological, psychological, social, and environmental aspects of human development. This individual development is placed in the context of the developmental family life cycle and the ecological perspective of social work practice. The course is designed to enhance students' critical thinking skills about how people understand themselves, how they create meaning in their lives, how they change, and how the student's perspective influences his/her understanding of the client-systems. Social and economic influences that are addressed include racism, poverty and discrimination. Changing gender roles, sexism, and sexual orientation are discussed within the context of human diversity. **Class 4, Credit 4 (F,S)**

0516-355

Human Behavior in the Social Environment II: Adolescence to Young Adult

Human Behavior in the Social Environment is a three-course sequence designed to give students a basic knowledge of human development over the entire life cycle. Students study the biological, psychological, social, and environmental aspects of human development. This individual development is placed in the context of the developmental family life cycle and the ecological perspective of social work practice. The course is designed to enhance students' critical thinking skills about how people understand themselves, how they create meaning in their lives, how they change, and how the student's perspective influences his/her understanding of the client-systems. Social and economic influences that are addressed include racism, poverty and discrimination. Changing gender roles, sexism, and sexual orientation are discussed within the context of human diversity. (0516-354) **Class 4, Credit 4 (F,W)**

0516-357

Mental Health & Mental Illness

This course gives social work students a basic understanding of mental health and mental illness from a social work perspective. The role of the social worker in working with individuals and their families is included. Students are given a general understanding of our current mental health systems. The medical model and alternative systems of diagnosis are considered. Elective for social work majors. **Class 4, Credit 4 (S)**

0516-358

Human Behavior in the Social Environment III: Adult to Late Adult

Human Behavior in the Social Environment is a three-course sequence designed to give students a basic knowledge of human development over the entire life cycle. Students study the biological, psychological, social and environmental aspects of human development. This individual development is placed in the context of the developmental family life cycle and the ecological perspective of social work practice. The course is designed to enhance students' critical thinking skills about how people understand themselves, how they create meaning in their lives, how they change, and how the student's perspective influences his/her understanding of the client-systems. Social and economic influences that are addressed include racism, poverty, and discrimination. Changing gender roles, sexism, and sexual orientation are discussed within the context of human diversity. **Class 4, Credit 4 (W, S)**

0516-380

Social Work & the Law

This course provides the student with the opportunity to develop a workable vocabulary and understanding of some of the basic legislative processes and laws that affect the practice of social work. Focus centers around significant issues and points of law that have affected the delivery of services. Elective for social work majors, (third-year standing) **Class 4, Credit 4 (offered on sufficient demand)**

0516-405

Practice III: Families

This course is the third course in the practice sequence. It is designed to give the social work student a basic understanding of the family as client. Students gain an understanding of family dynamics and the choices and decisions about family life that are required in contemporary society. A major focus of the course is the assessment of the family throughout its natural life cycle and areas of potential problems during its development when social work intervention may be beneficial. Students also learn about changes which can affect the family such as divorce, single-parenthood, remarriage, AIDS, death in the family, alcoholism, and family violence. It includes the influences currently affecting the contemporary American families such as social class, racism, ethnicity, poverty, and the changing status of women. (0516-354, 355, 358, 475) **Class 4, Credit 4(F)**

0516-406

SWPS: History of Social Welfare

This course acquaints the student with the historical roots of our present system of social welfare, emphasizing its development in the U.S. and the concurrent development of social work as a profession. It examines the value bases and the economic, social and political factors of each era as reflected in the social welfare programs of that time and their effects on people. Required course for social work majors. Part of the social welfare policy minor. **Class 4, Credit 4 (S)**

0516-407

Structure & Function of Social Work

This course examines the provision of current social services in five major fields of social welfare; public welfare, traditional voluntary agencies, voluntary social movements, mental health and the legal system. It also explores organization theory as it applies to the structure of these services, as well as major patterns and sources of funding. Part of the social welfare policy minor. This course is open to non-majors and non-matriculated students. **Class 4, Credit 4 (F)**

0516-408

SWPS: Policy Advocacy

This course examines the role of social workers in advocating with and on behalf of clients and others for negotiating or bringing about needed change in institutions or policies of our society. Discussion of the forces in the social, economic and political environment today that directly affect poverty, racism and other issues is related to examining techniques for achieving change. Required course for social work majors. Part of the social welfare policy minor. **Class 4, Credit 4 (offered on sufficient demand)**

0516-537 Social Policy & Aging
This course covers the culture and values as the context for policy formulation. Special attention is given to the process of policy analysis and implementation. Several specific policy areas are examined: social security, income maintenance, health and long-term care, work and retirement, social services and the aging network, housing and living arrangements for the elderly, and the role of the family and the elderly. Elective for social work majors. May also be taken for Liberal Arts elective credit under 0515-515. Part of the social welfare minor. Class 4, Credit 4 (offered on sufficient demand)

0516-538 Family Violence
This course acquaints social work students with the problem of family violence. The causes and dynamics of various forms of violence in the family are addressed. These include child abuse, incest, spouse abuse, sibling violence, marital rape, abuse of parents by adolescents and the abuse of the elderly by their adult children. Factors affecting intervention in families where these occur and techniques for intervention are included. Elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-539 Services or Aging
This course deals with the variety of existing community-based services available for the elderly. It also examines the tactics, assessment, coordination and evaluation of various direct and indirect services for the elderly. Particular attention is given to such service groups as nursing homes, home health care, mental health care and other formal and informal support systems. Elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-540 Research III: Practice Evaluation
The third of a three-course sequence is built on material learned in Research II: Practice Evaluation and its prerequisites. Students learn about baseline assessments, the ethics of research and experimental research. They also learn about report writing, grant writing and the politics of research. Concerns and issues in research with special populations and cross-cultural research also are explored. Students design and complete a major research project and report on their own professional social work practice. Required course for social work majors. (0516-550,551,553) Class 2, Credit 2 (W)

0516-550 Practice VI: Assessment & Intervention
Practice VI—Assessment and Intervention is the final course in the Practice Course Sequence. This seminar-structured class continues to build upon the basic principles and objectives presented in the previous practice courses. Students will be expected to continue to develop and expand knowledge of practice and interventions at the micro and mezzo levels. The focus is on the theory, concepts, and techniques of cognitive behavior therapies, with a particular emphasis on intervention methods that may be used by the social worker to help clients with specific thinking and behavioral challenges. Class 2, Credit 2 (W)

0516-551 Field Instruction II
Field Instruction I and II comprise a 20-week, 30-hour-per-week supervised field placement. Under the guidance of a faculty liaison and an agency-based supervising social worker, the student is placed in a cooperating social, governmental, health or educational agency in order to gain direct experience with its organization, programs and client services. Closely supervised work at the agency is supplemented by seminars designed to integrate theory and practice. Required course for social work majors. (0516-505, 506, 535, 552; corequisite with 0516-540,550,553) Field 300, Credit 6 (W)

0516-552 Field Seminar I
A practicum seminar taken during the first quarter of field instruction. Students and instructor discuss topics related to field experiences and concerns. This practicum is taken concurrently with Field Instruction I, Practice V: Assessment and Intervention I, Research II: Practice Evaluation. It is intended to help students integrate field experiences with their pre-field course content and the concurrently taken courses. Students are expected to write a complete self-assessment of their achievement of field instruction objectives. Required course for social work majors. (0516-505,506,535) Class 2, Credit 2 (F)

0516-553 Field Seminar II
A weekly seminar, taken during the second quarter of field placement, in which students continue to read, write, think about and discuss issues directly related to their field practice and social work education. Continuing with the work of the first quarter seminar for field students, focus is on students' professional growth. The seminar is taken concurrently with Field Instruction II, Practice VI: Assessment & Intervention II, and Research III: Program Evaluation. All three courses share common objectives as well as the study of the generalist practice model. Effort is made by faculty to ensure that students in the field education sequence successfully integrate course content and objectives. Required course for social work majors. (0516-540,550,551) Class 2, Credit 2 (W)

0516-590 Cultural Immersion II
This course will build on the cross-cultural communication and interaction principles formulated in Cultural Immersion I along with the selected readings by authorities on the topic. Students will share elements of their own family and cultural roots through stories, reflections, role-play, demonstrations, food, clothing, music, art, or any other artifact of their underlying cultural experiences. Group tasks and social activities will provide opportunities to observe how cultural differences reveal themselves in day to day interactions. As a portfolio assignment, each student will report in writing on the cross-cultural interaction plan generated in Cultural Immersion I and will participate in group discussion about the resulting experiences. Course cannot be taken for Liberal Arts credit. Class 4, Credit 4 (S)

0516-595 SWPS: Policy & Planning Processes
This course explores the development of social welfare services from the determination of social need through program design to implementation. Concepts of policy process, large system change, and grant and proposal writing are considered. (Fourth-year standing) Part of the social welfare minor. Class 4, Credit 4 (S)

0516-599 Independent Study
A combined student/faculty effort on a chosen topic beyond the normal course selections. Provides the self-motivated student with a creative orientation, the opportunity to develop an autonomous and personal sense of academic growth, and achievement. May include independent work in an agency setting or other field work away from the Rochester area. Credit variable (F, W, S, SU)

Interdisciplinary—Aerospace

0519-201 History of Airpower I
This course is the first in a three course sequence that examines air and space power through a historical perspective. The course traces the evolution of air and space power from the first balloons and dirigibles to the space age global positioning systems used in recent conflicts. The first sequence covers early flight, World War I, interwar years, and World War II. It examines the impact of air and space power on military and non-military operations in support of U.S. foreign and domestic policy and its role in 20th century warfare. Required for second year ROTC students. Class 1, Credit 1 (F)

0519-202 History of Airpower II
The second of a three course sequence that examines air and space power through a historical perspective. The second course covers the formation of an independent U.S. Air Force, the Berlin Airlift, Cold War deterrent policy, and the Vietnam conflict. It examines the impact of air and space power on military and non-military operations in support of U.S. foreign and domestic policy and its role in 20th century warfare. Required for second year ROTC students. Class 2, Credit 2 (W)

0519-203 History of Airpower III
The third of a three course sequence that examines air and space power through a historical perspective. The final course covers the post Vietnam reorganization, the Persian Gulf Wars, Kosovo, war on terror, and the future of air and space power. It examines the impact of air and space power on military and non-military operations in support of U.S. foreign and domestic policy and its role in future warfare. Required for second year ROTC students. Class 1, Credit 1 (S)

Interdisciplinary—Liberal Arts

0520-201

Career Exploration Seminar

This seminar is designed to introduce students to the process by which they can make informed decisions in selecting a career and identifying an educational program which will lead to that goal. Students begin the quarter by assessing, in a small group setting and with the assistance of facilitators familiar with careers and with RIT programs, their own skills and working styles. They then research careers that match their personal profiles. Finally, they research academic programs that lead to the careers they have identified. This includes interviewing faculty and administrators in campus programs as well as professionals working in the fields. This seminar is required for RIT Exploration program students. **Class 1, Credit 1 (offered quarterly)**

0520-501

Senior Seminar

Senior Seminar is a capstone Liberal Arts course for all baccalaureate degree students. Students, through the Gannett Lecture Series and selected readings and films, analyze, discuss and debate a social issue of current concern as it relates to their future roles as citizens in a global world. The issue, selected for two years by the Liberal Arts faculty, relates scientific, technical and artistic topics to their social contexts. Students write extensively and receive faculty feedback to refine their written communication skills as they enter the professional world. **Class 2, Credit 2 (offered quarterly)**

Public Policy

0521-301

Values & Public Policy

The course will introduce the student to a range of ethical issues that arise in policy decision making and policy analysis. It will focus upon the types of ethical reasoning that are utilized by focusing upon a series of case studies. **Class 4, Credit 4 (offered annually)**

0521-400

Foundations of Public Policy

This interdisciplinary course will introduce the student to the concept of public policy, the policymaking process, the role of stakeholders and interest groups, and the basic dimensions of quantitative and qualitative policy analysis. A range of public policy issues, such as environmental policy, science and technology policy, and information and communications policy will be explored. Part of the public policy concentration and minor. **Class 4, Credit 4 (offered fall quarter)**

0521-402

Policy Analysis I

This course is the first in a three-course sequence (Policy Analysis I-III) that normally will be taken in the third year of the program. The purpose of the three-course sequence is to introduce the student to both qualitative and quantitative policy analyses and to progressively integrate qualitative and quantitative dimensions of analysis into a systematic whole. Students will learn to apply a suite of analytical tools to better understand and evaluate public policy. Part of the public policy concentration and minor. (0521-406, 0511-401 and 1016-319 or equivalent; co-requisite 0511-450 or department approval) **Class 4, Credit 4 (offered fall quarter)**

0521-403

Policy Analysis II

This course is the second in a three-course sequence (Policy Analysis I-III) that normally will be taken in the third year of the program. This course will assist the student in integrating both quantitative and qualitative analysis in the context of their areas of developing specialization emerging from track courses. In this course, students continue to acquire new tools and techniques to analyze public policies. Part of the public policy concentration and minor. (0521-402, 0511-457 or 1016-320 or equivalent) **Class 4, Credit 4 (W)**

0521-404

Policy Analysis III

This course is the third in a three-course sequence (Policy Analysis I-III) that normally will be taken in the third year of the program. This course will provide students an opportunity to develop an analysis and proposal of a particular policy issue. The course continues to build upon the tools of Policy Analysis I and II using a case study and project-based approach. Part of the public policy concentration and minor. (0521-403) **Class 4, Credit 4 (S)**

0521-405

Senior Project I

The culminating educational experience for public policy students. The principal focus is an independent study project, centered on a major policy issue drawn from the student's chosen specialization. In Senior Project I, students focus on research methods and proposal design. Permission of the department is required to register for this course. (0521-404) **Class 4, Credit 4 (offered annually)**

0521-406

Introduction to Qualitative Policy Analysis

This is a course in the practical aspects of doing theoretically informed qualitative social research. Special attention will be given to the processes by which research problems are formulated, research designs selected, data gathered and interpreted, and inferences and conclusions drawn. Through example, illustration, and application, specific research skills will be simulated using case studies. Part of the public policy concentration and minor. (0521-400) **Class 4, Credit 4 (S)**

0521-407

Senior Project II

The culminating educational experience for public policy students. The principal focus is an independent study project centered on a major policy issue drawn from the student's chosen specialization. In Senior Project II students conduct research and produce their project report under the guidance of a faculty advisor on their senior project. Permission of department is required to register for this course. (0521-404) **Class 4, Credit 4 (offered annually)**

0521-408

Technological Innovation and Public Policy

Technological innovation, the incremental and revolutionary improvements in technology, has been a major causal factor for economic growth and social and political change. This course will introduce generic models of innovation that span multiple sectors including: energy, environment, bio- and information technologies. The course will then analyze how governments choose policies to spur innovation. Part of the public policy concentration and minor and may be taken as an elective. (0521-400 or permission of the department) **Class 4, Credit 4 (S)**

0521-410

Information & Communication Policy

This course examines how federal and international policies are developed to influence innovation of Information and Computer Technology. In particular the course will examine such topics as privacy, freedom of speech, intellectual property rights, access to information technology, and regulation of the Internet. Part of the public policy concentration and minor. (0521-400) **Class 4, Credit 4 (offered annually)**

0521-449

Special Topics in Public Policy

This course will examine current topics in public policy and may be used with consent of advisor as a policy core elective or track elective for the Public Policy BS degree. Part of the public policy concentration and minor. May also be used as an elective. **Class 4, Credit 4 (offered occasionally)**

0521-460

Public Policy Capstone for Minors

The overall objective of the course is to tie together the theories and applied skills learned in other Public Policy minor courses within a common analytical and theoretical framework of public policy formation and implementation. Students will apply their knowledge to a contemporary problem or issue related to science, technology, and policy. Readings, lecture, case studies, and projects will be used to highlight commonalities and dissimilarities among different policy regimes. Students must have department approval to register. Part of the public policy minor; cannot be used as an elective. **Class 4, Credit 4 (offered occasionally)**

Women's Studies

0522-400

Foundations of Women's Studies

This course will use an interdisciplinary perspective to provide an introduction to Women's Studies, the academic manifestation of feminism. The course will focus on the rise of feminist consciousness in the western world from the middle ages to the late 20th century. It will consider the concept of patriarchy, its dominance for the past four millennia, and the multitude of efforts by women and men to conceptualize an alternative world view. The course will consider key historical patriarchal and feminist texts, study the rise of feminist thought, and consider the history of women's activism and the women's rights movement from the late 18th century through the second half of the 20th century. The course will also consider feminist theory and the rise of feminism. The course will conclude with a survey of feminist practice in a wide range of contemporary issues and consider strategies for negotiating daily life. Part of the women's studies concentration and minor. **Class 4, Credit 4**

0522-401

American Women: Colonies to 1848

This course considers the history of American women from the colonial era to the Seneca Falls convention. We will examine the experience of women of different races and classes across the country, looking at Puritans in Massachusetts and at planter's daughters in the Carolinas; at female slaves in the deep South and at mill workers in the urban North. We will investigate the impact of the American Revolution upon women, and we will also trace the emergence of the women's rights movement, culminating in the convention at Seneca Falls. Part of the history concentration and the American history minor; the women's studies concentration and minor; and may be taken as an elective. (0507-301,302 or equivalent) Cross-listed with history, 0507-401. **Class 4, Credit 4**

0522-402

American Women: 1848 to Today

This course considers the history of American women from the Seneca Falls Convention to the present. We will trace the impact of the first women's rights convention and follow the story of the struggle for the vote. We will also consider the role of women in other important nineteenth century reform movements, including abolition, temperance, spiritualism, and progressivism. We will also look at the varied experience of women in the twentieth century from birth control to second wave feminism to co-education. Part of the women's studies concentration and minor. May be taken as an elective. (0507-301, 302 or equivalent) Cross-listed with history, 0507-402. **Class 4, Credit 4**

0522-405

Women & Science

This interdisciplinary women's studies course links science, feminist theory, history, and biography in recognizing the importance of gender to the study and practice of science. The course focuses on four critical concerns: recognition of women pioneers in the sciences, analysis of the barriers women scientists have faced historically and presently, awareness of the historical roots and exclusions of women in science, and examination of how the practice of science particularly affects women. Part of the women's studies minor and concentration. This course is relevant to non-science majors as well as those majoring in the field. Cross-listed with science and technology studies, 0508-581. **Class 4, Credit 4**

0522-406

Feminist Theory

This course will introduce students to the foundations of feminism in political theory, and it will critically explore how feminist concepts can be expanded to take account of class, race, and sexuality. We will examine the differences between the categories of sex and gender and the ways in which feminist understandings of human experience have modified traditional philosophical accounts of reality, knowledge, morality, and justice. Part of the philosophy concentration, the philosophy minor, the women's studies concentration and minor. May also be taken as an elective. Cross-listed with philosophy, 0509-454. **Class 4, Credit 4**

0522-407

Seminar on Sexual Violence

The course is intended to familiarize students with sexual crime and violence as they interface with each phase of the criminal justice system including enforcement, adjudication, treatment and prevention. Discussion will include laws related to sex offenses, types of sex crimes, child sexual abuse, the psychology and treatment of sex offenders, prevention strategies, and victim aftercare. Part of the women's studies concentration and minor. May be taken as an elective. Cross-listed with Major Issues: Seminar in Sexual Violence. **Class 4, Credit 4**

0522-436

Women's Stories, Women's Films

This course will provide an introduction to women's films through an exploration of narrative structure in films made by women. Through film screenings and class discussion, the course will examine the themes and issues of women's narratives and how they are presented in the medium of film. The hero's journey and traditional narrative structure will be contrasted with the heroine's journey and the more personal story telling style of the feminine. The course will also examine differences between films made by women and films made by men about women. The course will introduce the work of feminist film critics and consider the relevance of those theories to women's roles in current films. In addition, the course will view women's story telling in a context of feminine mythology and women's psychology. Part of the women's studies concentration and minor. Cross-listed with CIAS, 2065-553; and fine arts, 0505-436. **Class 4, Credit 4**

0522-446

Women & Crime

Deals with women as criminal offenders and as victims of crime, focusing upon theories about women in crime, types of crimes committed, patterns of criminality and the treatment of women offenders. Also examines the role of women as law enforcement officers, judges, lawyers and correctional officers in the criminal justice system. Professional elective for criminal justice majors. Part of the criminal justice concentration and minor, and the women's studies concentration and minor. May also be taken as an elective. Cross-listed with criminal justice, 0501-446. **Class 4, Credit 4**

0522-447

Women Work & Culture

Broad sociological issues affecting women, work and culture are a result of the emerging global economy and technological revolution. The course will consider how the process of gender socialization is complicated by the way in which gender intersects with racial, class, ethnic, sexual, and other identities. This course will present the major theoretical perspectives employed in sociology and women's studies and consider how they relate to the study of women, work and culture. This course is part of the sociology and women's studies concentrations and minors and may be taken as an elective. (0510-210,0515-210 or equivalent) Cross-listed with sociology, 0515-447. **Class 4, Credit 4**

0522-449

History of Women in Science & Engineering

Using biographical and social-historical approaches, this course examines the history of women's involvement in science and engineering since the birth of modern science in the seventeenth century; the historical roots of gender bias in the western scientific enterprise; and the influx of women into science and engineering since the mid-to-late twentieth century. Part of the science and technology studies and women's studies concentrations; the science, technology and environmental studies and women's studies minors; and also may be taken as an elective. Cross-listed with science and technology studies, 0508-449. **Class 4, Credit 4**

0522-450

Feminist Approach to Science & Technology

This course explores feminist critiques of Western science and technology by investigating the ways in which gender, power and politics shape the content and context of science and technology. Particular attention is placed upon social and cultural dimensions of scientific and technological practices including the development of theory, method and application. Part of the women's studies concentration and minor. Cross-listed with Special Topics: Feminist Approach to Science & Technology. **Class 4, Credit 4**

0522-459

Toni Morrison

Through reading and discussion of Toni Morrison's novels and feminist and African American critical theory, this course will allow students to follow the development of Morrison's art and to approach her work from alternative critical perspectives. Particular attention will be paid to the role of narrative in African American culture and to Morrison's understanding of its literary, historical, and political function. Part of the literary and cultural studies concentration and minor and the women's studies concentration and minor. May also be taken as an elective. Cross-listed with language and literature, 0504-459. (0504-225 and 226 or equivalent) **Class 4, Credit 4**

0522-480

Women & the Visual Arts

Examines the image of women in the visual arts and the role of women as image makers. Major topics include the variety of images of women, the evolution & change of these images over time, media images (as differentiated from fine art images) of women, images of women by women and by men, women's images and the issues of their relationship to the images made by men, the nude and pornography, history of women artists, selected women artists and their work, relation of their work to the art of the period, current issues and status of women artists. Part of the women's studies concentration, the art history concentration and minor and may also be taken as an elective. Cross-listed with fine arts, 0505-480. **Class 4, Credit 4**

0522-481

Women in Literature

Concentrates on literature by women, about women, primarily from the early 19th century to the present. Considers the aspirations, frustrations and achievements of women as documented by themselves, as well as the perceptions and representations of women in literature by male writers. Works are examined for their literary value as well as their documentation of broader feminist issues. Part of the literary and cultural studies concentration and minor and the women's studies concentration and minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Cross-listed with language and literature, 0504-480. **Class 4, Credit 4**

0522-482 Women in Politics
A study of feminist thought as it applies to the political, economic and social status of women and how it has been expressed through the women's political movement. Students study a number of public policies as they apply to and affect women and examine the opportunities for women to participate in the political process. Part of the American political concentration and minor. May be taken as an elective. (0513-211, 214 or equivalent) Cross-listed with political science, 0513-481. Class 4, Credit 4 (offered occasionally)

0522-483 Psychology of Women
Examines the relevance and applicability of present psychological theory and research to the understanding of the development and behavior of women. Major topics covered include psychological and biological sex differences, psychological theories of women's development, the relationship between female personality development and various sociocultural factors, women's place in society, women and their bodies, and women and mental health. Part of the women's studies concentration and also may be taken as an elective. Cross-listed with psychology, 0514-480. Class 4, Credit 4 (offered occasionally)

0522-484 Autobiography: Outlaw Narrative
According to poet James Merrill, we live in the age of "me-moir." At least in American culture. But what happens to the quarrel between truth and fiction, to the almighty autonomous "I", as we move outside of England and America? What "outlaw" forms of language and representation do a street fighter from Morocco, a Soweto social worker or an AIDS diarist use to write the self? How do international sex workers, a New Zealand filmmaker, and the author of *The English Patient*, negotiate the charged relationships of family, nation, class, and gender? Expect to encounter visual and biographies from art, photography and film, as well as projects in the classroom and out in the community in this course. Part of the literary and cultural studies and women's studies concentrations and minors. Cross listed with language and literature, 0504-490. (0504-225 and 226 or equivalent) Class 4, Credit 4

0522-492 Native American Women's Experience
This course examines the unique status of Native American women in tribal and Euroamerican societies. Given the gender complementary construction of many tribal communities, Native women long enjoyed a status and power not found in Europe, but this equality has been altered in many tribes as a result of colonialism. We will study how Native women have responded to assaults on the "feminine principle," as Paula Gunn Allen terms it, and how they have sought to rebuild tribal communities along the lines of traditional values. We will examine the following themes in Native women's lives: tribal gender roles, nation, community, family, class, work, race, sexuality, disability, culture-bearing, environment, land, health, and representation. Part of the literary and cultural studies and women's studies concentration and minor. May also be taken as an elective. Cross-listed with language and literature, 0504-492. (0504-225 and 226 or equivalent) Class 4, Credit 4

American Studies

0523-400 Foundations of American Studies
What does it mean to be American? American Studies offers students an opportunity to study American culture from a range of perspectives. This foundation course introduces critical concepts, key words, and practical methods for understanding some of the geographic, political, historical, cultural, technological, and symbolic meanings of America. Through seminal readings, films, images, popular culture representations, and assigned writing and projects, students explore questions about democratic culture and the significance of American identity from within and beyond national borders. In 2003-2004 the case study will be on the 1950's and students will investigate how Sputnik, McCarthyism, I Love Lucy, the Civil Rights movement, the Beats, the atomic bomb, interstate highways, and rock and roll converged in the formation of American culture and society. This course may be taken as a general elective. Class 4, Credit 4

Communication

0535-200 Foundations of Communication
An introduction to the theoretical and conceptual underpinnings of oral, visual and written communication. Introduces basic communication models, the role of language in communication, symbols and symbolmaking, issues of audience analysis and the development of different modes of discourse. Also explores the history of communication and introduces students to basic research in communication studies. Required course for communication majors only. Class 4, Credit 4

0535-210 Interpersonal Communication
Analysis and application of the major theories of interpersonal communication in various situations. Focuses on perception of self and others, language use, nonverbal communication and symbolic interaction in the communication of shared meanings in face-to-face interpersonal relationships. Required course for communication majors. Class 4, Credit 4

0535-221 Computer Applications in Communication
An introduction to essential software applications in professional and technical communication: desktop publishing, image manipulation, web authoring, and statistical applications. (4002-206 Web Foundations or instructor's permission) Required course for communication majors. Class 4, Credit 4

0535-311 Rhetoric & Public Discourse
Analyzes rhetorical discourse as spoken, symbolic human action intending to influence the formation of public opinion and public policy. Various critical perspectives, including classical origins, modern rhetorical theorists and contemporary critical approaches, are applied to public discourse in the United States. Students have the opportunity to apply appropriate critical methods to selected historical and contemporary rhetoric from the American experience. Research and writing are stressed. Required course for communication majors. Class 4, Credit 4

0535-315 Quantitative Research Methods
An introduction to the methods and ethics of scientific, scholarly communication research, including methods of locating, analyzing and critiquing communication research literature. Focuses on empirical methods and leads to the development of a research project proposal. Required course for communication majors. (0535-200,210,221,445) Class 4, Credit 4

0535-316 Qualitative Research Methods
Introduction to the methods and ethics of critical research, participant observation, and focus group interviewing. Qualitative research methods rely on the researcher's observational, analytic and critical skills, and seeks to understand the behaviors, beliefs, values, attitudes, assumptions, rituals and symbol systems that characterize relationships between the source, message, media and audience of specific communication acts. Students develop a research proposal suitable for implementation as their senior thesis in communication. Required course for communication majors. (0535-210,221,310,445) Class 4, Credit 4

0535-332 Newswriting
Practicum in basic techniques of newswriting and gathering for the daily press. Emphasis is primarily on writing for the print media and on frequent writing against a deadline. May be taken as a professional elective for communication degree program. Part of the communication minor. May also be taken as an elective. (0504-225 and 226 or equivalent) Class 4, Credit (offered occasionally)

0535-403 Effective Technical Communication
This course provides knowledge and practice of written and oral communication skills generally required in technical professions. Focus is on individual and group writing and speaking tasks. Required course for various programs. Class 4, Credit 4 (offered quarterly)

0535-415 Organizational Communication
Examines both interpersonal and small-group communication in organizational settings. Topics include information flow and networks, organizational theory, managerial decision making, interviewing, organizational development, corporate culture and conflict resolution. May be taken as a professional elective for communication majors, and is part of the communication minor. Class 4, Credit 4 (offered occasionally)

0535-420 Argument & Discourse
Examines the process of oral argumentation encountered in the "give-and-take" of formal and informal communication situations. Emphasizes development of research, speaking, organization, writing, oral cross examination, and critical listening abilities. Students are taught to develop the means to argue cogently in different interactive communication situations. (0535-501 or equivalent) Class 4, Credit 4 (offered occasionally)

0535-421 Public Relations
An introduction to the study of public relations. Topics include history, research areas, laws, ethics and social responsibilities as they relate to the theory and practice of public relations. May be taken as a professional elective for communication majors, and is part of the communication minor. Class 4, Credit 4 (offered occasionally)

- 0535-422 Ethics in Technical Communication
Ethics is the study of morals, of what is right and good, especially regarding specific moral choices. In a given situation, a system of ethics helps us answer the question: What should I do? "Ethics in Technical Communication" explores the ways in which ethical conduct is important in the communication of technical information, particularly among professional technical communicators; establishes principles, based on the history of ethical studies, for making ethical choices as technical communicators; and provides opportunities to apply ethical principles to case studies, in order to better understand the often problematical nature of ethical choices in technical-or any- communication. Part of the applied track of the communication minor, and a professional elective for communication majors. (0504-226) Class 4, Credit 4
- 0535-426 Archival Research
An applied learning experience that guides students through the process of research using special collections of archival material significant to visual communication. The course provides an opportunity to develop specialized research skills necessary to access, retrieve and examine specific artifacts in archival collections. Archives of special importance to visual communication include collections of advertising, documentary photography, photo journalism, public information posters, artifacts of propaganda, historical iconography and the visual media of film and television. Part of the communication minor; an elective for the communication degree program; and may be used as an elective. (0535-450) Class 4, Credit 4 (offered occasionally)
- 0502-444 Technical Writing
Provides knowledge of and practice in technical writing style; audience analysis; organizing, preparing and revising short and long technical documents; designing documents using effective design features and principles, and format elements; using tables and graphs; conducting research; writing technical definitions, and physical and process descriptions; writing instructions; and individual and group editing. Required course for communication and psychology degree programs and may be taken to fulfill a writing studies and language communication concentrations and the communication minor. (0504-225 and 226 or equivalent) Class 4, Credit 4 (offered regularly)
- 0535-445 Theories of Communication
An introduction to human communication theory, including a history of the major stages in development of modern theories of communication. Theories based both in the humanities and the social sciences are covered. Required course for communication majors only. Class 4, Credit 4
- 0535-446 Writing the Technical Manual
Develops in students those skills necessary for designing, writing and editing long technical manuals. Special emphasis is given to graphics and page layout. Students enrolling should have command of concise English prose. May be taken as a professional elective for the communication degree program. Part of the communication minor and may also be taken as an elective. (0504-226 and 0535-430) Class 4, Credit 4 (offered occasionally)
- 0535-448 Freedom of Expression
This course examines major free speech principles and trends in communication law. The course analyzes a wide range of issues related to the First Amendment, intellectual property, and broadcast regulation. Special attention is paid to new technologies and freedom of speech. May be taken as an elective. Class 4, Credit 4
- 0535-450 Visual Communication
Examines communication processes and principles that use the visual mode. Through a survey of several areas represented in the literature of visual communication, this course examines theories, analysis, and the meanings of images. Emphasis is on communicative understanding rather than on aesthetic, technical or skills approach. Discussion primarily depends on, but is not limited to, photographic images. Required course for the professional technical communication degree program and may be taken to fulfill communication minor. Class 4, Credit 4
- 0535-452 Uses & Effects of the Mass Media
An analysis of the "effects" and the "uses and gratifications" mass communication research with focus on building mass communication theory. May be taken as a professional elective for communication majors and is part of the communication minor. (0535-482) Class 4, Credit 4 (offered occasionally)
- 0535-480 Human Communication
An overview of the field of communication, including the contexts of interpersonal, group, mass and public communication. Option for the communication concentration and minor. May also be taken as an elective. Class 4, Credit 4
- 0535-481 Persuasion
An in-depth study of the theories, practices, effects and ethics of persuasion. Persuasion is defined as human communication designed to influence one's beliefs, values, attitudes and actions. Required course for communication majors and may be taken to fulfill a communication concentration and a communication minor. Class 4, Credit 4
- 0535-482 Mass Communications
This course takes an "institutions" perspective focusing on the history and development, laws and regulations, and theory and practice of mass communication. Additional topics will include the theoretical aspects, composition of audiences, how media effects and are effected by society, and future trends and career opportunities. Required course for the professional technical communication degree program. Part of the communication concentration and minor. (0504-225 and 226 or equivalent) Class 4 Credit 4
- 0535-483 Small Group Communication
Practice in analysis of a variety of small group discussion techniques focusing on processes of interaction, decision making, norms structure and development, membership and theory of group development. May be taken as a professional elective by communication majors and is part of the communication concentration and minor. May also be taken as an elective. Class 4, Credit 4
- 0535-484 Rhetoric of Race Relations
Examines the history of the struggle for freedom and equality for blacks in American society. This course traces the history and rhetoric of key spokespersons from the pre-civil war period to the 20th century as evidenced in texts of selected public speeches and reactions to them. Part of the minority relations concentration. Class 4, Credit 4
- 0535-490 Persuasion & Social Change
Reading and analysis of persuasive tactics for or against social change in the United States from the eighteenth century through contemporary advocacy. May be taken as a professional elective for professional technical communication majors and is part of the peace studies concentration and the communication minor. (0535-481) Class 4, Credit 4 (offered occasionally)
- 0535-501 Effective Speaking
The development of formal public speaking techniques as an aid to self-confidence in modern social and business situations. Weekly practice talks with emphasis on organization, clarity, vocal expressions and poise. Required course for communication majors and may be taken to fulfill the communication concentration and minor. May also be taken as an elective. Class 4, Credit 4
- 0535-502 Speech Writing
An advanced elective course in communication for those who wish to increase their abilities to write professional public speeches for themselves or others. The course uses "real life" situations as a context for speech writing assignments in a variety of genres. May be taken as a professional elective for communication majors and is part of the communication minor. May also be taken as an elective. Class 4, Credit 4 (offered occasionally)
- 0535-520 Intercultural Communication
An examination of the role of culture in face-to-face interaction. Students may find a basic background in communication, anthropology or psychology useful. Professional elective for professional technical communication majors. Option for concentrators in Arabic and French foreign language culture concentrations and for the communication minor. Also may be taken as an elective. Class 4, Credit 4
- 0535-524 Communication & Documentary Film
An examination of the documentary film and video as case studies in communication media. The course focuses on filmic techniques used as argument, persuasion, propaganda and reconstruction of reality. Such elements as the director, subject, shooting style, and editing technique will be analyzed in terms of message, purpose and audience. (0535-200 or equivalent) Class 4, Credit 4 (offered occasionally)
- 0535-525 Special Topics: Communication
A focused, in-depth study and analysis of a selected advanced topic in communication and associated issues. Specific topic varies according to faculty assigned and is published when the course is offered. Topics may include: political communication, archival research, international media, and mediation. Professional elective for communication majors. (For junior/senior communication majors, permission of the instructor required for all others) Class 4, Credit 4

0535-532

Professional Writing

Students develop writing, research, and interviewing skills necessary to the composition of articles for magazines, newsletters, and other similar publications. In addition students learn how to investigate the market for and "sell" their writing, and how to write query letters. Much of the course is conducted as a workshop, during which students appraise each other's work, and make suggestions for revision. Required course for communication majors and may be taken to fulfill a communication minor (0535-230 or equivalent) **Class 4, Credit 4**

0535-550

Film & Society

An inquiry concerning the relationship between motion pictures and society that uses historical, humanistic and social science research to achieve an understanding of movies as a social force, industry and art form. May be taken as a professional elective for communication majors and is part of the communication minor. (0535-482) **Class 4, Credit 4 (offered occasionally)**

0535-595

Senior Thesis in Communication

A guided research seminar culminating in a major project that brings together the student's communication studies and substantive work in his or her professional core. Focuses on designing, conducting and completing an independent research project. The progress of each project is shared with the class for discussion and critiques. Required course for communication majors only. (0535-410,411,445) **Class 4, Credit 4**

Honors Courses

0550-325

Honors Colloquium

The Honors Colloquium is an advanced introduction to the disciplines of the Liberal Arts general education core. It combines inquiry into the foundations of the disciplines with discussion of emerging trends within and interrelationships among the disciplines. Preferably, students will register for this colloquium in the fall or winter quarters of their first year in the program, receiving four credits toward their Liberal Arts core. The purpose of the colloquium is to provide honors students with an intellectually rich, diverse and discussion-based engagement with scholarly readings and presentations by representatives of the disciplines. A faculty member will be responsible for organizing the presentations, facilitating discussion and evaluating the oral and written participation of the students. **Class 4, Credit 4**

0550-400

Honors Research Seminar

The Honors Research Seminar is a College of Liberal Arts requirement for all Institute honors students. The end product of this experience is a substantial research project in the liberal arts, typically a paper on an interdisciplinary topic reflecting the student's interests. The Honors Research Seminar counts as an elective in the liberal arts or as a course in the student's minor (by approval through a course substitution form). **Class 4, Credit 4**

College of Science

Index

1001	Biological Sciences	284
1004	General Biology	287
1005	Field Biology	287
1006	Environmental Science	287
1008	Analytical Chemistry	288
1009	Biochemistry	288
1010	Chemistry	288
1011	General Chemistry	288
1012	Inorganic Chemistry	289
1013	Organic Chemistry	291
1014	Physical Chemistry	291
1015	Environmental Chemistry	291
1016	Mathematics & Statistics	292
1017	Physics	296
1018	General Science	299
1024	Medical Sciences	299
1025	Nuclear Medicine Technology	299
1026	Clinical Science—General	300
1027	Biomedical Computing	301
1029	Polymer Chemistry	291
1030	Diagnostic Medical Sonography	302
1032	Physician Assistant	302
1051	Imaging Science	304
1055	Honors Courses	258

Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100-399); upper division (400-699); or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites and/or corequisites are noted in parentheses near the end of the course description.

Biological Sciences

1001-200	Freshman Symposium
Introduction to academic and student life in the biological sciences department. Class 2, Credit 1 (F)	
1001-201	General Biology
Characteristics and origin of life; basic principles of modern cellular biology, including cell organelle structure; chemical basis and functions of life, including enzyme systems, cellular respiration and photosynthesis; nutrient procurement in plants and animals. (High school biology and chemistry) Class 3, Credit 3 (F,SU)	
1001-202	General Biology
A study of the physiological processes of gas exchange, internal transport, osmoregulation, excretion and hormonal control in plants and animals; nervous system and behavior in animals. (1001-201 or permission of instructor) Class 3, Credit 3 (W,SU)	
1001-203	General Biology
A study of cellular and organismal reproduction, the principles of genetics and developmental biology, introduction to evolution and ecology. (1001-202 or permission of instructor) Class 3, Credit 3 (S, SU)	
1001-205	General Biology Laboratory
Laboratory work to complement the lecture material of General Biology (1001-201). The experiments are designed to illustrate concepts; develop laboratory skills and techniques; and improve ability to make, record and interpret observations. (Corequisite 1001-201) Lab 3, Credit 1 (F, SU)	
1001-206	General Biology Laboratory
Laboratory work to complement the lecture material of general biology (1001-202). The experiments are designed to illustrate concepts, develop laboratory skills and techniques, and improve ability to make, record and interpret observations. (Corequisite 1001-202) Lab 3, Credit 1 (W, SU)	

1001-207 General Biology Laboratory
Laboratory work to complement the lecture material of general biology (1001-203). The experiments are designed to illustrate concepts, develop laboratory skills and techniques, and improve ability to make, record and interpret observations. (Corequisite 1001-203) Lab 3, Credit 1 (S, SU)

1001-241 Biological Science Research
Faculty-directed research projects involving field or laboratory work including data collection and analysis. (Permission of instructor) Class variable (F, W, S, SU)

1001-251 Introduction to Biology I
A study of the major concepts in cell biology that focuses on the molecular coordination within the cell that is necessary for life. Emphasis is on the evolution of cellular structures and their functions, cell division and transmission of genetic traits. Lab includes exercises on the theory of experimental design, applications of this theory in classical and investigative experiments. (High school biology and chemistry; biological sciences program major; or permission of instructor) Class 3, Lab 3, Credit 4 (F)

1001-252 Introduction to Biology II
Exploration of the major concepts in developmental biology using investigative laboratory techniques to illustrate principles of cell specialization and differentiation. Lab introduces students to biological systems that can be manipulated to study gene and cell functions at different levels of complexity. Students become familiar with experimental systems, discuss their initial results, develop new approaches to experimental design based on these results, and test their predictions of the outcomes. Lecture incorporates discussions of students' lab findings, background material and current research applications of the systems and techniques approach to scientific investigations. Modification of developmental mechanisms is examined as a fundamental process in bringing about evolutionary change. (Biology or biotechnology major and 1001-251, or permission of instructor) Class 3, Lab 3, Credit 4 (W)

1001-253 Introduction to Biology III
A study of the major concepts in physiology by exploring the evolutionary strategies employed by multicellular life forms to exploit environmental niches, with an emphasis on functional adaptation. Laboratory exercises include classical experiments in plant and animal physiology with an emphasis on investigative approaches to scientific problem solving. (Biology or biotechnology major and 1001-252, or permission of instructor) Class 3, Lab 3, Credit 4 (S)

1001-260 Introduction to Bioinformatics
This course is intended to provide an overview of Bioinformatics for those who are either curious about what this exciting field entails or about whether bioinformatics represents a sound career path. Pursuant to this goal we will touch upon many subjects but will not explore any one in particular detail. Nevertheless, suggestions are welcome from anyone regarding projects to pursue outside of class in order to gain a deeper understanding of any aspect of bioinformatics that appeals to a personal interest. Class 2, Credit 2 (F)

1001-280 Laboratory Teaching Experience
Provides qualified undergraduate students the opportunity to gain experience in a laboratory instructional setting under the direct guidance of a faculty member. Students are required to prepare and present prelab discussions, assist in the design and set up of labs, answer enrolled-student questions, and perform lab demonstrations and other associated duties and responsibilities. (Contact faculty member for specific eligibility criteria.) Class 0, Lab 3, Credit 1 (F, W, S)

1001-289 Independent Study
Faculty-directed study of appropriate topics on a tutorial basis. Enables an individual to pursue studies of existing knowledge in the literature. (1001-253 or equivalent) Class variable, Credit variable (F, W, S)

1001-300 Introduction to Co-op Seminar
Exploration of cooperative education opportunities in the biological sciences. Practice in writing letters of application, resume writing and interviewing procedures. Class 1, Credit 1 (W)

1001-301 Invertebrate Zoology
Biology of invertebrate animals with emphasis on phylogeny and functional morphology. (One year of Introductory Biology or equivalent or permission of instructor) Class 3, Lab 3, Credit 4 (F)

- 1001-302 Vertebrate Zoology
Morphology, physiology, behavior, classification and ecology of chordates. (One year of Introductory Biology or equivalent or permission of instructor) Class 3, Lab 3, Credit 4 (W)
- 1001-304 Botany
Distribution of the major groups of plants and their adaptations to their particular environment. (1001-253 or equivalent or permission of instructor) Class 3, Lab 3, Credit 4 (W)
- 1001-311 Cell Biology
Principles of cell biology including internal cell structure, cell cycle and growth control, cell interactions, cell differentiation and the extracellular matrix with an emphasis on the observations and experimental evidence supporting them. (One year of Introductory Biology or equivalent) Class 4, Credit 4 (F)
- 1001-312 Immunology
Investigation of the basic concepts of immunology (antigens, antibodies, immunologic specificity, antibody synthesis and cell-mediated immunity) and the applications of immunology to infectious diseases, allergic reactions, transplants, tumors, autoimmune diseases, immunosuppression and tolerance. (1001-253 or equivalent) Class 3, Credit 3 (W)
- 1001-313 Sports Biology
An introduction to the human physiology and anatomy of all types of sporting activities. Body systems studied include musculoskeletal, cardiovascular, neuromuscular and pulmonary. Motion, mobility, flexibility, strength, endurance and nutrition are other topics included in a comprehensive investigation of the biology of athletic performance. Class 2, Credit 2 (F, S)
- 1001-314 Tissue Culture
Study of the techniques and applications of culturing cells, tissues and organs in vitro. Emphasis on mammalian systems. (1001-253 or equivalent) Class 3, Lab 3, Credit 4 (W)
- 1001-315 Hybridoma Techniques
Designed to acquaint each student with the basic methods employed in the production of hybridoma cell lines and monoclonal antibodies. Includes preparation of viable cell suspensions, cell culture fusion techniques, cloning, and monoclonal antibody production and characterization. (1001-314) Lab 4, Credit 2 (S)
- 1001-330 Small Animal Laboratory Techniques
Prepares the student for small-animal handling, biological administrations and preparations, minor surgery and autopsies. (Third-, fourth- or fifth-year status and permission of instructor) Class 1, Lab 3, Credit 3 (S)
- 1001-340 General Ecology
Introduction to ecosystem ecology stressing the dynamic interrelationships of plant and animal communities with their environments. A study to include such ecological concepts as energy flow and trophic levels in natural communities, plant responses and animal behavior, population dynamics, bio-geography and representative ecosystems. (One year of Introductory Biology or equivalent) Class 3, Lab 3, Credit 4 (F)
- 1001-350 Molecular Biology
The study of structure, function and organization of proteins, nucleic acids and other biological macromolecules. (One year of Introductory Biology or equivalent, 1001-311) Class 3, Lab 3, Credit 4 (W, S)
- 1001-362 Introduction to Bioinformatics Computing
This course will provide a theoretical and practical (lab-based) study of computational genomics. Topics to be covered include web-based tools for data access, data structures encountered in biological database, database access and analysis, algorithms commonly used to analyze biological data and a comparison of those algorithms. (4003-231-233,1016-265 and concurrent registration in 1016-415) Class 3, Lab 3, Credit 4 (W)
- 1001-363 Advanced Bioinformatics Computing
This course will provide and in-depth exposure to advanced techniques in computational genomics. Topics to be covered include concepts of information theory as they apply to machine learning, algorithms for machine learning and mining of biomolecular data, data mining of microarray data, molecular network analysis, probabilistic framework for modeling and inference, and the design and management of genomic databases. (1001-362,1001-493) Class 3, Lab 3, Credit 4 (S)
- 1001-364 High Performance Computing for Bioinformatics
The purpose of this course is to introduce parallel and distributed computing so that students can understand the basics of this technology, determine the type of high-performance hardware and software that will be required in their work, effectively evaluate commercially available hardware and software systems, and be able to use and develop software that takes advantage of high-performance systems. (1001-363) Class 3, Lab 3, Credit 4 (S)
- 1001-365 Evolutionary Biology
Topics covered will include the historical framework of evolutionary biology, the meaning and nature of evidence pertinent to biological evolution, Earth history, the evolution of proteins and the genetic code, cellular and metabolic evolution, molecular evolution, neutral theory vs. selection, genetic variation, natural selection, migration, mutation, genetic drift, fitness, population dynamics and genetics, species concepts and speciation, systematics and classification systems, molecular phylogenetics, the evolution of protozoans, plants, fungi, invertebrates and vertebrates, behavioral evolution, interactions among species, historical biogeography, human evolution and variation. (1001-251-253 or 1001-201-203) Class 3, Lab 3, Credit 4 (F)
- 1001-370 Biological Writing
Written technical communication in the biological sciences with emphasis on components of report writing: analysis, definition, description, instruction, data presentation, literature research, abstracting and editing. (Third-, fourth-, fifth-year status, biology or biotechnology majors) Class 3, Credit 3 (S)
- 1001-375 Galapagos: Evolution & Biogeography
The course examines geological and biological factors that made the Galapagos Islands a crucible in which Darwin formed the theory of evolution and discusses the origins of the islands by the twin mechanisms of plate tectonics and volcanism. Students will observe recent lava flows and see initial biological colonists as well as ancient flows in advanced stages of colonization. The islands reveal the interaction between ocean currents, marine life, and mammalian and avian fauna that thrive on this rich sea life. Students will observe many endemic species and subspecies and gain an understanding of adaptive radiation. The 11-day trip includes a visit to the Darwin Scientific Research Station where students learn of the dangers of human infringement on the fragile ecology and efforts to conserve unique plant and animal species. Enrollment limited. Contact instructor fall quarter. Travel fee required. (1001-251-253 or 201-203) Class 3, Credit 4 (S)
- 1001-390 Vertebrate Evolution
Study of the major changes in vertebrate functional morphology through time, beginning with fish and ending with humans; fossil evidence depicting major transitions between the vertebrate classes; modern taxonomy, including cladistic analysis, geologic time and stratigraphy; and plate tectonics. (1001-253 or equivalent) Class 4, Credit 4 (W)
- 1001-395 Ethical Issues in Medicine & Biology
Students will explore major ethical issues in medicine and biology via lecture, readings, films, and presentation and discussion of cases. Students will also be encouraged to report on current events in ethics as researched via the library computer search facilities and the internet. The first two weeks of the course will be lecture. Students will learn about various theories of ethical analysis that are in current use. Subsequent classes will be devoted to particular ethical areas. Relevant cases will be given to the students for presentation, any additional background material that may be required to discuss the cases will be presented by the instructor, and the remainder of the period will be taken up with discussion based on the philosophical foundation provided at the beginning of the course. (Second-year or higher status in biology, biotechnology or premedical studies) Class 3, Credit 3 (W)
- 1001-403 Cell Physiology
Functional eucaryotic cytology, nuclear and cytoplasmic regulation of macromolecular synthesis, exchange of materials across cell membranes, regulation of cellular metabolism and control of cell growth. (1001-350) Class 3, Lab 3, Credit 4 (F)
- 1001-404 Introduction to Microbiology
Introduction to microorganisms and their importance. Principles of structure, metabolic diversity, taxonomy, environmental microbiology and infectious diseases of prokaryotes are discussed. Basic laboratory techniques, microscopy, staining, bacterial identification and food testing. (One year of organic chemistry) Class 3, Lab 4, Credit 5 (F)

- 1001-408 Comparative Vertebrate Anatomy
A comparative study of organ systems of representative members of the vertebrates with emphasis on structural changes that occur during evolution. (1001-302,1026-350,360) Class 3, Lab 6, Credit 5 (S)
- 1001-411 Histology
Detailed microscopic studies on the structure and function of normal human tissues. (1026-350,360 recommended) Class 3, Lab 3, Credit 4 (S)
- 1001-413 Comparative Animal Physiology
A comparative study of fundamental physiological mechanisms. A broad range of organisms are studied from the standpoint of evolution of functional systems, the mechanisms and morphological variations that exist to deal with functional problems posed by the environment, and the special mechanisms used to cope with extreme environments. (One year of general biology or 1001-253, and 1001-365) Class 3, Lab 3, Credit 4 (W)
- 1001-414 Plant Physiology
Physiological phenomena in the growth and development of higher plants, water relationships, photosynthesis, translocation, mineral nutrition, growth, hormonal control and reproduction. (1001-253 or equivalent, 1001-304, and one year of organic chemistry) Class 3, Lab 3, Credit 4 (F)
- 1001-415 Functional Biology of Invertebrates
A study of the unifying features of the functional anatomy, physiology and behavior of invertebrates. Emphasis is on feeding, locomotion, gas exchange, regulation of internal composition, defense, reproduction and life histories, and control systems. (20 credits of biology majors' courses) Class 3, Lab 3, Credit 4 (W)
- 1001-416 Plant Biotechnology
The course will investigate fundamental aspects of plant tissue culture and manipulation, the genetic transformation of plant cells, and the construction, characterization and application of transgenic plants to agriculture, plant molecular biology and novel product development. The laboratory will provide experiences to complement the lecture information in plant cell culture and in the use of *Agrobacterium* as the gene shuttle to introduce genetic information into plants. (1001-311,1001-350,1001-404) Class 3, Lab 4, Credit 5 (W)
- 1001-417 Industrial Microbiology
Practical applications of yeasts, fungi and bacteria in industrial fermentations. Industrial aspects of fermentor design, pilot plant operations, strain development and recovery of fermentation end products. Microbiology, biochemistry and engineering of large-scale processes. (1001-404 and one biochemistry course) Class 3, Lab 3, Credit 4 (W)
- 1001-420 Plant Ecology
A consideration of the nature and variation of plant communities with discussion of factors that limit, maintain and modify communities both locally and regionally. Laboratories involve field studies of various plant communities and the gathering and analysis of data. (1001-340) Class 3, Lab 3, Credit 4 (S)
- 1001-421 Genetics
Introduction to the principles of inheritance; the study of genes and chromosomes at molecular, cellular, organismal and population levels. (1001-253 or equivalent) Class 4, Credit 4 (F)
- 1001-422 Developmental Biology
Study of the processes of growth, differentiation and development that lead to the mature form of an organism. (1001-253 or equivalent, 1001-311,421) Class 3, Lab 3, Credit 4 (S)
- 1001-424 Descriptive Embryology
Study of the developmental processes leading to the mature vertebrate form, with emphasis on early human development and its clinical variations. Course requires extensive use of independent study materials. (1001-253 or equivalent) Class 2, Credit 4 (F)
- 1001-427 Microbial & Viral Genetics
The study of molecular genetics of bacteria, bacteriophages, fungi and eucaryotic viruses. (1001-350,421; one biochemistry course) Class 3, Lab 3, Credit 4 (F)
- 1001-450 Genetic Engineering
Introduction to the theoretical basis, laboratory techniques and applications of gene manipulation. (1001-350) Class 3, Lab 6, Credit 5 (S)
- 1001-451 Microbial Pathogenesis
Mechanisms of bacterial, fungal, viral and parasitic diseases; host response to pathogen invasion; subversion of host defenses; virulence factors; examples of infectious diseases. (1001-404) Class 3, Lab 3, Credit 4 (W)
- 1001-460 Basic Pathology
Introduction to pathophysiology; the study of disease and its consequences. Major topics of lecture discussions and laboratory exercises deal with general pathologic processes, including cell injury/cell death, inflammation, immunological deficiencies, hemodynamic and fluid derangements and neoplasia. Clinical correlations are made as often as possible as examples of how physiological processes can go awry in the generation of a particular disease. (1001-251, 252, 253 or equivalent required; 1026-350, 360 strongly recommended) Class 3, Lab 3, Credit 4 (S)
- 1001-462 Human Gross Anatomy
Exposes students to details of human anatomy through cadaver dissection. Lecture material stresses functional and clinical correlates corresponding to laboratory exercises. (1026-350,360 and permission of instructor) Class 3, Lab 6, Credit 5 (S)
- 1001-467 Advanced Microbial Fermentation
An advanced course in industrial microbial fermentations. The students are presented with advanced topics in fermentation design, operation, and the economics of operation. The laboratory consists of a ten week project in the optimization of product titers utilizing various principles of scale up which will include New Brunswick 7-liter fermenters. The students will be using either *Ralstonia eutrophis* to produce PHAs or *Xanthomonas campestris* to produce xanthan gum. Principles of product recovery will also be presented in the lab. (1001-404) Class 3, Lab 3, Credit 4 (S)
- 1001-471 Freshwater Ecology
A study of the physics, chemistry and biology of inland waters. Emphasizes the physical and chemical properties of water and how these properties affect the associated biological communities. Planktonic, benthic and littoral communities are considered. Field trips to streams and lakes are conducted to gather physical, chemical and biological data. (1001-340 or permission of instructor) Class 3, Lab 3, Credit 4 (W)
- 1001-475 Conservation Biology
A course concentrating on the practical application of ecological principles. Man's impact on species diversity will be emphasized as it relates to agricultural, forest, coastal and wetland ecosystems. A discussion of management practices used to restore disturbed ecosystems will be included. Laboratory exercises will concentrate on methods of analyzing ecosystems for regulatory requirements and management purposes. (1001-340) Class 3, Lab 3, Credit 4 (W)
- 1001-492 Genomics
Genomics will introduce students to the analysis of complex genomes. Emphasis will be placed on genetic information derived from the human genome project but advances with genomes of other model systems will be discussed. Lectures will cover scientific techniques used to map and sequence the human genome, as well as strategies for identification of disease susceptibility genes. The wet-bench laboratory will utilize an automated DNA sequencer to demonstrate the acquisition of genetic sequences. Laboratory sessions will emphasize cycle sequencing of cloned DNA fragments using an automated fluorescent DNA sequencer and mapping tactics using radiation hybrid cell panels. (1001-350) Class 3, Lab 3, Credit 4 (F)
- 1001-493 Bioinformatics
Bioinformatics will introduce students to the analysis of genetic sequences. Emphasis will be placed on genetic information derived from the human genome project but findings from genomes of other model systems will be presented. Lectures will discuss available computational tools for extracting biological information from nucleotide and protein sequences. The computer-based laboratory will utilize bioinformatics software to demonstrate how to manage, search and analyze genetic sequences. Laboratory sessions will cover gene prediction programs, DNA fragment assembly, multiple sequence analysis, secondary structure predictions, phylogenetic constructions and web-access to public databases. (1001-350) Class 3, Lab 3, Credit 4 (S)

1001-494 **Molecular Modeling & Proteomics**
The course will explore two facets of protein molecules: their structure and their expression. The structure component will build upon information from the Bioinformatics course and will add further sophistication with analysis of intermolecular interactions and ligand/receptor pairing. Software that permits molecular docking experiments will be employed. Tissue-specific protein expression will be addressed in lectures with description of micro-array technology and, in the laboratory, with two-dimensional protein gel electrophoresis. (1001-492,493) **Class 3, Lab 3, Credit 4 (S)**

1001-499 **Biology Co-op**
Cooperative education experience for undergraduate biological sciences students. **Credit 0 (offered every quarter)**

1001-502 **Advanced Immunology**
The lecture material will cover in depth the molecular and cellular events of antigen processing, recognition of antigen by T lymphocytes and their subsequent activation. The two distinct processing pathways for exogenous and endogenous antigens will be contrasted, in regards to intracellular compartments, proteolytic mechanisms and site of assembly with the major histocompatibility complex (MHC) molecules. Distinctions in maturation and transport to the cell surface of the two classes of peptide-loaded MHC molecules will be discussed. The structure, genetics, polymorphism and cell surface expression of MHC molecules will be covered. The intracellular events that occur following antigen recognition, as well as the two-signal model for T cell activation will be presented. The phenomenon of positive/negative selection within the thymus during T cell differentiation will be covered. (1001-350, 402) **Class 3, Lab 3, Credit 4 (S)**

1001-541,542,543 **Advanced Biology Science Research**
Faculty-directed projects of research usually involving original field or laboratory work encompassing a period of at least two quarters. Final results are presented in written and oral formats. (Third-year status with a GPA of 2.5 in science and mathematics courses and consent of faculty) **Class variable, Credit variable (F,W,S)**

1001-550 **Biology Seminar**
Written and oral reports and their discussion by class members covering topics of current interest in the biological sciences. (40 quarter credits in biology and successful completion of the departmental writing requirement) **Class 2, Credit 2 (W,S)**

1001-559 **Special Topics: Biology**
Advanced courses that are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures. **Class variable, Credit variable (Offered upon sufficient request) (F, W, S)**

1001-567 **Environmental Microbiology**
An advanced course in the principles of soil microbiology, groundwater microbiology, wastewater microbiology, composting microbiology, and bioremediation. The class will also focus on practical applications of microorganisms isolated from various types of environments. Examples of commercial use of microorganisms will also be presented. The lab consists of a series of experiments looking at the microbial flora of soils, plant surfaces, air particles, and water. Students will attempt to isolate microorganisms from soil samples that are capable of degrading organic compounds. Students will use various methods to determine degradative capabilities of soil microorganisms such as carbon dioxide evolution and soil depletion. (1001-404) **Class 3, Lab 3, Credit 4 (S)**

1001-599 **Independent Study Elective**
Faculty-directed study of appropriate topics on a tutorial basis for program elective credit. Enables an individual to pursue studies of existing knowledge in the literature. (1001-253 or equivalent) **Class variable, Credit variable (F, W, S)**

1004-210 **Microbiology in Health & Disease**
An introduction to microorganisms; their relationship to the environment and human health; the causes, prevention and treatment of infectious diseases; and the role of microorganisms in the preparation and spoilage of foods. (One year of high school biology or equivalent) **Class 4, Credit 4 (F)**

1004-211 **Human Biology I**
A general study of human anatomy and physiology. Includes discussions of cellular biology, skeletal, muscular, nervous and endocrine systems. **Class 3, Credit 3(F)**

1004-212 **Human Biology II**
A general study of human anatomy and physiology with emphasis on mechanisms by which the nervous and endocrine systems coordinate and integrate body functions. This second course includes discussion of nutrition, metabolism and respiratory, circulatory, lymphatic, urinary and reproductive systems. **Class 3, Credit 3 (W)**

1004-231 **Human Biology I Laboratory**
Laboratory to complement the lecture material of 1004-211. Experiments are designed to illustrate the dynamic characteristics of cells, tissues and organ systems. **Lab 2, Credit 1 (F)**

1004-232 **Human Biology II Laboratory**
Laboratory for dietetic and medical illustration students complements the lecture material of 1004-212. Experiments are designed to illustrate the dynamic anatomy and physiology of major organ systems. **Lab 2, Credit 1 (W)**

1004-289 **Contemporary Science: Biology**
A study in various biological topics relevant to contemporary problems of society. Topics may include population biology, pollution, disease control, human heredity, contagious diseases, marine biology, bioethics. **Class 4, Credit 4 (SU)**

1004-315 **Medical Genetics**
A survey of selected human variations and diseases of medical importance, with emphasis on the underlying genetic principles. (1001-203 or equivalent) **Class 2, Credit 2(F)**

1005-210 **Field Biology for Non-Science Students**
An introduction to the ecology of individuals, populations, and communities. The dynamic interaction between organisms and their environment will be stressed. Included will be the concepts of energy flow and nutrient cycling in ecosystems, population dynamics, food webs, and the causes of temporal and spatial changes in communities. **Class 3, Lab 3, Credit 4 (S)**

1005-250 **Galapagos: Ecology & Evolution**
An 11-day field course in Ecuador and the Galapagos Islands. Students meet weekly on the RIT campus during spring quarter to learn about the wildlife and geology of the islands and about their influence on Darwin's Theory of Evolution. The difficulties of balancing human problems with environmental conservation are ongoing problems in the Galapagos. The actual field trip occurs in May, right after graduation. We charter a boat and cruise among the islands for one week. There are daily shore excursions and frequent snorkeling opportunities. The course provides outstanding opportunities for nature photography. Although this is a spring quarter offering, students must contact the instructor during the previous fall quarter. Enrollment is limited to 11 students. A travel fee is required. **Credit variable (S)**

Environmental Science

1006-200 **Environmental Science Freshman Seminar I**
This course is designed to maximize the student's potential to achieve academic success and to adjust to personal and interpersonal challenges presented by college life. An interactive approach to classroom activities will include teamwork, small group discussions, information presentations, personal and academic assessment and group exercises. Required for all first year environmental science students. **Class 1, Credit 1 (F)**

1006-201 **Introduction to Environmental Science I**
Introduction to environmental science is a three-quarter sequence that presents an integrated approach to the interrelated, interdisciplinary principles of environmental science through the study of the Earth's ecosystems. Throughout the sequence, the focus will be on sustainability as the foundation for problem solving. The first quarter will establish the educational foundation that will be built upon in subsequent courses. To demonstrate the interdisciplinary methodology of environmental science, elements of government/political science/policy, ethics, economics, sociology, history and engineering are embedded in the scientific matrix used to present this course. (Permission of instructor) **Class 2, Lab 4, Credit 4(F)**

1006-202 **Introduction to Environmental Science II**
Continuation of 1006-201. (1006-201 or permission of instructor) **Class 2, Lab 4, Credit 4 (W)**

1006-203 **Introduction to Environmental Science III**
Continuation of 1006-202. (1006-202 or permission of instructor) **Class 2, Lab 4, Credit 4 (S)**

1006-210 Environmental Science Freshman Seminar II
Continuation of 1006-200. Class 1, Credit 1 (W)

1006 499 Environmental Science Co-op
Cooperative education experience for undergraduate environmental science students. Credit 0

1006-501 Environmental Science: Great Lakes I
First course in a three-quarter sequence that continues the integrated presentation of interrelated, interdisciplinary principles of environmental science through an in-depth study of the Great Lakes ecosystem. Throughout the sequence, the focus will be on sustainability as the foundation for environmental problem solving in the Great Lakes. To demonstrate the interdisciplinary methodology of environmental science, elements of government/political science/policy, ethics, economics, sociology, history and engineering are embedded in the scientific matrix used to present this course. (Permission of instructor) Class 2, Lab 4, Credit 4(F)

1006-502 Environmental Science: Great Lakes II
Continuation of 1006-501. (1006-501 or permission of instructor) Class 2, Lab 4, Credit 4 (W)

1006-503 Environmental Science: Great Lakes III
Continuation of 1006-502. (1006-502 or permission of instructor) Class 2, Lab 4, Credit 4 (S)

1006-559 Special Topics: Environmental Science
Courses that are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and may have specified prerequisites, contact hours, and examination procedures. Class variable, Credit variable (F, W, S, SU)

1006-599 Independent Study: Environmental Science
Faculty-directed study of appropriate topics on a tutorial basis. Enables an individual to pursue studies of existing knowledge available in literature. Class variable, Credit variable (F, W, S, SU)

1055-300 The Greening of RIT
This course seeks to teach students about the concept of sustainability by using the campus of RIT as their laboratory. During the quarter, students will investigate methods and strategies used by other colleges and universities to minimize environmental impacts in areas such as energy use, solid and hazardous waste management, transportation, landscaping and construction, food production and consumption, and purchasing. They will assess their personal and RIT's environmental impacts, develop strategies for minimizing the impacts, implement changes where possible, and prepare reports designed to guide RIT to becoming a greener campus. (Honors student status) Class 3, Lab 3, Credit 4 (S)

Chemistry

1008-261 Quantitative Analysis I
Designed for chemistry, polymer chemistry and biochemistry majors or those interested in pursuing the major. Topics include theoretical introduction to quantitative methods, including gravimetric techniques, equilibria, statistical methods and solution chemistry. (Corequisites 1008-265,1010-252) Lecture 3, Credit 3 (W)

1008-262 Quantitative Analysis II
Designed for chemistry department majors or those interested in pursuing the major. Topics include equilibrium for polyprotic acids, electrochemistry and redox reactions, spectroscopy, potentiometry and electrogravimetric determinations. (Corequisite 1008-266) (1008-261,265) Lecture 4, Credit 4 (S)

1008-265 Quantitative Analysis I Laboratory
Designed for chemistry department majors or those interested in pursuing the major. Experiments include statistics, calibration, of equipment, spectroscopy, volumetric analyses and kinetics. (Corequisites 1008-261, 1010-252) Lab 4, Credit 1(W)

1008-266 Quantitative Analysis II Laboratory
Designed for chemistry department majors or those interested in pursuing the major. Experiments include statistics and calibration of equipment; Gran Plot, double endpoint titration (carbonate/bicarbonate), potentiometric titration, electrogravimetric and photometric determination of copper; water hardness. Lab report writing is emphasized. (Corequisite 1008-262) (1008-261,265,1016-252) Lab 6, Credit 2 (S)

1008-311 Analytical Chemistry: Instrumental Analysis
Elementary treatment of instrumental theory and techniques; properties of light and its interaction with matter; ultraviolet, visible and infrared absorption spectroscopies; atomic absorption and molecular fluorescence spectroscopy; nuclear magnetic resonance spectroscopy. (Corequisite 1008-318) (1010-252 or 1011-212 or 1011-217) Class 3, Credit 3 (F, W)

1008-312 Analytical Chemistry: Separations
Inorganic and organic separations; phase rules; distillation; extraction; adsorption and surface effects; chromatography, including gas, liquid, column, paper, thin layer and ion exchange. (Corequisite 1008-319) (1008-262 or 1011-217 or equivalent) Class 3, Credit 3 (S, SU)

1008-318 Instrumental Analysis Laboratory
Lab accompanying 1008-311. Quantitative and qualitative experiments in ultraviolet, visible, infrared, fluorescence and atomic absorption spectroscopies. Laboratory report writing is emphasized. (Corequisite 1008-311) (1010-252 or equivalent) Lab 4, Credit 1 (F, W)

1008-319 Separations Laboratory
Lab accompanying 1008-312. Experiments with chemical separation techniques including distillations, extractions and a variety of chromatographic methods (HPLC, thin layer, paper, ion exchange, gas, gel filtration). Laboratory report writing is emphasized. (Corequisite 1008-312) (1008-262 or 1011-217 or equivalent) Lab 4, Credit 1 (S, SU)

1008-511 Advanced Instrumental Analysis
Theory, applications and limitations of selected instrumental methods in qualitative, quantitative and structural analysis. Possible topics include electrochemistry, surface analysis, NMR spectroscopy, mass spectroscopy, ICP and other modern instrumentation. (1014-441) Class 3, Credit 3 (F, W-X*)

1008-620 Building Scientific Apparatus
Basic skills associated with the construction of scientific laboratory apparatus—some of which is not commercially available are covered: machine shop skills, working with glass, vacuum technology, optics and electronics. Special emphasis on function-structure relationship between an instrument and its intended use. Several references on construction techniques are provided, and information about current manufacturers and suppliers of necessary components is given. (Corequisite 1018-621) (1014-441, 1017-212, 213 or 312, 313) Class 3, Credit 3 (Offered upon sufficient request)

1008-621 Instrumental Analysis Laboratory
A capstone course requiring students to develop experimental protocols to accomplish assigned experiments involving advanced techniques in instrumental analysis. Library, literature and textbook research will be required. Upon agreement with instructor, two to four major experimental techniques will be required. (Corequisite 1008-511 or 711) (1014-441,445) Lab 6, Credit 2 (F-X*, W)

1009-300 Introduction to Biochemistry
Describes the field of biochemistry in relation to the traditional fields of biology and chemistry. Biochemical approaches to problems in medicine, industry and forensics are presented. Issues of ethical concern also are discussed. (1013-231 or 1013-431) Class 1, Credit 1 (F)

1009-502 Biochemistry: Conformation & Dynamics
Provides a foundation for biochemistry course sequence and for participation in undergraduate research in biochemistry. The relationship between the three-dimensional structure of proteins and their function in oxygen transport and enzymatic catalysis is examined. In preparation for the next course in the sequence (1009-503, Biochemistry: Metabolism), membrane structure and the physical laws that apply to metabolic processes are also discussed. (1013-233 or 1013-433, or permission of instructor) Class 3, Credit 3 (F-X*, W-X*)

1009-503 Biochemistry: Metabolism
Introduction to the metabolic pathways used for energy production and for the synthesis and degradation of the building blocks of living organisms. The pathways are presented individually, then integrated to show the balance between pathways; for example, the products generated by one pathway that are necessary for a second pathway. The efficiency of chemical synthesis in biological organisms is discussed. Finally, the metabolic basis of selected diseases is examined. (1009-502 or permission of the instructor) Class 3, Credit 3 (F, W-X*)

*X, extended day (after 5 p.m.)

- 1009-504 Biochemistry: Nucleic Acids & Molecular Genetics
Nucleic acid structures, including the classical Watson-Crick DNA secondary structure, as well as more recently discovered forms, are described. Nucleic acid metabolism and the flow of genetic information including replication of DNA, its transcription into RNA and the translation of messenger RNA into protein, as well as regulation of gene expression in prokaryotes are presented. DNA sequencing and recombinant DNA techniques having practical applications in medicine, agriculture and forensics are described. The nucleic acid biochemistry of viruses and oncogenes is surveyed. (1009-502) Class 3, Credit 3 (F, S-X)
- 1009-505 Biochemistry: Experimental Techniques
An introduction to the theory and practice of modern experimental biochemical laboratory techniques and concepts. The weekly one-hour lecture provides a theoretical framework for the course and includes a discussion of the properties of biomolecules and how those properties are exploited in the separation and characterization of the molecules. Practical laboratory techniques include the preparation of buffers, centrifugation, gel exclusion chromatography, electrophoretic methods, and UV-visible and fluorescence spectrophotometry as applied to the isolation and characterization of proteins and nucleic acids. The manipulation of genetic material in *E. coli* will also be examined. Faculty-directed student projects or research in biochemistry, usually involving laboratory work and/or calculations that would be considered original. (Permission of research adviser) Class variable, Credit variable (F, W, S, SU)
- 1010-200 Chemistry Safety
A basic course in safe chemical laboratory practices. Topics include protective equipment; toxicity; safe reaction procedures; storage and disposal methods; and handling of all chemicals, including flammable materials, compressed gases, cryogenics, radioactive materials and other special chemicals. Class 1, Credit 1(F)
- 1010-230 Introduction to Co-op Seminar
Exploration of cooperative education opportunities with practice in writing letters of application and resumes and in interviewing techniques. Careers related to chemistry, polymer chemistry, biochemistry and environmental chemistry option are discussed, and career information resources at RIT are utilized. Class 1, Credit 1 (F)
- 1010-251 General Chemistry I
Designed for chemistry department majors or those interested in pursuing the major. Topics include theoretical introduction to quantitative methods, including gravimetric techniques, equilibria, statistical methods and solution chemistry. (Corequisites 1008-265,1010-252) Lecture 3, Credit 3 (W)
- 1010-252 General Chemistry II
Designed for chemistry department majors. Includes topics on atomic theory and electronic structure, chemical bonding, VSEPR and valence bond theory, molecular orbital theory, enthalpy and entropy, rate laws, catalysis and nuclear chemistry. (Corequisite 1008-265) (1010-251) Class 3, Credit 3 (W)
- 1010-255 General Chemistry I Laboratory
Designed for chemistry department majors to complement General Chemistry I (1010-251). Experiments involve inorganic chemistry (empirical formula, qualitative analysis of transition metal ions, synthesis of an inorganic complex ion), quantitative analysis (acid-base titrations, gravimetric analysis, visible spectroscopy) and an introduction to polymer chemistry. (Corequisite 1010-251) Lab 3, Credit 1(F)
- 1010-401 Chemical Literature
Instruction is given on the use of chemical literature resources such as Chemical Abstracts, Science Citation Index, Beilstein, Current Contents and computerized information retrieval. Students prepare a library-based research paper and poster on a chemical topic of their choice as a culmination of instruction on planning a research paper: outlining, using correct scientific English and formats for documentation (footnotes, endnotes, bibliographies) preparing visuals, abstracts and letters of transmittal. Class 2, Credit 2 (F, W)
- 1010-480 Laboratory Teaching Experience
This course is designed to offer students teaching experience in an undergraduate laboratory setting. Evaluation by a faculty supervisor is based on teaching performance and preparation of materials required for the lab. (Must have completed the course and laboratory or equivalent experience under consideration with a grade of A or B; permission of instructor/laboratory coordinator and department head) Class 3-6, Credit 1-2 (F, W, S, SU)
- 1010-499 Chemistry Co-op
Cooperative education experience for undergraduate chemistry students. Credit 0 (offered every quarter)
- 1010-541,542,543 Chemical Research
Faculty-directed student projects or research usually involving laboratory work and/or calculations that would be considered original. (Permission of research adviser) Class variable, Credit variable (F, W, S, SU)
- 1010-559 Special Topics: Undergraduate Chemistry
Courses in which topics of special interest to a sufficiently large group of students, and not covered in other courses, may be offered upon request. Class variable, Credit variable (offered upon sufficient request)
- 1010-561 Advanced Undergraduate Chemistry Research I, II, III
An opportunity for undergraduates to participate in a research project with chemistry faculty, requiring a more formalized presentation of results than the 1009-541 or 1010-541 series. Results from the research must be reported in a public forum (such as a written report, poster, and/or oral presentation) as determined by the research advisor and the head of the Department of Chemistry. (Permission of the research advisor and approval by the head of the Department of Chemistry) Class/lab variable, Credit variable (F, W, S, SU)
- 1010-599 Chemistry Independent Study: Undergraduate
Faculty-directed study of appropriate topics on a tutorial basis. Enables an individual to pursue studies of existing knowledge available in the literature. (Permission of independent study adviser) Class variable, Credit variable (F, W, S, SU)
- 1011-201 Survey of General Chemistry
One-quarter survey of general chemistry for non-science majors with no previous background in chemistry. Fundamentals of dimensional analysis, matter and energy, atomic theory, molecular structure, chemical bonding, chemical reactions, solution chemistry, acid-base chemistry, nuclear reactions and an introduction to equilibrium are covered with emphasis on the relationship between chemistry and modern sociological, nutritional and environmental issues. (Corequisite 1011-205) (1016-225) Class 5, Credit 5 (F)
- 1011-202 Introduction to Organic & Biological Chemistry
Survey of organic chemistry fundamentals followed by an introduction to the structure and function of biomolecules. Organic functional groups covered include hydrocarbons, alcohols, thiols, amines and carbonyl compounds. Biomolecules covered include amino acids, proteins, enzymes, vitamins and hormones. (Corequisite 1011-207) (1011-201) Class 4, Credit 4 (W)
- 1011-203 Metabolic & Nucleic Acid Biochemistry
Application of carbohydrate, lipid, protein and amino acid metabolism to nutrition and health is covered as well as the flow of genetic information from DNA to RNA to protein. Fluid balance, blood chemistry and kidney function are also surveyed. (1011-202) Class 4, Credit 4 (S)
- 1011-205 Chemical Principles I Laboratory
Laboratory course to introduce basic laboratory techniques: gravimetric, volumetric, thermal and titration analyses. Experiments complement material in first-quarter lecture. (Corequisite 1011-201, 211,215, or 271) Lab 3, Credit 1 (F, W, S, SU)
- 1011-206 Chemical Principles II Laboratory
Laboratory course to introduce techniques of chemical analysis: spectrometry, calorimetry, separations, reaction schemes, titrations and kinetic studies. Experiments complement material in second-quarter lecture. (Corequisite 1011-212 or 216) (1011-205) Lab 3, Credit 1 (F, W, S, SU)
- 1011-207 Introduction to Organic Chemistry Laboratory
An introduction to organic laboratory techniques. Methods of separating, purifying and characterizing organic compounds are covered. (Corequisite 1011-202 or 213) (1011-205) Lab 3, Credit 1 (W, S, SU)
- 1011-208 College Chemistry
Primarily for, but not limited to, engineering students. Topics include an introduction to some basic concepts in chemistry, stoichiometry, First Law of Thermodynamics, thermochemistry, electronic theory of composition and structure, chemical bonding. Class 4, Credit 4 (F, W)

*X, extended day (after 5 p.m.)

1011-211	Chemical Principles I	For science, microelectronics, information technology majors and others who desire an in-depth study of general chemistry. Atomic structure and chemical bonding; chemical equations, stoichiometry and chemical analysis; gases; acids and bases. Also offered in distance-learning format. (Corequisite 1011-205) Class 3, Credit 3 (F, W, S, SU)	1011-246	Chemistry for a Global Society Laboratory II	Laboratory to accompany 1011-242, with experiments emphasizing basic chemical principles often using everyday life materials: organic molecular models, pigments and dyes, gravimetric determination, field trip to a police or photo lab, syntheses of esters, aspirin; polymers, food tests. (Corequisite 1011-242) (College chemistry course) Lab 2, Credit 1 (S)
1011-212	Chemical Principles II	Problem-solving applications of chemical principles. Topics include thermodynamics and equilibrium, nuclear chemistry and electrochemistry, oxidation-reduction and chemical kinetics. Also offered in distance-learning format. (Corequisite 1011-206)(1011-211) Class 3, Credit 3 (F, W, S, SU)	1011-271	Fundamentals of Chemistry	Introduction to basic concepts of chemistry, assuming no prior experience. Topics include atomic theory, chemical bonding, stoichiometry, states of matter and the periodic table. Also offered in distance-learning format. (Corequisite 1011-205) Class 3, Credit 3 (F, W)
1011-213	Introduction to Organic Chemistry	Introduction to the structure and reactivities of organic molecules for physical science majors. An overview of the structure, nomenclature, bonding and reactivities of major functional groups. Special topics include polymers and biomolecules. Also offered in distance-learning format. (Corequisite 1011-207) (1011-201 or 1011-212) Class 3, Credit 3 (S, SU)	1011-272	Chemistry of Water & Waste Water	Chemistry of water analyses, including solids, pH, alkalinity, acidity chloride, phosphate, BOD, COD, nitrogen, metals, radioactivity, residual chlorine and chlorine demand. Polymers are also covered. (Corequisite 1011-276) (1011-271 or equivalent) Class 3, Credit 3 (F)
1011-215	General & Analytical Chemistry I	General chemistry for students in biological and medical sciences. Introduction to chemical symbols, formulas, equations, stoichiometry, atomic structure, chemical periodicity and bonding. Emphasis on an early introduction to solutions, concentrations, acid-base and precipitation reactions; analytical chemistry problem-solving applications are stressed. (Corequisite 1011-205) Class 3, Recitation 1, Credit 4 (F)	1011-273	Introduction to Chemical Materials	Application of the basic concepts of chemistry to energy conversion (thermochemistry, nuclear chemistry), reaction kinetics and equilibria, electrochemistry and materials (metals, ceramics and polymers). Also offered in distance-learning format. (Corequisite 1011-277) (1011-271 or 1011-208) Class 3, Credit 3 (W, S)
1011-216	General & Analytical Chemistry II	Introduction to quantitative gravimetric analysis, oxidation-reduction nomenclature, chemical equilibrium and equilibria in aqueous solutions. Particular emphasis on solution equilibria including weak acids, bases, buffers, hydrolysis, pH titrations and heterogeneous equilibria. (Corequisite 1011-206) (1011-215) Class 3, Credit 3 (W)	1011-276	Chemistry of Water & Waste Water Laboratory	Laboratory to be taken concurrently with 1011-272. Techniques used in water and waste water analysis are covered. (1011-271 or equivalent) Lab 3, Credit 1 (F)
1011-217	General & Analytical Chemistry III	The concepts of polyprotic equilibria, spectrophotometry instrumentation and analyses, electrochemistry, nuclear chemistry and chemical kinetics are presented with an emphasis on the analytical applications of these principles to the life sciences. (Corequisite 1011-227) (1011-216) Class 3, Credit 3 (S)	1011-277	Introduction to Chemistry of Materials Laboratory	Experiments in thermochemistry, kinetics, equilibrium, oxidation-reduction and the properties of matter that complement the lecture material. (Corequisite 1011-273) (1011-205 or 1011-208) Lab 3, Credit 1 (W, S)
1011-227	General & Analytical Chemistry III Laboratory	Continuation of 1011-206 laboratory. Topics include pH measurement, buffers and pH indicators, polyprotic acid multi-endpoint titrations, spectrophotometric analysis of equilibrium constants, and an independent laboratory practical on the quantitative analysis of an unknown solution by various analytical methods. Experiments are designed to complement lecture material in 1011-217. Emphasis is on independent laboratory analysis, experimental design and data analysis. (Corequisite 1011-217) (1011-206) Lab 6, Credit 2 (S)	1011-309	Glassblowing Techniques	Introduces and trains each student in small-scale scientific glassblowing techniques. Proficiency is developed in rod manipulation, ring seals, construction of apparatus, annealing, use of a simple lathe and hand-torch work. (May be taken by chemistry, polymer chemistry and other majors.) Class 4, Credit 2 (offered upon sufficient request)
1011-241	Chemistry for a Global Society I	This course is designed for students in any discipline and will address the basic concepts of chemistry as applied to natural phenomena, familiar everyday situations, or relevant social, political and cultural issues. Topics will include atomic models, the mole concept, stoichiometry, chemical reactions, acids and bases, and oxidation/reduction. Environmental and nuclear application may be among special topics selected by the instructor. Basic mathematics will be utilized, but many topics will be non-quantitative. (Corequisite 1011-245) Class 3, Credit 3 (W)	1011-507	Introduction to Intellectual Property	An introductory course on the fundamentals of intellectual property covering trade secrets, copyrights, confidentiality issues and patents. Students will write an invention disclosure and patent application based on knowledge gained in this course. In addition, students will understand intellectual property issues in corporate settings and in particular industries. Class 3, Credit 3 (F, W)
1011-242	Chemistry for a Global Society II	This course is designed for students in any discipline and will address the basic concepts of chemistry as applied to natural phenomena, familiar everyday situations, or relevant social, political and cultural issues. Topics will include organic chemistry concepts, including polymers and biochemistry with applications to the environment, forensic science, food, household chemicals, photography, and pigments and dyes. Basic mathematics will be utilized, but many topics will be non-quantitative. (Corequisite 1011-246) (College chemistry course) Class 3, Credit 3 (S)	1012-562	Inorganic Chemistry I	For common elements, mastery of chemical reactions that describe: (1) their isolation, (2) their characteristic chemical reactivities with other common elements, (3) large-volume industrial processes and (4) environmental impacts required. Nomenclature and isomerism are included. (1013-433, 1014-441) Class 4, Credit 4 (F,W)
1011-245	Chemistry for a Global Society Laboratory I	Laboratory to accompany 1011-241, with experiments emphasizing basic chemical principles oftgn using everyday life materials: density, conservation of mass, chromatography^water, acids and bases, oxidation and reduction. A field trip may be incorporated as part of lab. (Corequisite 1011-241) Lab 2, Credit 1 (W)	1012-563	Inorganic Chemistry II	This course provides a view of how bonding theories endeavor to account for and predict the physical properties of a wide variety of inorganic compounds; e.g., color, magnetism, stability, chemical potential and electrical conductivity. Applications of bonding theory to current research areas are included. (1012-562,1014-442 or permission of instructor) Class 4, Credit 4 (S)
			1012-564	Modern Inorganic Chemistry	Introduces the more sophisticated tools with which an inorganic chemist investigates inorganic molecules and materials. These physical methods are applied to inorganic reactions that distinguish the chemistries of the elements and to current research directions in the field. Oral presentation required. (1014-441) Class 4, Credit 4 (S)
			1012-565	Preparative Inorganic Chemistry Laboratory	The chemistries of different areas of the periodic table are examined; advanced synthetic and characterization methods are utilized. (1012-562 or permission of instructor) Recitation 1, Lab 7, Credit 3 (W)

*X, extended day (after 5 p.m.)

1013-231	Organic Chemistry I	1014-442	Quantum Chemistry
Survey of the structure, nomenclature, reactions and synthesis of the major functional groups. (Corequisites 1013-235) (1011-212 or 216 or permission of instructor) Class 3, Credit 3 (F, W-X*, SU)		Introduction to quantum mechanics and spectroscopy, radioactivity; Planck's Law; photoelectric effect; the Bohr atom; deBroglie, Schrodinger and Heisenberg theories; eigenvalue/eigenfunction equations; variation and perturbation theory; quantum statics; Heitler-London theory of covalent bonds; selection rules and spectroscopy; and matrices applicable to quantum chemistry. (Corequisite 1014-446) (1014-441,1016-306) Class 4, Credit 4, (W, S-*)	
1013-232	Organic Chemistry II	1014-443	Chemical Kinetics
Mechanisms of main classes of reactions are discussed. (Corequisite 1013-236) (1011-231) Class 3, Credit 3 (W, S-X*, SU)		Kinetic molecular theory, transport properties of gases, chemical kinetics, surface chemistry, photochemical kinetics, irreversible processes in solution and introduction to statistical mechanics. (Corequisite 1014-447) (1014-441) Class 4, Credit 4 (S, SU-X*)	
1013-233	Organic Chemistry III	1014-445	Chemical Thermodynamics Laboratory
Structure, nomenclature, reactions and properties of the important classes of bio-organic molecules (carbohydrates, lipids, amino acids, proteins and nucleic acids) are covered in depth. Emphasis is on structure and reactivity in relation to biochemical processes. (Corequisite 1013-237) (1013-232) Class 3, Credit 3 (S, F-X*)		Introduction to physical chemistry laboratory; chemical thermodynamics and equilibrium. (Should be taken concurrently with 1014-441.) Lab 3, Credit 1 (F, W-X*)	
1013-235	Organic Chemistry Laboratory I	1014-446	Quantum Chemistry Laboratory
Laboratory work emphasizes techniques, preparations and analyses. (Corequisite 1013-231) Lab 3, Credit 1 (F, W-X*, SU)		Experiments in the application of quantum chemistry, atomic and molecular spectroscopy, and radioactivity. (Should be taken concurrently with 1014-442.) Lab 3, Credit 1 (W, S-X*)	
1013-236	Organic Chemistry Laboratory II	1014-447	Chemical Kinetics Laboratory
Laboratory work emphasizes techniques, preparations, and analyses. (Corequisite 1013-232) Lab 3, Credit 1 (W, S-X*, SU)		Laboratory experiments in chemical dynamics. (Should be taken concurrently with 1014-443.) Lab 3, Credit 1 (S, SU-X*)	
1013-237	Organic Chemistry Laboratory III	1015-520	Environmental Chemistry
Laboratory work emphasizes reactions and properties of biomonomers and polymers. (Corequisite 1013-233) Lab 3, Credit 1 (S, F-X*)		Students will be introduced to sources, reactions, transport, effects and fate of chemical species in air, soil, water and living systems. (Organic chemistry) Class 3, Credit 3 (S-X*)	
1013-431	Organic Chemistry I	1015-521	Atmospheric Chemistry
A rigorous survey of the mechanisms and reactions of organic functional groups, emphasizing alkanes, alkenes and alkynes. Stereochemistry is also included. (Corequisite 1013-435) (1010-252) Class 3, Credit 3 (S, SU)		An overview of the major forces controlling the chemical composition of Earth's atmosphere with emphasis on the role of the biosphere and the changes induced by human activity. Emphasis is placed on urban pollution, acid rain, stratospheric ozone depletion, and climate change. (1014-443) Class 3, Credit 3 (S)	
1013-432	Organic Chemistry II	1015-522	Aquatic Toxicology & Chemistry
A continued survey of reactions and mechanisms of organic functional groups including aromatic compounds, alcohols, ethers, aldehydes and organometallics. Spectral analysis (IR, UV, NMR) is also included. (Corequisite 1013-436) (1013431) Class 3, Credit 3 (F, W)		An introduction to key chemical, biological, microbiological and toxicological concepts and processes that govern the presence and fate of pollutants in the aquatic environment; environmental fate of specific inorganic, organic and pathogenic pollutants; analytical testing and modeling methods used to assess the toxicity impact of aquatic pollutants. (Organic chemistry, 1001-201) Class 3, Credit 3 (S-X*)	
1013433	Organic Chemistry III	1029-301	Introduction to Polymer Technology
A continued survey of reactions of major organic functional groups, including carboxylic acids, carboxylic acid derivatives, amines and enolate anions. Structure, nomenclature, reactions and properties of important classes of bio-organic molecules are also included. (Corequisite 1013-437) (1013432) Class 3, Credit 3 (S, SU)		Survey of polymer science, including terminology, synthesis, structures, properties, applications and processing techniques of commercially significant polymers. (General Chemistry, 1016-251 or equivalent) Class 2, Credit 2 (F)	
1013435	Preparative Organic Chemistry I Laboratory	1029-501	Organic Chemistry of Polymers
Designed for chemistry department majors to complement 1013431, Organic Chemistry I. Synthesis, purification and characterization of organic compounds are conducted. (Corequisite 1013431) (1010-252) Lab 4, Credit 1 (S, SU)		The synthesis of high molecular weight organic polymers and their properties are introduced. Mechanisms of step growth and chain growth polymerization reactions, polymer reactions and degradation are also considered. The end properties of polymers can be "tailored" by their method of synthesis. Controlled synthesis is particularly achievable when using coordinative polymerization, which will be discussed in detail. (1013-433) Class 4, Credit 4 (F-X*)	
1013436	Preparative Organic Chemistry II Laboratory	1029-502	Polymer Chemistry: Chains & Solutions
Designed for chemistry department majors to complement 1013432, Organic Chemistry II. Emphasis is on synthesis, functional group reactivities, separations, IR and NMR analysis and introduction to microscale synthesis. (Corequisite 1013432) (1013431) Lab 4, Credit 1 (F, W)		Although most polymeric materials find utility as solids, polymer fabrication and characterization techniques are general liquid-phase processes. This course is concerned with the fundamental physical chemistry of polymers in liquid solutions. Topics to be addressed include polymerization kinetics and chain structure, molecular weight distributions and determination, polymer solution thermodynamics and transport phenomena, and solution phase transitions. The study of polymeric solids is the focus of 1029-503 Polymer Chemistry: Properties of Bulk Materials. (1029-301,1014-442) Class 4, Credit 4 (S-X*)	
1013437	Systematic Identification of Organic Compounds		
A laboratory course utilizing synthesis, chemical and spectral (IR, NMR and GC/MS) techniques to identify and characterize organic compounds. (Should be taken concurrently with 1013433.) (1008-319,1013432,436) Lab 6, Credit 2 (S, SU)			
1013-537	Advanced Organic Chemistry Synthesis		
This course will revisit undergraduate organic chemistry topics at a more advanced level with specific examples from the current chemical literature. Multistep synthesis and synthesis of complex multifunctional molecules will be emphasized. (Students requiring 4 credits should register for 1013-737.) (1013433) Class 3, Credit 3 (F-X*)			
1014-441	Chemical Thermodynamics		
Properties of gases; temperature; energy and the First Law of Thermodynamics; entropy and the Second and Third laws; Helmholtz and Gibbs free energies; criteria for equilibrium and spontaneity; chemical equilibrium; phase equilibrium; equilibrium in ideal and non-ideal solutions; electrochemistry. (Corequisite 1014-445) (1010-252,1016-252, 1017-211 or 311) Class 4, Credit 4 (F, W-X*)			

*X, extended day (after 5 p.m.)

1029-503 Polymer Chemistry: Properties of Bulk Materials
This course is designed to give the student with a chemistry or materials science background a thorough grounding in the main concepts that describe bulk polymer structure, behavior and properties. The course follows a synthetic path; the structure-property relationships for polymeric materials are built up from a microscopic to a macroscopic level. One of the most important lessons of the course is that polymers are almost never in a thermodynamically stable state. Consequently, the behavior of polymers and the properties they display are time dependent and vary with the thermo-mechanical history of the materials. (1029-501,502) **Class 4, Credit 4 (F-X*)**

1029-504 Polymer Characterization Laboratory
This course introduces, and gives the student experience with, analytical techniques commonly employed to characterize high polymers. To accomplish this, the course is divided into five sections, each highlighting a particular characteristic of polymeric materials: 1)molecular weight distributions; 2)spectroscopic analysis of chemical structure; 3)thermal stability; 4)morphology and phase transitions, and 5)mechanical properties. The experiments, each requiring eight lab hours to complete, are designed to give students exposure to laboratory techniques not generally covered in undergraduate science/engineering curriculum. Although the documentation of experimental results is important, and will be evaluated, the main purpose is to give the student hands-on experience, hopefully piquing his/her interest in and enthusiasm for the field. (1008-319, 1029-301) **Lab 6, Credit 2 (offered alternate years; offered 2003-04) (S)**

1029-505 Synthesis of High Polymers Laboratory
Students will carry out about eight experiments. They will conduct in about half of those experiments step-growth polymerizations and in the other half chain-addition polymerizations. Among the polymers produced will be Nylon 6-10, Nylon 11, polystyrene, high-density polyethylene, linear low density polyethylene, copolymer of styrene and methyl methacrylate and polyurethane. The most specific types of polymerizations and reactions introduced will be cross-linking polymer, interfacial and bulk step-growth polymerizations, cyclopolymerization, radical, ionic and coordinative chain polymerizations. Instructors may add or delete polymer-related experiments of their choice. Experiments also include basic characterization of products by at least one method. (1013-437) **Lab 6, Credit 2 (offered alternate years; offered 2003-04) (F)**

Mathematics & Statistics

1016-200 Algebra
An algebra course including such topics as operations involving polynomials, algebraic fractions, factoring, exponents and radicals, solution of linear and quadratic equations, and graphing linear equations. (One year of high school algebra) **Class 4, Credit 4 (F, W, S)**

1016-204 College Algebra & Trigonometry
Topics include a review of the fundamentals of algebra; solution of linear, fractional and quadratic equations; functions and their graphs; polynomial, exponential, logarithmic and trigonometric functions; systems of linear equations. (Two years of high school algebra) **Class 4, Credit 4 (F, W, S, SU)**

1016-205 Discrete Mathematics for Technologists I
An introduction to topics of discrete mathematics for students of information technology, including number systems, sets and logic, counting and matrices. (1016-204 or equivalent) **Class 4, Credit 4 (F, W, S)**

1016-206 Discrete Mathematics for Technologists II
A continuation of an introduction to topics of discrete mathematics for students of Information Technology, including relations, Boolean algebra, graph theory and regular sets. (1016-205 or 1016-265 or equivalent) **Class 4, Credit 4 (W,S)**

1016-210 Math Seminar I
An introductory course for freshmen and some transfers that explores the three majors and shows typical problems that applied mathematicians, computational mathematicians and applied statisticians solve in academic and industrial settings. **Class 1, Credit 1 (F)**

1016-211 Math Seminar II
A continuation of 210 including a four-week introduction to co-op with a cover letter and resume writing. Additional mathematical and statistical topics will be discussed. A technical report is required. **Class 1, Credit 1 (W)**

1016-214 Elementary Calculus I
Introduction to the study of differential calculus. The following topics are covered: functions and graphs, limits, continuity, the derivative concept, derivative formulas, and applications of derivatives, with an emphasis on manipulative skills. (1016-204 or equivalent) **Class 3, Credit 3 (W, S)**

1016-215 Elementary Calculus II
A continuation of 1016-214, dealing with an introduction to integral calculus. The following topics will be covered: definite integral, area, work and distance problems, volumes, fundamental theorem of calculus, approximation techniques, exponential and logarithmic functions, applications, introduction to differential equations. (1016-214) **Class 3, Credit 3 (S, F)**

1016-220 Fundamentals of Trigonometry
A study of the fundamental concepts in trigonometry including terminology, radian measures, trigonometric ratios, graphs of trigonometric functions, applications and vectors. **Class 1, Credit 1 (S)**

1016-225 Algebra for Management Science
Introduction to functions, including linear, quadratic, polynomial, exponential, logarithmic and rational functions with applications to supply and demand, cost, revenue and profit functions. Additional topics include matrices, linear programming and mathematics of finance. (Three years of high school mathematics) **Class 4, Credit 4 (F, W, S)**

1016-226 Calculus for Management Science
A course stressing applications of calculus concepts to solving problems in business and economics. Topics include the limit concept, differentiation, partial differentiation and integration. (1016-225) **Class 4, Credit 4 (F, W, S, SU)**

1016-228 Analytical Geometry
Topics in analytical geometry such as slopes, lines and conic sections. Also additional topics in polar coordinates, determinants, parametric equations, trigonometry, and two- and three-dimensional vectors. (1016-204) **Class 4, Credit 4 (W)**

1016-230 Precalculus
The course reviews functions and graphs and then concentrates on a full discussion of trigonometric functions to prepare students for their use in higher mathematics and applications courses. (Three years of high school math) **Class 4, Credit 4 (F,W)**

1016-231 Calculus for Engineering Technology I
The first course in a calculus sequence covering essential concepts and manipulations. Topics include limits, derivative, indefinite and definite integrals, and numerical approximation. Applications to physical problems are stressed. (Grade of C or better in 1016-230) **Class 4, Credit 4 (F, W, S)**

1016-232 Calculus for Engineering Technology II
A continuation of 1016-231. Topics covered in this course are applications of the integral calculus, differential and integral calculus of the transcendental functions, and basic techniques of integration with emphasis on applications to engineering technology problems. (Grade of C or better in 1016-231) **Class 4, Credit 4 (F, W, S)**

1016-241 Calculus & Analytical Geometry I
A study of precalculus topics needed to succeed in learning calculus combined with the course material covered in 1016-251. (Three years of high school mathematics) **Class 6, Credit 6 (F, W)**

1016-242 Calculus & Analytical Geometry II
A continuation of the material from 1016-241 combined with the course material covered in 1016-252. (Grade of C or better in 1016-241 or 251) **Class 6, Credit 6 (W, S)**

1016-243 Calculus & Analytical Geometry III
A continuation of the material from 1016-242 combined with the course material covered in 1016-253. (Grade of C or better in 1016-242 or 252) **(S, F)**

1016-251 Calculus I
Calculus I-III is a standard first course in calculus intended for students majoring in mathematics, science or engineering with the major emphasis on understanding the concepts and using them to solve a variety of physical problems. Calculus I covers two-dimensional analytic geometry, functions, limits, continuity, the derivative and its formulas, and applications of the derivative. (Three years of high school mathematics) **Class 4, Credit 4 (F, W, S, SU)**

*X, extended day (after 5 p.m.)

- 1016-252 Calculus II
This course follows 1016-251 and is a continuation of the standard first course in calculus intended for students majoring in mathematics or science or engineering, with the major emphasis on understanding the concepts and using them to solve a variety of physical problems. The subject matter is as follows: anti-derivatives by various methods; the definite integral with applications to calculation of area, volumes of revolutions, etc; transcendental functions; numerical integration. (Grade of C or better in 1016-251 or 241) Class 4, Credit 4 (F, W, S, SU)
- 1016-253 Calculus III
Third in the sequence of a standard first course in calculus intended for students majoring in mathematics, science or engineering with the major emphasis on understanding the concepts and using them to solve a variety of physical problems. The subject matter is as follows: improper integrals, formal limits of sequences, infinite series, Taylor series, polar coordinates, conic sections. (Grade of C or better in 1016-252 or 242) Class 4, Credit 4 (F, W, S, SU)
- 1016-258 Introduction to Mathematica
An introduction to the computer algebra system Mathematica and its uses and applications in several undergraduate courses. Symbolic manipulations, numerical calculations and graphics techniques are explored, as well as Mathematica packages and programming techniques. (Corequisite is a basic calculus course such as 1016-251,1016-231,1016-241 or 1016-214) Class 2, Credit 2 (S)
- 1016-260 Statistical Computing with Excel & Minitab
An introduction to statistical computing using Excel and Minitab software packages. (Permission of instructor) Class 1, Lab 1, Credit 2 (S)
- 1016-265 Discrete Math I
An introduction to discrete mathematics with applications in computer science and mathematics with an emphasis on proof techniques. The basics of combinatorics, sets, functions, the natural numbers and the integers modulo n are covered. (Sophomore standing or department permission) Class 4, Credit 4 (F, W, S, SU)
- 1016-289 Contemporary Science: Mathematics
A basic survey of mathematical structures as well as an introduction to problem solving. Topics are chosen from foundations of mathematics, algebra, topology, number theory, graph theory, probability and statistics. These structures are examined as they occur naturally in modern settings. NOTE: Not acceptable as science credit for College of Science majors. Class 4, Credit 4 (offered upon sufficient request)
- 1016-304 Differential Equations for Engineering Technology
A continuation of 1016-232. Course covers selected applied mathematics topics, including differential equations, Laplace transforms, numerical methods and the calculus of functions of two variables. Emphasis is on the application of these topics to engineering technology problems. (1016-232 or equivalent) Class 4, Credit 4 (F,W,S)
- 1016-305 Calculus IV
An introduction to multivariate calculus. Topics include three-dimensional analytic geometry and vector algebra, functions of two or more variables, limits, partial derivatives, integrals and applications of these topics. (1016-252 or 1016-242) Class 4, Credit 4 (F, W, S, SU)
- 1016-306 Differential Equations I
An introduction to the study of ordinary differential equations and their applications. Common first-order equations and linear second-order equations are solved. Method of undetermined coefficients, variation of parameters, linear independence and the Wronskian, numerical solution techniques, vibrating systems, Laplace transforms. (1016-253) Class 4, Credit 4 (F, W, S, SU)
- 1016-307 Differential Equations II
Second-quarter course in ordinary differential equations that includes power series solutions to ordinary differential equations about ordinary and regular singular points; orthogonal polynomials; solution of systems of linear differential equations; phase plane analysis, stability and chaos. (1016-305, 306) Class 4, Credit 4 (offered upon sufficient request)
- 1016-314 Engineering Statistics
Basic statistical concepts: descriptive statistics, probability, inference and quality control. The statistical package Minitab will be used to reinforce these techniques. The focus of this course is on statistical applications and quality improvement in engineering. This course is intended for engineering programs and has a calculus prerequisite. NOTE: This course may not be taken for credit if credit is to be earned in 1016-319. (1016-253) Class 4, Credit 4 (W, S)
- 1016-318 Matrices & Boundary Value Problems
An introduction to matrix algebra and boundary value problems. Topics include matrix operations with applications to the solution of linear systems of algebraic equations, Fourier series, separation of variables, the heat equation and the wave equation. (1016-305,306) Class 4, Credit 4 (F, S, SU)
- 1016-319 Data Analysis I
This course will study the statistical principles of presenting and interpreting data. Topics covered will include: descriptive statistics and displays, random sampling, the normal distribution, confidence intervals and hypothesis testing. The statistical software package Minitab will be used to reinforce these principles and to introduce students to the use of the computer in statistical analysis. This is a general introductory statistics course and is intended for a broad range of programs. NOTE: This course may not be taken for credit if credit is to be earned in 1016-314. (1016-204) Class 4, Credit 4 (F, W, S, SU)
- 1016-320 Data Analysis II
An elementary introduction to the topics of regression and analysis of variance. The statistical software package MINITAB is used to reinforce these techniques. The focus of this course is on business applications. This is a general introductory statistics course and is intended for a broad range of programs. (1016-319 or equivalent) Class 4, Credit 4 (F, W, S)
- 1016-328 Engineering Mathematics
An introduction to matrix algebra and vector calculus. Topics include matrix operations with applications to the solution of linear systems of algebraic equations; gradient, divergence and curl; line and surface integrals; independence of path and the divergence theorem; and Stake's theorem with discussion of engineering applications. (1016-305,306) Class 4, Credit 4 (F, S, SU)
- 1016-331 Matrix Algebra
An introduction to the basic concepts of linear algebra, with an emphasis on matrix manipulation. Topics include Gaussian elimination, matrix arithmetic, determinants, Cramer's rule, vector spaces, linear independence, basis, nullspace, row and column spaces of a matrix, eigenvalues and eigenvectors. Various applications are studied throughout the course. (1016-305 or 1016-366) Class 4, Credit 4 (F, W, S)
- 1016-351 Probability & Statistics I
Descriptive statistics; sample spaces and events; axioms of probability; counting techniques; conditional probability and independence; distributions of discrete and continuous random variables; joint distributions; central limit theorem. (1016-253) Class 4, Credit 4 (F, W, S, SU)
- 1016-352 Probability & Statistics II
Basic statistical concepts, sampling theory, hypothesis testing, confidence intervals and nonparametric methods. A statistical software package is used for data analysis. (1016-351) Class 4, Credit 4 (F, W, S)
- 1016-353 Applied Statistics
Topics in simple linear regression, an introduction to analysis of variance and the use of the statistical software package SAS. (1016-352 or 1016-314) Class 4, Credit 4 (S)
- 1016-354 Introduction to Regression Analysis
A study of regression techniques with applications to the type of problems encountered in real-world situations. Includes use of statistical software. Topics include review of simple linear regression, residual analysis, multiple regression, matrix approach to regression, model selection procedures, various other models as time permits. (1016-353 and 331 or permission of instructor) Class 4, Credit 4 (W)
- 1016-355 Design of Experiments
A study of the design and analysis of experiments. Includes extensive use of statistical software. Topics include single-factor analysis of variance; multiple comparisons and model validation; multifactor factorial designs; fixed, random and mixed models; expected mean square calculations; confounding; randomized block designs; other designs and topics as time permits. (1016-353) Class 4, Credit 4(F)
- 1016-358 Statistical Quality Control
A review of probability models associated with control charts, control charts for continuous and discrete data, interpretation of control charts, acceptance sampling, O.C. curves, standard sampling plans. A statistical software package is used for data analysis. (1016-352 or 1016-314) Class 4, Credit 4 (S)

1016-360 **Statistical Computing with SAS**
This course presents the features of statistical computing using SAS software programming language. Statistical methods are taught with the aim of utilizing the SAS programs to arrive at outputs and their interpretation. (1016-352 or 1016-314 or consent of instructor) **Class 1, Lab 1, Credit 2 (S)**

1016-365 **Combinatorial Mathematics**
An introduction to the mathematical theory of combination, arrangement and enumeration of discrete structures. Topics include enumeration, recursion, inclusion-exclusion, block design, general functions. (1016-265 or permission of instructor) **Class 4, Credit 4 (W)**

1016-366 **Discrete Mathematics II**
A continuation of 1016-265 Discrete Mathematics I with applications in computer science. The topics introduced include combinatorics, logic, introduction to algebraic systems, introduction to graph theory and their interconnections. (1016-265) **Class 4, Credit 4 (F, W, S)**

1016-370 **Introduction to Undergraduate Research**
This is an introduction to the skills necessary for independent research on a mathematical or statistical problem with a focus on a specific research problem or problems. Literature search techniques, writing, and presentations are included in the course. The students work on a research topic. (1016-331 or permission of instructor) **Class 4, Credit 4 (S)**

1016-379 **Data Analysis I Laboratory**
A computer laboratory course that reinforces the concepts of 1016-319: Data Analysis I. The statistical software package MINITAB is used. The focus is on statistical analysis of data with business applications. (Corequisite: 1016-319 or equivalent) **Class 2, Credit 2 (F, W, S)**

1016-380 **Data Analysis II Laboratory**
A computer laboratory course that reinforces the concepts of 1016-320 Data Analysis II. Statistical software such as MINITAB, SPSS or SAS is used, and spreadsheet software such as Lotus or Excel may also be used. The focus is on statistical analysis and model building using data with business applications. (Corequisite: 1016-320 or equivalent) **Class 2, Credit 2 (S, F)**

1016-385 **History of Mathematics**
An introduction to the history of mathematics that provides the student the opportunity to study the historical background of some topics in the mathematical sciences and to write about those topics. The set of topics studied will vary. (1016-306 or equivalent) **Class 4, Credit 4 (offered upon sufficient request)**

1016-399 **Mathematics Co-op Seminar**
Exploration of cooperative education opportunities, practice in writing letters of application, resume writing and interviewing procedures. **Class 1, Credit 0**

1016-407 **Dynamical Systems**
The course revisits the equations of spring-mass, RLC circuits and pendulum systems in order to view and interpret the phase space representations of these dynamical systems. This begins with linear systems followed by a study of the stability analysis of nonlinear systems. Matrix techniques are introduced to study higher order systems. The Lorentz equation will be studied to introduce the presence of chaotic solutions. A computer algebra system will be used. (1016-306) **Class 4, Credit 4 (S)**

1016-411 **Real Variables I**
An investigation and extension of the theoretical aspects of elementary calculus. Topics include mathematical induction, real numbers, functions, limits, continuity, differentiation, l'Hopital's rule, Taylor's theorem. (1016-305 and 265 or permission of instructor) **Class 4, Credit 4 (F)**

1016-412 **Real Variables II**
A continuation of 1016-411 which concentrates on integration: definition of integral—its existence and its properties, improper integrals, infinite series, sequences and power series. (1016-411) **Class 4, Credit 4 (W)**

1016-415 **Statistical Analysis for Bioinformatics**
An introduction to the probabilistic models and statistical techniques used in computational molecular biology. Probabilistic and/or statistical techniques will be presented for the understanding of pairwise and multiple sequence alignment methods, gene and protein classification methods, and phylogenetic tree construction. (1016-252,265,319) **Class 4, Credit 4 (W)**

1016-420 **Complex Variables**
A brief discussion of preliminaries leading to the concept of analyticity. Complex integration. Cauchy's integral theorem and integral formulas. Taylor and Laurent series. Residues. Real integrals by complex methods. (1016-305) **Class 4, Credit 4 (F,W,SU)**

1016-432 **Linear Algebra**
A further development of the basic concepts of linear algebra, including orthogonality. Topics include similarity, linear transformations, diagonalization, inner products, Gram-Schmidt, quadratic forms and various numerical techniques. Several applications of these ideas are also presented. (1016-331) **Class 4, Credit 4 (F,W)**

1016-437 **Computer Methods in Applied Mathematics**
Emphasizes the formulation of problems to allow solutions by standardized techniques and library routines. A study of numerical techniques such as direct and iterative methods for solving linear and nonlinear equations and optimizing functions, discrete methods for boundary value problems and other techniques for solving problems. Computer-based homework. (1016-305, 306, 331 and some programming knowledge) **Class 4, Credit 4 (offered upon sufficient request)**

1016-451 **Mathematical Statistics I**
Brief review of basic probability concepts and distribution theory; mathematical properties of distributions needed for statistical inference. (1016-352) **Class 4, Credit 4 (W)**

1016-452 **Mathematical Statistics II**
A continuation of 1016-451 covering classical and Bayesian methods in estimation theory; chi-square test; Neyman-Pearson lemma; mathematical justification of standard test procedures; sufficient statistics and further topics in statistical inference. (1016-451) **Class 4, Credit 4 (S)**

1016-453 **SAS Programming**
This course presents the features of the SAS programming language that are essential for statistical applications. The focus is on the SAS data step emphasizing techniques useful in reshaping data sets and data entry. Other topics include SAS procedures for data description and manipulation, the SAS Macro language, SAS/IML, SAS/Graph and the SQL procedure. This is an intense introduction to SAS. All topics covered in the typical commercially offered SAS programming course are included. In addition, a number of statistical ideas are studied—bootstrapping, permutation tests and generalized linear models—along with their implementation in SAS. (1016-353,1016-331 recommended or permission of instructor) **Class 4, Credit 4 (offered upon sufficient request) (S)**

1016-454 **Non-parametric Statistics**
An in-depth study of inferential procedures that are valid under a wide range of shapes for the population distribution. Topics include tests based on the binomial distribution, contingency tables, statistical inferences based on ranks, runs tests and randomization methods. A statistical software package is used for data analysis. (1016-314 or 1016-352) **Class 4, Credit 4 (F)**

1016-457 **Research Sampling Techniques**
Provides a basis for understanding the selection of the appropriate tools and techniques for analyzing survey data. Topics include design of sample surveys, methods of data collection, a study of standard sampling methods. A statistical software package is used for data analysis. (1016-352 or 1016-314) **Class 4, Credit 4 (W)**

1016-461 **Mathematical Modeling**
Explores problem solving, formulation of the mathematical model from physical considerations, solution of the mathematical problem, testing the model and interpretation of results. Problems are selected from the physical sciences, engineering and economics. (1016-305,306,331,352) **Class 4, Credit 4 (F)**

1016-465 **Linear Programming**
A presentation of the general linear programming problem. A review of pertinent matrix theory, convex sets and systems of linear inequalities; the simplex method of solution; artificial bases; duality; parametric programming; and applications. (1016-432) **Class 4, Credit 4 (offered upon sufficient request) (W)**

1016-466 **Advanced Mathematical Programming**
A continuation of 1016-465 that surveys the mathematical optimization techniques of integer programming, dynamic programming, project scheduling, queuing theory and some simulation. NOTE: 1016-465 and 1016-466 together cover the material on which the Operations Research exam of the Society of Actuaries is based. (1016-465) **Class 4, Credit 4 (offered upon sufficient request)**

1016-467	Graph Theory	1016-532	Abstract Algebra II
The basic theory of graphs and networks, including the concepts of circuits, trees, edge and vertex separability, planarity and vertex coloring and partitioning. There is a strong emphasis on applications to physical problems and on graph algorithms such as those for spanning trees, shortest paths, non-separable blocks and network flows. (1016-265) Class 4, Credit 4 (F, S)		The basic theory of rings, integral domains, ideals and fields GF (pn), applications to coding theory or abstract vector spaces, function spaces, direct sums, applications to differential equations, and to scientific problems. (1016-531) Class 4, Credit 4 (S)	
1016-469	Mathematical Simulation	1016-541	Actuarial Mathematics I
An introduction to computer simulation, simulation languages, model building and computer implementation, and mathematical analyses of simulation models and their results using techniques from probability and statistics. (1016-352; 4001-241,4001-242 or 4002-208,210) Class 4, Credit 4 (offered upon sufficient request)		Students study challenging problems whose solutions require a combination of skills that one acquires in a typical mathematics-based curriculum. Course work synthesizes basic, essential problem-solving ideas and techniques as they apply to various areas, such as actuarial mathematics. (1016432 or permission of instructor) Class 2, Credit 2 (offered upon sufficient request)	
1016-481	Problem Solving	1016-542	Actuarial Mathematics II
Helps students develop strategies for solving problems that are chosen from a wide variety of areas in mathematics. Emphasis is on attempting problem solutions and presentation of efforts to the class or to the instructor. (One year of calculus or permission of instructor) Class 2, Credit 2 (F)		Students study challenging problems in probability and statistics whose solutions require a combination of skills that one acquires in a typical mathematical statistics curriculum. Course work synthesizes basic, essential problem-solving ideas and techniques as they apply to various areas, such as actuarial mathematics. (1016-451 or permission of instructor) Class 2, Credit 2 (offered upon sufficient request)	
1016-485	Number Theory	1016-543	Actuarial Mathematics III
A study of the structure of the set of integers. Topics such as divisibility, congruences, arithmetic functions, primitive roots, quadratic residues, and the nature and distribution of primes are investigated. (1016-265) Class 4, Credit 4 (W)		Students study challenging problems in applied statistical methods whose solutions require a combination of skills that one acquires in a typical mathematical statistics curriculum. Course work synthesizes basic, essential problem-solving ideas and techniques as they apply to various areas, such as actuarial mathematics. (1016-542 or permission of instructor) Class 2, Credit 2 (offered upon sufficient request)	
1016-501	Advanced Differential Equations	1016-544	Actuarial Mathematics IV
A study of first order, linear higher order and systems of differential equations including such topics as existence, uniqueness, properties of solutions, Green's functions, Sturm-Liouville systems and boundary value problems. (1016-305, 306; 1016-331 desirable) Class 4, Credit 4 (offered upon sufficient request)		Students study challenging problems in the field of operations research as used in actuarial studies. In addition to receiving thorough treatment of topics in these areas, they enhance their mathematical background for upper-division courses, graduate school and such exams as the GRE, actuarial exams, etc. (1016-466 or permission of instructor) Class 2, Credit 2 (offered upon sufficient request)	
1016-502	Advanced Differential Equations II	1016-545	Actuarial Mathematics V
A study of first order, linear higher order and systems of differential equations including such topics as existence, uniqueness, properties of solutions, Green's functions, Sturm-Liouville systems and boundary value problems. (1016-501) Class 4, Credit 4 (offered upon sufficient request)		Students study challenging problems in numerical methods whose solutions require a combination of skills that one acquires in a typical mathematical statistics curriculum. Course work synthesizes basic, essential problem-solving ideas and techniques as they apply to various areas, such as actuarial mathematics. (1016-511, 512 or permission of instructor) Class 2, Credit 2 (offered upon sufficient request)	
1016-511	Numerical Analysis	1016-551	Topics in Algebra
Numerical techniques for the solution of nonlinear equations, interpolation, differentiation, integration, initial value problems. (1016-305 and 306, some programming knowledge) Class 4, Credit 4 (F, S)		Topics in abstract algebra to be chosen by the instructor either to give the student an introduction to topics not taught in 1016-531,532 or to explore further the theory of groups, rings or fields. (Permission of instructor) Class 4, Credit 4 (offered upon sufficient request)	
1016-512	Numerical Linear Algebra	1016-552	Topics in Analysis
Numerical techniques that treat systems of equations, eigenvalue problems, boundary value problems, splines, additional topics at the discretion of the instructor. (1016-305, 306, 331 and some programming knowledge) Class 4, Credit 4(F)		Topics in analysis to be chosen by the instructor, either to introduce the student to topics not covered in 1016411,412 or to explore further the topics covered there. (1016-265,412) Class 4, Credit 4 (offered upon sufficient request)	
1016-521	Topics in Probability & Statistics	1016-555	Statistics Seminar I
Selected topics in applied probability and statistics to meet the need and interest of the students. (1016-305, 352 or permission of instructor) Class 4, Credit 4 (offered upon sufficient request)		Introduces the student to statistical situations not encountered in the previous course of study. Topics include open-ended analysis of data, motivating use of statistical tools beyond the scope of previous courses, introduction to the statistical literature, development of statistical communication skills and the pros and cons of statistical software packages. (1016-354,355) Class 4, Credit 4 (S)	
1016-524	Introduction to Time Series	1016-558	Multivariate Analysis
A study of the modeling and forecasting of time series. Topics include ARMA and ARIMA models, autocorrelation function, partial autocorrelation function, detrending, residual analysis, graphical methods and diagnostics. A statistical software package is used for data analysis. (1016-352 or 1016-314) Class 4, Credit 4 (offered alternate years) (S)		A study of the multivariate normal distribution, statistical inference on multivariate data, multivariate analysis of covariance, canonical correlation, principal component analysis and cluster analysis. A statistical software package is used for data analysis. (1016-354, 1016-331) Class 4, Credit 4 (offered upon sufficient request)	
1016-525	Stochastic Processes	1016-559	Special Topics
Explores Poisson processes and Markov chains with an emphasis on applications. Extensive use is made of conditional probability and conditional expectation. Further topics, such as renewal processes, Brownian motion, queuing models and reliability, are discussed as time allows. (1016-331,351, or permission of instructor) Class 4, Credit 4 (W)		Topics of special interest to a sufficiently large group of students, and not covered in other courses, may be offered upon request. Class variable, Credit variable (offered upon sufficient request)	
1016-531	Abstract Algebra I		
A review of pertinent basic set theory and number theory. Groups, subgroups, cyclic and permutation groups, Lagrange's theorem, quotient groups, isomorphism theorems, applications to scientific problems. (1016-265, 432) Class 4, Credit 4 (W)			

1016-561 Complex Analysis I
Introduction to the theory of functions of one complex variable. Limits, continuity, differentiability; analytic functions; complex integration; Cauchy integral theorem and formula; sequences and series; Taylor and Laurent series; singularities; residues; analytic continuation; conformal mapping. A more in-depth study of analytic function theory than 1016-420. (1016-411) Class 4, Credit 4 (offered upon sufficient request)

1016-562 Complex Analysis II
This course provides an introduction to the notion of Cauchy integration theory, analytic function by power series and the calculus of residues. (1016-561) Class 4, Credit 4 (offered upon sufficient request)

1016-565 Game Theory
Introduction to the theory of games with solution techniques and applications. Topics include game trees, matrix games, linear inequalities and programming, convex sets, the minimax theorem, n-person games. (1016-331 or permission of instructor) Class 4, Credit 4 (offered upon sufficient request)

1016-566 Nonlinear Optimization Theory
The theory of optimization of nonlinear functions of several real variables. Topics include unconstrained optimization (Newton-Raphson, steepest ascent and gradient methods), constrained optimization (Lagrange multipliers, Kuhn-Tucker theorem, penalty concept, dynamic programming) and computational aspects (rates of convergence, computational complexity). (1016-305, 432) Class 4, Credit 4 (offered upon sufficient request)

1016-571 Topology I
Metric spaces, topological spaces, separation axioms, compactness, connectedness, product spaces. (1016-412 or permission of instructor) Class 4, Credit 4 (offered upon sufficient request)

1016-572 Topology II
A continuation of topics from 1016-571. (1016-571 or permission of instructor) Class 4, Credit 4 (offered upon sufficient request)

1016-581 Introduction to Linear Models
Introduction to the theory of linear models. Least squares estimators and their properties, matrix formulation of linear regression theory, random vectors and random matrices, the normal distribution model and the Gauss-Markov theorem, variability and sums of squares, distribution theory, the general linear hypothesis test, confidence intervals, confidence regions, correlations among regressor variables, ANOVA models, geometric aspects of linear regression and less than full rank models. (1016-331,354) Class 4, Credit 4 (offered upon sufficient request)

1016-599 Mathematics: Independent Study
Faculty-directed study of appropriate topics on a tutorial basis. Used to enable an individual to pursue studies of existing knowledge available in the literature and not taught in regularly offered courses. Class variable, Credit variable

1016-620 Fourier Transform
An introduction to an important mathematical tool for the analysis of linear systems. Topics covered are a Fourier integral theorem; the Fourier transform and its inverse; an introduction to generalized functions; the Dirac delta functions; evaluating transforms; convolution, serial products; the sampling theorem; Rayleigh, power convolution and autocorrelation theorems; the discrete Fourier transform; the fast Fourier transform. (1016-420) Class 4, Credit 4 (offered upon sufficient request)

1055-265 Honors Discrete Math
This is an honors course in discrete mathematics designed to challenge honors students and others capable of excellence in mathematics with demanding problems and proofs in introductory number theory, set theory, logic and combinatorics. (Honors student status or permission of instructor) Class 4, Credit 4 (W)

1055-319 Honors Research Statistics
This is a project-based introductory statistics course for RIT honors students. Students will learn to formulate research problems in statistical terms, summarize data, draw inferences about populations, and then state results in the context of an application. The statistical software package Minitab and a graphing calculator will be used. This course may not be taken for credit if credit is to be earned in 1016-319 or 1016-314. (1016-204 or equivalent, Honors student status or permission of instructor) Class 4, Credit 4 (W)

Physics

1017-200 Physics Orientation
An introduction to the nature and scope of physics for freshmen interested in physics as a profession. Topics include: (a) what is physics?; (b) professional opportunities in physics; (c) the physics profession; (d) the literature of physics; (e) communicating in physics. Laboratory includes safety instruction, measurement and recording techniques, graphical analysis, error analysis and report writing. Each student presents a formal written or oral report on some topic of interest at the end of the course. Class 1, Credit 1 (F)

1017-201 Physics Orientation II
This course continues the introduction to physics at RIT started in 1017-200. Class 1, Credit 1 (W)

1017-202 Explorations in Physics
An activity-based course in which topics will encompass a range of physical phenomena. Scientific concepts are introduced to provide a basis for understanding phenomena such as sight and optics, motion, rainbows, cloud formation, and global warming. Typically two topics per quarter will be covered. The main emphasis will be on the process of scientific investigation, with students developing hands-on projects throughout each quarter. Class 4, Lab 2, Credit 4 (S)

1017-211 College Physics I
An elementary course in college physics. Mechanics: Newton's laws of motion, momentum, rotational motion, energy. (Competency in algebra, geometry and trigonometry) (See 1017-271 for lab) Class 3, Credit 3 (F, W, S, SU)

1017-212 College Physics II
Heat and thermodynamics, fluids, wave motion, sound, geometrical optics. (1017-211) (See 1017-272 for lab) Class 3, Credit 3 (F, W, S, SU)

1017-213 College Physics III
Wave optics, electricity and circuits, magnetism, some elements of modern physics. (1017-211,212) (See 1017-273 for lab) Class 3, Credit 3 (F, W, S, SU)

1017-230 Stellar Astronomy
An introduction to the basic concepts of stellar astronomy, including celestial sphere, constellations, nomenclature, physical properties of the stars, principles of spectroscopy as applied to astronomy, double stars, variable stars, star clusters, stellar evolution, gaseous nebulae, stellar motions and distribution, Milky Way system. This course is not recommended for students required to take University Physics. (Competency in algebra) (May be taken before or after 1016-235,240) Class 3, Credit 3 (F)

1017-231 Stellar Astronomy Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. Observational exercises utilizing the RIT observatory and associated equipment are emphasized. (Credit or coregistration in 1017-230) Class 2, Credit 1 (F)

1017-235 Solar System Astronomy
An introduction to basic concepts of solar system astronomy, including celestial sphere, zodiac, astronomical telescopes, sun, moon, eclipses, earth as a planet, planets and their satellites, comets, meteors and theories of the origin of the solar system. This course is not recommended for students required to take University Physics. (Competency in algebra) (May be taken before or after 1017-230,240) Class 3, Credit 3 (S)

1017-236 Solar System Astronomy Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. Observational exercises utilizing the RIT observatory and associated equipment are emphasized. (Credit or coregistration in 1017-235) Class 2, Credit 1 (S)

1017-240 Extragalactic Astronomy
An introduction to extragalactic astronomy, including the history of our discovery of the external galaxies and their classification, the "cosmic distance ladder," quasars and other distinct objects, the Big Bang theory of cosmology and the future of the universe. This course is not recommended for students required to take University Physics. (Competency in algebra) (May be taken before or after 1017-230,235) Class 3, Credit 3 (W)

- 1017-250 Fundamentals of Radiation
An introduction to ionizing radiation. Includes the different kinds of radiation and their properties. The effects of radiation, how it can be detected and its applications are also discussed. This is a distance learning course. (Competency in algebra) Class 4, Credit 4 (offered every year upon sufficient request)
- 1017-271 College Physics I Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. (Credit or coregistration in 1017-211) Lab 2, Credit 1 (F, W, S, SU)
- 1017-272 College Physics II Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. (Credit or coregistration in 1017-212) (1017-271) Lab 2, Credit 1 (F, W, S, SU)
- 1017-273 College Physics III Laboratory
This laboratory course includes experiments related to the principles and theories discussed in corresponding lecture. (Credit or coregistration in 1017-213) (1017-271) Lab 2, Credit 1 (F, W, S, SU)
- 1017-289 Contemporary Science: Physics
Introductory science for nonscience students. One or more topics such as astronomy, space exploration, relativity, nuclear energy and lasers are discussed and simply explained to give an appreciation of the significance of physics in our contemporary technological society. A minimum of mathematics is used. A laboratory or discussion option may be offered for small group meetings once a week, which reinforces the material given in demonstration lectures and audiovisual presentations. NOTE: Not acceptable for science credit for College of Science majors. (Competency in algebra) Class 4, Credit 4 (F, W, S)
- 1017-300 Introduction to Semiconductor Devices in Physics
An introductory survey, using some calculus, of the physics underlying operation and manufacture of modern semiconductor devices used in integrated circuits and microcomputers. Review of classical physics, classical free-electron gas, atomic physics, molecular bonds and band theory, theory of metals, structure and properties of semiconductors and semiconductor devices. (1017-213,273; 1016-304) Class 4, Credit 4 (offered upon sufficient request) (S)
- 1017-301 University Astronomy
An introduction to the basic concepts of astronomy and astrophysics for scientists and engineers. Topics include the celestial sphere, celestial mechanics, methods of data acquisition, planetary systems, stars and stellar systems, cosmology, and life in the universe. (1017-311; 1016-251) Class 4, Credit 4 (F, S)
- 1017-311 University Physics I
An intensive course in calculus-based physics for science and engineering majors. The course is taught in a lecture/workshop format that integrates the material traditionally found in separate lecture and laboratory courses. Topics include kinematics, planar motion, Newton's Laws, gravitation; work, kinetic and potential energy; momentum and impulse; conservation laws; systems and particles; data presentation and analysis, error propagation. (Credit or coregistration in 1016-252 or 1016-242) Class 7, Credit 5 (F, W, S)
- 1017-312 University Physics II
A continuation of 1017-311 University Physics I. The course is taught in a lecture/workshop format that integrates the material traditionally found in separate lecture and laboratory courses. Topics include rotational kinematics and dynamics, rigid body motion, angular momentum; oscillatory motion, wave motion, sound, physical optics; heat and thermodynamics, kinetic theory of gases. (Credit or coregistration in 1016-253 or 1016-243) (1017-311) Class 7, Credit 5 (F,W,S, SU)
- 1017-313 University Physics III
A continuation of 1017-312 University Physics II. The course is taught in a lecture/workshop format that integrates the material traditionally found in separate lecture and laboratory courses. Topics include electrostatics, Gauss' law, electric field and potential, capacitance, resistance, DC circuits, magnetic field, Ampere's law, inductance. (Credit or coregistration in 1016-253 or 1016-243) (1017-311,312) Class 7, Credit 5 (F, W, S)
- 1017-314 Modern Physics I
An introductory survey of modern physics at the sophomore level. Fundamentals of relativity; photons; interaction of radiation with matter; deBroglie waves; Bohr model; introduction to quantum mechanics through the application of Schrodinger equation to the hydrogen atom. (1016-305, 1017-312,313) Class 4, Credit 4 (F, W, S)
- 1017-315 Modern Physics II
A continuation of a survey of modern physics at the sophomore level. This course introduces the fundamentals of multi-electron atoms, statistical treatment of systems of particles, elementary solid state physics, applications to semiconductors and nuclear and particle physics. (1016-314) Class 4, Credit 4 (S)
- 1017-316 Particle Physics, Stars & the Big Bang
This course is a second course in modern physics and designed for students who have completed the introductory modern physics course. Topics include: an introduction to the structure of nuclei, nuclear reactions, and elementary particle physics; the creation of the elements through the lives of stars, hydrogen fusion, black holes, supernovae; the origin and fate of the universe from the Big Bang to the unknown future. (1017-314 or permission of instructor) Class 4, Credit 4 (offered upon sufficient request) (S)
- 1017-317 Introduction to Computational Physics & Programming
An introduction to techniques of computational physics, such as numerical differentiation, integration, solutions of the equations of Newtonian mechanics, coupled differential equations. The course includes a very brief introduction to computer programming, focusing on documentation, style and clarity, as well as introducing functional programming language. (Credit or coregistration in 1017-312 and 1016-252) Class 4, Credit 4 (S)
- 1017-320 Principles of Optics
An introductory course in physical and geometrical optics. Wave and photon description of light; propagation of electromagnetic waves in vacuum and transparent media; mirrors, lenses, and simple optical instruments; basics of optical fibers; polarization of light and polarizing optical elements; interference; Michelson interferometer; Fraunhofer and Fresnel diffraction; diffraction gratings. (1017-213,1017-273,1016-206) Class 4, Credit 4 (W)
- 1017-321 Introduction to Laboratory Techniques
An introduction to equipment and procedures common to the physics research laboratory. The oscilloscope and AC circuit analysis, statistics, vacuum systems including vacuum pumps and gauges, the laboratory notebook and writing for publication. (1017-313) Class 3, Lab 3, Credit 4 (W)
- 1017-331 Introduction to Electricity & Electronics
Fundamentals of electricity; construction and measurements of electrical and electronic circuits encountered in a scientific laboratory. (1017-211, 212, 271, 272) Class 3, Lab 3 Credit 4 (offered upon sufficient request) (S)
- 1017-341 Foundations of Scientific Thinking
Definition of science; historical perspective; ingredients of the scientific quest; the scientific method; scientific explanation, laws, theories and hypotheses; the role of mathematics; probability and induction; science and other disciplines. (At least a year of basic sciences at the college level) Class 2, Credit 2 (offered upon sufficient request) (F, W)
- 1017-350 Sophomore Physics Seminar
A study of concepts that unify the diverse topics covered in the introductory physics sequence. Preparation for Comprehensive Oral Exam I. Techniques of physics literature searches and the preparation and organization of technical papers and oral presentations. Physics majors must pass this course before going on to 400-level courses. (1017-311,312,313,314) Class 2, Credit 1 (S)
- 1017-351 Radiation Physics I
Introductory modern physics emphasizing radiation phenomena. Atomic physics, nuclear physics, radioactivity, production of radionuclides, interaction of charged particles and neutrons with matter. (1017-213; competency in algebra, geometry and trigonometry; 1016-309 recommended) Class 4, Lab 3, Credit 5 (F)
- 1017-352 Radiation Physics II
Interaction of x-rays and gamma-rays with matter. Radiation detectors, scintillation detectors, solid state detectors. Radionuclide imaging instrumentation. (1017-351) Class 4, Lab 3, Credit 5 (W)
- 1017-353 Radiation Physics III
Principles of radiation protection. Radiation protection instrumentation. Internal and external dose calculations. Practical radiation health physics. Introduction to electronics, including laboratory. (1017-352) Class 4, Lab 3, Credit 5 (S)
- 1017-355 Radiation Protection
Principles and practical aspects of radiation protection; calculation of external and internal radiation dose measurements. (Permission of instructor and one year of college-level physics) Class 3, Credit 3 (S)

- 1017-358 Nuclear Medicine Physics & Instrumentation
An introduction to radiation, radioactive materials and radiation detection to provide students with the background for understanding and working with radiation and radioactive materials. Principles of radiation detection systems and clinical uses are presented. Class 5, Lab 3, Credit 6 (SU)
- 1017-359 Special Topics: Physics
Intermediate courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specific prerequisites, contact hours and examination procedures. Topics could include introductory statistical mechanics, plasma physics, general relativity, linear integrated circuits, cryogenics, radio astronomy, history of physics, astrophysics, astronomy. The level of study is appropriate for students in their first three years of study/Class variable, Credit variable (offered upon sufficient request)
- 1017-361 Ultrasonic Physics
The basic physics of ultrasound, covering ultrasonic wave generation and propagation, transducers, Doppler effect, reflection and refraction, biological effects and applications of ultrasonic physics in medicine. (Permission of instructor and one year of college-level physics) Class 4, Lab 3, Credit 5 (F)
- 1017-374 Modern Physics Laboratory
Basic experiments representative of the experimental foundations of modern quantum physics, such as photoelectric effect, Franck-Hertz experiment, X-ray diffraction, optical diffraction and interference, atomic spectroscopy, electron microscopy, nuclear spectroscopy, radioactive half-life, Millikan oil drop, black-body radiation. (1017-314,1017-321) Lab 3, Credit 1 (S)
- 1017-395 Physics Research
Faculty-directed student project or research involving laboratory work or theoretical calculations that could be considered of an original nature. The level of study is appropriate for students in their first three years of study. (Permission of instructor) Class variable, Credit variable (offered every year)
- 1017-399 Physics Intermediate Independent Study
Faculty-directed study of appropriate topics on a tutorial basis. The level of study is appropriate for students in their first three years of study. Class variable, Credit variable
- 1017401 Intermediate Mechanics I
Particle dynamics in one, two and three dimensions; systems of particles; conservation laws; rigid body motion; gravitational fields and potentials. (Credit or coregistration in 1017-480) (1016-306,1017-312,313) Class 4, Credit 4 (F)
- 1017402 Intermediate Mechanics II
Translating and rotating coordinate systems, mechanics of continuous media, wave motion, Lagrangian formulation of mechanics. (1017-401, 480) Class 4, Credit 4 (W)
- 1017-411 Electricity & Magnetism I
Electric and magnetic fields using vector methods, Gauss's law, theory of dielectrics, Ampere's law and Faraday's law, vector potential, displacement current, Maxwell's equations, wave propagation in dielectrics and conductors; production and propagation of radiation. (1016-306; 1017-312, 313, 480) Class 4, Credit 4(F)
- 1017412 Electricity & Magnetism II
Electric and magnetic fields using vector methods, Gauss's law, theory of dielectrics, Ampere's law and Faraday's law, vector potential, displacement current, Maxwell's equations, wave propagation in dielectrics and conductors; production and propagation of radiation. (1016-306; 1017-312, 313, 411, 480) Class 4, Credit 4 (W)
- 1017415 Thermal Physics
Introduction to the principles of classical thermodynamics and kinetic theory. Equations of state, the First and Second Laws of Thermodynamics, entropy, thermodynamic potentials, applications of thermodynamics and kinetic theory of gases. (1016-305; 1017-312,313) Class 4, Credit s (W)
- 1017-421 Experimental Physics I
The elements of advanced laboratory work, including the importance of detailed experiment planning, are presented. The requirement of effective communication of results is also an integral part of the course. Experiments are chosen from any area of physics compatible with department facilities: optics, thin films, cryogenics, semiconductors, acoustics, nuclear, etc. (1017-314, 321, 374, 431 plus coregistration or credit in any one of these: 1017-401, 411,415,455) Class 1, Lab 5, Credit 3 (W)
- 1017422 Experimental Physics II
The elements of advanced laboratory work, including the importance of detailed experiment planning, are presented. The requirement of effective communication of results is also an integral part of the course. Experiments are chosen from any area of physics compatible with department facilities: optics, thin films, cryogenics, semiconductors, acoustics, nuclear, etc. (1017-314, 321, 431 plus coregistration or credit in any one of these: 1017401, 411, 415,455) Class 1, Lab 5, Credit 3 (S)
- 1017-431 Electronic Measurements
Laboratory course in electronic measurements and instrumentation, with theory and applications of discrete and integrated circuits in analog and digital electronics. (1017-313, either 1017-321 or permission of instructor) Class 3, Lab 3, Credit 4(F)
- 1017-432 Computer Interfacing to Laboratory Instrumentation
An introduction to microcomputer interfacing with associated laboratory exercises. Emphasis on the interface circuits using an 80286-based microprocessor. Covers elementary logic circuits, computer architecture, assembly language programming, serial and parallel interfaces, A/D and D/A conversion, RS-232C, IEEE488 and other industry standards. (1017-331 or 431 or equivalent) Class 3, Lab 3, Credit 4 (offered upon sufficient request) (F)
- 1017435 Introduction to Chaotic Dynamics of Physical Systems
Basic concepts for visualizing the behavior of nonlinear physical systems. Use of the computer as an exploratory tool for generating and observing transitions between periodic and chaotic behavior. The driven, damped pendulum as a model dynamical system for exploring such concepts as sensitivity to initial conditions, routes to chaos, strange attractors and fractal basin boundaries. Students are asked to extend general ideas to a specific physical system by performing a term project. (1017-317,401) Class 4, Credit 4 (offered upon sufficient request) (F or W)
- 1017-440 Stellar Astrophysics
A survey of basic concepts of the astrophysics of stars and stellar systems. Observed characteristics of stars, stellar atmospheres, stellar structure, stellar evolution, interstellar medium and Milky Way. (1017-301 or permission of instructor, 1017-314) Class 4, Credit 4 (offered upon sufficient request) (W)
- 1017-441 Galactic & Extragalactic Astrophysics
A survey of the basic concepts of the astrophysics of stellar systems, galaxies, and cosmology. Emphasizes extragalactic astronomy and high-energy processes. (1017-301 or permission of instructor, 1017-314) Class 4, Credit 4 (offered upon sufficient request) (S)
- 1017-445 Observational Astronomy
This course provides a practical, hands-on introduction to optical astronomy. Students will use the RIT Observatory telescopes and CCD cameras to take images of celestial objects, reduce the data, and analyze the results. The course will emphasize the details of image processing required to remove instrumental effects from CCD images. (1017-301 or permission of instructor) Class 4, Credit 4 (offered upon sufficient request) (F)
- 1017455 Optical Physics I
Physical optics including interference, diffraction and polarization. Brief introduction to modern optics. (1016-305; 1017-312,313,480) Class 4, Credit 4 (F)
- 1017-480 Mathematical Methods of Physics I
This course serves as an introduction to the tools needed to solve intermediate and upper-level physics problems. Topics to be covered include matrix algebra, vector calculus, Fourier analysis, and partial differential equations in rectangular coordinates. (1016-306,1017-312,313) Class 4, Credit 4 (F)
- 1017481 Mathematics Methods of Physics II
This course is a continuation of 1017-480. In the context of intermediate-level physics problems, this course serves as an introduction to the tools needed to solve those encountered in upper-level physics courses. Topics typically covered include series solutions to ordinary differential equations, solving partial differential equations in various coordinate systems, phase-space treatment of differential equations (stability, non-linear systems), matrix eigenvalue problems, and the calculus of variations. (1017480) Class 4, Credit 4, (W)
- 1017-511 Experimental Optics
Advanced laboratory course with experiments based on topics in Optical Physics I and II. Laboratory work includes experimental design, construction, data collection, analysis and reporting. (1017-455) Lab 6, Credit 3 (offered upon sufficient request) (F or W)

1017-521 Advanced Experimental Physics
Advanced laboratory experiments and projects in atomic physics, nuclear physics or solid state physics. Special emphasis on experimental research techniques. (1017-412,421) Lab 6, Credit 2 (F)

1017-522 Quantum Mechanics I
A study of the concepts and mathematical structure of nonrelativistic quantum mechanics. Wave functions and the Schrodinger equation. Solutions to the one-dimensional and three-dimensional time-independent Schrodinger equation. Stationary states and their superposition to produce time-dependent states. Quantum-mechanical operators, commutators, and uncertainty principles. Solutions to central potential problems, including the hydrogen atom. (1017-314,402,480) Class 4, Credit 4 (F)

1017-523 Quantum Mechanics II
Continued study of the concepts and mathematical structure of non-relativistic quantum mechanics presented in Quantum Mechanics I, with an emphasis on applications to real physical systems. Topics to be covered include: orbital angular momentum, effect of magnetic field on spinning charged particles, systems of identical particles, many-electron atoms and band structure solids, absorption and emission of radiation by atoms. (1017-522) Class 4, Credit 4 (W)

1017-531 Solid State Physics
The structure of solids and their thermal, mechanical, electrical and magnetic properties. (1017-315,415,480 and 522) Class 4, Credit 4 (F)

1017-539 Astrophysics Research
Faculty-directed student project or research involving observational or theoretical work that could be considered of an original nature. (1017-445 or permission of instructor) Class variable, Credit variable (offered every year)

1017-540 Astronomical Instrumentation & Techniques
A survey of modern instrumentation and techniques used in astronomical data acquisition. Topics include astronomical sources, observational limits, telescopes, atmospheric effects, spectrographs, dilute apertures and detectors. (1017-455 or permission of instructor) Class 3, Credit 3 (offered upon sufficient request) (F or W)

1017-550 Senior Physics Seminar
A study of concepts that unify the diverse topics covered in the intermediate and advanced physics courses. Preparation for Comprehensive Oral Exam II. Preparation and organization of technical papers as well as the oral and poster presentation of such papers. (1017-402, 412, 415, 455, 522) Class 2, Credit 1(F)

1017-553 Nuclear Physics
A study of the structure of the atomic nucleus as determined by experiments and theory. Description and quantum mechanical analysis of nuclear properties, radioactivity and nuclear reactions. (1017-522) Class 4, Credit 4 (offered on sufficient request) (F or W)

1017-555 Optical Physics II
This course is an extension of Optical Physics I (1017-455). It covers coherence theory, fourier optics, holography, gradient index optics, and other modern optics topics. (1017-455) Class 4, Credit 4 (offered upon sufficient request) (F or W)

1017-556 Laser Physics
The semiclassical theory of the operation of a laser, characteristics and practical aspects of laser systems, applications of lasers in scientific research. (1017-455) Class 4, Credit 4 (offered upon sufficient request) (F or W)

1017-559 Special Topics
Advanced courses that are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specific prerequisites, contact hours and examination procedures. Topics could include introductory statistical mechanics, plasma physics, general relativity, linear integrated circuits, cryogenics, radio astronomy, history of physics, astrophysics, astronomy. (The level of study is appropriate for students in their fourth or fifth years of study.) Class variable, Credit variable (offered upon sufficient request)

1017-595 Advanced Physics Research
Faculty-directed student project or research involving laboratory work or theoretical calculations that could be considered of an original nature. The level of study is appropriate for students in their fourth and fifth years of study. (Permission of instructor) Class variable, Credit variable (offered every year)

1017-599 Physics: Advanced Independent Study
Faculty-directed study of appropriate topics on a tutorial basis. The level of study is appropriate for students in their fourth or fifth years of study. Class variable, Credit variable

1017-602 Statistical Physics
Introduction to the statistical description of systems of particles with mechanical, electrical, and thermal interactions. Statistical calculation of thermodynamic quantities. Basic methods and results of statistical mechanics. Applications of statistical mechanics to elementary classical and quantum systems. (1017-314, 1017-415,1017-480) Class 4, Credit 4 (offered upon sufficient request)

General Science

1018-210,211 General Science Exploration I, II
This course provides an introduction to the opportunities available within the College of Science and RIT. It offers the students the opportunity to increase their knowledge of science programs and careers, develop group skills, and establish a sense of community within the group. Class 2, Credit 1 (F, W)

1018-621 Build Scientific Apparatus Laboratory
Basic skills associated with the construction of scientific laboratory apparatus, some of which is not commercially available, are covered: machine shop skills, working with glass, vacuum line technology, optical spectrometer design and instrument electronics. (Corequisite 1008-620) (1014-441; 1017-212, 213 or 312,313; or permission of instructor) Lab 4, Credit 1 (offered upon sufficient request)

Medical Sciences

1024-210 Medical Technology Seminar
Introduction to the profession of medical technology through a series of lectures that provide an overview of the major departments within the modern clinical laboratory. Historical perspectives, developmental aspects and regulating standards of the medical technology profession are discussed. Class 1, Credit 1 (F)

1024-401 Hematology/Immunohematology
A study of the blood (erythrocytes, leukocytes, platelets, coagulation factors and blood group antigens). Descriptions of the cellular components of the blood in health and in disease. Cellular and immunological functions and their interrelationships. Hemostasis and coagulation mechanisms. Structures of antigens and antibodies and mechanisms of antigen-antibody reactions. Lab procedures demonstrate cell counting techniques, coagulation studies, antigen-antibody reactions and compatibility testing of various blood groups. (1026-360 or permission of instructor) Class 3, Lab 3, Credit 4 (F)

1024-432 Clinical Laboratory Instrumentation
Principles of clinical laboratory instruments in the analysis of body fluids. This quarter stresses the principles of instrumental methods of analysis including visible and ultraviolet spectrophotometry, nephelometry, fluorometry, flame photometry, refractometry, chromatography, electrophoresis, osmometry, radiation counters and coulometric/amperometric techniques. (1011-217 or equivalent) Class 2, Lab 6, Credit 4 (W)

1024-433 Basic Clinical Chemistry
Principles of clinical chemistry in the analysis of the chemical component of body fluids. This quarter stresses the basic chemistries underlying the classical methodologies and relates them to the disease state. Topics include liver function tests, renal function tests, carbohydrates, electrolytes, acid base balance, enzymes, lipids, endocrine function tests, drug analysis and statistical quality control. (1011-217 or equivalent) Class 2, Lab 6, Credit 4 (S)

1024-450 Medical Laboratory Testing
Emphasizes the role of clinical laboratory testing in the areas of blood banking, clinical chemistry, hematology, urinalysis and serology. Relates laboratory values with disease states. (Third year in the PA program) Class 4, Credit 4 (S)

1025-301 Clinical Aspects of MRI
Principles of clinical magnetic resonance imaging in different organ systems. Lectures stress system operation, instrumentation and protocols for imaging, applying basic MRI principles. Topics include image quality and contrast, pulse sequences, clinical applications and management of an MR center. Credit 3 (offered upon sufficient request)

- 1025-401 Introduction to Clinical Nuclear Medicine
A combination lecture/laboratory course introducing clinical aspects of nuclear medicine. This course includes an introduction to the principles of NM imaging, commonplace NM studies, radiopharmacy, ethics in NM, and hospital organization. Laboratories at affiliated hospitals are correlated with lectures upon site availability. Credit 2 (S, SU)
- 1025-402 Nuclear Medicine Procedures: Central Nervous System
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the central nervous system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year in the NMT program) Credit 1 (S)
- 1025-502 Nuclear Medicine Procedures: Skeletal System
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the skeletal system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year in the NMT program) Credit 1 (F)
- 1025-503 Nuclear Medicine Procedures: Respiratory System
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the respiratory system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year in the NMT program) Credit 1 (F)
- 1025-510 Nuclear Medicine Procedures: Urinary System
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the urinary system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year in the NMT program) Credit 1 (W)
- 1025-511 Nuclear Medicine Procedures: Endocrine System
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the endocrine system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year in the NMT program) Credit 2 (W)
- 1025-512 Nuclear Medicine Procedures: Cardiovascular System
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the cardiovascular system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year in the NMT program) Credit 2 (F)
- 1025-513 Nuclear Medicine Procedures: Digestive System
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the digestive system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year in the NMT program) Credit 2 (W)
- 1025-514 Nuclear Medicine Procedures: Special Studies
A combination lecture/practicum course. Lectures are given on specific imaging procedures involving special studies. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth year in the NMT program) Credit 1 (S)
- 1025-515 Nuclear Medicine Procedures: Hematological & In-Vitro Studies
Lectures are given on specific non-imaging procedures utilized in nuclear medicine for the evaluation of patients with hematopoietic and lymphatic system disorders. Fundamental principles, techniques, data calculations and test interpretations are covered for each procedure discussed. (Fourth year in the NMT program) Credit 2
- 1025-516 Instrumentation & Computers in Nuclear Medicine
A combination lecture/practicum course covering radiation detection instrumentation found in a nuclear medicine clinical setting. The lectures provide knowledge of the function and characteristics of the basic components of any scintillation detection system necessary to understand its applications in nuclear medicine. Lectures are reinforced through clinical practicums in which the student operates the equipment. Topics include: detection systems, collimation, tomography, quality control, and computer systems. (Fourth year in the NMT program) Credit 2 (F)
- 1025-517 Radiochemistry & Radiopharmacology
A combination lecture/lab course covering the production and use of radioisotopes in medicine. Radiopharmaceutical compounding, quality control procedures, dose calibration and licensing regulations regarding the handling and use of radiopharmaceuticals are covered. (Fourth year in the NMT program) Credit 2 (S)
- 1025-518 Radionuclide Therapy
A course that addresses the application of radionuclides in the treatment of disease including the study of the biological changes which occur following irradiation. (Fourth-year in the NMT program) Credit 1 (W)
- 1025-521 Review in Nuclear Medicine
Discussion of all aspects of nuclear medicine covered during the clinical internship including preparation for the national certification exams in nuclear medicine technology. (Fourth year in the NMT program) Credit 2 (S)
- 1025-522 Clinical Nuclear Medicine I
A clinical practicum that gives the student the opportunity to learn and master nuclear medicine procedures through technical and practical experience. Each student is assigned a particular combination of three hospitals and trains approximately three months in each. Students work with patients under the supervision of physicians and technologists on the hospital staff. Student progress and performance is monitored by the RIT nuclear medicine technology clinical coordinator, who makes periodic visits to the hospital department. (Fourth year in the NMT program) Credit 7 (F)
- 1025-523 Clinical Nuclear Medicine II
Continuation of Clinical Nuclear Medicine I. (Fourth year in the NMT program) Credit 7 (W)
- 1025-524 Clinical Nuclear Medicine III
Continuation of Clinical Nuclear Medicine II. (Fourth year in the NMT program) Credit 7 (S)
- 1026-203 Medical Science Freshman Seminar
Basic skills, techniques and instruction for incoming students to develop strategies for a successful RIT experience. Topics include diversity, study skills, community service, and self-discovery and awareness. Class 1, Credit 1 (F)
- 1026-205 Introduction to Diagnostic Medical Imaging
An entry-level exploration of the historical, professional and occupational development of medical imaging. Current uses and future trends are discussed in the areas of radiography, computed tomography, magnetic resonance, nuclear medicine, and ultrasound imaging. Class 2, Credit 2 (F, S)
- 1026-220 Medical Laboratory Procedures
This first part of a three-course sequence (see 1026-221,222 following) is a survey of the most frequently performed laboratory tests used in the diagnosis and treatment of disease and maintenance of health. The fundamentals of medical laboratory procedures are reinforced by laboratory experiences in microscopy, urinalysis, clinical chemistry, hematology, serology and bacteriology. Laboratory safety and quality assurance are also stressed. This course may not be taken by medical sciences majors to fulfill degree requirements. Class 3, Lab 2, Credit 4(F)
- 1026-221 Health Awareness
In this continuation of 1026-220 (see above) the opportunity is provided to explore the effects of common stressors on lifestyle. Basic structure and function of selected human body systems are discussed and related to factors such as diet, alcohol, drugs, smoking, stress and the environment. Lecture, discussion, demonstrations and student participation are used to explore health-related issues. Class 4, Credit 4 (W)

- 1026-222** **Human Diseases**
A general survey of human diseases from a systematic approach with emphasis on disease symptoms, etiology, diagnosis and prognosis. Also included are the topics of immunology, oncology, endocrinology and pathophysiology. Upon completion of this course students will have a basic knowledge of many diseases that afflict mankind. **Class 3, Lab 2, Credit 4 (S)**
- 1026-230** **Computers in Medicine**
An introduction to computer technology and its use in the medical field. A study of large computer systems and microcomputers as well as related software. Exposure through demonstration and computer laboratory assignments to personal productivity software such as word processors, spreadsheets, database systems and electronic communications. A study of major applications of computers in medicine, including hospital information systems (HIS), laboratory information systems (LIS), medical imaging, disease diagnosis, patient treatment, medical education and biomedical research. **Class 4, Credit 4 (F, W)**
- 1026-301** **Medical Terminology**
Emphasizes etymology, definition, pronunciation and correct utilization of medical terms, which enables students to develop a vocabulary essential to the understanding of and communication with the various health areas in which allied health professionals will serve. **Class 3, Credit 3 (F, S)**
- 1026-305** **Sports Physiology & Life Fitness**
A contemporary science course that provides a foundation for understanding the importance of nutrition and energy transfer in maximizing the potential for exercise and training. In addition to the basic principles of exercise physiology, a variety of contemporary issues are covered, including use of legal and illegal aids, cardiovascular fitness and disease prevention, training methodologies and fitness assessment. Particularly appropriate for individuals interested in maintaining their level of physical fitness and wellness, participating in competitive athletics or working in recreation or physical therapy. (Distance learning offering) **Class 4, Credit 4 (F, S, SU)**
- 1026-306** **Fitness Prescription Programming**
This course is designed to help students develop the skills and knowledge necessary to provide safe and appropriate fitness assessments and exercise programs. The American College of Sports Medicine objectives for health fitness instructor certification serve as the core learning objectives. Students will practice exercise testing and prescription skills at various points throughout the course. (1026-305) **Class 4, Credit 4**
- 1026-307** **Exercise Prescription**
This course is designed for those who work in the field of exercise/fitness or medical health care who work with individuals and patients with diagnosed disease states or other significant limitations who would benefit from appropriately designed and prescribed exercise programs. The course will review theoretical and diagnostic value of testing, create exercise prescriptions, and understand the therapeutic benefit exercise will have on specific conditions. Some topics to be addressed include: rheumatoid arthritis, diabetes, high blood cholesterol, obesity, pulmonary disorders, coronary heart disease, cystic fibrosis, hypertension, low functional capacity and aging. (1026-306) **Class 4, Credit 4**
- 1026-310** **Radiation Effects on the Human Body**
Details qualitative and quantitative effects on the human body of exposure to various amounts and types of ionizing radiation and the benefits of the medical uses of radiation. Presents a rationale for the safe handling and use of radioactive materials. **Class 2, Credit 2**
- 1026-333** **Patient Care**
This course is designed for students in the medical sciences and biological sciences. The course will introduce and develop basic skills for providing integrated patient care through assessment, communication and continuous care. The course will also introduce students to the concept of medical ethics and infection control issues related to their future patients. **Credit 2 (S)**
- 1026-350** **Anatomy & Physiology I**
An integrated approach to the structure and function of the nervous, endocrine, integumentary, muscular and skeletal systems. Laboratory exercises include histological examinations, anatomical dissections and physiological experiments using human subjects. (1001-253 or equivalent or permission of instructor for nonscience majors) **Class 4, Lab 3, Credit 5 (F)**
- 1026-351** **Trends in Allied Health**
A seminar series that provides students with exposure to current issues of concern to the clinical laboratory scientist. **Class 1, Credit 1 (F)**
- 1026-352** **Medical Laboratory Management**
A seminar series that provides students with exposure to basic management concepts and topics related to maintaining effective laboratory operations. **Class 1, Credit 1(W)**
- 1026-353** **New Medical Technologies**
A seminar series that provides students with exposure to the latest techniques and scientific discoveries modernizing the clinical laboratory. **Class 1, Credit 1 (S)**
- 1026-360** **Anatomy & Physiology II**
An integrated approach to the structure and function of the gastrointestinal, cardiovascular, immunological, respiratory, excretory and reproductive systems with an emphasis on the maintenance of homeostasis. Laboratory exercises include histological examinations, anatomical dissections and physiological experiments using human subjects. (1026-350 or permission of instructor) **Class 4, Lab 3, Credit 5**
- 1026-415** **Medical Pathophysiology**
Presents the physiologic and pathologic processes that underlie the spectrum of human disease entities. Taught in the context of clinical scenarios that demonstrate the basic science principles in a real-world context of health care. Material is presented in the context of case studies, utilizing clinical findings and addressing underlying basic physiologic, biochemical and immunologic processes as they relate to patient care and individual patient problem cases. (1026-350,360) **Credit 4 (F,S)**
- 1026-501** **Medical Botany**
This course is intended to introduce the student to the subject of medical botany. A detailed study will be made of those members of the plant kingdom that are medically useful in preventing, treating, or curing disease states. Where possible, the active chemical ingredient(s) will be defined for each medicinal plant described. Emphasis will be placed on those plant substances that are useful in the treatment of cancers, nervous system disorders, heart and circulatory diseases, metabolic disorders, sensory organ diseases, dental disease, gastrointestinal disorders, respiratory diseases, urogenital diseases, skin diseases, infections, and mental disorders. When available, the data from clinical trials and clinical studies will be discussed. (1001-203 and 1013-233) **Class 3, Credit 3 (W) (offered alternate years)**
- 1026-519** **Radiation Protection**
A course designed to familiarize the student with the daily routine of safe handling of radioactive materials. Radiation protection, licensing regulations, decontamination procedures, waste disposal and area surveys are covered. **Course 2, Credit 2 (W)**
- 1026-559** **Special Topics: Medical Sciences**
Advanced courses that are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures. **Class variable, Credit variable (F, W, S)**
- 1026-599** **Independent Study: Medical Sciences**
Faculty-directed study of appropriate topics on a tutorial basis. Enables an individual to pursue studies of existing knowledge available in the literature. **Class variable, Credit variable (F, W, S)**
- 1027-201** **Introduction to Biomedical Computing**
An introduction to the applications of computers in health care. Information concerning career opportunities and cooperative education is also provided. **Class 1, Credit 1 (W)**
- 1027-305** **M Programming**
An in-depth study of the M programming language and its database capabilities. Programming projects are required and are taken from the health care field. Direct mode, local/global/special variables, commands, arguments, operators, writing and executing routines, M editors, screen/printer formatting, string manipulation, pattern matching, concatenation, arrays and trees, multilevel and string subscripts, input/output using devices, cross reference files, indirection. (1026-230 or permission of instructor) **Class 3, Lab 2, Credit 4**

- 1027-1315** **Internet, Java & Health Care**
An introduction to the Internet as a vehicle for accessing medical information. A study of the Java object-oriented programming language for developing both stand-alone medical applications and interactive applets to be run on the Internet with animation and full multimedia. Applications will include computer simulations, interactive models, teaching tools, and more. Weekly computer assignments will demonstrate the use of Java and the Internet in applications from health care. (1026-230) **Class 3, Lab 2, Credit 4 (S)**
- 1030-412** **Cross-sectional Anatomy**
Basic sectional anatomy of the abdomen and pelvis. Builds on the basic knowledge of anatomy. Prepares the student to recognize sectional anatomy of major human structures, especially as they relate to medical imaging techniques. Lectures are augmented with exercises using prepared human sections, organ modeling and diagnostic imaging units. (1026-350,360 or permission of instructor) **Class 4, Credit 4 (W)**
- 1030-413** **Ultrasound Instrumentation**
Principles of ultrasound physics are directly applied to the use of ultrasound instrumentation in medical imaging. Transducers, signal production, data display, manipulation of controls, quality control, biologic effects and doppler are discussed. Emphasis is on the creation of high-quality images on laboratory scanners. **Class 4, Credit 4 (S)**
- 1030-414** **General Vascular Evaluation**
Provides basic knowledge of general vascular evaluation with an emphasis on the sonographic approach. Two-dimensional real-time imaging and Doppler techniques are presented as well as a discussion of other imaging modalities and their use in vascular evaluation. Performance of examinations on laboratory equipment is stressed. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 4, Credit 4 (S)**
- 1030-552** **Introduction to Obstetrical Ultrasound**
Provides the ultrasound candidate with basic knowledge necessary to perform obstetrical examinations. High-quality image production, recognition of normal structures and basic pathologic states are stressed. Examination protocols, review of specific anatomy, film reading, and use of other imaging techniques are addressed. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 3, Credit 3 (F)**
- 1030-553** **Introduction to Gynecological Ultrasound**
Information necessary to perform basic gynecologic sonographic examinations is presented. Examination strategies for various procedures are explored, as well as the integration of ultrasound into established clinical practices. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 3, Credit 3 (F)**
- 1030-554** **Advanced Obstetrical Ultrasound**
Provides information necessary to perform more sophisticated obstetrical procedures utilizing ultrasound. Examination strategies for various procedures are explored as well as the integration of ultrasound into established clinical practices. This is an internship course. (Fourth year standing in ultrasound program or permission of faculty) **Class 4, Credit 4 (W)**
- 1030-556** **Abdominal Ultrasound I**
Laboratory simulation and classroom instruction are used to develop practical skills and clinical knowledge necessary to perform basic abdominal examinations utilizing ultrasound. High-quality image production, recognition of normal abdominal structures and basic pathologic states are stressed. Examination protocols, review of anatomy, film reading and use of other scanning techniques are addressed. This is an internship course. (Fourth year standing in ultrasound program or permission of faculty) **Class 3, Credit 3 (F)**
- 1030-557** **Abdominal Ultrasound II**
A continuation of 1030-556. Laboratory simulation and classroom instruction are used to develop practical skills and clinical knowledge necessary to perform basic abdominal examinations utilizing ultrasound. High-quality image production, recognition of normal abdominal structures and basic pathologic states are stressed. Examination protocols, review of anatomy, film reading and use of other scanning techniques are addressed. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 3, Credit 3 (F)**
- 1030-558** **Small Parts Ultrasound**
Provides the classroom and clinical knowledge necessary to perform basic sonographic examination of anatomy classified as small parts, usually utilizing specialized equipment and high megahertz frequencies. Examination strategies for various procedures are discussed, as well as the role of ultrasound in established clinical practices utilizing small parts imaging. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Credit 3 (S)**
- 1030-560** **Seminar in Ultrasound**
Candidates prepare a complete plan for an ultrasound department as if they had been hired to establish a new department in a hospital setting. The candidates work together to develop the physical, administrative and financial aspects of a department. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 2, Credit 2 (S)**
- 1030-561** **Advanced Seminar Ultrasound**
Speaking, writing and researching skills are explored. Methods of basic research, developing writing strategies and oral presentations. Students develop or critique a research project and prepare a written document following common publishing guidelines in addition to making oral presentations. This is an internship course. (Fourth year in the ultrasound program or permission of faculty) **Class 2, Credit 2 (W)**
- 1030-570** **Clinical Diagnostic Medical Sonography I**
Prepares the student for application of classroom knowledge to the practice of ultrasound by means of a clinical internship. Performing basic, general ultrasound examinations in both the laboratory and clinical settings is stressed. Nursing procedures, ethical issues and medico-legal considerations also are discussed as they relate to the practice of ultrasound examination. This is an internship course. (Fourth year in the ultrasound program or permission of director) **Credit 7(F)**
- 1030-571** **Clinical Diagnostic Medical Sonography II**
Further prepares the candidate for application of classroom knowledge to the practice of ultrasound by means of a clinical internship. Performing basic, general ultrasound examinations in both the laboratory and clinical settings is stressed. The candidate is expected to perform basic examinations with little, if any, assistance by the end of this course. This is an internship course. (Fourth year in the ultrasound program or permission of director; 1030-570) **Credit 7 (W)**
- 1030-572** **Clinical Diagnostic Medical Sonography III**
Final development of ultrasound examination skills by means of clinical internship. The candidate is expected to perform general ultrasound examinations with no assistance by the end of this course. This is an internship course. (Fourth year in the ultrasound program or permission of director; 1030-571) **Credit 7 (S)**
- 1032-200** **Behavioral Medicine**
Familiarizes physician assistant students with biological concepts and the human life cycle. Provides students with a foundation in basic psychopathology and its relationship to understanding human illness. Addresses basic principles of patient care in the context of biopsychosocial, cultural, and ethical issues while examining social structures in contemporary Western society. (Third year in the PA program) **Credit 2 (S)**
- 1032-201** **Early Clinical Experience I**
This course brings together first year physician assistant students to evaluate the role of the PA as a critical member of the health care team. A thorough understanding of the duties and training of our colleagues in the many health professions is critical to performing as a PA. The numerous professions from clerical staff to understanding the training of our physician supervisors are researched and discussed. Team building exercises are an important aspect of the course. **Class 2, Credit 1 (W)**
- 1032-202** **Early Clinical Experience II**
A continuation of 1032-201, this class begins to examine the various aspects that make our future patients different. Comparing cultural, racial and religious differences is the main focus of this course. Other issues such as sexual orientation and socioeconomic status are also discussed. Students will draw on their own experiences to contribute to the learning process. Attitudes toward diversity are assessed and their impact on patient care is examined. Service learning is a mandatory and critical component of this course.(1032-201) **Class 2, Credit 1(S)**

1032-203	Early Clinical Experience III	Continuation of 1032-201 and 202, students will continue to look at important characteristics of the populations they will serve as clinicians. Topics of domestic violence, child abuse, drug addiction and alcohol abuse are presented. Students will also learn about the demographic and sociographic features of the growing geriatric population. A group community service project and presentation of the project concludes this three-course sequence. (1032-201, 202) Class 2, Credit 1(F)
1032-210	Physician Assistant Seminar	Introduces the student to the role of the physician assistant in relationship to patients, supervising physicians, colleagues and other physician assistants. Emphasis is on developing a high degree of professionalism in conjunction with health care. Topics include legislation, certification, registration, professional organizations, sociomedical issues, ethics, legal and economic aspects of medicine, health care organization and medical records. (Second or third year in the PA program) Class 1, Credit 1 (W)
1032-330	Law & Medicine	This course will provide an overview of health care law, principles and ethics as it relates to the health care provider. Lecture topics will cover an introduction to law, criminal aspects of health care, patient consent issues, legal reporting obligations, contracts and antitrust, information management and health care records, legal risk to the health care provider, end of life issues and malpractice issues. (Third year in the PA program or permission of instructor) Class 2, Credit 2 (W)
1032-401	Patient History & Physical Exam I	This first part of a three-quarter sequence introduces and develops the clinical psychosocial skills and anatomic/physiologic science involved in interviewing and examining patients. Includes practical medical terminology, attitude development and values clarification strategies to aid students in adopting a humanistic approach, interviewing techniques used during patient interaction, comprehensive database, demonstrated techniques for a complete physical examination of all body systems and explanation/implementation of the Problem Oriented Medical Record (POMR). Weekly patient contact. (Third year in the PA program or permission of instructor) Class 2, Credit 2 (F)
1032-402	Patient History & Physical Exam II	This second part of a three-quarter sequence introduces and develops the clinical psychosocial skills and anatomic/physiologic science involved in interviewing and examining patients. Includes performing and writing complete, accurate medical histories and physical examinations with small group instruction. Weekly patient contact. (1032-401) Class 1, Credit 2 (W)
1032-403	Patient History & Physical Exam III	This final part of a three-quarter sequence introduces and develops the clinical psychosocial skills and anatomic/physiologic science involved in interviewing and examining patients. Includes a critical analysis of students performing and writing complete, accurate medical histories and physical examinations. Small group instruction. Weekly patient contact. (1032-402) Class 1, Credit 2 (S)
1032-406	Medical Microbiology	Provides physician assistant students with the understanding of the biology of human pathogens. The students study how this understanding impacts therapeutic modalities for the treatment of human disease. Students have the opportunity to master specific skills that will be central to their roles as practicing physician assistants. (Second year in the PA program) Credit 4 (S)
1032-410	Clinical Skills	Provides for the PA student requisite skills for professional courses and internships. Emphasis is on developing competence in basic skills in conjunction with patient care. (Third year in the PA program or permission of instructor) Class 1, Credit 1 (S)
1032-420	Clinical Pharmacology I	A study of the mechanics of medications: indications, effects, distribution, absorption, metabolism, excretion, interactions, pharmacokinetics and administration/dosing. Emphasizes agents commonly prescribed in the diagnosis and treatment of disease. A body systems approach is utilized to study cardiology, pulmonology, infectious diseases, dental diseases, otorhinolaryngology, neurology and ophthalmology. (Third year in the PA program or permission of instructor) Class 3, Credit 3 (F)
1032-421	Clinical Pharmacology II	Continuation of 1032-420. Indications, effects, distribution, absorption, metabolism, excretion, interactions, pharmacokinetics and administration/dosing. Emphasizes agents commonly prescribed in the diagnosis and treatment of disease. A body systems approach is utilized to study fluids/electrolytes/nutrition, gastroenterology, nephrology, urology, endocrinology and dermatology. (1032-420) Class 3, Credit 3 (W)
1032-422	Clinical Pharmacology III	Continuation of 1032-421. Indications, effects, distribution, absorption, metabolism, excretion, interactions, pharmacokinetics and administration/dosing. Emphasizes agents commonly prescribed in the diagnosis and treatment of disease. A body systems approach is utilized to study hematology, obstetrics, gynecology, orthopedics, surgery, geriatrics, pediatrics and psychiatry. Prescribing and dispensing are discussed. (1032-421) Class 2, Credit 2 (S)
1032-430	Clinical Diagnostic Imaging	Introduces PA students to the principles of diagnostic imaging: physical foundations, recognition of gross abnormalities, determination of a diagnostic impression and application of different diagnostic procedures. Emphasis is on correlating body systems with findings of specific radiographic studies. (Third year in the PA program or permission of instructor) Class 1, Credit 1 (S)
1032-440	Clinical Medicine I	The clinical medicine courses give the PA student the necessary foundation of knowledge and understanding to deal with the patient in the clinical context. This preparation precedes the clinical rotations in which students apply their knowledge in examining patients and expand their expertise in evaluation, clinical procedures and problem solving. A body systems approach is utilized to study cardiology, pulmonology, nephrology, hematology, psychiatry and obstetrics/gynecology. (Third year in the PA program or permission of instructor) Class 15, Credit 4(F)
1032-441	Clinical Medicine II	Continuation of 1032-440. This section covers fluids/electrolytes/nutrition, gastroenterology, neurology, orthopedics, rheumatology/allergy, infectious disease, endocrinology and dermatology. (1032-440) Class 15, Credit 4 (W)
1032-442	Clinical Medicine III	Continuation of 1032-441. Further areas of study encompass emergency medicine, oncology, ophthalmology, dermatology and preventive medicine, surgery, geriatrics, pediatrics. (1032-441) Class 15, Credit 4 (S)
1032-490	PA Clinical Rotation I	Mandatory rotations are in fields of general clinical practice that build a solid basic understanding and groundwork. These required rotations are inpatient medicine, family practice, orthopedics, emergency medicine, OB/GYN, pediatrics, general surgery, geriatrics, and psychiatry. Students also are able to select one elective rotation. These latter rotations allow students to individualize their experiences according to their own areas of interest. (Fourth year in the PA program) Credit 12 (SU)
1032-491	PA Clinical Rotation II	Continuation of PA Clinical Rotation I. (Fourth-year standing in PA program) Credit 12 (F)
1032-492	PA Clinical Rotation III	Continuation of PA Clinical Rotation II. (Fourth-year standing in PA program) Credit 12 (W)
1032-493	PA Clinical Rotation IV	Continuation of PA Clinical Rotation III. (Fourth-year standing in PA program) Credit 12 (S)

1051-446	Multiwavelength Astronomical Imaging	Senior Project II, III
Survey of modern imaging techniques in astronomy. Students analyze astronomical imaging systems in terms of the requirements placed on the systems, and the strengths and limitations of each component in the imaging chain. Examples of specific techniques covered include optical CCD cameras and spectrometers, X-ray CCD imaging spectroscopy, and radio molecular mapping. (1017-314,1017-301 also recommended) Class 3, Lab 1, Credit 4 (S)		
1051-461	Digital Image Processing I	Imaging Systems Analysis I
This course is an introduction to the basic concepts of digital image processing. The student will be exposed to image capture and image formation methodologies, sampling and quantization concepts, statistical descriptors and enhancement techniques based upon the image histogram, point processing, neighborhood processing, and global processing techniques based upon kernel operations and discrete convolution as well as the frequency domain equivalents, geometrical operations for scale and rotation, and grey-level resampling techniques. Emphasis is placed on applications and efficient algorithmic implementation using the IDL programming language. (1016-253,1016-305,1051-211 or equivalent) Class 4, Credit 4		
1051-462	Digital Image Processing II	Imaging Systems Analysis II
This course is an introduction to the more advanced concepts of digital image processing. The student will be exposed to image reconstruction, noise sources and techniques for noise removal, information theory, image compression, video compression, wavelet transformations and the basics of digital image watermarking. Emphasis is placed on applications and efficient algorithmic implementation using the IDL programming language. (1051461) Class 4, Credit 4		
1051-463	Digital Image Processing III	Image Microstructure
This course discusses the digital image processing concepts and algorithms used for the analysis of hyperspectral, multispectral and multi-channel data in imaging science application areas. Concepts are covered at the theoretical and implementation level using current, popular commercial software packages for classroom demonstrations and high-level programming languages for homework and programming assignments. The requisite multivariate statistics will be presented as part of this course as an extension of the univariate statistics that the students have been exposed to previously. Topics to be covered will include methods for supervised data classification, clustering algorithms and unsupervised classification, multispectral data transformations, data redundancy reduction techniques, image-to-image rectification, and data fusion for resolution enhancement. (1051-211 (or equivalent), 1016-351,1061-352) Class 4, Credit 4		
1051499	Imaging Science Co-op	Design & Fabrication of Solid State Camera
Cooperative education experience for undergraduate imaging science students. Credit 0 (offered every quarter)		
1051-501	Senior Project I	Special Topics: Imaging Science
Develops skills in scientific research, including use of library resources, technical report writing, technical presentations. Students are required to research, write and present a proposal for a research project. The proposed research is performed in 1051-502,503. (Matriculation in SIMG) Class 3, Credit 3 (F)		
1051-502,503		Independent Study
Students perform the independent research project defined in 1051-501 under the direction of a faculty member in imaging science. The student presents the results of the project to a public meeting at the end of spring quarter. Class 1, Credit 1-3 (W-502, S-503)		
1051-511		
This first course introduces the necessary mathematical topics, e.g., vector space, matrix algebra, complex functions, special functions and Fourier series. The concepts of continuous and discrete convolution, Fourier transform, linear systems in both one and two dimensions are examined and then applications of these concepts to the evaluation of imaging systems is considered. Emphasis is placed on understanding the underlying mathematical principles and their connection to real-life applications. The perspective of modeling an imaging system as a linear system is introduced from the beginning and is maintained throughout the course. Finally, some examples of imaging systems, including cascaded systems are used to describe how and why output depends on the system design parameters. (1051-313, 1051-401, 1051-462 or permission of instructor) Class 4, Credit 4 (F)		
1051-512		
A continuation of 1051-511 extending the linear-systems formalism for analyzing and characterizing imaging systems; point, line and edge spread functions; optical, modulation and phase-transfer functions; coherent and incoherent optical systems. (1051-511) Class 4, Credit 4 (W)		
1051-513		
This course examines the spatial properties of both linear and non-linear imaging processes. Instrumental techniques are examined for the experimental characterization of noise (granularity) and resolution properties of images and imaging processes. The control of tone and color reproduction through both optical and digital strategies of halftone imaging is described. Also described are temporal microstructure effects in real-time imaging systems such as television and motion pictures. Emphasis is also placed on the underlying physical, chemical and optical mechanisms that impact microstructure of images and systems. (1051-403) Class 3, Lab 1, Credit 4 (S)		
1051-528		
The purpose of this course is to provide the student with hands-on experience in building a CCD camera. The course provides the basics of CCD operation including an overview, CCD clocking, analog output circuitry, cooling and evaluation criteria. (Senior status imaging science or permission of instructor) Class 1.5, Lab 7.5, Credit 4 (W)		
1051-553		
Topics of special interest, varying from quarter to quarter, selected from the field of imaging science and not currently offered in the curriculum. Specific topics are announced in advance. (Not offered each quarter. Consult director of the Center for Imaging Science) Class variable, Credit variable		
1051-599		
A student-proposed advanced project sponsored by an instructor. Approval required by the department chairperson and the director of the school. Available to upper-level students with a GPA of 3.0 or greater. Credit variable		

National Technical Institute for the Deaf

Index

0801	Accounting Technology	308
0804	Business Technology/Administrative Support	314
0805	Applied Computer Technology	309
0806	Interdisciplinary Studies	306
0812	Computer Integrated Machining Technology	318
0813	Computer Integrated Machining Technology	318
0820	Healthcare Billing & Coding Technology	324
0825	Art & Computer Design	311
0827	Applied Optical Technology	320
0853	Pre-baccalaureate Studies	331
0860	Speech & Language	334
0875	ASL-English Interpretation	306
0876	Deaf Studies Certificate	335
0878	Digital Imaging & Publishing Technology	320
0879	Laboratory Science Technology	327
0880	Communication Studies	316
0880	Humanities	316,319,324
0881	Performing Arts	319,326
0882	Social Sciences	320,333
0883	English	323
0884	Mathematics	329
0885	Science	331
0886	American Sign Language	319,325
0886	Deaf Studies	319
0890	Computer Aided Drafting Technology	316
0891	Automation Technologies	313

Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100-399); upper division (400-699); or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites and/or corequisites are noted in parentheses near the end of the course description.

Interdisciplinary Courses

0806-101 Job Search Process
Course goals are to prepare students to secure a cooperative or professional work experience in the student's major and to assist the student in acquiring the skills for accessing information, networking, developing resumes and letters, completing various employment-related forms, interviewing, and using various communication techniques in preparing students for the job search process. Class 2, Credit 2 (F, W, S)

0806-201 Employment Seminar
Provides the student with an opportunity to synthesize a work experience with knowledge gained in technical and liberal arts courses in order to prepare for permanent employment. Experiences will include resume revisions, further research into potential permanent employment, including accessing professional journals, electronic networks, and interviewing for permanent employment. Discussions relating to financial considerations to be used in evaluating employment opportunities and individual roles with the organization will also be included. Class 1, Credit 1 (F, W, S)

8087-200 Freshman Seminar
Provides entering NTID students with opportunities to enhance personal, social, intellectual, academic, and ethical decision making in order to maximize their college experience. Students have opportunities to explore and negotiate the college environment, confront questions of identity and social roles, and deal with ethical issues with faculty members and peer mentors, expand critical thinking skills, learn and use academic skills. Course emphasizes student self-assessment of current strengths and areas of needed improvement along with development of plans for ongoing growth, rather than attainment of skill mastery within a quarter-length course. Class 2, Credit 2 (F, W)

8087-210 Career Decision Making
This course provides the students with information and experience regarding career choices and selecting a major. Students will develop a career plan after completing career and self-assessments, learning about the career decision-making model, and gathering information from career and direct exposure to academic disciplines (program sampling). Class 1, Lab 2, Credit 2 (W, S)

ASL-English Interpretation

0875-201 American Sign Language I
ASL I introduces linguistic features, cultural protocols, and core vocabulary. On successful completion, students will be able to participate fully in basic ASL conversations. This course is designed for students who have no prior knowledge of American Sign Language. Class 4, Credit 4 (F, W, S, Su)

0875-202 American Sign Language II
ASL II expands on the basic principles presented in ASL I. ASL II students extend their knowledge of linguistic features, cultural protocols, and core vocabulary. ASL II students' conversational skills develop into basic communicative competence. (0875-201) Class 4, Credit 4 (F, W, S)

0875-203 American Sign Language III
ASL III prepares students for admission to the interpreting course sequence. Students are challenged in ASL III to improve their communicative competence to the intermediate level. On successful completion of ASL III, students will have a thorough grounding in ASL semantics, syntax, and cultural protocols and the Deaf community. (0875-202) Class 4, Credit 4 (S, Su)

0875-211 Intercultural Communication for Interpreters
Students examine their own cultural background and how this influences face-to-face interaction. Major concepts that will be addressed include the influence of culture, the relationship between language and culture, equivalence issues in translation, nonverbal communication and culture, cultural influences on context, stereotyping and prejudice, and developing strategies for improved intercultural communication. Class 4, Credit 4 (F)

0875-212 Deaf Culture & Community
This course is designed to introduce students to aspects of Deaf culture and the Deaf community. The distinction between these two groups will be reviewed and characteristics of both will be identified. Students will learn about the language, norms of behavior, values, traditions, and possessions (materials) of Deaf people. The evolution of a pathological view of Deaf people to a cultural one will be analyzed from a historical and sociological perspective. Intercultural issues relating to the role of hearing people within the Deaf community will also be covered. (0875-211) Class 4, Credit 4 (F)

0875-213 Introduction to the Field of Interpreting
This course provides students with information regarding the role and function of an interpreter. Information about the history of interpreting, terminology, employment options with regard to various settings, and the function of assessing as part of the interpreting process is presented. Additional topics include values and characteristics of a profession and cumulative trauma disorders (CTDs). (0875-211, 212) Class 4, Credit 4 (F)

0875-301 American Sign Language IV
This course will continue to increase the grammatical features of ASL, introduces new grammatical features of ASL, specialized vocabulary (including math, chemistry, the medical environment, and drugs), and continues to increase fingerspelling and numbers. In addition, the use of space in ASL discourse will be expanded. (0875-203) Class 4, Credit 4 (F)

0875-302 American Sign Language V
This course continues to build upon the foundation in the previous courses. The use of space in ASL discourse will be a focus of this class. Areas of vocabulary development include social work, social services, and alcoholism. (0875-301) Class 4, Credit 4 (W)

0875-303 **American Sign Language VI**
This course builds upon the foundation in the previous ASL courses. The focus of this course will be the different registers of ASL discourse, in addition to the use of space in discourse will be reviewed and expanded. Most of the work in this class will involve students producing appropriate, accurate ASL discourse. Areas of vocabulary development include contextually sensitive vocabulary (e.g. human sexuality, AIDS), national and world events, and politics. (0875-302) **Class 4, Credit 4 (S)**

0875-310 **Discourse Analysis for Interpreters**
This course presents an in-depth look at interpreters as bicultural/bilingual mediators, participants at the center of communicative activity. The interpreter's communicative competence requires knowledge of what is appropriate in both the source-language and target-language communities. This course includes a study of conversational exchanges in English and ASL, including open and close signals, backchannel signals, turnover signals, acoustically adequate and interpretable messages, bracket signals, non-participant constraints, preempt signals, and Grice's maxims. (Co-requisite: 0875-302) **Class 4, Credit 4 (W)**

0875-311 **Processing Skills Development**
This course is an introduction to the mental processing skills (pre-interpreting skills) of consecutive and simultaneous interpretation. This course includes an overview of the theoretical models of translation and interpretation, provides skill development activities for isolated interpreting sub-tasks and practice activities for the integration of these tasks in translation activities. Course content includes translation and interpreting theory, visualization, listening and comprehension, shadowing, paraphrasing, abstracting, dual task training, text analysis (including identification of main point, summarizing, and structuring), cloze skills and translation. (0502-225; 0875-310, 0875-302 can be taken concurrently) **Class 4, Credit 4 (W)**

0875-315 **Voice-to-Sign Interpreting I**
This is the first course in a two-course sequence in which students develop the ability to produce an equivalent ASL message from a spoken English source message. The focus of this course is text analysis and consecutive production of an equivalent message in the target language. Content also includes interpreting management strategies for voice-to-sign interpreting. Students will interpret both rehearsed and unrehearsed monologues and dialogues. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. (0875-302,310,311) **Class 4, Credit 4 (S)**

0875-316 **Sign-to-Voice Interpreting I**
This is the first course in a two-course sequence in which students develop the ability to produce an equivalent spoken English message from an ASL source message. The focus of this course is text analysis and consecutive production of an equivalent message in the target language. Content also includes interpreting management strategies for sign-to-voice interpreting. Students will interpret both rehearsed and unrehearsed monologues and dialogues. (0875-302, 310, 311) **Class 4, Credit 4 (S)**

0875-320 **Practical & Ethical Applications**
Students examine the underlying principles of the Registry of Interpreters for the Deaf (RID) Code of Ethics and discuss application of the Code of Ethics to the various situations and settings in which sign language interpreters work. Students will explore how professional interpreters apply these principles in their daily work and how Deaf consumers perceive the ethical role and function of interpreters. In addition to ethical considerations, etiquette and protocol for each setting will be discussed. Settings include K-12, post-secondary, religious, medical, mental health, deaf-blind, performing arts, business and industry, and vocational rehabilitation. (0875-213) **Class 4, Credit 4 (W)**

0875-325 **Voice-to-Sign Interpreting II**
This is the second course in a two-course sequence in which students develop the ability to produce simultaneously an equivalent ASL message from a spoken English source message. Specific discipline areas will be addressed. Students will develop the ability to analyze and apply text analysis skills related to the simultaneous English to ASL interpreting tasks. Additionally, students will develop the ability to apply the principles of diagnostic feedback. One special area of emphasis will include affect equivalence between source and target languages. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. (0875-315) **Class 4, Credit 4 (F)**

0875-326 **Sign-to-Voice Interpreting II**
This is the second course in a two-course sequence in which students develop the ability to produce simultaneously an equivalent English message from an ASL source message. Specific discipline areas will be addressed. Students will develop the ability to analyze skills related to the simultaneous ASL to English interpreting task. In addition, students will develop the ability to apply the principles of diagnostic feedback. One special area of emphasis will include affect equivalency between source and target languages. (0875-316) **Class 4, Credit 4 (F)**

0875-330 **Introduction to Transliteration**
This course develops the ability to transliterate simultaneously from a spoken English message into an equivalent signed message while retaining English word order. The focus of this course will be transliterating in post-secondary settings. Course work includes analysis and interpretation of text macrostructure and microstructure of academic texts, translating frozen texts, an introduction to team interpreting, and producing transliterations that are sensitive to contact language situations. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. (0875-325, 326) **Class 4, Credit 4 (W)**

0875-350 **Practicum & Seminar I**
The student experiences a practicum placement under the immediate supervision of a professional interpreter who functions as the student's mentor and the overall supervision of the seminar instructor (supervising instructor). The practicum will involve such activities as supervising the mentor and a variety of other interpreters at work, preparing videotapes for mentor critique, interpreting under the supervision of the mentor, and meeting weekly with the mentor to discuss the practicum experience. In addition, practicum students will meet weekly to share observations and experiences gained from the practicum placement. Class discussions focus on linguistic issues in interpretation, ethical dilemmas, situational concerns and problem solving. Field experience includes 100 hours. (Cumulative GPA 2.5; 0875-320,325,326,330) **Class 2, Credit 4 (F, W, S)**

0875-400 **Advanced Interactive Interpreting**
In this course students advance their skills in working with interactive texts within small-group and one-to-one settings. Students will observe and practice simultaneous sign-to-voice and voice-to-sign interpreting for interactions. Students will expand English language skills and their understanding and use of ASL vocabularies and interpreting analysis skills. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. Students will participate in four hours of lectures and four hours of lab work per week. (0875-325,326) **Class 4, Lab 4, Credit 6 (W)**

0875-411 **Interpreting Frozen & Literary Texts**
This course will focus on skills and techniques for the interpretation of frozen texts in English and literary ASL texts. Work includes translation and interpretation of both sign-to-voice and voice-to-sign texts, including prayers, music, poetry, drama, etc. (0875-400) **Class 4, Credit 4 (F)**

0875-415

Practicum & Seminar

This course will provide students with the opportunity to experience several different interpreting settings. All students will complete three different practical experiences: three weeks in a post-secondary setting, three weeks in a K-12 setting, and three weeks in a community setting (e.g., hospitals, interpreter referral agencies, mental health agencies, etc.). Students are assigned to a professional interpreter working in the setting who functions as the student's mentor. Students use the final week of the quarter to compose a written paper that will compare and contrast the three practical experiences and settings. Additionally, practicum students meet together weekly to share observations and experiences gained from the practicum placement. Class discussions focus on linguistic issues in interpretation, ethical dilemmas, situational concerns, and problem solving. (0875-400, GPA of 2.5 or better and permission of instructor) **Class 2, Credit 4, Field experience 100 hours (S)**

0875-430

Introduction to K-12 Interpreting

This course includes an overview of the history and current status of educational interpreting throughout the United States. Content includes the role, practices, and skills of educational interpreters in K-12 settings; communication systems; pertinent laws and regulations; resources, information, and strategies for consumer awareness and education; administrative practices and personnel structure of school systems; assessment and management of educational interpreters; and topics that concern educational interpreters. (0875-400) **Class 4, Credit 4 (W, S)**

0875-501

Advanced Sign-to-Voice Interpreting

In this course students advance their skills in simultaneously producing equivalent spoken English messages from ASL or contact language source messages. Single speaker texts on specific topical areas for large group settings will be the focus of this course. Students will continue to develop their English vocabulary, ASL vocabulary, interpreting analysis skills, and strategies for team interpreting. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. (0875-400) **Class 4, Credit 4 (F)**

0875-502

Advanced Voice-to-Sign Interpreting

In this course students advance their skills in simultaneously producing equivalent ASL messages from spoken English source messages. Single speaker texts on specific topical areas for large group settings will be the focus of this course. Students will continue to develop their English vocabulary, ASL vocabulary, interpreting analysis skills, and strategies for team interpreting. Warm-up exercises will be performed as part of the self-care regimen recommended for sign language interpreters. (0875-400) **Class 4, Credit 4 (F)**

0875-515

Interpreting Internship

This experience provides students with extensive exploration of the profession under the supervision of qualified, professional interpreters, in one of several settings, including but not limited to education, medical, business, and government. Internships will be available nationally at sites that provide high quality supervised experiences. The internship will be 10 weeks in length, requiring approximately 35 hours per week. (Permission of instructor) **Class 35, Credit 12 (W)**

0875-520

Issues in Interpreting

This course offers students who have completed their internship an opportunity to integrate all curricular content areas through the examination and discussion of issues in the field of interpreting. While the course content and focus will vary depending on current issues and student interest/experiences, the course will provide an advanced experience of problem solving and value clarification. Students will develop and demonstrate their ability to define a research topic or problem, gather and evaluate scholarly evidence, and present their findings in a paper and presentation. (0875-515) **Class 4, Credit 4 (S)**

0875-531

Educational Interpreting: Elementary Settings

This course is designed to prepare students to interpret in elementary school settings. Content will include an orientation to activities, discipline content and sign vocabulary, language development, psychosocial development, and interpreting issues that are pertinent to elementary students. The course addresses strategies for interpreting classroom discourse and various content areas. Vocabulary for various elementary content areas will be introduced. Students will do voice-to-sign and sign-to-voice interpreting for elementary-level texts. (0875-430) **Class 4, Credit 4**

0875-532

Educational Interpreting: Middle/Secondary Settings

This course is designed to prepare students to interpret in middle and secondary school settings. Content will include orientation to the activities, discipline content and vocabulary, language development, psychosocial development, and issues pertinent to middle and secondary school students. The course also includes information about teaching methodologies and strategies for interpreting classroom discourse and various content areas. Students will learn how to prepare the middle/secondary students to request and work with interpreters in community and post-secondary settings. Vocabulary for various middle and secondary school content areas will be introduced. Students will also learn about interpreting for foreign language courses. Students will do voice-to-sign and sign-to-voice interpreting for middle and secondary school-level texts. (0875-430) **Class 4, Credit 4**

0875-533

Interpreting in Post-Secondary Settings

This course prepares students to interpret in the post-secondary setting. Students will learn preparation strategies for voice-to-sign and sign-to-voice interpreting for the following topics: computer science, advanced science and mathematics, selected liberal arts, physical education, and the instruction of a foreign language. In addition, students will become familiar with current issues facing interpreters in post-secondary settings. As part of this course, students will observe interpreters working in several types of college classrooms, (e.g. lectures, seminars, labs, and studios). (0875-400 Advanced Interactive Interpreting or previous coursework in transliteration) **Class 4, Credit 4**

0875-540

Oral Transliteration

This course concentrates on the theory and skill of oral transliteration. Students will develop the skill of receiving a spoken English message and reproducing it in a highly visual modality by applying the principles of clear speech production and support techniques. Additionally, students will develop the skill of visible to spoken (voice-over) interpreting for Deaf and hard-of-hearing persons who rely on speech and speech reading. Major concepts that will be addressed include speech production principles; speech visibility factors; verbal and non-verbal support techniques; knowledge of the characteristics, methodologies, and philosophies of oral education and oral consumers; and oral interpreting certification. (0875-400) **Class 4, Credit 4**

0875-550

Deaf-Blind Interpreting

This course is designed to prepare students to interpret for deaf-blind individuals who have different degrees and types of deaf-blindness. Content includes an introduction to aspects of deaf-blindness including the language, norms of behavior, values and traditions of deaf-blind people. Students learn about tools and technology used by deaf-blind individuals and develop visual orientation skills, guiding skills, and the interpreting skills needed to work with this population of consumers. (0875-501,502) **Class 4, Credit 4**

Accounting Technology

0801-201

Principles of Accounting I

Introduction to accounting for both accounting and nonaccounting students. Topics covered include the analyzing and recording of business transactions using the double-entry accounting system, end-of-period adjustments, the worksheet, financial statements, closing entries, the post-closing trial balance and the management of cash funds. Students complete a comprehensive "accounting cycle" project. Computerized spreadsheet applications are emphasized. **Lecture/Lab 6, Credit 4 (W, S)**

0801-202

Principles of Accounting II

A continuation of Principles of Accounting I for both accounting and non-accounting students. Topics covered include the payroll system and accounting for a merchandising business using special journals. Course work includes a practice set that applies accounting concepts in a simulated business situation. Computerized spreadsheet applications are emphasized. (0801-201) **Lecture/Lab 6, Credit 4 (F, S)**

0801-203

Principles of Accounting III

This course for accounting students is a continuation of Principles of Accounting I and II. Topics include notes payable, notes receivable, the valuation of receivables, inventories, fixed assets and partnerships. Computerized spreadsheet applications are emphasized. (0801-202) **Class 4, Credit 4 (F,W)**

0801-204 **Principles of Accounting IV**
Emphasizes corporate accounting concepts and principles. Topics covered include capital stock, retained earnings, taxes, dividends, bonds, the statement of cash flow, and the analysis of financial statements. A comprehensive "annual report" team project is completed. (0801-203) **Class 4, Credit 4 (F, W)**

0801-231 **Economics I**
This two-course sequence gives an overview of micro- and macroeconomic concepts. Students examine economic problems in a rational manner by learning the fundamental processes of economic analysis and the skills of economic reasoning. These courses include selected knowledge and skills from the economic discipline presented in the form of concepts and understandings deemed most important to economic literacy for students. (Accounting Technology associate degree status, 0804-101) **Class 4, Credit 3 (W)**

0801-232 **Economics II**
This two-course sequence gives an overview of micro- and macroeconomic concepts. Students examine economic problems in a rational manner by learning the fundamental processes of economic analysis and the skills of economic reasoning. These courses include selected knowledge and skills from economic discipline presented in the form of concepts and understandings deemed most important to economic literacy for students. (Accounting technology associate degree status, 0804-101,0801-231) **Class 4, Credit 3 (S)**

0801-252 **Cost Accounting I**
Introduces students to cost accounting with an emphasis on job order costing. Topics covered include manufacturing statements; cost theory; and integration of materials, labor and overhead to the computerized job cost situation. Students complete a comprehensive practice set. Computerized spreadsheet applications are emphasized. (0801-203) **Class 6, Credit 4 (W, S)**

0801-253 **Cost Accounting II**
A continuation of cost accounting, with particular concentration on process and managerial aspects. Topics covered include average and FIFO process costing methods, equivalent units, multiple products, changes in units, budgeting, cost classification and computerized applications. Students complete a comprehensive practice set. Computerized spreadsheet applications are emphasized. (0801-252) **Class 6, Credit 4 (F, S)**

0801-260 **Applied Accounting Techniques**
Gives students an opportunity to reinforce and apply accounting topics and skills previously studied. Students work in a simulated accounting office as accounting clerks and perform a variety of general and process costing duties. Computerized spreadsheet applications are emphasized. (0801-252) **Lab 6, Credit 2 (F, W)**

0801-299 **Co-op: Accounting Technology**
Designed to give the student an opportunity to gain experience on the job, to apply what has been learned, and to self-evaluate personal and communication skills. A job relating to the student's field of study could be taken near the student's hometown. Placement assistance is provided to help the student find a work experience job. One or two work experience sessions are required depending on program of study. **Credit 0**

0801-399 **Independent Study**
This course is offered on a quarterly basis to students who have special requirements not met in other accounting courses. This course is arranged on an individual basis and is flexible in design to meet individual needs. **Credit variable**

Applied Computer Technology

0805-201 **Applications Software**
This course is an introduction to computers and problem solving using general-purpose application software. Students solve a variety of problems by using application software tools such as a word processor, a spreadsheet, a presentation package, and a database program. **Class 3, Credit 3 (F, W, S)**

0805-205 **Introduction to Midrange Computer Operations**
This course introduces the major components of the operating system and hardware of a mid-range computer. Students build skills in the shared use of peripheral equipment and use of computer-based messages, queues, and business applications. **Class 2, Lab 2, Credit 3 (F, W)**

0805-206 **Command Language Utilities for Midrange Computers**
Students learn how to use application development tools (like Source Entry Utility) and how to manage libraries, files, members, and user-defined options. Students also develop a working knowledge of the command language used by most system operators of midrange computers, such as commands for manipulating files, compiling command language programs, performing a specified set of tasks, monitoring run-time error messages, and working with message queues, output queues, and library lists. (0805-205) **Class 2, Lab 2, Credit 3 (W, S)**

0805-207 **Multiprogramming & Spooling for Midrange Computers**
Students are introduced to system administration of a midrange computer system in a multiprogramming environment, including queue control and general control of a spooling system. Students study the requirements for the physical environment, networking environment, operating systems environment, and user's work environment. While they learn to maintain the total computing environment, students study the hardware architecture of an example midrange computer and its requirements for physical security, electrical environment, and atmospheric requirements. (0805-206) **Class 2, Lab 2, Credit 3 (W, S)**

0805-210 **Data Processing for Business Occupations**
An introduction to the use of computers in business-related applications. Concepts of interacting with the computer function of a business as well as hands-on use of computers are presented. (Second-year standing in business occupations) **Class 3, Credit 3 (W)**

0805-212 **Applied Circuits I**
A first course in circuits that introduces students to the fundamentals of direct current (DC) and alternating current (AC) electricity. Students become familiar with fundamental concepts of conductivity, resistivity, laws of attraction and associated engineering notation and prefixes. Topics covered include power, energy transfer, open- and short-circuit diagnosis. Through hands-on laboratory projects, students will acquire an understanding of fundamental DC and AC, voltage and resistance and will develop skills for connecting and measuring series and parallel DC and AC circuits. Digital multimeters (DMMs) are used to measure and troubleshoot breadboard circuits. **Class 3, Lab 2, Credit 4 (F, W)**

0805-213 **Applied Circuits II**
A second course in circuits where students continue to study concepts of electricity related to direct current (DC) and alternating current (AC) circuits, including power, energy transfer, open- and short-circuit diagnosis. Topics include series and parallel circuits, resistance, capacitance, impedance, inductance, conductance, DC/AC power and transformers. Through hands-on laboratory projects, students will acquire an understanding of AC/DC current, voltage and resistance; build skills in connecting and measuring series, parallel, and series-parallel circuits. Oscilloscopes and DMMs will be used to measure and troubleshoot breadboard circuits. (0805-212) **Class 2, Lab 2, Credit 3 (W, S)**

0805-215 **PC Operating Systems**
This course is designed to acquaint students with the structure and function of microcomputing operating systems and to provide the skills required to install, configure, and maintain them. Topics include system concepts, system-level commands, and commands relating to program, file, and applications management. Students perform a variety of functions including OS installation and configuration, application program installation and management, creation and management of directories and file structures, partitioning and preparation of storage media. (0805-216) **Class 2, Lab 2, Credit 3 (F, S)**

0805-216 **PC Hardware I**
This course introduces the fundamental hardware concepts of IBM-compatible personal computer (PC) systems including their structure and components. The skills required to install, upgrade and maintain PCs are presented. Hands-on topics include the identification and handling of basic computer hardware, input/output devices, and data communications. Various methods of upgrading microcomputers are presented. **Class 2, Lab 2, Credit 3 (F, W)**

0805-217 **PC Hardware II**
This course provides students with methodologies and hands-on activities related to the configuration, diagnosis, repairing, and preventive maintenance of microcomputers. Topics include familiarization with the basic functions and use of test equipment, logical troubleshooting of internal system conflicts and faulty peripherals, electrical safety, and methods of maintaining computer equipment. (0805-216) **Class 2, Lab 2, Credit 3 (W, S)**

0805-220 **Introduction to UNIX**
This course is designed to address the basics of the UNIX computer operating system. Salient features of mainstreamed operating systems covered in PC operating systems and other systems such are reviewed in this course and compared with similar UNIX functions to illustrate efficiencies of various operating systems. Topics include language commands; mail; network communications; directory and file structure; the editor; shell, pipe, and filter concepts. (0805-201) **Class 3, Credit 3 (F, S)**

0805-224 **Networking I**
This first course focuses on stand-alone local area networks (LANs) of microcomputers. Students study network configurations, cabling, physical layer protocols, and network operating systems. Students add computer equipment to a LAN, install software and identify and correct hardware and software incompatibility problems. (0805-215) **Class 2, Lab 2, Credit 3 (F, W)**

0805-225 **Networking II**
This second course in networking builds on concepts learned in Networking I. Topics focus on connecting local area networks (LANs) of personal computers with other LANs, wide area networks (WANs), and minicomputer/mainframe computers. (0805-224) **Class 2, Lab 2, Credit 3 (W, S)**

0805-226 **Networking III**
This third course is designed to provide students with skills in implementing and maintaining the network infrastructure required to support intranets/internet. Topics include implementing and administering of internet/intranet services of appropriate server platform, applications, WAN technologies, security, reliability, and coordination with content providers. Heavy emphasis is placed on hands-on problem solving. (0805-225) **Class 2, Lab 2, Credit 3 (F, S)**

0805-230 **Programming I**
A first course in programming that introduces students to general programming concepts and enables them to design simple Windows-based business applications. Course focus is on problem-solving methods, design, and writing of simple Windows-based applications with an emphasis on logic skill development. The course serves as a foundation for future programming courses. Programming projects are required. (0805-215) **Class 3, Credit 3 (F, W)**

0805-231 **Programming II**
A second course in programming where students learn to write modular, well-documented programs and are introduced to computer programming constructs. Course focus is on problem analysis, design, and writing of typical Windows-based business applications with emphasis on logic skill development. Programming projects are required. (0805-230) **Class 3, Credit 3 (W, S)**

0805-240 **Fundamentals of Digital Logic**
This course introduces the fundamentals of digital logic, devices and circuits. Topics include binary arithmetic, truth tables, Boolean algebra, logic gates, counter, flip-flops, multiplexers and decoders. Common digital decoders will be used to drive LED and LCD displays. Troubleshooting procedures will be studied, including static and dynamic tests. Digital multimeters (DMMs) are used to measure and troubleshoot breadboard circuits. (0805-212) **Class 2, Lab 2, Credit 3 (W, S)**

0805-245 **Fundamentals of Electronics**
This course covers the fundamentals of electronic components and circuits, including diodes, rectifier circuits, bipolar transistor switches, SCRs, op amps and power supplies. Various types of field effect transistors, IC operational amplifiers and their applications will be studied. Laboratory equipment such as oscilloscopes, digital multimeters (DMMs) and power supplies will be used for measuring devices and circuits. (0805-213 for ICE option; 0805-212 for automation technologies program) **Class 2, Lab 2, Credit 3 (F, S)**

0805-251 **Internet Technologies I**
This course addresses the basics of the Internet, including introduction to the Internet, Web browsers, searching/researching on the Internet, creating and maintaining home pages with page/site-creation applications, multimedia on the web, and introductory level Web programming. (0805-201) **Class 3, Credit 3 (W, S)**

0805-252 **Internet Technologies II**
This course continues Internet Technologies I, by addressing intermediate topics for the Web, including: using hypertext programming and scripting languages to enhance Web pages, creating links between home pages and databases maintained outside of the Web, and creating advanced multimedia for the Web (for example, image maps, animations, audio, and movies/video). (0805-251) **Class 3, Credit 3 (F, S)**

0805-298 **General Work Experience**
This course serves as an introduction to work experience. Students are expected to seek supervised employment to apply skills that promote desirable work habits, effective communication, awareness of employer expectations, and the ability to make cooperative and productive interpersonal choices. This work experience need not be related to the student's technical educational goals. **Credit 0 (F,W, S, SU)**

0805-299 **Co-op: Applied Computer Technology**
Prerequisite of 0805-298 and minimum 45 ACT technical credits. **Credit 0 (F, W, S, SU)**

0805-301 **C++ Programming I**
The first course in a two-quarter sequence in C++ programming. Topics include elementary data types, C++ control structures, arrays, records, functions with parameters, and introductory object-oriented programming concepts. (0805-231) **Class 4, Credit 4 (W, S)**

0805-302 **C++ Programming II**
Second in a two-quarter course sequence in C++ programming. Topics include additional information on data types, C++ control structures, arrays, records, functions with parameters, and introductory object oriented programming concepts. This sequence is intended to give students beginning skills in C++ programming. (0805-301) **Class 4, Credit 4 (F, W)**

0805-305 **Spreadsheet Software**
This course provides students with an in-depth study of spreadsheets and how they are used as a productive tool in business. Students are given hands-on instruction on how to create and manipulate spreadsheets to solve common business problems and how to use the built-in language found in spreadsheet software to automate the solution to a variety of spreadsheet problems. (0805-201,230) **Class 3, Credit 3 (F, S)**

0805-310 **Microcomputer Database Software**
Creating, inquiring, reporting and other functions of databases. A leading database software product for microcomputers is studied. Students design a database, establish criteria for data to be accepted and coded, and prepare views of the database contents. Database utilization in the business environment and application to the student's expected work environment is presented. (0805-201, 231) **Class 3, Credit 3 (F, W)**

0805-311 **RPG Programming I**
An introduction to the report program generator language (RPG). This course covers program logic, flowcharting, writing programs in RPG, and entering the programs and related files on a mid-range computer. Students practice debugging and executing programs. Break logic, exception reporting and the use of databases for input are presented. (0805-231) **Class 3, Credit 3 (F, W)**

0805-312 **RPG Programming II**
A continuation of RPG Programming I. Advanced applications such as screen design, on-line processing, real-time updating, and file updating are topics used for programs the students write, debug and execute. **(0805-311) Class 3, Credit 3 (W, S)**

0805-315 **Introduction to Desktop Publishing**
Provides a hands-on introduction to the use of desktop publishing software on computer platforms. The mechanics of the use of software products to create and integrate text and graphics is presented. Technical topics including file formats and file exchange are stressed over design considerations. **(0805-251) Class 3, Credit 3 (W, S)**

0805-325 **Database Systems**
In this course, which uses a midrange computer system, students learn the basic criteria for data to be a relational database, the use of basic relational database commands such as record selection and joining of databases, SQL, and extraction and formatting of data for reports. Students design a database, establish criteria for data to be accepted and coded, and prepare views of the database contents. **(0805-231) Class 4, Credit 4 (S)**

0805-330 **Microprocessor I**
This is the first course in a two-course sequence in microprocessors. Students will learn how to control microprocessors using assembly language to control importing and exporting of data to and from external devices through the I/O ports of a computer and to control the operation of a microprocessor. Programming assignments will be required. **(0805-230,0805-240) Class 2, Lab 2, Credit 3 (F, S)**

0805-331 **Microprocessor II**
This is the second course in a two-course sequence in microprocessors. This course will cover internal microprocessor architecture and interfacing to external devices through analog and digital means. Students will use a C-based compiled assembler to control a specific microprocessor. A/D converters, I/O ports, interrupts and DMA will be covered in depth. Detail pin-outs and pin functions, clock generators, bus buffering, latching and timing will be covered. **(0805-330, 0805-245) Class 2, Lab 2, Credit 3 (F, W)**

0805-340 **Visual Programming Language I**
This is the first course of a two-quarter sequence in visual programming language (VPL). Topics include pick and drop data controls, module and variable declarations, property boxes, form design windows, code design windows, event generators, and introductory visual object oriented programming concepts. This course is intended to give students beginning skills in graphical user interface (GUI) programming. **(0805-231) Class 4, Credit 4 (W, S)**

0805-341 **Visual Programming Language II**
This is the second course of a two-quarter sequence in visual programming language (VPL). This course covers advanced topics such as error handling, client/server applications, procedure calls, functions and application program interfaces (APIs), OLE, multiple document interfaces, and dynamic linked libraries. The two-course sequence is intended to give students an in-depth background in developing GUI client/server applications and basic technical writing in the form of on-line help screens. **(0805-340) Class 4, Credit 4 (F, S)**

0805-345 **Groupware Administration**
This course builds on skills previously developed in Networking I and II courses. Students acquire an understanding of the structure and functionality provided by groupware and obtain hands-on experience in installing and administering a groupware product across heterogeneous platforms. Topics include installation, security, users, groups, and backup, as well as integration with the Internet, relational database management systems (RDBMS), and other productivity software. **(0805-225) Class 2, Lab 2, Credit 3 (S)**

0805-350 **PC Electronics & Interfacing**
This course provides a deeper understanding of software/hardware electronics interfacing theory and applications. Topics include fundamental understanding of DC and AC electricity, and how it applies to computers and their peripherals. Software/hardware program interfacing and testing of general real-world applications such as computer telephony, video/voice communications and the interconnection of digital devices are also included. Students become familiar with electronic test equipment such as digital multimeters (dmm), oscilloscopes and such, and how they are used in the laboratory to diagnose hardware and software problems. **(0805-217,231) Class 2, Lab 2, Credit 3 (S)**

0805-355 **Industrial Controls**
This course will familiarize the student with various industrial controls and devices used in a manufacturing environment. The most commonly used DC and AC motors and servos will be studied. Motor controls, containing commonly used sensors, vision and feedback systems will be studied. Programmable logic controllers will be studied from both a hardware and software perspective. **(0805-245) Class 2, Lab 2, Credit 3 (F, W)**

0805-360 **Command Language Programming**
This course is a continuation of Control Language/Utilities for Midrange Computers. Students expand their knowledge of control language commands and learn the use of variables and control commands, and how to pass parameters between processes for control language programs. Exercises may include writing control language programs for basic error handling, monitoring messages, and controlling work management. **(0805-207,231) Class 2, Credit 2 (F)**

0805-370 **Fiber Optic Cable: Uses & Maintenance**
This course introduces fiber optics and parallels the objectives of the National Association of Communication Contractors fiber optic cable installer training. Students will learn the basic fiber systems, which consist of a light-emitting diode or laser transmitter, fiber optic cable, connectors and a receiver. The course is primarily oriented to connectorization of cable ends and their evaluation using the optical time domain reflectometer (OTDR). **(0805-224) Class 2, Lab 2, Credit 3 (W, S)**

0805-375 **Telecommunication Concepts**
This course introduces concepts in both analog (voice) and digital (data) telecommunications. Topics covered include plain old telephone service (POTS), in-home wiring service, telephone operation, number coding, routing, transmission media and other appropriate telephony topics. Private branch exchanges (PBX) and Centrex also will be discussed. **(0805-225) Class 2, Lab 2, Credit 3 (S)**

0805-398 **Special Topics: Applied Computer Technology**
Credit variable (F, W, S)

0825-110 **Bit-Map Graphics**
Students learn skills related to bit-mapped illustration programs to create color images using various functions of the programs such as the pencil, brush, airbrush, rubber stamp, selection tools, basic layer controls and image correction and enhancement. Fundamentals of color, including using color library and color controls are taught. Comprehension and correct usages of terminology/vocabulary and concepts are emphasized. **Studio 4, Credit 2 (F, W)**

0825-204 **Perspective Drawing**
Introduction to the fundamentals of perspective, including one-point, two-point and three-point perspective; special vanishing points; mixed perspective; and ellipses. Basic three-dimensional shapes are drawn using both freehand techniques and drafting tools. Perspective concepts are applied to drawing more complex objects and environments, including shading. **Studio 4, Credit 2 (W, S)**

0825-206 **Figure Drawing**
Introduces students to the study of the human form, including quick gesture drawing, contour studies, line drawing, proportion, shading and light, study of head/facial features and use of quick sketches and sustained study, including use of the figure in composition. Students are introduced to media and materials used to draw the human form. **Studio 4, Credit 2 (W, S)**

0825-208 **Drawing Composition**
Use of drawing principles learned in previous drawing courses will be applied to drawing still life, architecture, various environments and the human form within environments. Use of sketchbooks is emphasized for development of compositions. Students are encouraged to research visual ideas through the use of the library and other sources. A variety of media and materials are used. (0825-204,206) **Studio 4, Credit 2 (S)**

0825-210 **Vector Graphics**
Students learn the skills to use vector-based illustration programs to create color graphics using various basic bezier functions of the programs, such as the pen tool, basic shapes tool set, brushes, type and related sub-menus. Fundamentals of color, including gradient, radial, blend, and mesh gradient functions are taught. Comprehension and correct usage of terminology/vocabulary concepts are emphasized. **Studio 4, Credit 2 (W, S)**

0825-211 **Basic Design**
Emphasis is placed on concepts, elements and exploration of basic two-dimensional design principles such as point, line, shape, texture and space, using black-and-white media for presentation of ideas; technical quality in presentation of design concepts is emphasized. **Studio 4, Credit 2 (F, W)**

0825-212 **Color in Design**
In this course, color theory is emphasized and concepts learned in Basic Design are applied using color media and materials to solve basic design problems. Technical quality in presentation of design concepts is emphasized. (0825- 211) **Studio 4, Credit 2 (W, S)**

0825-213 **Design for Graphics**
Students apply fundamentals of basic design, color theory and composition to explore a wide variety of solutions to simple graphic design problems. Focus will be placed on techniques and tools used to visualize and create clear, effective, well-crafted thumbnails and rough layouts. Emphasis is on process, rather than finished work, and students are encouraged to experiment with a range of media. (0825-105,212) **Studio 4, Credit 2 (F, S)**

0825-221 **Basic Typography**
Students learn the fundamentals and principles of typography, including type measurement/point sizes and type classification/type families, identification of typefaces, effective use of letter spacing, word spacing, line spacing, line length and type arrangements. (0825-109, 210) **Studio 4, Credit 2 (F, S)**

0825-230 **Electronic Layout Programs**
Computer page layout programs are taught through the use of professional tutorials and supplemental practice materials. Students acquire a good working knowledge of page layout software used in most graphic design studios and agencies (0825-109) **Studio 4, Credit 2 (F, S)**

0825-281 **Drawing Applications**
An advanced course refining freehand and technical drawing concepts, methods and techniques developed in Perspective Drawing, Figure Drawing and Drawing Composition. Emphasis is on development of advanced drawing skills, using various subjects, media and processes. Elective course for both art and computer design students and students in other majors. (0825-208) **Studio 4, Credit 2 (W)**

0825-282 **Applied Art Photography**
Use of photographic processes as they relate to the applied artist. Emphasis is on understanding and using the camera, black-and-white film processing, contact printing and enlarging. Students practice darkroom procedures and methods for obtaining a well-crafted photographic image. Elective course for both art and computer design students and students in other majors. **Studio 4, Credit 2 (F, S)**

0825-284 **Three-Dimensional Applications**
Extends basic concepts, principles and methods as they apply to three-dimensional form. Emphasis is on material characteristics, tool/material processes, construction techniques and craftsmanship. Elective course for both art and computer design students and students in other majors. **Studio 4, Credit 2 (W, S)**

0825-299 **Cooperative Work Experience: Art & Computer Design**
This 10-week, full-time experience gives students matriculated in the art and computer design program a sampling of the world of work in the applied art field under the supervision of qualified professionals such as production managers and art directors. Students complete a workbook as part of this experience. This experience must be satisfactorily completed before the student enrolls in the final courses in the major. (0806-101,0825-324,334,344) **Credit 0 <F, W, S)**

0825-301 **Graphics for Communication**
Using design concepts and practices learned in the first level of the program, students work through steps of the design process, including definition and research of simple graphic design problems, development and presentation of solutions through clear, well-executed thumbnail sketches, roughs and comprehensive layouts. Students learn how to select printing papers and finishing methods. Major emphasis is given to verbal presentation of layout ideas, group production meetings and group critiques. (0825-110, 210, 213) **Studio 6, Credit 3 (F, W)**

0825-310 **Digital Illustration**
Provides students with comprehensive skills in the area of computer illustration. Students focus on comparison, use, integration, and functions of several illustration photo manipulation software programs, to create professional-quality renderings for print publication. (0825-109, 110, 208, 210) **Studio 4, Credit 2 (F, W)**

0825-315 **Art History I**
Survey of major historical developments in the visual arts as they relate to the field of art, specifically examining art from prehistoric times to the late Renaissance at the end of the 16th century. **Class 3, Credit 3 (F)**

0825-316 **Art History II**
Survey of major historical developments in the visual arts, specifically examining Western art from the Baroque period of the 17th century to the post-Impressionists to current movements in fine art. (0825-315) **Class 3, Credit 3 (W)**

0825-317 **History of Graphic Design**
Survey of art and design movements, designers and typographers who have made significant contributions to the field of graphic design. (0825-316) **Class 3, Credit 3 (S)**

0825-321 **Type in Design**
Students focus on selection of appropriate type to best communicate a message, use of type as an integral part of a design, how to choose letter, word and line spacing, line length and type arrangement. Emphasis is on working with type and grids, legibility and readability, proofreaders' marks and proofreading and copy specification. (0825-210, 221) **Studio 4, Credit 2 (F, W)**

0825-324 Introduction to Print Design
This overview of the Print Design concentration introduces students to the various areas within the general field of print design, including corporate graphic design, information design, advertising/promotion design, and publication design/editorial design. Students become familiar with the broad range of print design, and students are required to create several examples of print design. Students also are expected to use correct graphic design vocabulary and demonstrate understanding of design principles and the design process by discussing and evaluating their own and others' work. (0825-301,310,321) Studio 4, Credit 2 (W, S)

0825-326 Grid Systems
Provide students with knowledge needed to understand and utilize grids and other organizational systems to solve graphic design problems. Students are asked to use pre-designed grid systems and will design and apply their own systems to solve graphic design problems related to publication page layout, as they become proficient in understanding and use of these systems. This course is part of the Print Design concentration. (0825-324,344) Studio 4, Credit 2 (F, S)

0825-327 Identity Systems Design
Emphasis is placed on design and development of identity symbols/logos/logotypes and systems of identification for corporations, businesses and organizations, as well as individuals including business cards, letterheads, envelopes, invoices and other components. Focus is placed on analysis of company need, audience, budget, compatibility, design consistency, and practicality of use. This course is part of the Print Design concentration. (0825-324,344) Studio 6, Credit 3 (F, S)

0825-328 Multi-page Design
Focus is on layout and design of multi-paged printed graphics including brochures, booklets, catalogs, calendars, and magazine spreads using grids and other organizational systems. Issues such as page sequencing and pagination, design flow and consistency through the layout/design and successful communication of the client's needs are addressed. Projects are completed using page layout software that is consistent with industry standards. This course is part of the Print Design concentration. (0825-326,327) Studio 6, Credit 3 (F, W)

0825-322 Basic Production
Course provides an overview of the Production concentration and students learn the fundamentals of preparing production art for black and white and color reproduction and using page layout and illustration software. Technical vocabulary related to preparing artwork for printing is emphasized. (0825-210,221,230) Studio 4, Credit 2 (W, S)

0825-329 Production for Designers
Students continue to learn skills needed to produce art for black and white and color reproduction. Students use computer skills to create and prepare more complex, multi-page production art. Technical vocabulary related to preparing artwork for printing is emphasized. (0825-322) Studio 4, Credit 2 (F, W)

0825-344 Introduction to Web Design
An overview of the Web Design concentration is provided and students are introduced to the fundamental skills needed to use the World Wide Web, learn basic HTML programming for graphics, and legal issues of the Internet. Issues concerning successful use of typography, color and composition are discussed. Students are expected to create web pages that demonstrate their understanding and use of basic design principles. (0825-301,310,321) Studio 4, Credit 2 (W, S)

0825-346 Creating Web Graphics
Internet graphics and how they are related to the World Wide Web are introduced. Students gain in-depth knowledge of graphics preparation and optimizing graphics for use on the Internet. Course content includes exploring the Internet, using various programs to create and optimize images for use on the Internet, and the use of basic HTML programming. Vocabulary of the Internet, various graphic file formats, compression schemes, and concepts of effective graphic communication on the Internet are also discussed. This course is part of the Web Design concentration. (0825-324,344) Studio 4, Credit 2 (F, S)

0825-347 Designing Web Sites
Students continue to learn how to use design elements successfully to create a multi-page web site. Students are introduced to the concept of web site design, site navigation theories, and the management of a multi-page web site. Students explore advanced techniques of web design with the inclusion of video and programmed elements. This course is part of the Web Design concentration. (0825-346, 0805-251) Studio 4, Credit 2 (F, W)

0825-351 Graphic Studio
An advanced course stressing layout, mechanical and computer skills within the context of a professional studio environment. The course involves practical work experience, with an emphasis on studio procedures, work habits, professional skills and dealing with clients, as well as working in teams to solve design problems. (0825-324, 334, 344) Studio 8, Credit 4 (F,W,S)

0825-352 Portfolio Presentation
Art and computer design students' final professional preparation course prior to graduation. Students must prepare and submit a portfolio of artwork for final review by a jury composed of department faculty members and professional artists. (0825-299, 351) Studio 8, Credit 4 (F, W, S)

0825-382 Computer Illustration Techniques
Students experiment and further explore the creative possibilities of several illustration software programs. Students will have the opportunity to create professional quality illustrations for various audiences and print media. This is an elective course for both art & computer design students and students in other majors. (0825-310) Studio 4, Credit 2 (W, S)

0825-399 Independent Study
Credit variable

Automation Technologies

0891-201 Survey of Automation Technologies
This course introduces students to the Automation Technologies program, its entry and graduation requirements and its employment options. The course uses examples of automated manufacturing systems to promote an understanding of their configuration and the processes that are involved. Installation, preventative maintenance and troubleshooting are introduced, as are the procedures, tools and instrumentation used by technicians. The importance of quality control, safety practices and teamwork in an automated manufacturing environment is emphasized co-requisite (0806-003). Class Lab 6, Credit 3 (F)

0891-210 Pneumatic & Hydraulic Systems
The basics of fluid power are the course focus. Areas of study include pressure, viscosity, turbulence, flow, thermal properties and displacement. Hydraulic/pneumatic components such as pumps, actuators, valves, accumulators, lines, directional controls, sealing devices, servomechanisms are introduced, as are the tools and procedures used to install and maintain hydraulic/pneumatic systems. (0885-201) Class 1, Lab 6, Credit 3 (S)

0891-214 Electromechanical Devices
This course introduces various devices used in the manufacturing environment for automation control. The most commonly used AC and DC motors, stepper motors, motor controllers and servomotor drives are used in laboratory set-ups along with sensors and transducers used in monitoring or controlling the manufacturing process. Relays, contactors, starters, symbols, ladder diagrams, motor connections, overload protection and interlocking schemes are studied. In addition, control loops, feedback, rate response, proportional control, process instruments and sensor interfaces as they apply to automatic control systems are studied in detail. (0805-240, 0891-201); co-requisite (0805-245) Class 2, Lab 6, Credit 4 (S)

0891-216 Programming Concepts
This course introduces problem solving processes and programming concepts as they can be used to guide automation control systems and other automated system subsystems. Programming structure and flowcharting are studied. Students are exposed to programming applications with automated control systems and are expected to write simple programs. Class 3, Lab 3, Credit 4 (F)

0891-218 **Robotics Fundamentals**
Students begin to learn about industrial robots and their applications in automated manufacturing industries. Students learn robotic safety practices, robotic coordinate systems, basic mechanics and power systems for robots and some interfacing considerations. This course helps students to choose a concentration in either the semiconductor technology option or the applied robotics option. (0891-210, 0891-214) Lab 2, Credit 1 (F)

0891-220 **Automated Systems I**
This course reinforces previously learned subsystem level skills while introducing additional concepts and skills at a system level. System assembly, wiring, programming, networking, monitoring (data collection and analysis) and troubleshooting are addressed. Basic robotic technology is introduced as part of an automated system. Students also work in a semiconductor clean room environment in preparation for choosing a concentration in either the semiconductor or the applied robotics option. (0891-210,214; co-requisites 0891-216,218) Class 2, Lab 6, Credit 4 (F)

0891-230 **Automated Systems Troubleshooting I**
This course introduces skills associated with performing basic system maintenance and troubleshooting. Maintenance sheets, along with the appropriate equipment manuals, procedures, tools and instrumentation to safely and correctly perform the maintenance functions are considered. Analysis of data from system performance charts are interpreted and used to make necessary process or equipment adjustments. Skills needed to diagnose and repair a system fault in a safe and logical manner will be introduced and performed according to manufacturer specifications. (0891-220) Class 2, Lab 6, Credit 4 (W)

0891-299 **Co-op: Automation Technologies**
Credit 0 (F, W, S)

0891-314 **Programmable Logic Controllers (PLC) Programming**
Students begin to learn about the use of programmable logic controllers (PLCs). Content includes the concepts of PLC programming and interfacing and the development of PLC applications. Students use PLC program development software, test PLC applications, and modify PLC programs to effect process changes as indicated. (0891-220) Class 2, Lab 6, Credit 4 (W)

0891-316 **Mechanical Devices & Systems**
This course builds on coursework introduced in prior physics and automated system courses. Students learn about mechanical components found in transmission pathways of automated systems including drive mechanisms, pallet changers, shifters, conveyers, gears and linkages. Students analyze factors contributing to mechanical failure such as load and torque. Effects of changes in pressure, direction, force, speed and other physical parameters are also studied. Students work with simulated modules and automated systems with mechanical components. (0885-203,0891-220) Class 1, Lab 6, Credit 3 (W)

0891-318 **Applied Robotics**
Students use, maintain, develop and debug robotic programs. Course content requires that students learn the concepts related to robotic programming and interfacing as well as the applications that use robotics. Using lab experiments and robotics program development software students learn to set up, install, download, diagnose, write, manipulate and test programs in automated manufacturing environments. (0891-220) Class 2, Lab 6, Credit 4 (S)

0891-320 **Automated Systems II**
This course builds on the system level skills developed in Automated Systems I and Automated Systems Troubleshooting I. Students encounter advanced robotic operations, process and equipment control using programmable logic controllers and material transport systems as they learn to work with product changeovers relative to upgrading or retooling a flexible manufacturing cell. Human machine interfaces (HMI) and electronic operator interfaces (EOI) are used for machine-user interfacing. (0891-230, 0891-238, 0891-314; co-requisites:0891-318, 0891-391) Class 2, Lab 6, Credit 4 (S)

0891-330 **Automated Systems Troubleshooting II**
This advanced troubleshooting course not only incorporates all the maintenance and troubleshooting skills developed in Automated Systems Troubleshooting I for basic system maintenance, diagnosis and repair, but also introduces maintenance and troubleshooting of the more difficult and advanced system areas such as networked controllers, vision systems, advanced robotics, programmable logic controllers, and other system and subsystem components where hardware and software are heavily integrated for system operation. (0891-320) Class 2, Lab 6, Credit 4 (F)

0891-340 **Semiconductor Manufacturing**
This course is an introduction to fundamental semiconductor properties and silicon processing technology. Students are introduced to the individual processes utilized in the fabrication of silicon circuits such as epitaxial growth, chemical and physical deposition of amorphous and polycrystalline films, thermal oxidation, diffusion, ion implantation, microlithography and etching processes. In the lab, students have the opportunity to observe the equipment involved at each step of the process. Students experience the fabrication process from the initial design phase through the production of an operational silicon circuit. (0891-230; co-requisite 0885-212) Class 2, Lab 6, Credit 4 (S)

0891-344 **Vacuum & RF Technology**
This course provides concentrated study in vacuum and RF technology and its applications. Vacuum topics addressed include vacuum system components, vacuum pumps and pumping systems and complete vacuum system configurations, considerations and maintenance. The RF portion of the course includes introduction to RF principles for semiconductor manufacturing, RF plasma system components, RF systems and their applications and RF subsystems. Students learn maintenance and troubleshooting practices and various measurement techniques and safety considerations utilizing high technology equipment. (0891-230) Class 1, Lab 6, Credit 3 (F)

0891-350 **Semiconductor Tooling**
Students are introduced to several semiconductor tool sets used in the chip fabrication process. Set up, maintenance and repair of the tool set is the course focus. Students use a variety of resources and tools including assembly drawings and manuals, manufacturing specifications, assembly/disassembly procedures for parts or assembly replacement, hand tools and instrumentation. In addition, use of calibration and maintenance logs, computer user interface operation and diagnostics and correct protocol for working in a clean room environment are addressed. (0891-340) Class 2, Lab 6, Credit 4 (F)

0891-398 **Special Topics: Automation Technologies**
Credit variable (F, W, S)

0891-399 **Independent Study**
Credit variable (F, W, S)

Business Technology/ Administrative Support Technology

Administrative Support Technology

0804-101 **Orientation to Business**
Broad overview of the form and structure of American business. It provides students with a basic knowledge of the history, organization and operation of business and its particular vocabulary. Students use a microcomputer in a market simulation. Class 4, Credit 3 (F, W, S)

0804-110 **Business English**
This self-paced course provides proofreading and editing skills as they relate to typewritten communications. Course content includes rules for word division, capitalization, numbers, abbreviation style, spelling and business letter writing. Designed specifically for students enrolled in courses in the business occupations department. Class 3, Credit 3 (W, S)

0804-111 **Keyboarding**
These courses are for students with limited keyboarding experience and for those who keyboard below 25 net words per minute. Keyboarding focuses on skill development, introduction to the computer, and basic formatting. Keyboarding students are expected to exit this course with a 20 words proficiency per minute for five minutes. Business correspondence, reports, and tables are prepared in the Formatting course and students are expected to exit this course with a 25 net words per minute proficiency. Class 1, Lab 3. Credit 2 (F, W, S)

0804-112 **OAS-Formatting**
These courses are for students with limited keyboarding experience and for those who keyboard below 25 net words per minute. Keyboarding focuses on skill development, introduction to the computer, and basic formatting. Keyboarding students are expected to exit this course with a 20 words proficiency per minute for five minutes. Business correspondence, reports, and tables are prepared in the Formatting course and students are expected to exit this course with a 25 net words per minute proficiency. Lab 4, Credit 2 (F, W, S)

0804-113 **OAS-Document Production I**
This course focuses on enhancements to business correspondence, reports, and tables produced on a microcomputer using current software. Skill development continues with an expected exit speed to 30 net words per minute for five minutes. Lecture/Lab 5, Credit 4 (F, W, S)

0804-114 **Keyboarding for Non-majors**
Offered to students who possess 0-20 words per minute keyboarding speed. The focus of the course is to facilitate inputting of alphabetic, numeric and other character information on a microcomputer and on an electric typewriter using a standard keyboard. Students are expected to exit this course with a keyboarding speed of 25 words per minute for three minutes. Open to all NTID students. Class 4, Credit 2 (F, W, S)

0804-211 **Records Management & Business Calculation**
This course develops basic skills in current business procedures related to general office functions. Skills include current records management applications, introductory database techniques, and business calculation methods. Students develop skills applicable to a variety of office settings. Class 5, Credit 3 (F, W, S)

0804-212 **Payroll/Spreadsheet Applications**
This course develops basic skills in current business procedures related to general office functions. Students learn basic database and spreadsheet techniques. Students complete payroll record using both manual and computerize systems. Students develop skills applicable to a variety of office settings. Class 5, Credit 3 (F, W, S)

0804-221 **OAS-Document Production II**
Emphasis on the improvement of basic skills and their application to a variety of realistic office projects. Students type correspondence, reports and tables on a microcomputer using current software. Students are expected to exit with a net speed of 40 words per minute for five minutes. (0804-113) Class 3, Lab 2, Credit 4 (F, W, S)

0804-230 **Administration Support Technology Seminar**
Gives students an opportunity to prepare for employment through field trips, mentoring and guest lectures. Topics for discussion are identified by students enrolled in the seminar. Topics covered may include time management, career development and personal/social development skills necessary for job success. Students are expected to participate in planning class sessions. (Administrative support technology diploma status) Class 2, Lab 2, Credit 3 (S)

0804-284 **Fundamentals of Management**
Focuses on theory and practice basic to the management process. Students use case studies, lectures and simulations to study planning, organizing, directing, staffing and controlling functions. Also introduces students to motivation and leadership theory as it relates to the role of a manager. (0804-101) Class 4, Credit 3 (F, W)

0804-286 **Fundamentals of Marketing I**
Introduction to the field of marketing and its strategies. Topics include consumer behavior and its effect in the marketplace, product research and planning, pricing, distribution channels, marketing institutions, advertising and promotion, and organization. (0804-101) Class 4, Credit 3 (S)

0804-290 **Small Business Organization**
An elective course for business students but available to students who have completed the prerequisites and have a desire to learn entrepreneurial skills for starting a business. Each student writes a business plan describing a selected business. (0804-201, 0804-284, or 0804-286) Class 4, Credit 3 (S)

0804-291 **Applied Business Techniques**
Gives students an opportunity to review skill-oriented course work on a microcomputer prior to graduation and job entry. Skill review includes production and speed typing, payroll procedures, records management techniques, word processing and database applications using current software packages. (0804-301) Class 4, Credit 2 (F, W, S)

0804-299 **Co-op: Business Technology/Administrative Support Technology**
Credit 0 (SU)

0804-302 **Advanced Applications for Word Processing**
This self-paced course provides an introduction to advanced document formatting and applications using various types of word processing and electronic office procedures. Students learn new skills using current software on a PC. (0804-221) Class 4, Credit 4 (F, W, S)

0804-303 **Business Graphics**
This self-paced course provides a continuation of the word processing concepts and applications presented in the previous course. Students use current software on a PC to create basic business and data-driven graphics that are prepared in the office environment. An introduction to desktop publishing basics also is included. (0804-302) Class 4, Credit 4 (F, W, S)

0804-304 **Database Applications for Business**
This self-paced course contains the concepts and applications for creating, maintaining and printing files. Using current database software on PC equipment, students use files to create various forms and reports. Class 4, Credit 4 (F, W, S)

0804-310 **Desktop Publishing for Business**
This course for students in the administrative support technology program provides further study in the field of desktop publishing, utilizing word processing and microcomputer equipment. Students create documents that contain business graphics, clip art and self-created graphics. Current software programs are used and provide a working knowledge of microcomputer-based desktop publishing. In addition to required projects, students select and design documents of their choice. (0804-303) Class 4, Credit 3 (S)

0804-312 **International Dimensions of Business**
Increases students' awareness of the impact of international developments on the U.S. work force and market conditions as well as the impact of the global marketplace as it relates to employment in a U.S. or foreign-owned company in the industrial, manufacturing and service sectors. Class 4, Credit 3 (S)

0804-399 **Independent Study**
Credit variable

Communication Studies

Communication studies courses may satisfy the social sciences, humanities or Deaf Studies graduation requirements. B level courses satisfy the diploma requirement. C level or higher courses satisfy the AOS requirement.

Introductory (Level A)

0880-101 Foundations of Critical Thinking
This course sharpens students' ability to think clearly, logically and creatively and to communicate knowledge effectively in an academic setting. Critical thinking strategies are learned for examining issues and solving problems. Course topics include problem solving using a five-step model; analyzing and giving directions; classifying and sequencing information; identifying multiple perspectives on an issue; analyzing arguments used to support a position; and creating visual representations of problems and solutions. The importance of thinking critically for effective communication regardless of modality (writing, reading, signing, speaking, listening) is stressed. (ACT reading score 1-11 or permission of instructor) Class 3, Credit 3 (F, W, S)

Fundamental (Level B)

0880-160 Communication Technologies^
In this information age, an understanding of and skill in the use of technological advances enables individuals to communicate more effectively in academic and professional settings. This course provides students with information and practice in using new telecommunication equipment (e.g., fax, ASCII compatible TTYs), and an introduction to computer-based information systems (e.g., local area networks, the Internet). Special emphasis is on accessing alternative technology that prepares students to live and work in the mainstream of a rapidly changing global community. Ethical aspects of different telecommunication systems are discussed. (ACT reading score 12-13 or permission of instructor) Class 3, Credit 3 (F, W, S)

0880-170 Effective Presentations+†
This course assists students in developing the ability to research, prepare and deliver effective presentations in groups. Students learn to specify a topic, research sources of information, evaluate the value of the information using critical thinking skills, develop an outline and investigate strategies for delivery, including visual aids. Students also learn to analyze intended audiences for appropriateness of language use and register. (ACT reading score 12-13 or permission of instructor) Class 3, Credit 3 (F, W)

Intermediate (Level C)

0880-201 Interpersonal Relationships^
This course examines the role of communication as it relates to establishing, maintaining, and ending relationships. Topics include relationship development; self-concept; perceptions and first impressions; stereotyping, prejudice and discrimination; conflict resolution; active and passive listening; personal and social values; self-disclosure, gender-related communication, and communication among Deaf and hearing people. (ACT reading score 14-16 or permission of instructor) Class 3, Credit 3 (F, W, S)

0880-202 Intercultural Communication^
This course provides the students with an introduction to the concepts of culture and communication, as they relate to face-to-face interactions. The students learn the relationship between culture and communication and how to reduce potential conflict. Skills learned in this course apply to communication in everyday situations as well as the work setting. (ACT reading score 14-16 or permission of instructor) Class 3, Credit 3 (F, S)

*This course satisfies the Deaf Studies/American Sign Language requirement.
†This course satisfies the humanities requirement.
^This course satisfies the social sciences requirement.*

0880-206 Group Dynamics & Effective Teamst|
This course focuses on the information and skills needed to be a knowledgeable, effective participant in small groups. Topics related to group dynamics and team-building are addressed at the practical and theoretical levels. These topics include characteristics of effective teams, stages of group development, techniques for group self-analysis, how groups operate for different outcomes, group vs. personal goals, the role of diversity, and group decision-making and problem-solving techniques. (ACT reading score 14-16 or permission of instructor) Class 3, Credit 3 (W,S)

0880-207 Organizational Communication & the Deaf Employee|*
This course examines interpersonal and small-group communications in organizational settings in today's corporate climate, with emphasis on important aspects of communication for Deaf individuals entering a professional career. Students become familiar with the business environments of large and small companies and the implication of company size regarding personnel decisions. Case studies from selected corporations provide insights into elements of communication processes such as networks (electronic and nonelectronic), organizational structures, managerial decision making, interviewing, organizational development and conflict resolution. Companies' perspectives on hiring culturally and ethnically diverse individuals and Deaf individuals are discussed. Laws, such as the ADA, related to the hiring and support of disabled workers are addressed. (ACT reading score 14-16 or permission of instructor) Class 3, Credit 3 (W, S)

0880-210 Internet Communication^
This course assists students in gaining a better understanding of computer-based communication systems and related legal and ethical issues. Students learn to skillfully work with systems such as the Internet and Web and available services such as notes, e-mail, newsgroups, bulletin boards, distribution lists, and home pages. Applications to workplace/employment situations, job searches and personal use are examined. RIT policies, applicable copyright laws, cost, benefits, advantages and disadvantages are incorporated into the syllabus. The course is continually updated as new information technologies become available. (ACT reading score 14-16 or permission of instructor) Class 3, Credit 3 (F, W, S)

Bridging (Level D)

0880-250 Professional Presentations^
This course focuses on knowledge and competencies required for making effective presentations in various professional contexts. Students learn and explore selected communication theories and principles, and the role of language use and register in professional presentations. Issues of audience analysis, critical listening, the use of an interpreter and the use of media are discussed. Reading activities (such as researching appropriate sources for presentation information and materials), writing (such as preparing outlines and presentation scripts) and application of problem-solving strategies to presentation situations are emphasized. (ACT reading score 17-19 or permission of instructor) Class 3, Credit 3 (S)

Computer Aided Drafting Technology

0890-201 Computer Aided Drafting I
Students learn the basic AutoCAD commands necessary to create and edit 2-D drawings. Students are introduced to drafting conventions and project types associated with the manufacturing and construction industries. Lab 6, Credit 2 (F)

0890-202 Computer Aided Drafting II
Students learn advance 2-D drafting with AutoCAD. This course covers commands designed to make the user more productive. Topics include advanced data input, grips, attributes, advanced dimensioning commands, external references, model and paper space viewports, and basic 3-D. (0890-201) Lab 6, Credit 2 (W)

0890-204 Computer Aided Drafting Technology Seminar
The course provides students with information regarding careers in the A/E/C and manufacturing industries. Activities include field trips, hand-on experiences, career information presentations, self-assessment testing, group discussion, and interaction with technical and professional people in the field. These activities help students decide on a CADT career option of study. (0890-201, corequisite 0890-202) Class 2, Lab 3, Credit 3 (W)

0890-206 Manufacturing Measurement Systems
This course provides students with hands-on experience with basic measuring instruments used in the manufacturing industry. Students practice measurement skills in classroom and laboratory settings as well as use computer simulations. Care and handling of the instruments, data collection, data management, data analysis and calculations will be developed. Students will learn standard procedures to communicate, report, and display measurement information. Class 1, Lab 3, Credit 2 (S)

0890-208 A/E/C Measurement Systems
This course provides students with hands-on experience with basic measuring instruments used in the A/E/C industry. Students practice measurement skills in lab and field settings as well as using computer simulations. Care and handling of the instruments, data collection, management, analysis, and other calculations are developed. Students learn standard procedures to report and display measurement information. Class I, Lab 3, Credit 2 (S)

0890-210 Construction CAD I
Students learn to apply 2-D and 3-D CAD techniques to a one-story construction project on a level site. Concepts associated with 3-D elements (wall, floor, foundation, deck, and roof) are integrated into the creation of a virtual 3-D model. Students will derive a series of orthographic (plan, section, elevation) and pictorial views from the model. 2-D features (site boundaries, setbacks, location of the structures on the site, sewer alignment, road, driveway, parking layout, and building access) are included in a 2-D drawing on which plan views of the 3-D models are overlain. All these drawings are organized on sheets according to accepted conventions. (0890-202) Lab 12, Credit 4 (S)

0890-215 Manufacturing CAD I
This course introduces students to basic 3-D manufacturing CAD concepts. Students will create a solid model that they will translate into 2-D drawings. The topics will include basic drawing techniques such as orthographic projections, dimensioning, and engineering detail drawings. Lab 12, Credit 4 (S)

0890-220 Construction CAD II
Students learn to apply 3-D CAD techniques to a bi-level construction project situated on a site with modest topographic features. Concepts associated with structural systems are integrated into the construction of the 3-D model. Students will extract a series of orthographic and pictorial views from the model, producing a comprehensive set of working drawings. (0890-210) Lab 12, Credit 4 (F)

0890-225 Manufacturing CAD II
Students apply the concepts learned in Manufacturing CAD I to the intermediate level of manufacturing 3-D computer-aided drafting. Students, working in teams to simulate an industrial drafting team, will create solid assembly models and extract the parts into 2-D engineering working drawings. Students will make presentations on their portion of the team project. Topics to be taught are 3-D assemblies, methods of assembly, materials and methods of manufacturing, intermediate level engineering working drawings, and tolerance and fits. (0890-215) Lab 12, Credit 4 (F)

0890-230 Construction CAD III
Students learn to apply 3-D CAD techniques to a multi-level construction project situated on a site with significant topographic features. Students will function as a team to create a total project model. Concepts of structural systems will be integrated into the construction of the building models. Students will extract and refine a series of orthographic views from the site and building models such that a comprehensive set of working drawings is produced. (0890-220) Lab 12, Credit 4 (W)

0890-235 Electrical CAD
This course covers the principles and practices of printed circuit board drafting and design. Students will design printed circuit boards from schematic diagrams. Topics will include schematic capture, surface-mounted and through-hole mounted theory of printed circuit board design and fabrication. (0890-250,0890-225) Lab 12, Credit 4 (W)

0890-250 Electronic Components
This course is designed to introduce students to surface-mounted and through-hole electronic components and how they function within a circuit. Students will use CAD to produce schematic diagrams and build breadboards from their schematic drawings. (0890-215) Class 2, Lab 3, Credit 3 (F)

0890-255 Construction Materials & Methods I
Students begin to learn about the common structural materials used in construction. Content includes vocabulary, identification, characteristics, origins, sources, standard sizes and shapes, units of measure, and methods for testing and acceptance. Students use standard references and classification systems for materials and products. (0890-208) Class 2, Lab 3, Credit 3 (F)

0890-260 Geometric Dimensioning & Tolerancing
The course is designed to give students an overview of geometric symbols and how these symbols effect the shape and features of a part or object in relationship to size. Students learn a drawing language that fosters uniform understanding among design, production, and inspection groups. Topics will include form controls, datums, orientation controls, and location controls per industrial standard ASME/ANSI Y 14.5M-1994. (0890-206,215) Class 3, Credit 3 (F)

0890-265 Construction Materials & Methods II
This course is a continuation of the Construction Materials and Methods I course. Students learn standard classification systems and use reference sources to investigate materials and products. Students select construction materials and products and integrate their selections into design solutions. The course focuses on non-structural materials and products associated with the construction industry. (0890-255) Class 2, Lab 3, Credit 3 (W)

0890-270 Introduction to Manufacturing Materials
A study of engineering-related materials/characteristics, structure, and properties as they apply to design and fabrication. The emphasis will be on metallic, polymeric, ceramic, and composite materials as related to atom movement and phase changes. (0890-225, 250) Class 2, Lab 3, Credit 3 (W)

0890-275 Principles of Structural Systems
Students learn the basic concepts of loads and stresses and how the structural members of a construction project support loads. This overview includes the practical aspects of how structural elements are assembled and incorporated into construction projects. (0890-208, corequisite 0890-255) Class 3, Credit 3 (F)

0890-299 Co-op: Computer Aided Drafting Technology
Credit 0 (SU)

0890-310 Advanced Construction CAD
Students develop the CAD drafting skills gained in previous courses by adding skills in design development. The project, a building of two or more stories, requires the synthesis of information and principles both from previous courses and from reference sources. The use of these reference sources is an important part of the instruction. (0890-230,265,275) Lab 15, Credit 5 (S)

0890-315 Electrical/Mechanical CAD Design
This course includes an electrical/mechanical design project in which students apply the knowledge, concepts, and techniques learned in previous CAD courses. Students create a basic design that includes a printed-circuit board (PCB) interfacing with a chassis and/or mechanical assembly. Students are given engineering design projects to choose from and must decide all the parameters of the design. The course uses a team approach whereby the students stimulate a professional drafting team. (0890-235,370) Lab 15, Credit 5 (S)

0890-320 Presentation Graphics
Students gain specialized skills and knowledge in production of presentation graphics using CAD. Using their general CAD skills as a starting point, they learn to produce various types of 3-D views, fly throughs, virtual reality, and web graphics for presentation of construction projects to clients, agencies, boards, and the public. (0890-310) Lab 15, Credit 5 (F)

0890-325 3-D Solid Modeling
This course covers advanced concepts in solid modeling and also provide students the opportunities to work in teams. Students are given a project that is divided between them. Each student is required to create a part of the project using advanced 3-D CAD techniques. Components used on the project must be researched and downloaded from the web and other digital sources. Students will also use the "no-dimensioning" technique creating 3-D solid modeling assemblies for size and fit. (0890-315) Lab 15, Credit 5 (F)

0890-350 Introduction to Material Processes
The course covers the application processes and techniques to engineering-related materials in the manufacturing of products. Processes emphasized will be machining, cutting, casting, molding, forging, forming, and joining. (0890-270) Class 3, Credit 3 (S)

0890-355 Site Utilities, Mechanical & Electrical Systems for A/E/C
Students learn to identify the basic equipment, requirements and operation of site utilities, mechanical and electrical systems for construction projects. The systems include water supply, sanitary sewers and treatment, storm drainage, solid waste handling, gas, power, telephone, cable services, fire protection, heating ventilating, air conditioning, lighting, communication systems and conveying systems. Students become acquainted with the graphic representation of this equipment and these systems on construction documents. (0890-220, 265) Class 3, Credit 3 (S)

0890-360 Internet CAD Applications
Students apply the concepts learned in Internet Technologies I to the hypertext markup language (HTML) used in CAD applications. Students store their previous CAD projects on their own web page for other students to access. Students use Xerox Corporation software, Intranet Docs, to import, scan, index, search, view, manipulated, and print/plot CAD files. (0805-251) Class 2, Lab 3, Credit 3 (F)

0890-370 Mechanical Components
This course covers mechanical components and devices as they apply to the design and manufacturing of industrial products. The emphases will be on driving systems (belts, chains, pulleys, and gears), couplings, bearings, cams, and linkages. Students will be required to give presentations on the operation of driving systems. (0890-315,350) Class 3, Credit 3 (F)

0890-375 Construction Regulations
Students gain a general knowledge of laws, codes, ordinances, regulations, approval processes and approving agencies or bodies which affect construction projects. Students gain a basic understanding of how these regulations and processes are applied to the work they will perform. (0890-255,265,275) Class 3, Credit 3 (F)

0890-399 Independent Study
Credit variable

Computer Integrated Machining Technology

0812-150 Introduction to Computer Numerical Control
Introduces the principles, concepts and terminology of computer numerical-controlled machining (CNC). Students review CNC history, development and applications and learn basic programming formats and techniques. (0813-135) Class 1, Lab 2, Credit 2 (S)

0812-151 Computer Numerical Control I
Introduction to computer-controlled machine tools. Students develop the skills required to program a machine, using several canned cycles, and to write programs that include point-to-point, linear and circular interpolation operations. (0813-134, 0884-210) Class 2, Lab 5, Credit 4 <W)

0812-152 Computer Numerical Control II
Students use on-line computers to prepare and verify programs. Students are introduced to advanced concepts through computer numerical control programming of a CNC milling machine and a CNC lathe. (0812-151) Class 2, Lab 5, Credit 4 (S)

0812-253 Computer Numerical Control III
Introduces students to computer numerical control. Topics include programming, set-up and operation of machining and turning centers with industrial applications. Programming with manual data input, basic graphics and machine language is emphasized. Safety is stressed throughout the course. (0812-152) Class 2, Lab 5, Credit 4 (S)

0813-101 Basic Drafting I
Provides instruction in the principles and techniques of basic drafting for students in other technical programs. The emphasis is on understanding how drawings are made and used in industry. (0884-180) Lab 6, Credit 2 (F)

0813-102 Basic Drafting II
A continuation of Basic Drafting I for students who desire or need greater depth of knowledge of drafting in industry. Topics include auxiliary views, sections, applied mathematics, and isometric and pictorial drawings with greater attention to drawing quality. (0813-101, 0884-180) Lab 6, Credit 2 (W)

0813-131 Manufacturing Processes I
Students develop the basic skills necessary to use traditional machine tools. Laboratory instruction simulates an industrial environment. Emphasis on safety in the operation of machines is an integral part of the course. (0884-180) Class 1, Lab 8, Credit 4 (F)

0813-132 Manufacturing Processes II
Students develop the basic skills necessary to use traditional machine tools. Laboratory instruction simulates an industrial environment. Emphasis on safety in the operation of machines is an integral part of the course. (0813-131) Class 1, Lab 8, Credit 4 (W)

0813-133 Manufacturing Processes III
Students develop the basic skills necessary to use traditional machine tools. Laboratory instruction simulates an industrial environment. Emphasis on safety in the operation of machines is an integral part of the course. (0813-132) Class 1, Lab 8, Credit 4 (S)

0813-134 Manufacturing Processes IV
Students apply theory required to set up and operate lathes, milling machines, grinders and precision hand tools. Students also are introduced to nontraditional machining. Greater emphasis is placed on accuracy and quality. Safety is stressed throughout all courses. (0813-133) Class 1, Lab 8, Credit 4 (F)

0813-135 Manufacturing Processes V
Students apply the theory associated with the set-up and operations of lathes, milling machines, drill presses, grinders, and bench operations. Students also are introduced to non-traditional machining. Greater emphasis is placed on accuracy and tolerance of machine parts. Safety is stressed throughout all courses. (0813-134) Class 1, Lab 8, Credit 4 (W)

0813-136 Manufacturing Processes VI
Students apply the theory associated with the set-up and operation of lathes, milling machines, drill presses, grinders, and bench operations. Students also are introduced to nontraditional machining. Greater emphasis is placed on accuracy and tolerance of machine parts. Safety is stressed throughout all courses. (0813-135) Class 1, Lab 8, Credit 4

0813-139 Blueprint Reading I
Students develop the skills necessary to read and interpret engineering drawings of details and assemblies. (0884-180) Class \, Lab 3, Credit 2 (F)

0813-140 Blueprint Reading II
Students develop the skills necessary to read and interpret prints of engineering drawings of details and assemblies. (0813-139) Class 1, Lab 3, Credit 2 (W)

0813-151 Industrial Materials
Introduction to the many materials used in industry and the reasons why the final cost of producing a part is influenced by material selection. Metals, plastics and ceramics are covered from the perspective of physical, mechanical and dimensional properties. (0813-134) Class 3, Credit 3 (W)

0813-152 Manufacturing Analysis
Introduction to manufacturing concepts. Students learn modern methods of planning, producing and controlling manufactured goods. The text and class discussions focus on problem solving and industrial operations. (0813-134) Class 3, Credit 3 (S)

0813-153 Welding I
Students learn about basic oxyacetylene and shielded metal arc welding processes as well as how to set up and operate equipment properly. Safety rules pertaining to welding are emphasized. (0813-134) Lab 4, Credit 2 (W)

0813-154 Precision Measurement
Students develop the skills necessary to measure to the highest tolerances commonly used in industry. They measure parts or groups of parts using industrial methods and equipment. Analysis of measurements and problem solving are stressed. (0813-132) Class 1, Lab 3, Credit 2 (S)

0813-155 Welding II
Students develop skills in gas tungsten arc welding, gas metal arc welding and resistance welding. Emphasizes proper operation of equipment and related safety measures. (0813-153) Lab 4, Credit 2 (S)

0813-237 Advanced Machining & Processes
Students develop advanced-level machining skills. They apply theories associated with precision form and compound-angle grinding, advanced mill and lathe techniques, nontraditional machining processes and electrical discharge machining. Safety is stressed throughout the course. (0813-136) Class 1, Lab 8, Credit 4 (F)

0813-256 Automated Process Control
Introduction to advanced-level precision measuring equipment and quality control procedures. Students develop additional skills in the use of optical and computer-programmed measuring equipment. (0813-136) Class 2, Lab 2, Credit 3 (W)

0813-260 Senior Seminar
Provides exiting manufacturing processes students with a structured forum for discussions with program faculty members about employee relations and ethics, industrial employment trends, apprentice programs and continued technical skills development. (0813-136) Class 2, Credit 1 (S)

0813-299 Co-op: Computer Integrated Machining Technology
Credit 0 (SU)

0813-399 Independent Study
Credit variable

Deaf Studies

Deaf Studies/American Sign Language courses also satisfy social sciences and humanities requirement as noted below. B level courses satisfy the diploma requirement. C level or higher courses satisfy the AOS requirement.

Fundamental (Level B)

0886-150 Introduction to American Sign Language†
Introduces knowledge about American Sign Language (ASL) and provides a basic understanding of ASL and discusses principles of sign formation. The course also introduces a brief history of ASL, compares aspects of different visual languages and spoken language. Strategies for learning ASL will be discussed. Class 3, Credit 3 (F, W, S)

0886-199 American Sign Language 1†
Designed for students who have no previous knowledge of American Sign Language. ASL I includes the linguistic features, cultural protocols and core vocabulary for students to function in basic ASL conversations that include ASL grammar for asking and answering questions while introducing oneself; exchanging personal information; talking about family, friends and surroundings; and discussing activities. Classroom and lab activities include practicing conversations and videotaping. (SIPI/LCBQ:1) Class 4, Credit 4 (F, W, S)

†This course satisfies the humanities requirement.

†This course satisfies the social sciences requirement.

0881-166 Sign Mime & Creative Movement†
Focuses on the dominant historical form of expression used by theaterers of the Deaf. Topics include principles for effective use of space, creative movement strategies, and expression of original ideas in sign-mime. This course satisfies the Deaf Studies requirement. Class 3, Credit 3 (F, W) (Performing Arts)

0880-190 Introduction to Deaf Studies
Introduces students to major concepts and issues in the field of Deaf Studies. The course integrates the fields of history, anthropology, linguistics, creative arts and literature as they apply to Deaf culture and the Deaf community. The course is designed to foster students' active participation as a means of developing strong leadership and advocacy skills among NTID students. After completing this course, students will be able to pursue specific areas of interest within the Deaf Studies/ASL program. (ACT arts/literature reading score 1-4 or permission of instructor) Class 3, Credit 3 (F, W)

Intermediate (Level C)

0886-200 American Sign Language lit
Expands the basic principles presented in ASL I. The course teaches students to use linguistic features, cultural protocols, and core vocabulary to function in additional basic ASL conversations including ASL grammar for giving directions; describing others; making requests; talking about family, occupations and routines; and attributing qualities to others. Classroom and lab activities include practicing conversations and videotaping. (0886-199 or equivalent) Class 4, Credit 4 (F, W, S)

0886-201 American Sign Language Hit
This course is a continuation of ASL II expanding the emphasis on ASL grammar, syntax, spatial referencing and vocabulary development. ASL III teaches further communicative competencies in ASL conversations beyond the basic level that include telling life events, describing events in time, asking for clarification, correcting, conforming, elaborating on information, agreeing and disagreeing, resolving conflicts, and giving directions. Classroom and lab activities include practicing dialogues, short stories, narratives and short conversations. (0886-200 or equivalent) Class 4, Credit 4 (F, W, S)

0886-249 Structure of American Sign Language†
Provides students with basic knowledge about the linguistic structure of American Sign Language (ASL). Through an introduction to language components, students examine the phonology, morphology and syntax of ASL. Information regarding historical and cultural aspects of ASL is also introduced and discussed. Class 3, Credit 3 (F, W, S)

0880-247 Deaf Art/Deaf Artist†
Examines art works and artists' statements, goals and intentions. The artwork and the statements of artists are examined to determine if the artists focus on being Deaf as the subject of their art, or if the focus of their art is related to Deaf issues or other subjects. By examining these connections and influences and comparing the varieties of choices artists have made, a definition of Deaf art is developed. From the readings and reviews, students develop a list of issues that lead to identification of a person as a Deaf artist or an artist who is Deaf. The question of what is culture and what is art is examined, and comparisons to cultural groups occur. (ACT arts/literature reading score 5-7 or 0880-180 or permission of instructor) Class 3, Credit 3 (S)

0881-204 Deaf Theater History†
Examines the Deaf experience in theater and the roles that Deaf people have played in theater history. Particular attention is given to the documented achievements of individuals and companies in the 19th and 20th centuries. This course satisfies the Deaf Studies requirement. (0881-202 or 0882-221) Class 3, Credit 3 (S)

0880-207 Organizational Communication & the Deaf Employee[^]
Examines interpersonal and small-group communications in organizational settings in today's corporate climate, with emphasis on important aspects of communication for Deaf individuals entering a professional career. Students become familiar with the business environments of large and small companies and the implication of company size regarding personnel decisions. Case studies from selected corporations provide insights into elements of communication processes such as networks (electronic and nonelectronic), organizational structures, managerial decision making, interviewing, organizational development and conflict resolution. Companies' perspectives on hiring culturally and ethnically diverse individuals and Deaf individuals are discussed. Laws, such as the ADA, related to the hiring and support of disabled workers are addressed. Class 3, Credit 3 (S)

0882-221 Deaf Heritage!
Provides introductory survey of sociocultural patterns associated with the unique characteristics of Deaf culture and Deaf community; the changing social, linguistic and educational conditions and attitudes influencing Deaf people throughout the past hundred years; and the achievements and accomplishments made by Deaf individuals in various professional fields. Hard-of-hearing and late-deafened individuals involved in the Deaf community will be included. Students learn how technology has impacted the lives of Deaf people. Students also learn the importance of the national organizations of the Deaf, of the achievements of Deaf minorities including women and ethnic/racial individuals, and of Deaf advocacy groups protecting the rights of Deaf people. (0882-200 or permission of instructor) Class 3, Credit 3 (F, W, S)

0882-222 Deaf Culture & Community!
Introduces students to aspects of Deaf culture and community. The distinction between these is reviewed, and characteristics of each is identified. Students learn about the language, norms of behavior, values, traditions, and possessions of Deaf people. Deaf culture and community are analyzed from a historical and sociological perspective. Cross-cultural issues relating to the role of hearing people with the Deaf community are also covered. (0880-200 or permission of instructor) Class 3, Credit 3 (W)

0882-223 Deaf Women's Studies!
Provides a historical review of Deaf women in their professional and personal lives. The issues covered in this course include the exploration of the social, political and economic conditions affecting Deaf women and how this compares to other women in society. Hard-of-hearing and late-deafened women, and ethnic/racial women with hearing loss, are included in this course. Students will be able to summarize trends from the social/political analysis and apply their learning to their own personal development and empowerment. (0882-200 or permission of instructor) Class 3, Credit 3 (W, S)

Bridging (Level D)

0886-250 Introduction to ASL Teaching!
Provides overview of how second languages have traditionally been taught, what the current methods and theories are, and their applications to the teaching of sign language. Students are provided opportunities to practice basic teaching techniques, select appropriate materials, design curriculum and evaluation techniques, including how to teach cultural and grammatical features in lessons. Students learn about resources to support their efforts to teach sign language. (0886-249) Class 3, Credit 3 (W, S)

0882-285 Civil Rights & Deaf People!
Reviews the history of oppressed groups in the United States and their struggle for equality. Parallels will be drawn between various groups with a focus on Deaf people. Patterns of oppression and empowerment will be compared and contrasted for Black Americans, women, lesbians and gays, and Deaf people. Specific strategies and techniques employed to gain civil rights are covered. Court cases are reviewed and discussed. (ACT social studies/science reading score 9-11 or permission of instructor) Class 3, Credit 3 (S)

0881-259 Creative Translation for Staget
Focuses on different translation forms used by theatre, mime, and dance companies. Students learn to distinguish between English and American Sign Language (ASL). They translate stories, poems, and plays into American Sign Language and other Sign Languages. Theatrical integrity dealing with translation issues and visual access are central goals. (0881-210 or 0881-256) Class 3, Credit 3 (F, W)

Digital Imaging & Publishing Technology

0878-200 Overview of Digital Imaging & Publishing Software
This course provides an overview of the major applications, by type and function, in the categories of object-oriented/vector graphics, raster/bitmap graphics, document layout, image manipulation, presentation graphics, multimedia, and print prepress; included are the concepts of application version upgrades, plug-ins and extensions and special-purpose/niche applications. Class 2, Lab 3, Credit 3 (F, W, S)

0878-210 Digital Design & Typography
Digital photography, graphics and typography blend to communicate quickly and memorably, as well as beautify a layout. The student will learn basic design and typography principles, terminology, guidelines, methods and systems used to solve graphic design problems. Font management and color model specifications are also included. Students will develop design and typography skills that can be applied in a wide variety of digital prepress and presentation media applications. Typography study will emphasize font selection, font management, and typesetting and copyfitting functions as critical elements of successful page layout design. Class 2, Lab 3, Credit 3 (F, S)

0878-215 Fundamentals of Image Acquisition
This course introduces the student to: reflective and transmission scanning of two-dimensional art per given specifications; acquiring photographic images from Photo-CD, CD-ROM, digital cameras, grabbing video images; acquisition of text and graphics from on-line networks such as the Internet and WWW; acquisition of text with OCR scanning; and applying image size, resolution, and file format specifications to image files. Class 2, Lab 3, Credit 3 (F, W)

0878-220 Fundamentals of Image Manipulation
This course introduces students to the production and manipulation of raster images with image manipulation software. Topics covered will include the study and application of painting and editing tools and techniques; selection techniques and digital masking to manipulate raster images; and application of image size, resolution and file format specifications. The technology and processes taught in this course will reflect the current trends in the marketplace. Class 2, Lab 3, Credit 3 (F, S)

0878-225 Fundamentals of Vector Graphic Illustration
This course introduces the student to using digital illustration and page design programs to generate vector-based images. Emphasis is placed on mastering vector-based tools as preparation for intermediate and advanced digital imaging and publishing skill development. Assignments emphasize the use of the computer and its application to preparing images for print and media publication. Page layout, type specification, and graphics integration are covered. Class 2, Lab 3, Credit 3 (W, S)

0878-230 Fundamentals of Desktop Publishing
This course includes the use of desktop publishing applications to create pages and documents to specification; importing and placing text and graphic files; the application of style sheets, templates and libraries, and color specifications. The application of design and typographic principles, trade terminology and measurement systems, font management, and file management are emphasized. Class 2, Lab 3, Credit 3 (F, W)

0878-235 Fundamentals of Digital Media Publishing
In this course students prepare basic digital presentations for computer display. Skills included are: text import, entry and editing; graphic import, editing and basic creation; and acquisition and placement of motion graphic elements. An overview of hardware and software requirements will be presented. Class 2, Lab 3, Credit 3 (F, S)

*f*This course satisfies the humanities requirement.

*f*This course satisfies the social sciences requirement.

0878-240 Fundamentals of Network Publishing

This course uses network publishing software to generate and distribute PDF pages; create linked pages to specifications for the World Wide Web. Other topics include an overview of Internet resources, Web page description languages, image standards, and browser software. **Class 2, Lab 3, Credit 3 (W, S)**

0878-245 Fundamentals of Digital Output

This course includes the fundamentals of file, system and device preparation required for output to PostScript and non-PostScript devices. Other topics include the technologies associated with standard industry output devices, image evaluation, and network communication protocols. **Class 2, Lab 3, Credit 3 (F, W)**

0878-250 Color Theory & Practice

This course includes the study of the identification of colors; factors affecting color perception and recognition; color correction; and design and production influences on the selection of color specification systems, such as Pantone, Trumatch, and custom colors. **Class 2, Lab 3, Credit 3 (W, S)**

0878-255 Imaging Processes & Markets

This course presents an overview of the major imaging processes in printing (lithography, gravure, flexography, screen printing, digital, and non-impact) and multimedia publishing (interactive CD-ROM, World Wide Web, electronically delivered documents) together with a study of their respective and overlapping markets and career opportunities. **Class 2, Lab 3, Credit 3 (F, W, S)**

**0878-299 Co-op: Digital Imaging & Publishing Technology
Credit 0 (F, W, S, SU)****0878-300 Desktop Publishing**

This course builds on topics presented in Fundamentals of Desktop Publishing. Topics include defining and applying style sheets, templates, and libraries; recognizing and applying proofreaders marks and notations; and defining and applying color model specifications. (0878-210,0878-230,0878-245) **Class 2, Lab 3, Credit 3 (F, W)**

0878-302 Database Publishing

This course includes the principles and techniques of database construction, manipulation, and reporting. It provides the opportunity to develop expertise in creating graphically attractive and informationally useful reports both within the layout capabilities of a database application, and through importation into a page layout program, and conversion into a form compatible with a Web server. Topics include database formation, document tagging, template generation, style sheets, HTML coding, and database publishing techniques and procedures. (0878-210, 0878-230,0878-245) **Class 2, Lab 3, Credit 3 (F, S)**

0878-304 Publication Publishing

This course includes the use of page layout and special-purpose applications to produce book, magazine, and long format publications. Topics include techniques for defining and applying font selections, page formats, page and section numbering, headers and footers, footnotes, text editing, graphics, color, table of contents, index, glossary, appendix, colophon, and other features typical for book and long document publishing formats. Students are introduced to the repurposing of documents into various forms of digital media, and the creation, manipulation, and use of digital photographs. (0878-300) **Class 2, Lab 3, Credit 3 (W)**

0878-305 PDF Production & Workflow

This course includes the study of the Portable Document Format (PDF) file format. It includes defining and applying specifications for color management, file optimization, and file security; recognizing and editing PDF documents; and using PDF files in a variety of print and non-print media production workflows. (0878-230, 0878-245, 0878-250) **Class 2, Lab 3, Credit 3 (W)**

0878-306 Network Publishing

This course builds on the skills previously learned in Fundamentals of Network Publishing. Topics include Internet resources; network publishing; and Web page authoring, including the use of features such as forms and tables. (0878-210,0878-240,0878-250) **Class 2, Lab 3, Credit 3 (W,S)**

0878-308 Digital Media Publishing

In this course students taken written and illustrative information, create and prepare digital elements that relate to the topic, and organize the result into electronic presentations for CD-ROM or network use. Issues of typography, quality, format, layout and audience are included. Word processing, desktop publishing, vector and raster graphics, and presentation applications will be used. Scripting and markup languages will be introduced. (0878-210,0878-240,0878-250) **Class 2, Lab 3, Credit 3 (F, S)**

0878-310 Image Acquisition

This course builds on the skills previously learned in Fundamentals of Image Acquisition. Topics include determining and applying resolution and magnification settings appropriate to the characteristics of the specified output device; setting highlight and shadow points, removing color cast, unsharp masking, and tone adjustment of acquired images; use of high-end, mid-range, and desktop scanners with their related software; jobs for RGB output; and changing image files for other purposes (repurposing). (0878-215, 0878-245, 0878-250) **Class 2, Lab 3, Credit 3 (F, S)**

0878-312 Image Manipulation

This course builds on the skills previously learned in Fundamentals of Image Manipulation. Topics include applying production planning techniques to image manipulation, production quality standards, advanced methods and quality criteria for image manipulation, legal and ethical issues. This is a production-oriented course with the emphasis on producing photographic quality (raster) digital images. (0878-215,0878-220,0878-245,0878-250) **Class 2, Lab 3, Credit 3 (F, W)**

0878-314 Preparing Photographs for Publishing

This course focuses on editing digital files to produce specific black & white and color reproduction outcomes on a variety of publishing systems, i.e., network printers, film recorders (slides), the Web, CDs, and offset presses. It teaches how to prepare the image files and related workflow procedures, while reinforcing many of the skills learned in the prerequisite courses (0878-300 or 0878-310) **Class 2, Lab 3, Credit 3 (S)**

0878-316 Black & White & Color Halftone Production

This course focuses on editing digital files to produce specific black/white and color halftone outcomes on a variety of printing systems, i.e., laser printers, network printers, digital presses, direct to plate systems and offset presses. The application of production criteria for the full variety of screening options for image files and the related workflow procedures and designed to reinforce many of the skills learned in the prerequisite courses. (0878-314) **Class 2, Lab 3, Credit 3 (W)**

0878-318 Color Management Systems

This course includes the study of color management system (CMS) software and color measurement devices as they are used to control color quality in the digital imaging and publishing disciplines. CMS concepts are introduced and applied to imaging equipment (input, display, and output), systems, and documents. (0878-215, 0878-220, 0878-245, 0878-250) **Class 2, Lab 3, Credit 3 (F, W)**

0878-322 Composite Imaging

This course includes specialized image manipulation techniques applied to produce images that blend images together into a single composite image. Emphasis is given to developing efficient production techniques for this advanced image manipulation concept. (0878-310,0878-312) **Class 2, Lab 3, Credit 3 (W)**

0878-324 Image Retouching & Restoration

This course includes specialized image manipulation techniques used to reconstruct, restore, and enhance images. Emphasis is given to developing skills for image evaluation and production work plan strategies. (0878-310,0878-312) **Class 2, Lab 3, Credit 3 (S)**

0878-326 Videography

This course introduces students to videography, cameras, videocassette recording, digital non-linear editing, and lighting. Emphasis is on proper operation of video and computer equipment for productions and post production of digital non-linear edited sequences and their adaptation to different presentation formats. Students gain hands-on experience in making a digital video. (0878-210, 0878-220, 0878-225,0878-235) **Class 2, Lab 3, Credit 3 (W)**

- 0878-328 **Digital Media Interactive**
In this course students create and prepare digital elements and integrate them into interactive presentations for CD-ROM or network use. Issues of file size, quality, format, client/server interaction are included. 2-D/3-D vector and raster, animation, video, and presentation applications will be used. (0878-308) Class 2, Lab 3, Credit 3 (S)
- 0878-330 **Preflight Procedures**
This course includes the study of procedures to inspect files for adherence to production standards and specifications; to modify and apply necessary job specifications. Focus will be on font, color, and trapping specifications; picture and graphic file types and linkages; measurements and typographic specifications; output device-specific parameters (all 0878 200-level) Class 2, Lab 3, Credit 3 (F)
- 0878-332 **Image Assembly: Trapping & Imposition**
This project-based course includes the study of trapping and imposition variables, an overview of production workflow, and use of software solutions for trapping and imposition. An emphasis is given to the study of press and post-press factors that impact trapping and imposition. (0878-210, 0878-225, 0878-230, 0878-245, 0878-255) Class 2, Lab 3, Credit 3 (W)
- 0878-341 **Proofing & Platemaking**
The course includes the study of procedures to produce analog mono-chrome and color proofs and analog offset plates to production standards and specifications; the comparison of various analog proof types and capabilities; the comparison of types of offset plates; proof and plate processor care and maintenance; and exposure, processing, and inspection procedures. (0878-250,0878-255) Class 2, Lab 3, Credit 3 (W)
- 0878-344 **Offset Press Operation I**
This course emphasizes the systematic methods of press preparation and operation, of offset printing technology. Emphasis is on sheet control, set-up of ink and dampening systems, and introduction to four-color process printing. (0878-343) Class 2, Lab 3, Credit 3 (W)
- 0878-345 **Offset Press Operation II**
This course continues the development of offset press operation skills. Areas of study include process color printing, densitometry, quality control test targets, and investigative press problem solving. Students will develop production skills in a simulated production setting. (0878-344) Class 2, Lab 3, Credit 3 (F, S)
- 0878-346 **Digital Printing Systems**
This course presents a study of digital printing system technology and marketplace production issues, and prepares students with the technical knowledge and skills to output, and potentially operate, a variety of digital printing systems. (0878-245,0878-250,0878-255) Class 2, Lab 3, Credit 3 (F, S)
- 0878-351 **Fundamentals of Photographic Imaging**
This course includes the study of the fundamental principles, processes, and equipment used in the production of photographic images. Topics include the proper use of darkroom equipment (enlargers, easels, timers, processors, etc.) and the application of tone and color control in the production of photographic proofs and prints. (0878-250, 0878-255) Class 2, Lab 3, Credit 3 (F, S)
- 0878-352 **Photographic Imaging**
This course builds on the skills introduced in Fundamentals of Photographic Imaging. This course introduces calibration and evaluation of photographic images and equipment by the use of standard reference materials and industry methods. Other topics include the continued production and evaluation of photographic prints from a variety of formats to satisfy provided specifications. (0878-351) Class 2, Lab 3, Credit 3 (W)
- 0878-353 **Photographic Imaging Production**
This course builds on the photographic imaging skills beyond the essentials covered in previous photographic imaging courses by requiring greater depth of expertise and providing greater breadth of experience. The course includes additive and subtractive system exposure equipment; the operation of mechanized processors and exposure equipment; applied densitometry; and, production techniques for quality and quantity. (0878-352) Class 2, Lab 3, Credit 3 (F, S)
- 0878-354 **Advanced Photographic Imaging**
This course includes the production of negatives from transparencies; color and density matching a photographic print to a sample; and photographic print production from slides. An emphasis is given to following standard lab practices for safety, quality, and productivity. (0878-353) Class 2, Lab 3, Credit 3 (W)
- 0878-355 **Display Imaging**
This course includes the study and production of captioned prints, prints and transparencies for display use, and mural prints. Emphasis is given to comparative finishing techniques, quality control issues, comparative materials specifications, lab safety, and technical vocabulary. (0878-354) Class 2, Lab 3, Credit 3 (F, S)
- 0878-356 **Copywork**
This course includes the set-up and use of optical camera systems to produce copy and duplicate images. Topics will include determination of exposure, copywork magnification, filter factors and the production of copy and duplicate images using provided specifications. (0878-351) Class 2, Lab 3, Credit 3 (W)
- 0878-361 **Production Procedures & Quality Control**
Production Procedures & Quality Control reinforces the students' skills in the core courses. Students are introduced to procedures that are used in an actual printing production environment, understanding the cost of doing business, estimating procedures and quality control requirements. This course prepares the student for continuation on to the applied production print sequence of courses as well as prepare them for success in the working world. (All 0878 200-level) Class 2, Lab 3, Credit 3 (F, W, S)
- 0878-362 **Applied Production I**
This elective three-course sequence provides an environment where students and customers interact in order to produce completed imaging projects and finished print jobs. Students work in a simulated production environment where they can develop their technical skills, work habits, and customer relations. (0878-361) Class 2, Lab 3, Credit 3 (F, W, S)
- 0878-363 **Applied Production II**
This elective three-course sequence provides an environment where students and customers interact in order to produce completed imaging projects and finished print jobs. Students work in a simulated production environment where they can develop their technical skills, work habits, and customer relations. (0878-362) Class 2, Lab 3, Credit 3 (F, W, S)
- 0878-364 **Applied Production III**
This elective three-course sequence provides an environment where students and customers interact in order to produce completed imaging projects and finished print jobs. Students work in a simulated production environment where they can develop their technical skills, work habits, and customer relations. (0878-363) Class 2, Lab 3, Credit 3 (F, W, S)
- 0878-371 **Beginning DocuTech Operations**
This course will focus on the fundamental operating features of the Xerox DocuTech 135 publishing system. It provides an opportunity to understand the job and market capability of the DocuTech, xerography, image and paper quality considerations and basic operating procedures. This course is the first of a two-course sequence that can lead to employment opportunities as a DocuTech operator. (0878-230,0878-245,0878-255) Class 2, Lab 3, Credit 3 (F, S)
- 0878-372 **Advanced DocuTech Operations**
This course will focus on the advanced operating features of the Xerox DocuTech 135 publishing system. It provides an opportunity to understand the job and market capability of the DocuTech, creation of electronic files and file transfer, and advanced operating procedures. This course is the second of a two-course sequence that can lead to employment opportunities as a Xerox DocuTech operator. (0878-371) Class 2, Lab 3, Credit 3 (W)
- 0878-399 **Independent Study**
Credit variable (F, W, S)

English

Academic Writing

Introductory (Level A)

0883-101 Writing I
In this developmental course, students learn and practice the writing skills necessary to enter Writing II. Strategies to discover (from personal experience and resource materials), develop and organize thoughts on various topics are presented. Students organize and develop paragraphs and texts in various forms, such as narration, process and summary. Students also learn to revise, edit, and present texts for specific groups of readers. Students will be required to develop word-processing skills. (NTID Writing Test score below 40) Class 4, Credit 4 (F, W, S)

0883-102 Integrated Reading & Writing I
First course in a two-course developmental sequence in which students work on the academic reading and writing skills necessary for all degree programs at NTID. Students develop the language knowledge and procedures needed to continue the development of academic reading and writing skills in the Non-Fiction Reading II and Writing II courses. (NTID Reading Test score below 80 and NTID Writing Test score below 40) Class 5, Credit 5 (F)

0883-103 Integrated Reading & Writing II
Second course in a two-course developmental sequence in which students work on the academic reading and writing skills necessary for all degree programs at NTID. Students develop the language knowledge, strategies, and procedures needed to continue the development of academic reading and writing skills in the Non-Fiction Reading II and Writing II courses. (NTID Reading Test score below 80 and NTID Writing Test score below 40 and 0883-102) Class 5, Credit 5 (W)

Fundamental (Level B)

0883-161 Writing II
In this developmental course, students learn and practice the writing skills necessary to satisfy the requirements for a diploma or to enter Academic Writing III. Students learn how to use personal experience and resource materials to develop and organize their thoughts on various topics. Students organize and develop paragraphs and brief compositions of various discourse forms, with particular emphasis on description and process. Students also learn to revise, edit, and present texts according to the conventions, format, and mechanics expected by the discourse community for which they write. (NTID Writing Test score between 40 and 49 or 0883-101 or 0883-103) Class 4, Credit 4 (F, W, S)

Intermediate (Level C)

0883-211 Writing III
In this developmental course, students learn and practice the writing skills necessary to satisfy the requirements for an AOS degree, or to enter Academic Writing IV. Students plan, draft, revise and edit short essays of various types, with particular emphasis on classification and exemplification. Students learn how to organize and develop their texts for various topics and purposes, and how to revise, edit, and present texts according to the conventions, format, and mechanics expected by the discourse community for which they write. Grade of C or better is required upon completion of this course before advancing to Writing IV, 0883-261. (NTID Writing Test score between 50 and 59 or 0883-161) Class 4, Credit 4 (F,W,S)

Bridging (Level D)

0883-261 Writing IV
In this developmental course, students learn and practice the writing skills necessary for College of Liberal Arts writing courses. Students gather information from various sources, plan, draft, revise and edit longer essays (of at least 500 words) of various discourse types with particular emphasis on description and exemplification. Students learn how to organize and develop their texts for various topics, purposes, and audiences. Students also learn how to revise, edit, and present texts according to the conventions, format, and mechanics expected by the discourse community for which they write. (Note: Students must earn a grade of C or better in the course if they wish to take the LAPT) (NTID Writing Test score between 60 and 67 or grade of C or better in 0883-211) Class 4, Credit 4 (F,W,S)

Nonfiction Reading

Introductory (Level A)

0883-100 Nonfiction Reading I
In this developmental course, students learn and practice the reading comprehension skills and English language skills necessary to increase comprehension of non-fiction reading materials necessary to begin degree programs at NTID. (NTID Reading Test score below 80) Class 4, Credit 4 (F, W, S)

Fundamental (Level B)

0883-160 Nonfiction Reading II
In this developmental course, students learn and practice the reading comprehension skills and English language skills necessary to increase comprehension of non-fiction reading materials necessary to success in diploma programs at NTID. (NTID Reading Test score between 80 and 97 or 0883-100 or 0883-103) Class 4, Credit 4 (F, W, S)

Intermediate (Level C)

0883-210 Nonfiction Reading III
In this developmental course, students learn and practice the reading comprehension skills and English language skills necessary to increase comprehension of non-fiction reading materials necessary for success in AOS programs at NTID. Grade of C or better required upon completion of this course before advancing to Nonfiction Reading IV, 0883-260. (NTID Reading Test score between 98 and 124 or 0883-160) Class 4, Credit 4 (F, W, S)

Bridging (Level D)

0883-260 Nonfiction Reading IV
In this developmental course, students learn and practice the reading comprehension skills and English language skills necessary to increase comprehension of non-fiction reading materials necessary for success in AAS and higher degree programs at NTID/RIT. (NTID Reading Test score between 125 and 143 or grade of C or better in 0883-210) Class 4, Credit 4 (F, W, S)

Literature

Fundamental (Level B)

0883-150 Exploration in Literature
In this developmental course, students are introduced to a variety of literary works (drama, poetry, short story/storytelling and novel or novel excerpts). Students learn basic literary terms and improve their critical reading skills in order to appreciate literature. The exploration and study of literature stimulates discussions of the relationships of literary works to one's own life. (ACT arts/literature reading score 1-i or 0883-103 or permission of instructor) Class 4, Credit 4 (F, W, S)

Intermediate (Level C)

0883-200 Analyzing Literature
This developmental course is for students who are familiar with basic literary analysis and are ready to identify, elucidate and discuss traditional literary elements. Instruction and practice focuses on elements such as theme, personal values, conflict, and tone. In addition, students discuss the relevance of literary works to their own life experiences and search for identity. (ACT arts/literature reading score 5-7 or 0883-150 or permission of instructor) Class 4, Credit 4 (F, W, S)

Bridging (Level D)

0883-250 Themes & Symbols in Literature
Students with experience in literary analysis apply their knowledge and ability to independently comprehend literary works in preparation for entry to RTT's College of Liberal Arts literature course work. Students learn how to effectively report in writing the results of such activities as individual literary analyses, critiquing and research study. In addition, students examine the multicultural voices and views expressed through literature. (ACT arts/literature reading score 8-9 or 0883-200 or permission of instructor) Class 4, Credit 4 (F, W, S)

Healthcare Billing & Coding Technology

0820-105 Medical Word Analysis
This course will serve as a foundation for understanding medical terminology emphasizing definitions, pronunciation, plurals, spelling, verbs and adjectives. The course will help the student construct medical terms by learning word elements, their meanings and ways of combining them to build medical terms. Class 3, Credits 3 (F, S)

0820-115 Introduction to Healthcare Billing & Coding Technology
This course will introduce students to the healthcare environment in the United States and provide an overview of the roles and responsibilities of healthcare technology professionals. Students will be exposed to the vocabulary of this profession and be prepared for the primary areas of study encountered throughout the remainder of the program. Class 4, Credit 4 (F)

0820-211 Medical Terminology: Human Anatomy I
This course provides the student with knowledge and skill in medical terminology and human anatomy. This is the first of a four-course sequence. The focus is on the integumentary, skeletal, muscular, and digestive systems. (Human Biology and 0820-105) Class 4, Credit 4 (F)

0820-212 Medical Terminology: Human Anatomy II
This course provides the student with knowledge and skill in medical terminology and human anatomy. This is the second of a four-course sequence and the focus is on the cardiovascular, blood and lymphatic, respiratory, and urinary systems. (0820-211) Class 4, Credit 4 (W)

0820-213 Medical Terminology: Human Anatomy III
This course provides the student with knowledge and skill in medical terminology and human anatomy. This is the third of a four-course sequence, and the focus is on the endocrine, nervous, auditory, and ophthalmic systems. (0820-212) Class 4, Credit 4 (S)

0820-214 Medical Terminology: Human Anatomy IV
This course provides the student with knowledge and skill in medical terminology and human anatomy. This is the last of a four-course sequence, and the focus is on the female and male reproductive systems, oncology, radiology, and nuclear medicine. (0820-213) Class 4, Credit 4 (F)

0820-221 Medical Office & Billing Procedures I
Students will develop skills in performing basic office functions, specific office procedures and be introduced to professionalism in the work environment. (0804-211; 0804-113; 0820-115) Class 3, Credit 3 (W)

0820-222 Medical Office & Billing Procedures II
This course focuses on health insurance reimbursement programs, billing procedures used for physicians' charges, and accounts receivable activities. The student will learn appropriate responses to a variety of medicolegal situations regarding bill collection, release of patient information/records and confidentiality, subpoenas, workers' compensation cases, and Medicare regulations for reimbursement. (0820-221, 0820-213) Class 3, Credit 3 (S)

0820-250 Ambulatory Disease/Surgery Processes
This course will provide students with knowledge of services rendered in ambulatory surgery centers. Students will be able to identify the disease processes associated with specified body systems that can be surgically treated in ambulatory centers. They will identify and describe diagnostic tests, diagnostic procedures and definitive procedures associated with ambulatory care. (0820-214) Class 4, Credit 4 (W)

0820-251 Ambulatory Care Coding
Students will receive an overview of ambulatory healthcare in preparation for learning to code services provided at ambulatory care sites. They will apply documentation review guidelines when evaluating ambulatory care records and learn to code using ICD-9-CM, CPT, and HCPCS. (0820-222; corequisite 0820-250) Class 4, Credit 4 (W)

0820-261 Cancer Registry I
In this course the student will be introduced to the cancer registry profession, given an overview of an approved cancer program, develop an understanding of cancer registry structure, perform patient care evaluations, follow quality control methods in data reporting, identify required elements needed in a computerized registry, and learn ICDO coding. Class 4, Credit 4 (W)

0820-262 Cancer Registry II
Students continue to learn and apply skills in completing files contained in the cancer registry. They will learn to stage cancers, compare cancer treatments, analyze oncology reports and abstract pertinent information, and conduct follow-up procedures. Focus will also encompass the cancer program annual report, data analysis, and epidemiology as it relates to the cancer registry. (0820-261) Class 4, Credit 4 (S)

0820-270 Outpatient Reimbursement
This course will provide knowledge of the payment system used for care rendered to outpatients. Students will develop skill in selecting appropriate ambulatory patient groups following reimbursement guidelines and demonstrate ability to maintain and update the computerized reimbursement system. (0820-251) Class 4, Credit 4 (S)

0820-299 Co-op: Healthcare Billing & Coding Technology
A cooperative work experience will occur the quarter following completion of the academic courses for the diploma, AOS, and AAS degrees. Each experience will provide performance of technical procedures for which the student has developed knowledge and skill during the preceding academic quarters. The co-op sites will include medical and claims processing offices and other related work environments. It is anticipated that each cooperative work experience will require ten (10) weeks at no less than 35 hours per week. (Completion of courses in the applicable preceding academic quarters) Credit 0 (F, W, S)

0820-399 Independent Study
Credit variable

Humanities

The humanities distribution requirement can also be satisfied by completing courses in American Sign Language, Communication Studies, Deaf Studies, and Performing Arts. See courses listed under these headings. B level courses satisfy the diploma requirement. C level or higher courses satisfy the AOS requirement. Humanities courses may also satisfy the Deaf Studies requirement as noted below.

Fundamental (Level B)

0880-180 Perspective on the Humanities
This course familiarizes students with the basic concepts and terminology in the study of the humanities (history, fine arts and philosophy). Students learn about the nature of intellectual and academic inquiry and the questions asked in these three disciplines. (ACT arts/literature reading score 1–4) Class 3, Credit 3 (F, W)

0880-190 Introduction to Deaf Studies*
This course introduces students to major concepts and issues in the field of Deaf Studies. The course integrates the fields of history, anthropology, linguistics, creative arts and literature as they apply to Deaf culture and the Deaf community. The course is designed to foster students' active participation as a means of developing strong leadership and advocacy skills among NTID students. After completing this course, students will be able to pursue specific areas of interest within the Deaf Studies/ASL program. (ACT arts/literature reading score 1-4 or permission of instructor) Class 3, Credit 3 (F, W)

This course satisfies the Deaf Studies/American Sign Language requirement.

0886-250 Introduction to ASL Teaching[^]
Provides overview of how second languages have traditionally been taught, what the current methods and theories are, and their applications to the teaching of sign language. Students are provided opportunities to practice basic teaching techniques, select appropriate materials, design curriculum and evaluation techniques, including how to teach cultural and grammatical features in lessons. Students learn about resources to support their efforts to teach sign language. Class 3, Credit 3 (W, S)

Performing Arts

Fundamental (Level B)

0881-166 Sign Mime & Creative Movement^{t*}
Focuses on the dominant historical form of expression used by theaters of the Deaf. Topics include principles for effective use of space, creative movement strategies, and expression of original ideas in sign-mime. This course satisfies the Deaf Studies requirement. (ACT arts/literature reading score 1-4 or permission of instructor) Class 3, Credit 3 (F, W)

0881-167 Dance Performancet
Provides an introduction to dance that gives students access to the language as well as the fundamental movements of dance. The styles and technique of Martha Graham (contraction) and Jose Limon (fall and rebound) are explored. Ensemble work, performance standards and creation of character and theme are stressed. This course satisfies humanities and physical education requirements. (ACT arts/literature reading score 1-4 or permission of instructor) Class 3, Credit 3 (F, W)

0881-168 Jazzt
Provides students with a wider range of dance vocabulary, which is created from ballet, modern dance, and ethnic dance traditions. The styles of Bob Fosse and the fall and rebound style of Jose Limon are a basis for this course. This course satisfies humanities and physical education requirements. (ACT arts/literature reading score 1-4 or permission of instructor) Class 3, Credit 3 (F, S)

Intermediate (Level C)

0881-202 History of Theater^t
Examines theater from its early origins in primitive societies to contemporary types of theater and issues in dramatic presentation. The role of theater in society and in a variety of cultures is examined with particular attention to the role of Deaf performers, directors and play creators in specific historical periods. (ACT arts/literature reading score 5-7 or permission of instructor) Class 3, Credit 3 (W)

0881-204 Deaf Theater History^{*t}
Examines the Deaf experience in theater, and the roles that Deaf people have played in theater history. Particular attention is given to the documented achievements of individuals and companies in the 19th and 20th centuries. This course satisfies the Deaf Studies requirement. (ACT arts/literature reading score 5-7 or permission of instructor; 0881-202 or 0882-221) Class 3, Credit 3 (S)

0881-210 Acting It
Covers fundamental vocabulary for developing the actor's craft, process, and technique. The vocabulary is Stanislavsky-based and explored through improvisation and simple monologue work. This course is crucial for character development, which is the core of Acting II. (ACT arts/literature reading score 5-7 or permission of instructor) Class 3, Credit 3 (F, W)

0881-217 Stage Combatt
Explores fundamentals of stage combat vocabulary historically, analytically and physically. Focus is on physical scene work related to hand-to-hand combat, and stage fencing. Falls, tumbling, punches, kicks, and the eight basic positions for single rapier engagement are included. A final scene is created from classroom vocabulary and evaluated as part of the final exam. This course fulfills physical education requirements. (ACT arts/literature reading score 5-7 or permission of instructor) Class 3, Credit 3 (S)

0881-218 Dance History*
Examines early examples of dance in Western and non-Western societies, initially as a form of religious and dramatic expression. Development of ethnic styles; formalization of ballet in France, England and Russia; the evolution of modern dance; and the role of dance in visual theater are explored. (ACT arts/literature reading score 5-7 or permission of instructor) Class 3, Credit 3 (S)

0881-222 Scenic Technology It
Provides hands-on exploration of basic construction techniques utilized in theater productions. Students gain an understanding of scenic construction methods and technology, as well as the safe and proper use of equipment. Readings on the production process and formal critiques are also required. (ACT arts/literature reading score 5-7 or permission of instructor) Class 3, Credit 3 (F, W, S)

0881-223 Scenic Technology lit
This project-oriented class focuses on props. Students use and apply the skills learned in Scenic Technology I to individual projects. The course also allows students the opportunity to work with more advanced materials. This course prepares students for more specialized work in Theatre Practicum. (ACT arts/literature reading score 5-7 or permission of instructor; 0881-222) Class 3, Credit 3 (W, S)

0881-224 Scene Painting^t
Provides an introduction to the craft of scene painting. Techniques, communication with designers, and use of appropriate materials and tools are emphasized. (ACT arts/literature reading score 5-7 or permission of instructor) Class 3, Credit 3 (W, S)

0881-231 Costume Technology It
Provides hands-on exploration of basic costume techniques utilized in theater. Students gain an understanding of costume construction techniques and terminology, as well as the role of the costume shop in the production process. (ACT arts/literature reading score 5-7 or permission of instructor) Class 3, Credit 3 (F, W)

0881-232 Costume Technology lit
Advanced course in costume construction develops students' sewing skills, problem-solving, and knowledge of costume history. The course prepares students for design courses, application of skills to a historical garment, and costume assistantship through Theatre Practicum. (ACT arts/literature reading score 5-7 or permission of instructor; 0881-231) Class 3, Credit 3 (W)

0881-233 Stage Make-up^t
Introductory course explores basic stage make-up techniques (e.g., corrective, aging, gender change, scarring, bruising, and fantasy). Student designers and actors learn through demonstration and hands-on experience. The course prepares students for Theatre Practicum and running crew. (ACT arts/literature reading score 5-7 or permission of instructor) Class 3, Credit 3 (F)

0881-241 Lighting Technology It
Teaches the basic understanding of lighting software, equipment, and practices that are utilized in theater production. This course prepares students for supervised practicum experience. (ACT arts/literature reading score 5-7 or permission of instructor) Class 3, Credit 3 (F, W, S)

0881-242 Lighting Technology lit
Introduces the student to the mechanics and the guidelines of lighting design. The structure of this course is designed to take the student through the step-by-step process of building a solid design foundation prerequisite to all lighting design application. This course is a prerequisite to all lighting studio/design courses. (ACT arts/literature reading score 5-7 or permission of instructor; 0881-241 or permission of instructor) Class 3, Credit 3 (W, S)

[^]This course satisfies the Deaf Studies/American Sign Language requirement.

^tThis course satisfies the humanities requirement.

^fThis course satisfies the social sciences requirement.

Bridging (Level D)

0881-250 Introduction to Performing Arts
Studies the characteristics and elements of theater/performing arts, emphasizing the principles that have guided theater productions through history. The course examines the ways that theater influences and is influenced by cultures and by individual life experience. Particular attention is paid to the development of performing arts by and for Deaf persons. This course satisfies part of the humanities requirement. (ACT arts/literature reading score 8-10 or permission of instructor) Class 3, Credit 3 (F, W)

0881-253 Arts Management
Addresses the skills required to manage artistic/theatrical projects and programs while maintaining artistic vision. Topics include the relationship of art and management, communication skills, fund raising in private and public sectors, and marketing strategies. (ACT arts/literature reading score 8-10 or permission of instructor) Class 3, Credit 3 (S)

0881-256 Script Analyst
Explores the prominent questions an actor/dancer/designer must research before and during the time a text can develop into playable action. The course uses texts from world literature, American Sign Language literature, and dance choreography. Particular attention is paid to the physical, emotional, and mental actions a character reveals to his/her audience. (ACT arts/literature reading score 8-10 or permission of instructor) Class 3, Credit 3 (F, S)

0881-257 Introduction to Dramatic Literature
Introduces students to the play script as literature, genres of dramatic literature, critical periods in the development of dramatic literature, and the use of analytical literary vocabulary. (ACT arts/literature reading score 8-10 or permission of instructor) Class 3, Credit 3 (W)

0881-258 Introduction to Play Creating
Uses a workshop approach to explore what being a playwright/play creator means. Class topics include exploring each writer's values and points of view, bringing those viewpoints to life on the stage, developing rounded characters, structuring action, creating dialogue, and taking a play through workshop critique. The goals of the course for each student are 1) to develop a more finely-tuned theatrical sensitivity, and 2) to have a playable scene, act, or one-act play by the end of the quarter. These plays may be scripted in English, American Sign Language or visual theater systems. (ACT arts/literature reading score 8-10 or permission of instructor) Class 3, Credit 3 (S)

0881-259 Creative Translation for Stage
Focuses on different translation forms used by theater, mime, and dance companies. Students learn to distinguish between English and American Sign Language (ASL). They translate stories, poems, and plays into American Sign Language and other Sign Languages. Theatrical integrity dealing with translation issues and visual access are central goals. (ACT arts/literature reading score 8-10 or permission of instructor; 0881-210 or 256) Class 3, Credit 3 (F)

0881-260 Acting I
Covers vocabulary for developing the actor's craft, process, and technique related to basic scene-study and character development. The work is Stanislavsky based. Improvisation and scene work focus on characterization and engaging conflict. (ACT arts/literature reading score 8-10 or permission of instructor; 0881-210 or audition with instructor) Class 3, Credit 3 (W, S)

0881-261 Audition Techniques
Emphasizes preparation for career research. Major topics include interviewing, portfolio, resume, photo selection, monologue repertoire development, and cold reading. (ACT arts/literature reading score 8-10 or permission of instructor; 0881-210, 260 or permission of instructor) Class 3, Credit 3 (F, S)

0881-266 Ballet
Introduces the art of ballet, its vocabulary (French, Sign, and English), discipline base, protocols, and specific movements. Students are introduced to key concepts through lecture-demonstration, video, and floor, center, and barre work. This course satisfies humanities and physical education requirements. (ACT arts/literature reading score 8-10 or permission of instructor) Class 3, Credit 3 (F, W)

0881-267 Fundamentals of Choreography
This course explores the freedom and discipline that balance the art of choreography. Visualization and notation systems are studied. Students are required both to choreograph for student ensembles and to perform in original works of other students in the class. (ACT arts/literature reading score 8-10 or permission of instructor; 0881-218, 266 or permission of instructor) Class 3, Credit 3 (W)

0881-272 Stage Management
Advanced course designed to train stage managers. Leadership and organizational skills are developed in relation to rehearsal schedules, production meetings, and performance. Projects include setting up and understanding the use of the stage manager's prompt book. The course also addresses the protocols of dealing with designers, actors, directors, and crew members, as well as the rehearsal process and calling the cues for the run of the show. This is a required course for stage managing any of the college's/departments' main stage shows. (ACT arts/literature reading score 8-10 or permission of instructor) Class 3, Credit 3 (W)

0881-291 Lighting Studio
Provides an introduction to the fundamentals of theater light design through light studio applications. These applications teach the student to "see" first and to display the psychology of what light does to the human eye through numerous exercises. The fundamentals of designing for stage and preparing the essential paper work for light design are emphasized. (ACT arts/literature reading score 8-10 or permission of instructor) Class 3, Credit 3 (S)

0881-298 Theatre Practicum
Applies technical, performing, script analysis, stage management, and other skills to an actual production. Students contract with a faculty mentor for responsibilities and the appropriate credit expectations. Class 1-6, Credit 1-6 (F, W, S)

0881-399 Independent Study
Credit variable

Laboratory Science Technology

0879-200 Introduction to Laboratory Science Technology
This course introduces students to the Laboratory Science Technology program, curriculum, content, entry requirements, graduation requirements and employment options. Topics will also include an introduction to basic concepts of food testing, identification of common microorganisms, communicable and noninfectious diseases, water quality, soil quality, air pollution and historical perspectives on environmental awareness. Class 1, Lab 2, Credit 2 (F, W, S)

0879-201 Laboratory Science Technology
Laboratory Applications I
This is the first of a six-course sequence that focuses on the application of laboratory processes and procedures. Each course builds on the knowledge and skills developed in previous Laboratory Applications course. This introductory course establishes an expectation of high performance and introduces the concepts of lab protocols and standards. Laboratory experiences focus on developing and practicing lab protocols for maintaining a laboratory environment and sampling and testing standards. Students begin to organize a laboratory science technology portfolio. (0879-200) Class 1, Lab 2, Credit 2 (W)

0879-202 Laboratory Science Technology
Laboratory Applications II
This is the second of a six-course sequence that focuses on the application of laboratory processes and procedures. This course continues to reinforce an expectation of high standards and introduces the concept of quality control. Laboratory experiences focus on developing and practicing performance independence and quality control schemes while performing basic sampling and testing procedures. (0879-201) Class 1, Lab 2, Credit 2 (S)

*This course satisfies the Deaf Studies/American Sign Language requirement.
This course satisfies the humanities requirement.
This course satisfies the social sciences requirement.*

- 0879-203 Laboratory Science Technology
Laboratory Applications III
This is the third of a six-course sequence that focuses on the application of laboratory processes and procedures. This course focuses on safety regulations (OSHA, FDA, TSCA), monitoring and reporting as applied to the sampling, testing and disposal of substances. (0879-202) Class 1, Lab 2, Credit 2 (F)
- 0879-204 Laboratory Science Technology
Laboratory Applications IV
This is the fourth of a six-course sequence that focuses on the application of laboratory processes and procedures. This course focuses on the application of laboratory information management systems (LIMS), chain of custody, data archiving and reporting. (0879-203) Class 1, Lab 2, Credit 2 (W)
- 0879-205 Laboratory Science Technology
Laboratory Applications V
This is the fifth of a six-course sequence that focuses on the application of laboratory processes and procedures. This course focuses on professional and ethical behavior standards in the science laboratory environment. Qualities of valued team members and their contribution to the overall performance of the laboratory are introduced, practiced and critiqued. Laboratory activities are focused on co-op preparation. (0879-204) Class 1, Lab 2, Credit 2 (S)
- 0879-206 Laboratory Science Technology
Laboratory Applications VI
This is the sixth of a six-course sequence that focuses on the application of laboratory processes and procedures. This course focuses on individual student needs related to the reinforcement of knowledge and skill areas identified in co-op evaluations as requiring more effort. (0879-205; co-requisite 0879-250) Class 1, Lab 2, Credit 2 (F)
- 0879-218 Introduction to Laboratory Science
Technology Microbiology
This general microbiology course includes basic concepts for the evaluation of bacteria, virus, fungi (molds and yeast), algae, and protozoa. The students learn laboratory procedures in the collection samples, selection of media, techniques in sterilization, asepsis, staining, cultural, microscopic, biochemical, and molecular identification and antimicrobial susceptibility. The students develop knowledge of the processes microorganisms are responsible for which are vital to our lives. (0885-161; co-requisite 0885-181) Class 2, Lab 3, Credit 3 (W)
- 0879-241 Laboratory Science Technology Microbiology
This microbiology course focuses on concepts related to microorganisms common in food and environmental settings. The emphasis is on the major families of microorganisms that are important in food processing, preservation, distribution, utilization and public health. Students will study the organism's role in ecology, recycling and biogeochemical cycles and the testing procedures for microbes in water, air, soil, sewage and the pathogens that affect humans. Students will develop knowledge and skills in the collection of samples, identification procedures and in understanding the laws related to public health and sanitation. (0885-181,0879-218; co-requisite 0885-182) Class 3, Lab 3, Credit 4 (S)
- 0879-250 Laboratory Science Technology Senior Seminar
This course provides a forum in which peer, faculty, and professionals discuss current topics in food and environmental science. Students also have an opportunity to synthesize their cooperative work experience with previous course experiences. Additional topics include communications, the importance of professional societies and federal/state/local agencies, environmental, and agricultural policies that regulate the food and environmental industries. (This is a required course open only to second-year LST students.) (0879-299) Class 2, Credit 2 (S)
- 0879-270 Concepts of Surveying & Mapping
Students have the opportunity to use surveying equipment in the field to obtain and record angle, distance, and elevation measurements. Using the information gathered students perform calculations and prepare sketches depicting the precise location of data points. Students learn about various types of topographic and geological mapping. (0879-321 or 311) Class 3, Lab 3, Credit 4 (F, S)
- 0879-280 Sampling & Testing Soils & Ground Water
Students begin to learn about soil and ground water and how it is contaminated. Content includes vocabulary, origin, identification, classification, characteristics, and methods for sampling and testing. Students use standard references and classifications. (0879-321 or 311) Class 3, Lab 3, Credit 4 (F, S)
- 0879-299 Co-op: Laboratory Science Technology
Credit 0 (SU)
- 0879-301 Instrumentation I
In this course students learn and apply basic concepts and principles in science using simple laboratory instruments, procedures and techniques. Procedures and techniques including sample preparation, calibration, precision measurement, safety, and data collection and analysis are introduced. Protocols governed by regulations and information management standards are introduced and practiced. Selected instrumentation presented in this course include analytical balances, meters and analyzers, and atomic and molecular spectrophotometers. (0879-202,0885-182,0884-231) Class 2, Lab 3, Credit 3 (F)
- 0879-302 Instrumentation II
This is the second course in the sequence of instrumentation courses. In this course students learn and apply advanced concepts and principles in science using sophisticated laboratory instruments, procedures and techniques. Procedures and techniques including sample preparation, calibration, precision measurement, safety, and data collection and analysis are introduced. Protocols governed by regulations and information management standards are discussed and practiced. Selected instrumental procedures presented in this course include gas and liquid chromatography, mass spectrophotometry, and electrophoresis. (0879-301,203,0885-211,0884-232) Class 2, Lab 3, Credit 3 (W)
- 0879-303 Instrumentation III
This course is the third and last in the sequence of instrumentation and analysis courses. In this course students learn and apply advanced concepts and principles in science using sophisticated laboratory instruments, procedures and techniques. Procedures and techniques including sample preparation, calibration, precision measurement, safety, and data collection and analysis are introduced and reinforced. Protocols governed by regulations and information management standards are discussed and practiced. Selected procedures presented in this course include the following: advanced gas chromatography, mass spectrophotometry, HPLC and automated and computer-based instrumentation. (0879-302,204,0885-212) Class 3, Lab 3, Credit 4 (W)
- 0879-311 Food Laboratory Science I
This first course in a two course sequence that prepares students to follow standard protocols to perform laboratory procedures commonly used in the food industry. Product analysis includes testing for protein and moisture. Emphasis is placed on precise and accurate data collection, data analysis and presentation, and practicing laboratory information management systems (LIMS). Federal regulations governing the food industry are examined and applied. Additional topics related to prepared foods and food additives are presented. (0879-301, 0885-211,0884-231) Class 3, Lab 3, Credit 4 (W)
- 0879-312 Food Laboratory Science II
This second course in a two course sequence prepares students to follow standard protocols to perform laboratory procedures commonly used in the food industry. A continuation of product analysis includes testing for fats, carbohydrates, and crude fiber. Emphasis is placed on precise and accurate data collection, data analysis and presentation, and practicing laboratory information management systems (LIMS). Federal regulations governing the food industry are examined and applied. Additional topics related to vitamins, and allergens in food are presented. (0879-311,212,302) Class 3, Lab 3, Credit 4 (S)

0879-321 Environmental Laboratory Science I
This first course in a two course sequence prepares students to follow standard protocols to perform laboratory procedures commonly used in environmental laboratories. Standard sampling and testing methods are introduced and practiced, e.g., gravimetric analysis, pH applications, and chemical analysis using spectrophotometry. Emphasis is placed on precise and accurate data collection, data analysis and presentation, and practicing laboratory information management systems (LIMS). Federal regulations governing sampling and testing procedures are examined and applied. Additional topics related to quality control schemes, regulatory protocols, and protocols governing sample collection are presented. (0879-301,0885-211,0884-232) Class 3, Lab 3, Credit 4 (W)

0879-322 Environmental Laboratory Science II
This second course in a two-course sequence prepares students to follow standard protocols to perform laboratory procedures commonly used in environmental laboratories. A continuation of standard sampling and testing methods are presented and practiced, e.g., chemical analysis using atomic absorption, mass spectroscopy and chromatography techniques. Emphasis is placed on precise and accurate data collection, data analysis and presentation, and practicing laboratory information management systems (LIMS). Federal regulations governing sampling and testing procedures are examined and applied. Additional topics related to quality control schemes, regulatory protocols, and protocols governing sample collection are presented. (0879-302,321,0885-212) Class 3, Lab 3, Credit 4 (S)

0879-341 Applied Microbiology
This course builds on concepts of food and environmental microbiology with an emphasis on food borne pathogens and environmental pathogens in water, air, and soil and current methods for detecting, isolating and identifying microorganisms. Students study food and industrial fermentation with a focus on biotechnology and genetic engineering as it applies to agriculture, manufacture of food ingredients and bioremediation or decomposition of materials and pollution. Students develop knowledge and skills in the technology and instrumentation used in food and environmental testing laboratories and in industrial applications according to the standards set by the regulating agencies. (0879-241,321 or 311,303) Class 3, Lab 3, Credit 4 (F)

0879-399 Independent Study
Credit variable

Mathematics

Introductory (Level A)

0884-100 Introduction to College Math
Improves students' fundamental understanding and skills in mathematics. Topics covered emphasize the use of language as it relates to basic mathematical computations. The use of calculators is stressed. Class 4, Credit 3 (F, S)

0884-120 Preparation for Algebra
This course is designed for students with no significant algebra experience. Topics include signed numbers, and introduction to variables and modeling, work with solving simple equations, and introductions to the coordinate plane and interpreting and displaying data. Estimation, calculator use, and language are emphasized, and problem solving stressed. (0884-100 or equivalent) Class/Lab 5, Credit 4, (F, W)

Fundamental (Level B)

0884-150 Concepts of Measurement
Explores the mathematical concepts involving linear measurement, proportion and percent through the use of examples from printing, photo/media and applied art. (0884-100 or equivalent) Class 4, Credit 3 (F, W)

0884-155 Mathematics Applications for the Business Technologies
This course explores concepts in mathematics and basic algebra as they relate to applications in business. (0884-100 or equivalent) Class 3, Lab 1, Credit 3 (W)

0884-170 Elements of Geometry
This course is designed for students with no significant geometry experience. Topics include geometric classification and construction, angle mensuration, area computation, the circle and its parts, similar triangles, and an introduction to trigonometry. Calculator use, estimation, and language are emphasized. (0884-180 or equivalent) Class 3, Lab 2, Credit 4 (W)

0884-180 Foundations of Algebra
Introductory algebra course consisting of a lecture and a lab component in which the basics of evaluating algebraic expressions, solving linear equations and inequalities and graphing linear functions are studied. Technology, in particular the graphing calculator, is an integral part of the learning and problem solving in this course. (0884-120 or equivalent) Class 3, Lab 2, Credit 4 (F, W, S)

0884-185 Fundamental Geometry
This course is designed for students with no significant past geometry experience and for students desiring a quick review of basic geometric concepts. Topics include geometric classification, angle mensuration, similar triangles, and an introduction to right triangle trigonometry. Calculator use, estimation and problem solving are emphasized. Students may not get credit for both 0884-185 and 0884-170. (0884-180 or equivalent) Class 1, Credit 1 (F, W, S)

Intermediate (C level)

0884-205 Trigonometry for Coordinate Analysis I
Students will study right angle trigonometry with an emphasis on concepts and applications related to computer integrated machining technology (CIMT) and computer aided drafting technology (CADT). Topics include Pythagorean Theorem, trigonometric ratios in right triangles, coordinate geometry calculations, circle properties, tapers and bevels, V-blocks, dovetails, and angle cuts. Development of numerical and geometric estimation and interpretation of visual data is emphasized. (0884-180 and either 0884-170 or 0884-185; or permission of department) Class 2, Lab 2, Credit 3 (S)

0884-206 Trigonometry for Coordinate Analysis II
This course is a continuation of Trigonometry for Coordinate Analysis I and continues the development of problem-solving using right angle trigonometry, with an emphasis on concepts and applications related to computer integrated machining technology (CIMT). Topics include complex machine applications, compound angles, slots and pockets, irregular-shape grooves, Law of Sines, Law of Cosines, and 3-D coordinate geometry. (0884-205 or permission of department) Class 2, Lab 2, Credit 3 (F)

0884-210 Applications of Algebra
An intermediate algebra course consisting of a lecture and a lab component in which exponents, rational expressions, polynomials, roots and radicals, and non-linear functions are studied. Technology, in particular the graphing calculator, is an integral part of the learning and problem solving in this course. Students may not take both 0884-210 and 0884-212 for credit without permission of the department. (0884-180 or equivalent) Class 3, Lab 2, Credit 4 (F, W, S)

0884-212 Integrated Algebra
An intermediate algebra course consisting of a lecture and a lab component in which non-linear functions and graphs, systems of linear equations, exponents, polynomials, roots, radicals and properties of the complex numbers are considered. There is significant emphasis on scientific and geometric models, as well as the use of a variety of graphing utilities. Integrated algebra is recommended for students enrolled in applied computer technology, laboratory science technology, computer aided drafting technology and automation technologies program, as well as for students preparing for baccalaureate programs in science, engineering and computer-related fields. Fundamental Geometry (0884-185) is a co-requisite for students expecting to advance to Elements of Trigonometry (0884-220), unless the mathematics placement process indicates the co-requisite can be waived. Students may not take both 0884-210 and 0884-212 for credit without permission of the department. (0884-180) Class 3, Lab 2, Credit 4 (F,W,S)

0884-220 **Elements of Trigonometry**
This course includes topics from trigonometry with an emphasis on the study of right and oblique triangles, rotational angles, trigonometric functions and their graphs. An introduction to trigonometric identities is also provided. (0884-185, 0884-212; or permission of department) **Class 3, Lab 2, Credit 4 (F, W, S)**

0884-231 **Laboratory Mathematics I**
This course addresses classic laboratory calculations and elementary descriptive statistics in the context of modern information technology and computing power. Use of hand-held calculators and computer spreadsheet software to exchange, analyze and chart electronically-stored data is a central focus. Study is closely coordinated with work in associated technical courses. Application areas encountered in this course may include gas laws, preparation and dilution of solutions, and analysis of chemical composition. (0884-212 or permission of department) **Class 2, Lab 2, Credit 3 (S)**

0884-232 **Laboratory Mathematics II**
This course continues study of computations relating to laboratory procedures in the context of modern information technology and computing power. Emphasis is on the capture and analysis of realistic laboratory data and the preparation of formal reports. Topics studied include the use of statistical procedures in quality control. (0884-231) **Class 2, Lab 2, Credit 3 (F)**

0884-235 **Industrial Statistics**
This course introduces students to statistical methods used in industry. Students learn form calculation skills, basic statistical concepts, techniques for graphical representation of data, and how to draw inference and interpret results. (0884-212 or permission of department) **Class 3, Lab 2, Credit 4 (F)**

Bridging (D level)

0884-250 **Preparation for Statistics**
An introductory statistics course consisting of a lecture and a lab component in which statistics concepts, elements of probability, and probability distributions, and bivariate data are studied. The course emphasizes number sense and algebraic concepts as they relate to statistics and probability. Technology, in particular the graphing calculator, is an integral part of the learning and problem solving in this course. (0884-210 or equivalent) **Class 3, Lab 2, Credit 4 (S)**

0884-260 **Explorations in College Algebra**
Students will study topics from algebra with an emphasis on functions and graphs. Topics include the algebra of functions and the study of inverse functions. Rational, radical, exponential and logarithmic functions and systems of linear equations are also studied. Exploration of mathematical concepts through use of a graphing calculator is an integral feature of the course. Students may not take both 0884-260 and 0884-275 for credit without permission of the department. (0884-210 or permission of department) **Class 4, Credit 4 (W, S)**

0884-275 **Advanced Mathematics**
Topics from pre-calculus mathematics are studied with an emphasis on functions and graphs. Topics include the algebra of functions and the study of inverse functions. Exploration of mathematical concepts through the use of graphing calculator is an integral feature of the course. Students may not take both 0884-260 and 0884-275 for credit without permission of the department. (0884-212 and 0884-220 or equivalent or permission of the department) **Class 4, Credit 4 (F, W, S)**

0884-290 **Concepts of Calculus**
Explores topics traditionally encountered in a first calculus course. Sequences and series, limits, continuity and derived function are studied. A graphing calculator is used extensively to develop concepts and to aid in problem solving. (Permission of the department) **Class 4, Credit 4 (F, S)**

Applied Optical Technology

0827-105 **Introduction to Optical Technology I**
A sampling of optical finishing technology, including an overview of the career, admissions and graduate requirements, sources of employment, and expectations of students in the program. Students learn the titles, roles and responsibilities of vision-care personnel, including the M.D., O.D., dispensing optician and optical finishing technologist. **Class 2, Credit 2 (F)**

0827-106 **Introduction to Optical Technology II**
The function and use of optical laboratory equipment necessary to the production of single-vision eye wear. Students learn the basic concepts of sphere, cylinder, axis and geometric center. **Class 2, Credit 2 (W)**

0827-107 **Introduction to Optical Technology III**
Introduces the concept of writing functions of given vertometer parts. Students learn the process of writing step-by-step sequential procedures for equipment operation. They practice determining lens powers from vertometer readings and calculating decentration from given prescription information. They also learn the meanings of various optical terms found on prescription forms. (0827-106) **Class 2, Credit 2 (S)**

0827-111 **Optical Technology Math I**
Focuses on the rules of transposition, including transposition of lens powers. Students learn to apply mathematic functions, solving for binocular and monocular P.D.s, near-vision prescriptions, and bifocal segment height and inset. The concepts of plus and minus cylinder prescription powers are discussed, and definitions and determinations of lens powers from given base curves, cross curves and inside curves are taught. (0884-180) **Class 4, Credit 3 (S)**

0827-112 **Optical Technology Math II**
Students learn how to select and determine appropriate base curves, cross curves and inside curves of given lens powers. Students learn mathematical formulas used in determining effective diameter, smallest lens blank and prism. They also learn to apply mathematic functions related to vertometer power readings, heat treat times and lens gauge readings. (0884-180; 0827-111) **Class 4, Credit 3 (F)**

0827-115 **Prescription Analysis**
Teaches students the meaning of various optical terms found on prescription forms. Students learn what information should be on a complete prescription and how to analyze single-vision and multifocal prescriptions for laboratory processing. **Class 4, Credit 3 (S)**

0827-117 **Lens Design**
Teaches students how to design lens systems based on specific optical factors such as frame selection, lens material, lens thickness, index of refraction, size of lens, lens power, blank manufacturer and cosmetic appeal. Students learn trade names of lenses, percentages of lens transmission, multifocal segment placement, and occupational and recreational lens forms. (0827-111,112) **Class 5, Credit 3 (S)**

0827-121 **Optical Techniques I**
Teaches students basic techniques of using the vertometer to analyze single-vision lenses, layout marker, heat treat units, and pattern maker, automatic edging machines and development of hand-beveling skills. (0827-112,116,162) **Class 6, Credit 5 (F)**

0827-122 **Optical Techniques II**
Teaches students the theory and techniques of centering, power verification and spotting of single-vision and selected multifocal lenses. Students also are taught the mechanics of lens centration using layout markers. (0827-121) **Class 2, Lab 2, Credit 3 (W)**

0827-123 **Optical Techniques III**
Teaches students how to automatic-edge lenses using a variety of edging machines. The concepts and techniques of Vee-beveling, rimless bevels and hide-a-bevel are emphasized. (0827-122) **Class 1, Lab 6, Credit 4 (W)**

0827-161 **Optical Terminology I**
Emphasizes comprehension, spelling and application of terminology related to the optical profession, including the laboratory environment, function and disorders of the eye, and optics/lens characteristics. **Class 5, Credit 3 (F, W, S)**

0885-154 **Processes of Science: Physics of Matter**
This course focuses on introductory science processes using the content of physical properties of matter as a vehicle to establish an appreciation of the processes of science. The basic processes of observing, collecting data, classifying, comparing, analyzing and forming hypotheses will be addressed using the concepts of physics. (0884-180 or equivalent) **Class 2, Lab 2, Credit 3 (F, W)**

0885-155 **Processes of Science: Biological Studies**
This course focuses on introductory science processes using the content of biological studies as a vehicle to establish an appreciation of the processes of science. The basic processes of observing, collecting data, classifying, comparing, analyzing and forming hypotheses will be addressed using the concepts of biology. Students will investigate microorganisms, metabolism, nutrition, physiology and embryology, and prepare laboratory reports with appropriate detail and accuracy. **Class 2, Lab 2, Credit 3 (F, W)**

0885-156 **Processes of Science: Forensics**
This course focuses on introductory science processes using the content of forensic studies as a vehicle to establish an appreciation of the processes of science. The basic processes of observing, collecting data, classifying, comparing, analyzing and forming hypotheses will be addressed using the concepts of forensics. Students will analyze crime scenes, perform tests on blood, fingerprints, chemicals and DNA, and prepare laboratory reports with appropriate detail and accuracy. **Class 2, Lab 2, Credit 3 (F, W, S)**

0885-161 **Fundamentals of Human Biology I**
Provides students with the fundamentals of human biology beginning at the molecular level. Cell structure and function including metabolic reactions important to life are presented. Skills necessary for success in future science courses are emphasized. Laboratory activities involving microscopic observation of living cells and basic chemical interactions complement classroom activities. **Class 3, Lab 3, Credit 4 (F, W)**

0885-162 **Fundamentals of Human Biology II**
Provides students with the fundamentals of human biology beginning with organization at the tissue level. Body systems and their interrelationships are presented on a structural, functional, and homeostatic level. Skills necessary for success in future science courses are emphasized. Laboratory activities, including the use of prepared specimens, complement classroom activities. (0885-161) **Class 3, Lab 3, Credit 4 (S)**

0885-171 **Fundamentals of Physics I**
A first course in physics for students with interest, but little background in laboratory science. The focus is on development of critical thinking, scientific processes and basic laboratory skills. (Permission of the department) **Class 4, Lab 1, Credit 4 (W)**

0885-172 **Fundamentals of Physics II**
A second course in a two-course physics sequence for students with interest, but little background in laboratory science. The focus will be on development of critical thinking, scientific processes and basic laboratory skills. (0885-171) **Class 4, Lab 1, Credit 4 (S)**

0885-181 **Fundamentals of Chemistry I**
This course is an introduction to the fundamental theories and principles of chemistry governing the structure and behavior of matter at the atomic level. The language of chemistry is introduced. Teaching activities focus on atomic structure, the classification of matter, nomenclature, and chemical bonding. Laboratory activities use basic chemistry equipment, scientific measurement, and laboratory methods. **Class 3, Lab 3, Credit 4 (W)**

0885-182 **Fundamentals of Chemistry II**
This course is the continuation of an introduction to the fundamental theories and principles of chemistry governing the structure and behavior of matter at the atomic level. Classification of reaction types, balancing simple chemical equations, and basic carbon chemistry are introduced. Teaching and laboratory activities focus on basic physical and chemical properties of solids, liquids, and gases; identification of acids and bases; and basic solution chemistry. Laboratory activities use fundamental chemistry equipment, scientific measurement, and laboratory methods. **Class 3, Lab 3, Credit 4 (S)**

Intermediate (Level C)

0885-200 **Optical Finishing Physics**
Studies light, reflection and refraction. These principles are applied to the study of the behavior of spherical and piano mirrors, prisms and lenses. The usefulness and application of dioptic power, the lens maker's equation, image and object dimensions and focal length measurements are addressed. Also included are basic optical instruments and a study of the electromagnetic spectrum. Emphasis is on geometrical (ray) optics. Includes a comprehensive laboratory experience that supplements and closely follows classroom instruction. (0884-180 and either 0884-170 or 0884-185; or permission of the department) **Class 4, Lab 1, Credit 4 (W)**

0885-201 **Physics I**
Physics I is the first course in a series designed to provide a broad background in general physics. Required for students entering NTID engineering technology programs. Students are provided with hands-on laboratory experience in a supervised setting. Topics, which are presented in a lecture/lab format, includes motion, Newton's Laws of Motion, forces, analysis of vectors, work, power and mechanical energy. (Permission of the department) **Class 4, Credit 4 (W, S)**

0885-202 **Physics II**
Physics II is the second course in a series designed to provide a broad background in general physics. Appropriate for students entering NTID engineering programs. Students are provided with hands-on laboratory experience in a supervised setting. Topics, which are presented in a lecture/lab format, include thermal energy, nature of light, reflection and refraction, static electricity, electric currents, series and parallel circuits, magnetic fields and electromagnetic induction. (0885-201 or equivalent) **Class 4, Credit 4 (S)**

0885-203 **Advanced Topics in Mechanics**
The third physics course for students in NTID's construction technology program. Students are provided with hands-on laboratory experience in a supervised setting. Topics, which are presented in a lecture/lab format, include motion, equilibrium, strength of materials, fluid statics and dynamics, sound, elastic potential energy and wave motion. (0885-201 or equivalent) **Class 4, Credit 4 (F)**

0885-205 **Physics for Science & Engineering I**
Introduces students to the basic laws of motion (both linear and two-dimensional), circular motion, the notion of force and force/mass interactions, and basic materials science topics such as elasticity. In addition, the intent objectives to which students were introduced in Fundamentals of Physics I and II (or with which they enter Physics for Engineering Technology) are reinforced and practiced. (Permission of the department) **Class 4, Lab 1, Credit 4 (F)**

0885-206 **Physics for Science & Engineering II**
Introduces students to the basic laws of energy and the transfer and conversation of energy, both mechanical and thermodynamic. In addition, the intent objectives to which students were introduced in Fundamentals of Physics I and II (or with which they enter Physics for Engineering Technology) are reinforced and practiced. (0885-205 or equivalent) **Class 4, Lab 1, Credit 4 (W)**

0885-207 **Physics for Science & Engineering III**
Introduces students to the basic laws of magnetism and magnetic fields, electric charge and electric fields, current electricity and DC circuits. In addition, the intent objectives to which students were introduced in Fundamentals of Physics I and II (or with which they enter Physics for Engineering Technology) are reinforced and practiced. (0885-206 or equivalent) **Class 4, Lab 1, Credit 4 (S)**

0885-211 **Principles of Chemistry I**
This course builds on the knowledge learned in Fundamentals of Chemistry I and II by preparing students to classify reactions and evaluate evidence to ascertain the reaction type. Predictions can then be made with respect to qualitative and quantitative composition of reactions. Theory governing the physical properties and characteristics of states of matter are examined. Stoichiometry is introduced, while chemical laboratory measurement and rules of chemical nomenclature are extended. Laboratory activities include investigations of different types of chemical reactions using basic instrumental laboratory technology. (0885-182 or equivalent, 0884-231) **Class 3, Lab 3, Credit 4 (F)**

0885-212 **Principles of Chemistry II**
This course expands on the mathematical determination of chemical composition and quantities established in Principles of Chemistry I. Laws governing the behavior of gases and related computation are used to determine their chemical composition and quantities. Quantitative solution chemistry is introduced. Principles and conditions which affect chemical equilibrium are investigated. Application of scientific measurement techniques, including unit conversion, and rules of organic compound nomenclature are extended. Investigations involving data collection and quantitative analysis provide a framework for laboratory activities. (0885-211 or equivalent, 0884-231) **Class 3, Lab 3, Credit 4 (W)**

Bridging (Level D)

0885-251 **Biological Concepts I**
Develops and/or enhances knowledge and skills necessary for success in a college-level general biology course. Themes include chemistry in living systems, movement through membranes, macromolecules, metabolism, enzymes. Laboratory activities complement each theme. (Permission of instructor) **Class 3, Lab 3, Credit 4 (F, S)**

0885-252 **Biological Concepts II**
Develops and/or enhances knowledge and skills necessary for success in a college-level general biology course. Themes include molecular genetics, microevolution, cell functions, cell nutrition, regulation of homeostasis. Laboratory activities complement each theme. Successful completion of Biological Concepts I is suggested but not required. (0885-251 or permission of instructor) **Class 3, Lab 3, Credit 4 (W)**

0885-261 **Concepts in Chemistry I**
This course is for students enrolled in programs requiring review or preparation for College of Science chemistry courses. Includes principles of measurement, composition of matter, energy changes, behavior of gasses, atomic structure and bonding. Laboratory work includes experiments related to topics covered. (Permission of instructor) **Class 3, Lab 3, Credit 4 (F)**

0885-262 **Concepts in Chemistry II**
A continuation of Introduction to Concepts in Chemistry I solutions in which equilibrium principles are studied. Also included are stoichiometric solution calculations involving ionization and solubility, product constants and acid-base pH calculations. Laboratory work includes qualitative analysis of common cations and anions. (0885-261 or equivalent) **Class 3, Lab 3, Credit 4 (W)**

0885-263 **Concepts in Chemistry III**
Introduces quantitative analysis utilizing both gravimetric and volumetric techniques. Topics include evaluation of analytical data, gravimetric analysis, acid-base titrations, redox titrations, and principles of colorimetry and spectrophotometry. (0885-262 or equivalent) **Class 3, Lab 3, Credit 4 (S)**

0885-281 **Human Genetics & Evolution**
Introduces basic human genetics, basic human evolution and the relationship between 20th century discoveries in genetics and current human evolution dogma. The history of scientific discovery in both fields is paired with a study of current concepts in microbiology and bridges between genetics and evolution are explored. This presentation/discussion/laboratory course includes topics in human reproductive history, cytology, embryology, molecular biology of the gene, the origin of life, human origins, heredity, genetic variations, population genetics, bioengineering, and old world and new world evolutionary theory. (Permission of instructor) **Class 3, Lab 3, Credit 4 (F)**

0885-282 **Scientific Basis of Social Responsibility**
Interactive course designed to provide students with both tools and confidence to become more literate in the sciences. An interdisciplinary teaching team of biologists, chemists and physicists challenge students to analyze contemporary social issues and/or problems that have a basis in science, utilizing basic principles in each of these areas of science. Potential topics include alternative medicine; biogenetics; calories, life-style and exercise; euthanasia; and organ transplants. Following analysis of the issue/problem, students formulate position statements and/or potential solutions utilizing new concepts and scientific tools. They articulate these decisions and outcomes to each other in print and through presentations. Laboratory exercises and community interactions provide hands-on opportunities to experience contemporary science and technology. (Permission of instructor) **Class 3, Lab 3, Credit 4 (S)**

0885-283 **Developmental Human Anatomy & Physiology**
Introduces basic human development and maturation from a multidisciplinary perspective. In this course, the fields of human anatomy and physiology are merged with developmental psychology for the purpose of examining the human life cycle from a holistic perspective. Changes that take place in the structure and function of the human body are studied over nine stages of the human life span. Concurrently, psychological and cognitive development are discussed, beginning with conception and ending with death processes. (Permission of instructor) **Class 3, Lab 3, Credit 4 (W)**

Social Sciences

B level courses satisfy the diploma requirement. C level courses or higher satisfy the AOS requirement. Some courses may also satisfy the Deaf Studies requirement as noted below.

Fundamental (Level B)

0882-150 **Making a Difference: A Social Science Perspective**
This course explores some of the core concepts found in the social sciences. These core concepts are taught by using biographical sketches of individuals who have made a difference with their lives: for example, Simon Wiesenthal, Mother Teresa, Helen Keller, Martin Luther King Jr., Franklin D. Roosevelt, Bonnie Consolo, Bill Gates and Vinton Cerf. Other biographies or materials may also be used. (ACT social studies/science reading score 1-5) **Class 3, Credit 3 (F, W, S)**

Intermediate (Level C)

0882-200 **Introduction to Social Sciences**
This course is intended to explore the understanding of human behavior and everyday life using important concepts from the social sciences. This course covers the fields of psychology, sociology, and political science. Materials from anthropology and economics may be covered as well. The course focuses on the application of the social sciences to the study of business, art, education, government, and other areas of interest. **Class 3, Credit 3 (F, W, S)**

0882-205 **American Family in Crisis**
This course studies contemporary social problems that influence the individual and family at different stages in the human life cycle. The course begins with the topic of child abuse and child neglect and moves to the study of problems often encountered by teens in their search for identity. The final portion of the course deals with the topic of divorce and its implications for adults and children. (0882-200 or permission of instructor) **Class 3, Credit 3 (F, W, S)**

0882-206 **Issues in Parenting & Early Childhood**
This course helps prepare students for the responsibilities, as well as the rewards, that come with parenthood. Introductory topics include conception, pregnancy, labor and delivery. Practical issues covered involve bathing, diapering, feeding and caring for newborns. Critical issues such as language development, discipline, self-esteem, child care options and the costs associated with having a child are also included.

This course focuses on common issues faced by all parents with special consideration given to issues unique to Deaf parents in raising their hearing or Deaf children. (0882-200 or permission of instructor) **Class 3, Credit 3 (F, W)**

0882-210 **The Black Experience**
This course helps students pursuing an AOS, AAS, or BS degree gain an understanding of the experiences of Black people in America. This course offers a historical perspective of Black people from their origins in Africa to their settlement in America. This perspective includes the period of slavery, the reconstruction period, the civil rights struggle, and modern day race relations among Black people and other groups in America. (0882-200 or permission of instructor) **Class 3, Credit 3 (W, S)**

0882-215 **Current Social Problems**
This course studies social issues that impact individuals who live in the United States and Canada. Important issues covered include cultural pluralism, the inequity among various ethnic and racial groups, and public and political policies. These social issues are related to the global environment, health care and family. Special consideration is given to how these issues impact on the Deaf community. (0882-200 or permission of instructor) **Class 3, Credit 3 (W, S)**

0882-221 **Deaf Heritage***
This course provides an introductory survey of sociocultural patterns associated with the unique characteristics of Deaf culture and Deaf community; the changing social, linguistic and educational conditions and attitudes influencing Deaf people throughout the past hundred years; and the achievements and accomplishments made by Deaf individuals in various professional fields. Hard-of-hearing and late-deafened individuals involved in the Deaf community will be included. Students learn how technology has impacted the lives of Deaf people. Students also learn the importance of the national organizations of the Deaf, of the achievements of Deaf minorities including women and ethnic/racial individuals, and of Deaf advocacy groups protecting the rights of Deaf people. (0882-200 or permission of instructor) **Class 3, Credit 3 (F, W)**

0882-222 **Deaf Culture & Community***
This course introduces students to aspects of Deaf culture and community. The distinction between these is reviewed and characteristics of each are identified. Students learn about the language, norms of behavior, values, traditions, and possessions of Deaf people. Deaf culture and community are analyzed from a historical and sociological perspective. Cross-cultural issues relating to the role of hearing people with the Deaf community are also covered. (0882-200 or permission of instructor) **Class 3, Credit 3 (W)**

0882-223 **Deaf Women's Studies***
This course provides a historical review of Deaf women in their professional and personal lives. The issues covered in this course include the exploration of the social, political and economic conditions affecting Deaf women and how this compares to other women in society. Hard-of-hearing and late-deafened women, and ethnic/minority women with hearing loss, are included in this course. Students will be able to summarize trends from the social/political analysis and apply their learning to their own personal development and empowerment. (0882-200 or permission of instructor) **Class 3, Credit 3 (W, S)**

0882-241 **Contemporary Political Systems & Issues**
This course guides students through the American political system, the three branches of government, and the electoral process. The course explores the relationship between politics, government, nationhood and individual empowerment through political process, activism and participation. Students compare and contrast major political systems such as democracy, communism, oligarchy, military rule and monarchy. Students navigate the economic and political assumptions that define increases or decreases in governmental involvement in issues such as education, rehabilitation and taxation. (0882-230 or permission of instructor) **Class 3, Credit 3 (offered on an occasional basis)**

0882-242 **Law & Society**
This course introduces students to general issues regarding the American legal system, jurisprudence, and the responsibilities of free society and individual citizens of that society. The course provides an overview of the historical aspects of the American constitution, legislative intent of law making and how laws are made and interpreted at the local, state and federal levels. The course explores the roles of lawyers and other practitioners within the legal system, and specifically addresses situations with criminal law, juvenile justice, tort law, consumer and mercantile laws, family law, and individual rights and liberties. (0882-200 or permission of instructor) **Class 3, Credit 3 (F, W, S)**

This course satisfies the Deaf Studies/American Sign Language requirement.

Bridging (Level D)

0882-285 **Civil Rights & Deaf People***
This course reviews the history of oppressed groups in the United States and their struggle for equality. Parallels will be drawn between various groups with a focus on Deaf people. Patterns of oppression and empowerment will be compared and contrasted for Black Americans, women, lesbians and gays, and Deaf people. Specific strategies and techniques employed to gain civil rights are covered. Court cases are reviewed and discussed. (ACT social studies/science reading score 9-11 or permission of instructor) **Class 3, Credit 3 (S)**

0882-295 **Social Sciences, Humanities & Technology: A Capstone Seminar (AOS)**
This course provides a culminating focus for AOS-degree students with respect to concepts and issues introduced in earlier arts and sciences and technical course work. Students develop a project related to a social issue or technological advancement and, using both traditional and electronic research, prepare a paper and presentation. This course is offered in a seminar format. Students must: 1) be within two quarters of graduation with an AOS degree, and 2) have completed (or be within one quarter of completing) all degree-related NTID arts and sciences requirements for the AOS degree. **Class 3, Credit 3 (F, W, S)**

0882-296 **Social Sciences, Humanities & Technology: A Capstone Seminar (AAS)**
This course provides a culminating experience for AAS-degree students with respect to concepts introduced in earlier arts and sciences, liberal arts and technical course work. Students apply skills of analysis, abstract reasoning, problem solving, statistical measurement and computer technology to explore a topic related to their technical major or career goal. Using traditional and electronic research methods, each student prepares a paper and presentation on the topic. This course is offered through a seminar format. Students must: 1) be within two quarters of graduation with an AAS degree, and 2) have completed (or be within one quarter of completing) their degree-related requirements in the College of Liberal Arts. Students must have completed **Writing and Literature I and II. Class 4, Credit 4 (F, W, S)**

Speech and Language

The following speech and language courses are non-credit.

0860-001 **Individual Speech/Language Instruction**
This course focuses on improvement of spoken language. Goals of the course are individualized based on student need. Instruction may include aspects of speech production such as voice, articulation, pitch, or loudness and aspects of language including grammar and vocabulary.

0860-002 **Pronunciation Rules & Strategies**
This course focuses on the pronunciation of new vocabulary. Students learn pronunciation rules and how to use the Merriam-Webster Dictionary in order to pronounce new and multi-syllable words correctly.

0860-003 **Vocabulary Development**
This course focuses on the use of strategies to improve vocabulary. Students develop strategies to determine word meaning through use of contextual clues and knowledge of prefixes, suffixes, and roots.

0860-004 **Understanding Word Categories & Relationships**
In this course students enhance their word knowledge by exploring similarities and differences in word meanings. Students study word relationships by using techniques such as semantic maps, classification schemes, and hierarchical trees. Students will apply skills to use of search engines on World Wide Web.

0860-005 **Improving Conversations**
This course provides information and practice designed to improve students' effectiveness and comfort with spoken English conversations. Students analyze typical conversations, partners, and situations to determine how they are affected by communication differences. Students discuss and practice the dynamics of a conversation, including how to initiate topics, maintain and change topics, and successfully close conversations.

Center for Human Performance

Index

1105	Wellness	336
1109	Fitness	336
1110	Health & Safety	337
1111	Lifetime Recreation Activities	338
1112	Interactive Adventures	342
1113	Martial Arts	343
1114	Military Sciences	344

Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first two digits refer to the college offering the course. The third and fourth digits identify the discipline within the college. The final three digits are unique to each course and identify whether the course is noncredit (less than 099); lower division (100-399); upper division (400-699); or graduate level (700 and above).

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's schedule of courses, published by the Office of the Registrar. Prerequisites and/or corequisites are noted in parentheses near the end of the course description.

Courses listed below are offered at various times throughout the academic year. For more detailed scheduling and fee information, please check SIS. No Refunds on any courses after the formal add/drop period ends. The Center for Human Performance reserves the right to decline permission to "audit" any of the following listed courses.

Wellness

1105-046 Wellness Challenge Exam
This learning experience is designed specifically as a "test out" option for students wishing to complete the wellness requirement for graduation. Strong multidimensional wellness background is highly recommended. Textbooks and study guides are available to prepare for the exam. Students satisfy the Wellness (core) part of the graduation requirement by passing the exam, which is restricted to 4th and 5th year students. Exam coordinator John Buckholtz may be contacted for additional information: jpbped@rit.edu, 5-7338, SLC weight room. Check SIS for detailed quarterly scheduling information. \$50 fee. (F, W, S, SU)

1105-048 First-Year Enrichment 10 Weeks
A 10-week, winter-quarter version of the first-year enrichment course for first-year students entering the Institute at that time. Successful completion of First-Year Enrichment 10 Week satisfies the Wellness requirement for graduation. For more information contact the FYE office at 475-7033. (W)

1105-051 First-Year Enrichment I
First part of the two-quarter version of the first-year enrichment course, designed to help first-year students make healthy decisions and choices that support their transition, adjustment, and social integration into college. Students must pass both FYE I and II in order to satisfy the Wellness requirement for graduation. For more information contact the FYE office at 475-7033. (F)

1105-052 First-Year Enrichment II
Second part of the two-quarter version of the first-year enrichment course, designed to help first-year students make healthy decisions and choices that support their transition, adjustment, and social integration into college. Students must pass both FYE I and II in order to satisfy the Wellness requirement for graduation. For more information contact the FYE office at 475-7033. (W)

1105-058 Wellness for Life
This core wellness course is designed specifically to assist students in making healthy decisions regarding lifestyle behaviors. Students will be presented with multidimensional wellness information that will help prepare them for co-op, job interviews, the workplace, and healthy, lifelong relationships. Key areas include behavior change strategies, stress, high risk behaviors, physical wellness, emotional wellness, psychological well being, safety, and spirituality. This course is part of the graduation requirement. Unique in design, this class meets once per week and includes ice breakers, instructional sessions, and interactive group activities. Check SIS for quarterly scheduling information. No fee. (F, W, S, SU)

Fitness

1109-002 Aerobics
This fitness course is designed to facilitate cardiovascular fitness as well as increase muscular strength, endurance and flexibility. All aerobics classes combine a balance of high- and low-impact moves that include a sequence of muscular strengthening and stretching exercises. In addition to the benefits of improved heart and lung function, students will have an opportunity to burn calories and increase muscular strength, endurance, and flexibility. Throughout the course students will be encouraged to work at individual paces, utilizing high- or low-impact moves where appropriate. Through instructor-lead group movements, with the use of music, brief explanations of basic aerobic principles, definitions and guidelines for proper technique will be covered. Options include CardioFUNK, Combo-Step, FUNK, Advanced, and Intermediate Step (varies each quarter). Check SIS for more detailed information. A course fee applies. (F, W, S, SU)

1109-003 Aquathenics
This course is designed to provide an alternative to traditional conditioning programs such as weight training, swimming, and/or aerobics. Aquathenics (choreographed exercises in a water environment/pool with music) assists in promoting physical fitness by utilizing the natural resistance that water provides. Non-swimmers are welcome but should feel comfortable in shoulder-level water. The major goals of the course are: to relieve muscle tension, to develop general muscle toning, to gently exercise most muscle groups of the body, and to develop capacities for self-directed water relaxation skills. Students must have a valid RIT ID to enter the pool. This class is offered at various times throughout the year depending on instructor availability. Check quarterly schedules for more detailed information. A course fee applies.

1109-004 Water Relaxation
This course is designed to provide an alternative to traditional water conditioning classes. A variety of floating positions, along with breathing exercises and underwater music, help students ease muscle tension and gain a state of mental relaxation. Floating "noodle" and aqua mats are provided by RIT. Non-swimmers are welcome but should feel comfortable in shoulder-level water. The major goals of the course are: to relieve muscle tension, to develop general muscle toning, to gently exercise most muscle groups of the body, and to develop capacities for self-directed water relaxation skills. Students must have a valid RIT ID to enter the pool. This class is offered at various times throughout the year depending on instructor availability. Check quarterly schedules for more detailed information. A course fee applies.

1109-005 Conditioning & Fitness
This course is designed for students who wish to enhance their overall level of physical fitness by designing a customized personal program of activity. Students will be assessed in terms of their baseline physical fitness norms (cardiovascular fitness, muscular strength and endurance, flexibility, body composition, blood pressure). Students will then establish individualized fitness goals. Through small group demonstrations and instructor lectures, students will design a fitness program that will assist them in achieving their goals. The majority of class time will be devoted to physical activity and program design. Students will learn how to use free weights and Cybex equipment safely and will receive instruction on how to design a "home-based" fitness program. Individual fitness folders will be established for regular and easy self-monitoring. This is a self-initiated, high-energy, motivating class. This class is offered at various times throughout the year depending on instructor availability. Check quarterly schedules for more detailed information. A course fee applies.

1109-006 Aeroboxing
Aeroboxing is a combination of high-intensity aerobics combined with boxing movements such as punches and kicks but without gloves or contact. This course is fairly new in the fitness circuit and fast becoming very popular. Instructors create aerobic-based routines and blend the program in with challenging no-glove punches and high/low kicks, allowing students to really challenge their cardiovascular systems. Class consists of warm-ups, choreographed routines, and cool downs. A course fee applies. (F, W, S)

1109-007 **Exercise Programming: F/S**
This course is designed for RIT faculty and staff who are interested in learning how to design a personal exercise program. Students will be assessed in fitness areas early on, then establish goals/exercise plan to achieve their goals. Students will learn some of the more contemporary fitness practices. Instructor will provide basic information on how to use the equipment and on cardiovascular development, stretching, and a variety of exercise program options. Post-testing at the end of the quarter allows students to assess their improvement levels and revisit fitness goals. This class is offered at various times throughout the year depending on instructor availability. Check quarterly schedules for more detailed information. A course fee applies (\$70).

1109-015 **Jogging**
Cardiovascular fitness, exercise awareness, endurance increase, resting heart rate improvement, and the joy of jogging add an element of educational self-confidence building activity to your college career. Evaluation is based on attendance, practical work improvement and attitude provides experience in building many miles on a gradual time increased program from one to four miles per run throughout the quarter. Jogging is a delightful mind-freeing exercise. This class is offered at various times throughout the year depending on instructor availability. Check quarterly schedules for more detailed information. A course fee applies.

1109-018 **Keiser Powerpace Cycling**
This course is an indoor group cycling class similar to the popular "spinning." Keiser bikes are used for a moderate- to high-intensity, low-impact aerobic and endurance program. General fitness goals for the course: facilitate a healthy level of cardiovascular fitness; enhance overall fitness and endurance; develop coordination and balance; and improve or maintain overall muscle tone, strength, and flexibility. At the end of the course, students should be able to properly set up the three adjustments on the Keiser PowerPacer bike to insure safe cycling; know the three basic hand positions and when they are appropriate; learn the five basic movements used for safe and effective indoor cycling; learn three ways to monitor heart rate; be aware of contraindicated movements that could cause damage to you or the equipment; understand the purpose of the various energy zones; and have fun! This class is offered at various times throughout the year depending on instructor/facility availability. Check quarterly schedules for more detailed information. A course fee applies (\$50).

1109-030 **Swimming for Fitness**
This fitness and conditioning activity course is designed for students who enjoy swimming and a no-impact routine to develop cardiovascular health. Designed for intermediate to advanced swimmers, this is *not* an instructional class. The class will focus on general aquatic fitness, stretching, refinement of all swimming strokes, lap swims, sprints, and outlined swim practices/programs. Students must provide their own swimming attire and have a valid RIT ID to enter the pool. This class is offered at various times throughout the year depending on instructor availability. Check quarterly schedules for more detailed information. A course fee applies.

1109-045 **Water Polo**
This exciting aquatic activity course is designed for students who wish to learn the sport of water polo. Students must be able to swim comfortably, and be willing to be challenged, before deciding to enroll in this course! Basic to advanced water polo skills will be presented. Course outline covers: Basic swimming/sculling skills; individual physical building blocks (strength, flexibility, speed, fitness) and core individual skills; game rules & history/basic strategies; offensive skills and strategies; defensive skills and strategies; goal-keeping; plays; refereeing; and tournament play. Students must provide their own swimming attire (suit, goggles – if desired – deck shoes, towels). RIT provides all other equipment. Class meets in the RIT competitive pool and provides an excellent fitness workout. Students will practice basic fundamentals and then progress into the competitive polo environment. This class is offered at various times throughout the year depending on instructor availability. Check quarterly schedules for more detailed information. A course fee applies.

1109-048 **Introduction to Weight Training**
Weight training fundamentals offer beginners to intermediates the chance to build strength through method discovery. Course content includes: stretching; flexibility; spotting; safety; free weights; Cybex; different program designs; and cardiovascular development. *Course design will focus on individual need and desire, leading to unique and successful program designs.* Instructors will present information on muscle groups development, basic CV training, and use of free weights and Cybex equipment. Class work involves initial orientation, hand-outs/discussion, definitions, Cybex station techniques, free weight specifics, and routine development for total body work. An enlightening approach to health/wellness improvement through weight strengthening activity blended with cardiovascular exercise. Students will have a complete individualized program upon completion of the course. A course fee applies. (F,W,S)

1109-060 **Dancercize**
This course provides students with a cardiovascular workout via basic dance steps and movements (with music, choreographed). The main objectives are to develop a better level of aerobic fitness, practice basic dance steps and movements, and improve coordination and flexibility. Students do not need a strong background in dance to enroll but rather an interest in becoming more aerobically fit through the use of intense dance steps and movements. Students will work individually, in pairs, and in small groups (lines). Appreciation and awareness of one's body are emphasized. Dancercize meets in the Student Life Center (building 23) dance studio. Students should dress appropriately. This class is offered at various times throughout the year depending on instructor availability. Check quarterly schedules for more detailed information. A course fee applies.

1109-300 **Pilates**
"Balanced body Pilates" dramatically transforms the way your body can look, feel, and perform. Pilates builds "core" strength without excess bulk, creating a toned body with stronger legs and abdominals. This activity teaches body awareness, good posture, and easy, graceful movements. Pilates improves flexibility, agility, economy of motion and alleviates back pain. Developed from the technique of Joseph Pilates, this course is a safe, sensible exercise system. Conventional workouts tend to build short, bulky muscles – the type most prone to injury. Pilates elongates and strengthens, developing muscle elasticity and joint mobility. A course fee applies. (F, W, S)

Health & Safety

1110-001 **Care & Prevention: Athletic Injury**
This course is designed to provide a thorough overview of the most common athletic-related injuries and the techniques for appropriate care and prevention. The main objective of the course is to provide students with the opportunity to learn how to become a student athletic-trainer. Upon successful completion of the course, students may qualify for professional employment opportunities in RIT sports medicine. Major topics include basic anatomy and physiology review, airway obstruction, CPR, muscle strains and sprains, joint dislocations, bleeding, shock, soft tissue injuries, bone fractures, splinting, emergency response skills, injuries to the head, face, eyes, neck and back, immediate injury care and prevention of the more common athletic-related injuries. This course is offered at various times throughout the year depending on instructor availability. Check SIS for quarterly offerings. A course fee applies.

1110-012 **CPR & First Aid**
This course is designed to provide certification by the American Red Cross for CPR and first aid. Upon successful completion of the course, students will receive certification cards for Community CPR, Pro CPR, and First Aid. Classes are generally held once a week for two to four hours. Students will be presented with information on the following for infants, children, and adults: rescue breathing, blocked airway, CPR, responding to an emergency situation, controlling bleeding and splinting techniques. Class sessions include the use of video tapes, lectures, demonstrations, and partner practice and skill evaluation (by the instructor). All equipment (manikins, mats, wraps) is provided by RIT. Students must have a pocket mask (or may purchase one from the instructor), must successfully pass (80%) a multiple choice exam, and must correctly demonstrate all skill sets (per American Red Cross standards/protocols). A course and book fee applies. (F, W, S).

1110-049 **Lifeguarding**
This course is designed to provide students with certification by the American Red Cross. Training consists of methods for individual rescue around and in the water. Basic skills and concepts will be presented. Objectives are: successful completion and certification for each individual by the end of the 10-week course. This course covers screening, approaches, carries, lectures, escapes, mouth-to-mouth, disrobing, apparatus use above and under water, double-drowning, search and rescue, and backboard use. Final review, water and written examinations complete the course requirements. **Prerequisites:** continuous 500-yard swim and demonstrated accomplishment in the front crawl, side stroke, and breast stroke. A course fee and book purchase required (F, S).

1110-060 **Water Safety Instruction**
Completion of this American Red Cross certification course allows students to teach swimming and lifesaving classes. Preparation for teaching follows instruction in lifeguarding skill review, strokes, teaching methods, class structuring and organization. Assignments, quiz evaluation, and a written course final are given. An intriguing course exploring teaching methods and problems, WSI allows actual teaching experience within the class curriculum. **Prerequisite:** Lifeguarding Certificate. A course fee and book purchases required. (S)

Lifetime Recreation

1111-001 **Archery**
This course presents the lifetime activity of archery as a recreational and/or competitive pursuit. A major objective is development of strength in the upper back, neck, and shoulder girdle. Students will be presented with the proper shooting techniques and forms. Instruction in the proper selection, use, and care of archery tackle (equipment) will be provided, and students will be introduced to the rules, safety, and etiquette of archery and archery competition. Once the fundamental skills have been well mastered, students will participate in a variety of class competitions (field, American, hunter, golf, clout, and flight). Archery bows, arrows, and targets are provided by RIT, and the course is held on campus. A course fee applies. (F, S, SU)

1111-003 **Badminton**
Most people regard badminton as a gentle, noncompetitive, backyard diversion for relaxing summer afternoon play. However, the best setting has been found to be indoors on a breezy court. Here the shuttlecock ("birdie") can zip back and forth with great control and amazing speed; it becomes a very exciting game. Because it is physically and mentally demanding, badminton is one of the most invigorating and challenging sports in the world. It is also a great reducer of stress and tension and a wonderful muscle toning activity. For the competitive person, badminton offers limitless opportunities to develop skills; for others, it is a wonderful recreational activity. This course is designed for beginners to intermediate players. Students will be able to practice basic through advanced skills and learn the rules, use of equipment, strategies, and tournament play (singles and doubles). All equipment provided by RIT. A course fee applies. (F, W, S)

1111-004 **Basketball**
This course is designed for beginner to advanced male and female students. It is designed to emphasize basic skill development and refinement, team competition, and tournament play. Students will be encouraged to develop individualized skills of the game: passing, shooting, dribbling, rebounding, and offensive and defensive movement techniques. Course objectives include enjoyment of playing and team competition, physical conditioning enhancement, becoming more informed about game strategies, and benefitting from the sociological aspects of a team sport. The general format of each class will include a warm-up, basic and advanced drills, and in-class competitions. Students must be dressed in appropriate athletic attire. The course is offered on campus. A course fee applies. (F, W, S depending on instructor and facility availability).

1111-006 **Officiating: Basketball**
Class provides competencies necessary for officiating in basketball. Basic rule review covers detailed aspects of the game. Officiating techniques are presented, as well as practiced, in an understandable, growth-providing approach. Fitness level is improved through drills, on-court experience, and playing options. Explanation through tape review, discussion, and experiential learning provides useful skill enhancement. Fee required. **Offered at varied times throughout the academic year depending on instructor and facility availability**

1111-007 **Massage: Wholistic Therapy**
Massage is an accepted part of many physical rehabilitation programs and has proven beneficial to many chronic conditions such as low back pain, arthritis, and bursitis. It helps relieve the stress and tension of everyday living, providing relief to people from all walks of life—the weekend or competitive athlete, home gardener, overstressed executive, secretaries, laborers, waitresses—anyone can feel a need for massage at some point in time. There are more than 200 variations of massage. This course is designed to provide students with the basics of massage therapy. They will learn the "how to's" of providing and receiving a therapeutic upper- and lower-body massage. A safe environment will be established so that all students can benefit from one another in each and every class session. A \$95 course fee applies. (F, W, S)

1111-009 **Billiards**
Course objective: to teach and develop the fundamental skills involved in the game of pocket billiards. Course consists of basic and advanced instruction covering all phases of the game. Students will be able to improve their skill and knowledge, adding an enjoyable recreational outlet to their lives. Students will be taught the various game rules, etiquette, terminology, use of equipment, general strategies, stroke, "English," stance, and positioning. All equipment provided by RIT. Class limited to 28 students. A course/facility fee required. Check SIS for more detailed information. (F, W, S)

1111-012 **Bowling (off campus)**
Beginners through intermediate/advanced students are welcomed. The course includes practice of the basic techniques of bowling and covers the following: rules and etiquette, stance, push-away, backswing, approach and release (fundamental skills). Students will learn the importance of proper ball selection and care of balls, shoes, and gloves. Once averages have been established, students will be placed on teams and will bowl as a competitive league (format) for the remainder of the quarter. The general course outline includes: orientation to the bowling center; ball selection; scorekeeping; approaches; strategies; calculating averages and handicaps; team and individual competition. Course held off campus (Olympic Bowl). **RIT does not provide transportation.** A course/facility fee applies (\$60). (F, W, S, SU)

1111-019 **Danceaerobics**
Danceaerobics is geared specifically for cardiovascular fitness (conditioning of the heart and lungs). The course provides a balanced general fitness training program in a 45 to 50-minute format. The routines are designed to challenge the cardiovascular system, improving strength, agility, coordination, speed, and balance. Additional areas include techniques for using aerobics for stress reduction and information on all components of physical fitness, including healthy nutritional practices, dieting, rest, and personal training habits. Course format includes overall stretching and warm-ups; abdominal overloads; hip/rear overloads; aerobic exercises featuring running, skipping, and jumping (choreographed to music); cool down; and lectures. This course is offered at varied times during the academic year depending on instructor availability. A course fee applies.

1111-027 **Diving**
This course is designed to accommodate all ability levels. The fundamentals of diving will be covered early in the quarter. Students will progress to the next ability levels at their own pace and with the guidance of the instructor. The course objectives are: To teach the basics of diving, to build skill level and to develop confidence levels to as high a point as possible. The course content includes the following areas: Approach, jump, positions, twists, and entries. Students must be reasonable coordinated with average strength and have a basic swimming competency (should be comfortable in deep water). This course is offered at varied times during the academic year depending on instructor availability. Check SIS for more detailed quarterly offering information. Class meets in the RIT pool. Students must bring a valid RIT ID card to enter the facility. A course fee applies.

1111-028 **Fencing (Foil & Sabre)**
Introduction to the sport of fencing: basic moves, rules, knowledge and understanding, conditioning principles, stretching, flexibility, blade work skills, experiential learning, and the opportunity to direct (officiate) for one another. Classes begin with a light warm-up, followed by stretching and conditioning exercises. **Section 1 focuses on fencing skills while section 2 focuses on use of the sabre.** Also includes competition discussion and bout situations. Grading is on attendance. Final weeks include mini-competition, games, Olympic video, and free fencing time. A course fee applies. (F, W, S)

1111-033**Flag Football**

Flag football allows students to experience football in a co-ed environment. Individual skill rehearsal as well as team/game play is provided. Skills presented include: Passing, catching, flag techniques, offensive/defensive play, kick-offs, point-after attempts, hand-offs, rules and safety issues. Active participation improves fitness levels in a fun, competitive atmosphere. All equipment provided by RIT. This course is offered at varied times throughout the academic year depending on instructor availability. A course fee applies.

1111-036**Frisbee**

Ultimate Frisbee is a non-contact disc sport played by two teams of seven players. The object of the game is to score goals. A goal is scored when a player catches any legal pass in the end zone of the opposing team. The disc (Frisbee) is advanced by throwing or passing it in any direction to teammates. Any time a pass is incomplete, intercepted, knocked down, or contacts an out-of-bounds area, a turnover occurs. A turnover results in an immediate change of the team in possession of the disc. Students will learn the rules, basic throws, and strategies of this exciting game while developing levels of physical fitness. This course is held on campus in the SLC (first meeting) and outdoors (weather permitting). A course fee applies. (F, S)

1111-038**Golf**

Beginning golf familiarizes the student with basic principles of technique, rules, etiquette, equipment and various course layouts. Students will benefit from play alongside novice and experienced players. Individual critiques, etiquette discussion, grip coverage, stance, posture, and swing planes are learned as well as use of irons, woods, and putters. When appropriate, videotaped presentations are shown. Stretching, technique demonstration, and review combine with hitting practice to fill 50 minutes of experiential golf education. Professional delivery and breadth of information combined with practice lead to a 27-hole class required performance. Written examination and a self-performance videotape test learning levels. An official golf rule book, history review, current events discussion, and informational handouts are included. A course fee applies. (F, S)

1111-041**Horseback/English**

Student equitation skills, horse control, walking work, and the trot and canter develop within this beginning course. Moving on to intermediate and advanced courses, students learn fence jumping and fence course introduction, while further refining equitation skills. Course objectives include riding and stable safe work techniques, developing correct positioning, riding control, and specifics dealing with a variety of horses and situations. Ground work education such as horse stall exiting, ground leading, correct mounting procedures, walking, sitting, posting and two-point positioning, walking without stirrups, trotting, and cantering lead into intermediate and advanced course experience with work over fences. Attendance is required. Course is offered at Huntington Meadows Stables in Webster. Instructor fee required. Check SIS for more detailed quarterly information. **Students must call Huntington Meadows Stables (872-6286) to set up lesson times.** (F, W, S)

1111-042**Horseback/Western**

Pleasure riding as well as exercise are provided through weekly western horseback riding in Bloomfield's Liberty Stables. Classes consist of lectures, demonstrations, and riding techniques (ring and trail riding). Missed classes are made up by appointment. Attendance is important and the key to success in this class. Details include safety rules, guiding and communication, grooming and saddling, feeding and maintenance, hoof care/horseshoes, color/markings, teeth and age, and bareback riding. Fifteen lesson horses and riding trails on 200 acres afford students a wonderful riding foundation and an exceptional learning experience. Instructor fee required. Call Liberty Stables (229-2384) for more information and check SIS for more detailed quarterly offerings. (F, W, S, SU)

1111-049**Ice Hockey**

This course is designed for beginning to advanced ice hockey players. **Students must provide their own skates, helmet, hockey stick, and gloves.** Course objectives: to learn the basics of equipment, safety, skating acceleration, stick handling, skating agility (forward and backward), and basic drills. The advanced classes (Power Skating) are **not** for beginners and will cover advanced hockey skills, including shooting, passing for accuracy, advanced drills, defensive zone coverage, and competitive play. If the class is above average in ability, a session on power plays and penalty kills may be added. **No body checking is allowed in class.** All penalties during class will be penalty shots. Held on campus. Skate rental available. A course fee applies (\$60). (F, W depending on instructor and facility availability)

1111-050**Ice Skating**

This course is designed for beginning to advanced ice skaters. Early in the quarter, students will be introduced to the use and care of equipment and safety implications. Once basic skills have been obtained, students will progress as follows: glide and snowplow stop; forward glide and sculling; backward glide and sculling; forward crossovers; short jumps and turns; two-foot spins; forward chasses; Killian hold; backward chasses; waltz hold; fox-trot hold; forward drag, bunny hop and lunge; forward arabesque; combination jumps and spins; Salchow, and basic program development. Held on campus. Skate rental available. A course fee applies (\$60). (F, W)

1111-053**Juggling**

This course is designed to acquaint students with the art of juggling in theory and practice while at the same time conditioning their minds and bodies. Course concentrates on three- and four-ball juggling patterns and is geared to accommodate all levels of learners. Instructor will teach one-on-one as well as group demonstration. Clubs, rings, combination cigar boxes, scarves, club swinging and five-ball juggling will be taught when appropriate to advanced students. Personal instruction will be supplemented with juggling movies, literature, and video taping. The goal of the course is not only for each student to achieve maximum juggling ability but also to improve concentration and physical coordination. Basic course format: ball juggling, history, scarf and cigar box juggling, physical/mental benefits, video taping, partner juggling, showmanship and passing, and challenge tricks. A course fee applies. (F, W, S)

1111-065**Racquetball**

Racquetball is designed to teach skill development for beginning to advanced players. Focus for the beginner is on skill development and refinement, while intermediates-advanced focus on perfecting the strokes and competitive strategies. Activity level is high. Students will have the opportunity to develop overall fitness elements. Basic course objectives: skill understanding, enhancement of the social/emotional components, CV fitness, basic shots, equipment, warm up/cool down, training, and game strategies. Singles, doubles and cut-throat games will be covered as well as a class tournament. This course meets twice weekly for 50 minutes on the SLC racquetball courts. Racquets and balls are provided. **Eye guards are required and may be purchased locally.** All students must bring their RIT ID to every class. Dress includes gym wear and sneakers. No course fee. (F, W, S, SU)

1111-067**Scuba**

Beginning, advanced, rescue diver, and dive master are components of the scuba program. Introduction to Scuba provides basic principles of skin and scuba diving. Diving physics and physiology, equipment, disease, decompression, and safety procedures are studied. Experiential work strongly emphasizes skin diving and swimming, including the introduction and use of scuba equipment. Admission to the follow-up scuba certification course requires demonstration of acceptable standards. Learning covers scuba equipment details, decompression, oceanography and marine life, dive planning, first aid, and general dive safety. Work involves advanced pool and open water skin/scuba diving training. Certification requirements include open-water dives. Certification available for Beginner's, Advanced, Dive Master, Rescue Diver. Emphasis is on safety conscious attitudes and practices. Student must be able to swim. Instructor fee applies. Course held off-campus at the Raddison Inn. RIT does not provide transportation. Call Dom's Scuba (292-5850, domsscuba@aol.com) for more detailed information. (F, W, S, SU)

1111-070**Crew: Water Rowing**

This exciting activity course is designed to provide beginning to intermediate students with an overview of the sport of water rowing (crew). Taught by RIT's intercollegiate coach, Jim Bodenstedt, this course takes place off campus at the RIT Boathouse (directions are located in the SLC lobby, or contact Coach Bodenstedt at 475-7360 or jcbatl@rit.edu). Students must be able to swim comfortably. General course content includes conditioning, equipment, safety, loading/docking, basic to advanced stroke work, timing and teamwork, sculling, coxswain skills, competitive opportunities (regattas), 8 boat. Students must provide their own transportation to the boathouse. This course is offered at varied times depending on instructor availability. A course fee applies.

1111-075

Snowboarding

Participation in this program may be for wellness activity credit or just for fun. Course objective: provide students with an opportunity to learn safe snowboarding and develop lifetime skill activity. Snowboarding begins the first week of January and runs for eight consecutive weeks. Students who elect to "just snowboard" will receive wellness activity credit by participating for 20 hours over the six-week program. Bristol Mountain determines program cost each fall. Fees for 2003-2004 academic year were \$125 for lift pass; \$70 for ski rental if needed; \$60 for lessons. Note: The lift pass does not include lessons, which are optional for all and provided by a full complement of certified ski professionals for all ability levels. Students must come to the SLC in the late Fall to register in person. RIT does not provide transportation. Instructor is Lex Sleeman (atsped@rit.edu; 475-7372 for more information about the class. (W)

1111-077

Skiing/Downhill

Participation in this program may be for wellness activity credit or just for fun. Course objective: provide students with an opportunity to learn safe snowboarding and develop lifetime skill activity. Snowboarding begins the first week of January and runs for eight consecutive weeks. Students who elect to "just ski" will receive wellness activity credit by participating for 20 hours over the six-week program. Bristol Mountain determines program cost each fall. Fees for 2003-2004 academic year were \$125 for lift pass; \$70 for ski rental if needed; \$60 for lessons. Note: The lift pass does not include lessons, which are optional for all and provided by a full complement of certified ski professionals for all ability levels. Students must come to the SLC in the late Fall to register in person. RIT does not provide transportation. Instructor is Lex Sleeman (atsped@rit.edu; 475-7372 for more information about the class (W)

1111-078

Soccer

Soccer, THE sport of all the world, is a game of constant action. Each player must be able to perform both as an individual and as an essential part of team play. Class covers fundamentals of ball control, trapping, dribbling, passing, heading, shooting, defensive (zone, man-to-man) techniques, offensive techniques, goal keeping, and soccer terms. In this class, we will also discuss how every team is comprised of individual skill, group skill and team tactics. Class format includes warm-up session with skill practice, instruction for the day, and mini-games in a controlled scrimmage situation. A course fee applies. (W indoor, F, S outdoor, depending on instructor/facility availability)

1111-081

Softball

Co-ed activity class designed for beginning to advanced players of slo-pitch Softball. Class meets outdoors on intramural Softball field. During inclement weather, class meets in Clark gym and plays a modified game, mushball. Course consists of fundamentals of slo-pitch Softball with "speed up" rules of three balls and two strikes, including rules, outfield play, infield defensive skills, hitting, pitching techniques, base running, basic game strategies, and umpiring. **No metal spikes allowed.** First class: meets indoors and consists of orientation session and instruction on game rules. Most other classes: outdoor drills, skill refinement, and team competition. Course objectives: develop an appreciation for slo-pitch Softball; acquire a variety of skills to be successful at playing; provide fitness activity; and have fun! This course is offered during the Fall OR Spring depending on instructor availability. A course fee applies.

1111-083

Swimming

Designed for student skill improvement, knowledge, fitness conditioning, and safety, this instructional class shares the latest swimming information and techniques. Course procedure includes individual and group instruction. Objectives involve work on skill improvement, safety development, all stroke recommendations, endurance improvement, and swimming enjoyment. Course content includes beginner, intermediate, and advanced swimming skill work; freestyle, side, back, breast, fly, and elementary backstroke. In addition to turns and variations, water orientation and entry, stroke mechanics, understanding fitness conditioning, games, diving and safety skills, students explore water enjoyment. Attendance, enthusiasm, participation, and performance evaluation are course requirements. Goggles recommended. No course fee applies. (F, W, S)

1111-087

Tennis

Participation, enjoyment, and lifetime game appreciation fulfill class expectations. Introduction to fundamentals and skills will be covered. Course objectives include learning game skills, rules, etiquette, tennis appreciation and attaining a level of play that allows competition with comparable players. Court layout, surfaces, scoring, equipment, individual skills (forehand, backhand, serve, volley, overheads), and footwork allow progression into preliminary games and round-robin play. Advanced players work on depth of shots and doubles strategy. Intermediates focus on the conditioning aspect, spins, volleys, approach and overhead shots. Pre- and post-assessment tools combined with regular attendance and full participation will provide the best opportunity to refine individual skills. Tennis balls/racquets are provided with a valid RIT ID. A course fee applies. (F, S, SU)

1111-089

Volleyball

Course designed for all playing levels. Course evaluation is based on attendance, effort, improvement, and enthusiasm. The basic course outline includes instruction and rehearsal of basic volleyball skills (underhand pass, overhead pass, spike, and serve), rules, basic formations/positions/strategies, and tournament play. Students will have ample time to practice/refine basic to advanced skills of the game. Tournament play will be in the form of random team selection from class to class. Students should dress in athletic wear, with comfortable sneakers and knee pads (if desired). This course is offered at varied times during the academic year depending on instructor availability. A course fee applies.

1111-093

Yoga

A body/mind discipline, Yoga encourages posture improvement, flexibility development, and learned relaxation. Mastered through learning an ancient posture series incorporating breath control, the body and mind relationship is explored. The practice of meditation gives one an opportunity to experience stress management: relaxation is Yoga practice's key. Classes contain sequential stretches, postures, and relaxation exercise, incorporated through breathing and visualization. New Age and mainstream music provides an inspiring atmosphere. Hatha Yoga exploration includes a diverse discipline collection for improving mental and physical health. Goals: personal mastery, robust health, and harmonious co-existence with the world. Attendance is required. Demonstration, direction, and participation add value. Recommended clothing is comfortable and loose fitting. Mats are provided. A course fee applies. (F, W, S)

1111-110

Rollerhockey/Power Skate

This course is designed for beginning to advanced roller hockey/ice hockey players. **Students must provide their own helmet, hockey stick, inline skates, gloves, and wrist guards** (off-ice training). Course objectives: learn the basics of equipment, safety, skating acceleration, stick handling, skating agility (forward and backward), and basic drills. The advanced classes (power skating) are **not** for beginners! These classes will cover advanced skills, including shooting, passing for accuracy, advanced drills, defensive zone coverage, and competitive play. If the class is above average in ability, a session on power plays and penalty kills may be added. Course variations include in-line power skate/ice power skate, roller hockey **No** body checking allowed. All penalties during class will be penalty shots. This course is offered on a limited basis depending on facility & instructor availability. A course fee applies.

1111-120

Inline Skating & Ice Skating

This course introduces students to in-line skating and ice skating as lifelong activities. The first half of the course will focus on basic to intermediate ice skating skills. The second half will focus on the skills and enjoyment of outdoor in-line skating. Instruction will include skating forwards and backwards, turning, crossovers and braking/stopping. Additional topics include the proper use of protective gear and equipment maintenance. **Students are required to provide their own in-line skates, helmets, and wrist guards.** Ice skates may be rented from the ice rink (nominal fee). The class sessions include individual as well as group instruction. A course fee applies. S (depending on instructor/facility availability)

1111-130

Team Handball

The similarity between the terms "team handball" and "handball" causes much confusion, but similarities between the two sports stop with the name. Team handball is played on a court much like a basketball court. Each team has seven players—six court players and a goalie—who play both offense and defense. The basic objectives are to throw the ball into the goal of the opposing team and to defend one's own goal against attacks by the other team. Team handball is a rapid, continuous-play activity. Students will learn the basic rules, throws, and game strategies while developing cardiovascular fitness levels. This course is offered on a limited basis depending on instructor availability. A course fee applies.

1111-200 Dance/Ballet
This course introduces the art of ballet, its vocabulary (French, Sign, and English), discipline base, protocols, and specific movements. Students are introduced to key concepts through lecture-demonstrations; video; and floor, center, and barre work. Class offered in the Student Life Center Dance Studio. Students must provide their own ballet shoes. This course is offered at varied times during the academic year depending on instructor availability. Check SIS for more detailed scheduling information.

1111-210 Dance/Ballroom
This foundational course is designed for complete beginners to intermediate social dancers and covers trendy and popular dances. The focus is on a mixture of melodies and Latin rhythms to give the student an overall feel for social dancing. The intent is to create a sense of competency as an above average ballroom dancer. Major course objectives include body- and self-awareness, mixing well with the same and opposite sexes, boosting self-confidence, developing natural body rhythms, and improving posture and poise. Dances covered are the foxtrot, meringue, swing, salsa, jazz, tango, waltz, cha-cha, ballet, and jitterbug. Class will attend a community dance event. Students should dress comfortably. (Spring quarter class focuses on intermediate to advanced skills.) A course fee applies. (F, W, S)

1111-215 Contemporary Jazz Dance
This course provides students with a wider dance vocabulary created from ballet, modern dance, and ethnic traditions. The course focuses on contemporary jazz skills and movements. The styles of Bob Fosse and the fall-and-rebound style of Jose Limon are bases for a course that focuses on the fundamental movements required for successful and enjoyable jazz dancing. The class is held in the SLC (Bldg. 23) dance studio and is offered at varied time during the academic year depending on instructor availability. Check SIS for more detailed scheduling information. A course fee applies.

1111-220 Country Line Dancing
Covering the latest line dances, club, and studio couples dances, country line dancing is designed for beginning to intermediate dancers. Traditional dances give depth and background to basic terminology and techniques. Dance adds excitement to improved body coordination, memorization, confidence, partner skills, and creativity. The electric slide, Chattahoochee, Dr. CC, earthquake, and Bubba are line dances of distinction. Couples pursue the cha-cha, two-step, waltz, and sugar waltz (full of turns and spins). Beginning with music beats and basic dance choreography counting, students build a foundational understanding. Warm-up, explanation, and practice lead to improvement. There will be a final performance review. A course fee applies. (F, W, S) Fee required.

1111-223 Embracing Space/Dance
This course is designed to allow students freedom of movement and expression within a dance environment. Instructors will provide a variety of musical selections and percussions and will guide/facilitate students' free movement in and around the dance studio. Students will focus on developing an appreciation for the freedom of "dance movements" and self-expression. Class structure varies depending on class needs. This course is held in the SLC dance studio. Please check SIS for quarterly schedule. Fee required. Offered throughout the year, depending on instructor availability.

1111-225 Multicultural Dance
This course is designed to teach basic to advanced components of a variety of cultural dances that may include jog, break, ballet, jitterbug, jazz, African-American, Native-American, salsa, swing, cha-cha, gharba, mambo, rhumba, tango, meringue, waltz, line dance, hora, tarantella, can-can, two-step, Charleston, locomotion, Mexican, flamenco, disco, and polka. Dance choices will be based on the current trends and overall class interest. Students will have an opportunity to learn and practice these dances independently and with partners. Some elements of conditioning will be required. Students should dress comfortably and wear rubber-soled sneakers. Boots and black-soled shoes will not be allowed. Class meets in Student Life Center (Bldg. 23) dance studio. A course fee applies. Offered according to instructor and facility availability.

1111-235 Swing Dance
Swing dance encompasses many forms of dance: West Coast swing, lady hop, Balboa, shag, jitterbug, bop, whip, jive, and many others. Movies, music, funky clothes, places to learn and places to dance, and new television commercials featuring swing dance have contributed to a worldwide resurgence in swing dance. This course is designed for all levels of students who wish to learn and participate in the fun of swing dancing. The instructor will introduce a variety of dance steps and movements to music. Working in pairs and small groups, students will have the opportunity to learn and practice a variety of swing dance styles. Check SIS for more detailed course information. A course fee applies. (F, W, S)

1111-240 Dance/Tap
Smooth dance movement, quick style changes, transitional moves, and the all-familiar sound of the known tap shoe can be yours. Beneficial cardiovascular improvement along with muscular coordination, self-presentation, musical accompaniment, and sheer expression are the highlights of this course. Experience will grow with participation. Tap dance history, development, art-form presentation, skill expression, and step improvement will be enhanced. Building new dance steps will culminate in individual and group presentations. Skill sharing and learning include musical selection and choreographic recommendation. Class meets in SLC dance studio. Check SIS for more detailed quarterly offering information. Tap shoes may be purchased locally. A course fee applies. (F, W, S)

1111-300 Dance/Ballet-Spec Topics
This course introduces the art of ballet, its vocabulary (French, Sign, and English), discipline base, protocols, and specific movements. Students are introduced to key concepts through lecture-demonstrations; video; and floor, center, and barre work. Class offered through NTID Dept. of Cultural and Creative Studies in the Johnson Building (60). Instructor uses sign language, but classes are open to hearing and deaf/hard-of-hearing students. Call 475-6250 for more information. Check SIS for more detailed quarterly information.

1111-310 Dance/Jazz-Spec Topics
This course provides students with a wider dance vocabulary created from ballet, modern dance, and ethnic traditions. The course focuses on contemporary jazz skills and movements. The styles of Bob Fosse and the fall-and-rebound style of Jose Limon are bases for a course that focuses on the fundamental movements required for successful and enjoyable jazz dancing. The class is held in LBJ and is offered through NTID Department of Cultural and Creative Studies. Instructor uses sign language, but classes are open to hearing and deaf/hard of hearing students. Call 475-6250 for more information. Check SIS for more detailed scheduling information.

1111-320 Dance Performance I
This introduction to dance gives students access to the language as well as the fundamental movements of modern dance. The styles and techniques of Martha Graham (contraction) and Jose Limon (fall and rebound) are explored. Basic body structure will be studied as it applies to creative movement. Ensemble work, performance standards, and creation of character and theme are stressed with respect to performance in the studio and on stage. All classes offered through NTID Dept. of Cultural and Creative Studies in Johnson Building (60). Instructor uses sign language, but classes are open to hearing and deaf/hard-of-hearing students. Check SIS for more detailed quarterly information. (F, W)

1111-330 Fundamentals of Choreography
This course explores the freedom and discipline that balance the art of choreography. Visualization and notation systems are studied. Students are required both to choreograph for student ensembles and to perform in original works by classmates. The class is offered through NTID Dept. of Cultural and Creative Studies in the Johnson Building (60). Instructor uses sign language, but classes are open to hearing and deaf/hard-of-hearing students. Check SIS for more detailed quarterly information. (W)

Interactive Adventures

1112-001

Snowshoeing/Hiking

This class is designed to utilize the sport of snowshoeing as a means of promoting and imparting physical fitness, outdoor preparedness, outdoor winter skills and knowledge of our local parks and natural resources. Students can expect to gain the necessary knowledge to continue enjoying this sport on their own. This class will typically meet at the Red Barn and depart for one of our many local trails and parks. In the event of a "no snow" day, hiking will be the substitute activity for the day. Equipment is provided by RIT. Please refer to SIS for possible offerings and/or visit the Interactive Adventures Web site at www.interactiveadventures.rit.edu. This course may be offered during the winter quarter depending on weather conditions and instructor availability. Course fees apply. (W)

1112-020

Cross-Country Skiing

Cross-country skiing is one of the best fitness workouts around, burning 499 calories an hour while working all the major muscle groups (hamstrings, calves, quads, shoulders, arms, back, and abdominals). This course provides a basic overview of this fun, challenging lifetime activity. The general course content addresses equipment (skis, shoes, poles, clothing), proper technique (gliding), climbing hills, skiing downhill with cross-country skis, and cardiovascular fitness benefits. Students must dress appropriately. All equipment is provided by RIT, although students are encouraged to use their own. The course is held on campus and coordinated by the Interactive Adventures program (www.interactiveadventures.rit.edu). This course may be offered during the winter quarter depending on weather conditions and instructor availability. Course fees apply. (W)

1112-045

New Games: Project Adventure

This course introduces students to New Games and the philosophy of Project Adventure. Each week students will participate in one or two new games, that will challenge them in the areas of trust, team building, problem solving, and leadership. General course objectives: improve students' mental concentration, problem solving, leadership, and team skills; provide a relaxed and positive atmosphere for learning, and discuss the philosophy of the "full value contract" and Project Adventure. General course content: trust and team building, basic leadership, and problem solving skills. Students should dress in casual, comfortable attire and sneakers. Class meets once per week for one hour, 20 minutes. Variations to this course include Outdoor Adventure and New Games: Advanced Challenges. This course is offered at various times during the year depending on instructor availability. A course fee applies.

1112-050

Rock Climbing: Indoor

This class is designed to educate students about indoor rock climbing, including a variety of climbing techniques, proper stretching and warm up, proper use of gear and equipment as well as all safety practices related to indoor climbing. Each class will consist of demonstrations, short lectures, opportunities to practice what has been learned, and time for "free" climbing. This class is appropriate for all experience levels, and all necessary gear and equipment are provided. Check quarterly schedule on SIS for possible offerings and/or visit the Interactive Adventures Web site at www.interactiveadventures.rit.edu. Course fees apply.

1112-052

Rock Climb/Training for Climbers

This class is designed for those with climbing experience and who already possess strong fundamental climbing skills (technical knowledge of ropework or technical climbing experience is not necessary). This class will introduce a variety of specific climbing training methods and exercises. Students will have the opportunity to take advantage of the increased motivation and synergy of group training. All exercises will be climbing related and target such areas as contact (finger) strength, endurance, power, balance and the mental aspects of enhancing climbing ability. Check quarterly schedule on SIS for possible offerings and/or visit the Interactive Adventures website at www.interactiveadventures.rit.edu. Course fees apply.

1112-055

Rock Climbing: Outdoor

The subject matter of this introductory class includes a variety of climbing techniques, proper use of gear and equipment, and all safety practices related to outdoor climbing. Class consists of one evening session and an all-day trip. The evening session acquaints classmates with each other, covers all rope handling and climbing techniques, and prepares the class for the trip. The trip usually takes place in Ontario, Canada (transportation is provided). Here, students will have the opportunity to spend the day climbing on the cliffs of the Niagara Escarpment. All necessary gear is provided. You must attend the evening session to go on the trip, and both sessions are required for a passing grade. Check quarterly schedule on SIS for possible offerings and/or visit the Interactive Adventures Web site at www.interactiveadventures.rit.edu. Course fees apply.

1112-060

Rock Climbing/Bouldering

Bouldering is the sport of climbing typically short distances without ropes or harnesses. These safety precautions are replaced with spotters and crash pads. This class is designed to expose students to the sport of bouldering, while teaching a variety of climbing techniques, mental and physical preparedness, proper spotting and other areas of climbing safety. The first session(s) will meet at the Red Barn; future sessions will take place in Niagara Glen bouldering area. All gear and transportation are provided. Check quarterly schedule on SIS for possible offerings and/or visit the Interactive Adventures Web site at www.interactiveadventures.rit.edu. Course fees apply.

1112-065

Rock climb/Top rope Set-up

This class is designed to teach students how to assemble safe and reliable anchors for top rope climbing using natural anchors (no artificial protection will be used). Participants should know how to belay and have had some climbing experience. Skills taught will include: Basic knowledge of all gear and equipment being used, choosing an anchor, tying off anchors, creating equalized and redundant anchor systems, anchoring the belay, redirected belays, top belays, escaping the belay and basic mechanical advantage systems. Class consists of one evening session and a full day trip. The trip will be to Ontario, Canada where participants will learn to set up and use their own climbs. Both sessions are mandatory. All necessary gear and transportation are provided. Check quarterly schedule on SIS for possible offerings and/or visit the Interactive Adventures website at www.interactiveadventures.rit.edu. Course fees apply.

1112-067

Rock Climbing: Technical Skill

This course is designed for those with some outdoor climbing experience. The class will be taught inside, but in simulated outdoor situations, covering such skills as anchor building and management in a variety of situations, various belay methods and considerations, hauling escapes, basic rescue skills, mechanical advantage and hauling systems; and above all-safety and its many components in the climbing discipline. Climbing movement will only be covered in so much as it pertains to ropework and other technical considerations. Check quarterly schedule on SIS for possible offerings and/or visit the Interactive Adventures Web site at www.interactiveadventures.rit.edu. Course fees apply.

1112-080

Backpacking

This class will impart basic backpacking skills such as fitting and properly packing your backpack; climbing skills and general outdoor awareness and preparedness. These skills will be put to use on an overnight backpacking/camping trip. The difficulty of the hike will be based on the abilities of the class. Fees include backpack, tent and camping gear. Check quarterly schedule on SIS for possible offerings and/or visit the Interactive Adventures Web site at www.interactiveadventures.rit.edu. Course fees apply.

1112-085

Hiking/Adirondack Peak

This class meets for one evening preparatory session and one overnight trip. The evening session acquaints the group with one another and informs them about appropriate gear for the trip, outdoor preparedness, and general expectations and logistics for the trip. The overnight trip departs from RIT Friday afternoon in an RIT van. That night, the class stays in the Adirondacks with bunk-style accommodations. Saturday we will hike one of the many peaks in the region. Hiking is typically strenuous on average, but the pace will be moderate, and an effort will be made to accommodate the abilities of the class when selecting a hike. Because of changing weather conditions and other unforeseeable factors, a peak may not be summated. Participants should possess dependable, well-fitting hiking boots and clothing necessary to spend the day outside in varying conditions. See SIS and/or visit Web site at www.interactiveadventures.rit.edu. Course fees apply.

1112-100

Canoeing

This class meets for one evening session and one full day trip. The evening session will cover: Acquainting the group, basic canoe/paddle parts and terminology, launching the canoe, paddle strokes and maneuvers, and basic canoeing safety with opportunity to practice skills learned on flat or slow moving water. The trip will be an all-day venture on moving water with sections of mild white water. Skills taught include: Review of evening session skills and strokes/skills for negotiating moving water. Participants should expect to be on the water for both sessions. Both sessions are mandatory. Check quarterly schedule on SIS for possible offerings and/or visit the Interactive Adventures website at www.interactiveadventures.rit.edu. Fees include canoe, transportation and instruction. Course fees apply.

1112-120 Kayaking: Roiling
This class, an introduction to kayaking, is typically taught in the pool and covers the following skills: kayak parts, accessories and terminology, wet exits, hip snaps, paddle strokes, j-leans, Eskimo rescues, and Eskimo rolls. All skills are taught in progression, using drills, games, and exercises leading up to a full roll. This class is taught in white-water kayaks. All necessary gear and equipment is provided. Participants should expect to be in the water each class. Check quarterly schedule on SIS and/or visit the Interactive Adventures Web site at www.interactiveadventures.rit.edu. Course fees apply.

1112-150 Wilderness Skills
This class will cover a variety of topics and is designed to impart a number of skills that pertain to safely and effectively enjoying the backcountry. Skills covered will include water treatment, bear bagging, camping skills, orienteering, backcountry first aid, environmental awareness and preparedness, wilderness ethics and more. This class will be taught both in and outdoors. Check quarterly schedule on SIS and/or visit the Interactive Adventures Web site at www.interactiveadventures.rit.edu. Course fees apply.

1112-155 Camp Cooking
This is a hands on course that focuses on the safe operation and practical use of a variety of camping stoves and other backcountry cooking methods to prepare meals in the backcountry. Topics covered will include: stove/method selection, safe and effective use of the chosen apparatus, backcountry nutrition and related considerations, water purification, meal planning and preparation, food dehydration methods, non-cooked nutrition options and a variety of other factors and considerations. Students will be given a light-weight camp stove to keep. Check quarterly schedule on SIS and/or visit the Interactive Adventures Web site at www.interactiveadventures.rit.edu. Course fees apply.

Martial Arts

1113-020 Cardiokickboxing
This fairly new and exciting course is designed to develop physical fitness, strength, stamina, power, speed, endurance, and flexibility. Students will have the opportunity to develop self-defense skills by utilizing the combination of boxing and karate techniques. Instructors will introduce basic kicking and punching skills and combine aerobic activity with music to provide an outstanding workout! Students will be encouraged to enhance their overall health, thus helping them look and feel good. Teaching methods include explanation, demonstration, program guidance, and motivational lecturing. The general course content includes a preview of techniques used in class, warm-ups, stretching, continuous punching and kicking drills using the heavy bag, floor work (abdominals), and cool-down. The equipment used in class includes training gloves (*new students MUST purchase for \$30*), athletic wear, training bags, and mirrors. A course fee applies. (F, W, S, SU)

1113-021 Karate
This course is designed to help students increase their stamina, flexibility, and basic self-defense techniques. Main course objectives include increasing physical fitness and self-confidence, relieving stress, and gaining the self-discipline to develop better study, work, and life habits. Course content: calisthenics; stretching; upper- and lower-body exercises; kata (a prearranged set of movements to use if attacked). The variations of Karate courses include options: Karate-Beginners (fundamentals); Karate-Advanced (more intense workout with basics); and Martial Arts/Self-Defense, co-ed (use of hands and feet as defensive weapons). A course fee applies. (F, W, S)

1113-022 Self-Defense for Women
This Karate course (women only) is designed to help students increase their stamina, flexibility, and basic self-defense techniques. It teaches the use of hands and feet as weapons to defend oneself as well as techniques to fend off two, three, or four attackers. It also teaches techniques that can be used against a person with a knife, gun, or club. Main course objectives: become more physically fit to enhance self-esteem; develop self-confidence in everyday situations; relieve stress by providing an outlet to "blow off steam"; and gain the self-discipline to develop better study, work, and life habits. Course content: calisthenics, stretching, upper- and lower-body exercises, and kata (a prearranged set of movements to use if attacked). A course fee applies. (F, W, S)

"13-030 Kung Fu: Shaolin System
There are literally hundreds of different Kung Fu styles, and then there are sub-styles and family styles within. The variations can be complex and wide-ranging. These different styles encompass what can be termed the "soft" or "internal" as well as "hard" or "external." Some styles emphasize strikes and kicks, others include grappling, ground fighting, or pressure point attacks. In general, Kung Fu is a label used to describe any martial art that comes from China. It is the generic name for literally hundreds of individual Chinese fighting arts, both internal and external, ancient and of relatively recent invention. This course uses the Shaolin system. Students will learn, through hard work and discipline, to respect the body and soul—their own and others. All levels are offered (depending on the quarter). Those more experienced would find the advanced and self-defense sections most suitable. A course fee applies. (F, W, S, SU)

1113-040 Tai Chi-chuan
This course teaches a soft and continuous martial art that can be practiced by individuals of any age and/or skill level, focusing on physical, mental, and spiritual dimensions of human development. Students will learn to balance the body with gentle movements that improve health conditions with each progressive section. Tai Chi was created 400 years ago and provides students with strong internal power as well as good external appearance. Students will be instructed in the more "free form" of Tai Chi that expands knowledge, strength, and capabilities, thus bringing individuals to the next level of progression. The basic format: history of Tai Chi, health benefits, warm-up exercises, movement from the *yang* form, cool down, and use in special situations. Students should wear comfortable clothing for free movement and be in stocking feet. A course fee applies. (F, S)

1113-050 Qigong
This martial arts course focuses on "internal energy exercise" based on practices from 2,000 years ago. The powerful combination of slow movement, breathing, postures, and meditation allows the body to open energy channels instantly, thus dramatically healing disease that conventional medicine has failed to overcome. Students will focus on using "health energy" to pursue success, peace, and happiness. Basic course content: flying crane Qigong (combines movement with mental concentration); fragrance Qigong (repeats simple movements in specific frequency for maximal biophysical energy); and Qigong meditation (involves applying physical pressure to transform "bad" energy to "good" energy to heal at a subconscious state). Instructor Master Lin Yao developed unique methods that allow anyone to participate regardless of physical condition. This course is offered during the Spring quarter (depending on instructor/facility availability). A course fee applies.

1113-060 Aikido
Aikido was founded by Master Morihei Uyeshiba as a synthesis of Aiki-jitsu, Aiki-ken, Judo, and the founder's philosophy of peaceful reconciliation of conflict. One of the founder's students, Koichi Tohei Sensei, founded a branch school called the Ki-Society, which emphasizes the development of personal *ki* through Aikido practice. RIT Aikido traces its lineage back to the original Hombu dojo in Japan. The course objective is to provide physical conditioning by educating and coordinating the whole body-mind-spirit system. Basic ideas and techniques will be taught. The four basic principles are "keep one-point," "relax completely," "keep weight underside," and "extend ki." The class will consist of warm ups and stretches, *ki* development exercises, and self-defense techniques. The course is held in the CLARK Gym wrestling room. A course fee applies. (F, W, S).

1113-061 Aikido: Bokken & Jo
Aikido: Bokken & Jo places an emphasis on the study of Aikido in a learning movement, timing and extending "ki" through an outside wooden object (the bokken or jo), as opposed to a regular aikido class. The Bokken and Jo are weapons only in the traditional sense, not in a 21st century sense. A course in Bokken & Jo would actually be safer than a regular aikido class in that no contact is allowed at all, and most of the study involves "kata" (a series of movements that one does on his/her own, similar to a dance). The course would only be open to those who have previously taken Aikido (or an equivalent), as this is an advanced class. No mats are needed for this class. It is a highly disciplined, mentally challenging activity. This course is offered during the Spring depending on instructor/facility availability. Check SIS for quarterly listings. A course fee applies.

1113-070

Martial Arts: Sparring

This Karate course is designed to help students increase their stamina, flexibility, and basic self-defense techniques, with an emphasis on controlled fighting bouts (two students matching their skills against one another). Main course objectives: become more physically fit to enhance self-esteem; develop self-confidence to help deal with everyday situations; relieve stress by "blowing off steam"; and gain the self-discipline to develop better study, work, and life habits. Course content: calisthenics, stretching, upper- and lower-body exercises; kata (a prearranged set of movements to use if attacked). This covered is offered on a limited basis depending on instructor availability. Check SIS for quarterly listings. A course fee applies.

1113-080

Martial Arts: Self-Defense

This Karate course is designed to help students increase their stamina, flexibility, and basic self-defense techniques. This is a "women only" class teaching the use of hands and feet as weapons to defend oneself as well as techniques to fend off two, three, or four attackers. It also teaches techniques that can be used against a person with a knife, gun, or club. Main course objectives: become more physically fit to enhance self-esteem; develop self-confidence in everyday situations; relieve stress by providing an outlet to "blow off steam"; and gain the self-discipline to develop better study, work, and life habits. Course content: calisthenics, stretching, upper- and lower-body exercises, and kata (a prearranged set of movements to use if attacked). This course is offered at varied times during the year depending on instructor/facility availability. Check SIS for quarterly listings. A course fee applies.

1113-090

Brazilian Capoeira

This exciting martial art course is one of the few, if not the only one, still in existence that is native to the Americas: it was developed in Brazil by the descendants of African slaves brought there by the Portuguese. Capoeira is characterized by dynamic body play, kicking, sweeping, takedowns, aggressive feinting, and head-butt movements. It is played within a circle of onlookers and fellow participants called a *roda*. Two contestants enter the circle and begin to *ginga* ("to swing" in Portuguese), launching various attacks, counters, and defenses. Capoeira involves strength, flexibility, and gymnastics-like movements. Course is held at Kim Murray's Karate Academy (see www.kimmurraykarate.com or shihankim@aol.com or SLC lobby for directions). **RIT does not provide transportation.** A course fee applies.

Military Sciences

1114-001

Air Force ROTC Physical Training

This course is designed to help the individual establish a physical readiness program. "Physical readiness" includes those factors that determine one's ability to perform heavy, physical work and those that help maintain good health and appearance. Factors/components of readiness: muscular strength and muscular and cardio-respiratory endurance. Major goals of the course: to physically challenge students and help them develop self-confidence, discipline, and spirit. Students will work to develop physical readiness to a degree that will enable them to achieve or exceed the physical readiness standard established by the U.S. Air Force. The evaluation will be determined by the use of the Air Force's Physical Readiness Test (outlined in the Army Field Manual). **Prerequisite:** Enrollment in the RIT Air Force ROTC program. **(Required for all Air Force ROTC students.)** There is no course fee. (F, W, S)

1114-010

Army Conditioning Drills: ROTC

This course is designed to help the individual establish a physical readiness program. "Physical Readiness" includes those factors that determine one's ability to perform heavy, physical work and those that help maintain good health and appearance. Factors/components of readiness: muscular strength and muscular and cardio-respiratory endurance. Major goals of the course: to physically challenge students and help them develop self-confidence, discipline, and spirit. Students will work to develop readiness to a degree that will enable them to achieve or exceed the physical readiness standard established by the U.S. Army. Evaluation will be determined by the use of the Army's Physical Readiness Test (Army Field Manual-Physical Readiness Training). **Prerequisite:** Students must be enrolled in the RIT Army ROTC program. **(Required for all Army ROTC students.)** There is no course fee. (F, W, S).

1114-011

Army Leadership Lab: ROTC

Prerequisite: successful completion of Army Conditioning Drills (**must be enrolled in Army ROTC**). See section notes on SIS under "Military Sciences" discipline, 1114, for more information on this required core course for Army ROTC. There is no course fee. (F, W, S)

1114-020

Navy Drill/ROTC/U of R

This course is designed to help the individual establish a physical readiness program. "Physical readiness" includes those factors that determine one's ability to perform heavy, physical work and those that help maintain good health and appearance. Factors/components of readiness: muscular strength and muscular and cardio-respiratory endurance. Major course goals: to physically challenge students and help them develop self-confidence, discipline, and spirit. Students will work to develop physical readiness to a degree that will enable them to achieve or exceed the physical readiness standard established by the U.S. Naval Sciences. Instruction and evaluation will be completed by the assigned commander of naval sciences at the University of Rochester. **Prerequisite:** Must be enrolled in the U of R ROTC naval sciences program. **(Required for all Navy ROTC students.)** There is no course fee. (F, W, S)

Academic Policies and Procedures

RIT'S educational mission is to prepare men and women for living and working in a democratic and technological society by offering curricula that meet those needs, within an educational community that supports and encourages individual achievement in an atmosphere of pluralism and diversity. Moreover, it sets high standards that challenge students to develop values that will enhance their lives professionally and enable them to contribute constructively to society.

Academic advising

Academic advising is an integral part of a student's education at RIT. Advising is provided through the student's home department. Please consult the individual college sections of this bulletin for more specific information.

Confidentiality of records

In accordance with the Family Education Rights and Privacy Act of 1974 (commonly known as the Buckley Amendment), RIT students have the right to inspect, review and challenge the accuracy of their official educational records. Students are also accorded the right to receive a formal hearing if dissatisfied with responses to questions regarding the content of the record.

RIT policy ensures that only proper use is made of such records. Therefore, with the exception of copies made for internal use (those provided to faculty and staff who have a legitimate need to know their contents), in most cases no copy of a student's academic record (transcript) or other non-public information from student records will be released to anyone without the student's written authorization. The determination of those who have a "legitimate need to know" (e.g., academic advisers, government officials with lawful subpoenas) will be made by the person responsible for the maintenance of the record. This determination will be made carefully, in order to respect the student whose record is involved. If an employer, for example, requests a transcript, he or she will have to obtain a written request from the student or former student.

The Buckley Amendment allows RIT to declare certain pieces of information as "directory" and therefore releasable without the specific permission of a student. Such "directory information" could include a student's name, date and place of birth, major field of study, participation records in official RIT activities and sports, weight and height of a member of an athletic team, dates of attendance at RIT, degrees and awards received. Students may make written request of the Office of the Registrar that such directory information not be released. Because requests for nondisclosure will be honored by RIT for only one year, requests to withhold such information must be submitted to the Office of the Registrar annually.

Copies of the full act and RIT's written policies relating to compliance with the law are on file in the Office of the Registrar. Also available is information regarding a student's right to file a complaint with the U.S. Department of Education concerning the alleged failure of RIT to comply with the requirements for this act.

Transcripts

A student's official academic record is maintained by the RIT Office of the Registrar and is normally reflected through a transcript. All requests for transcripts must be in writing and should include the student's full name (or name used while at RIT), student identification number, dates of attendance and signature to assure proper identification of the record requested. Transcripts are usually prepared and available within one week after the request is received.

Under no circumstances will a partial transcript be issued, nor will a transcript be issued to a student who is indebted to RIT. Transcripts issued directly to a student will be over-stamped "**This official transcript issued directly to the student.**" Transcripts from high schools and universities that have been received in support of admission applications and/or transfer credit evaluation will not be reissued by RIT.

The grading system

RIT uses a single-letter grading system. All grades are determined and issued by the faculty in accordance with the RIT *Institute Policies and Procedures Manual* and the particular standards of the attempted courses. Individual instructors have an obligation to carefully describe the standards and grading practices of each course.

The accepted RIT letter grades are as follows:

A Excellent	I Incomplete *
B Good	R Registered †
C Satisfactory	S Satisfactory †
D Minimum Passing	W Withdrawn
E Conditional Failure *	X Credit by Exam
F Failure	Z Audit

* E and I grades are considered "temporary" and will revert to a grade F unless changed by the faculty within a prescribed period of time.

† R and S grades are restricted to specific types of courses.

For more specific descriptions and procedures concerning the above, see Section D5.0, *Institute Policies and Procedures Manual*, available in the Office of Student Affairs or on reserve at Wallace Library. The manual is available online: www.rit.edu/~620www/manual/.

Course registration

To be officially registered at RIT, a student must be academically eligible, have been properly enrolled in a course and have made the appropriate financial commitment. The registration process is uncomplicated and can be accomplished in a variety of ways. Typically, students start choosing courses six to eight weeks before the academic term begins and can use a touch-tone telephone, the World Wide Web, the campus computer network, fax machine, mail or register in person at several locations across campus, including the Office of the Registrar. The registration period ends with the first six weekdays of the term, also called the "Drop/Add" period. Specific dates and procedures can be found in the quarterly *Schedule of Courses* booklet. RIT reserves the right to alter any of its courses at any time.

Students at RIT are free to choose their own courses and course loads. Colleges offering the courses are equally free to restrict enrollment to particular groups of students (for example, students in specific year groups or students who have already satisfied course prerequisites). Most courses also are restricted in class size. Students are strongly encouraged to seek out academic advice and plan their academic careers carefully.

Failure to make appropriate financial commitment, satisfy New York State Health Immunization requirements or fulfill course prerequisites can result in the loss of courses for which a student has registered and/or prohibition of future registrations.

Auditing courses

Courses that are taken on an audit basis will not count toward a student's residency requirement, may not be used to repeat a course taken previously and do not satisfy degree requirements. Permission to audit a course is granted only by the college offering that course. Any changes in registration between credit and audit must be completed prior to the end of the Drop/Add period.

Withdrawal from courses

A student may withdraw from a course up to the end of the sixth week of the quarter. A grade of "W" will be assigned and the course retained on the student's permanent academic record. Under exceptional situations, a dean may approve a course withdrawal following the sixth week. For policies pertaining to withdrawal from the Institute and tuition refund, see page 376.

Dean's List eligibility

Matriculated students who earn at least 12 credit hours in an academic term; have a quarterly grade point average of 3.40 or better; have not been placed on probation due to a low cumulative grade point average; and do not have any grades of I, D, E or F in that term are eligible for selection to the Dean's List of their college. Students who are pursuing their degree on a part-time basis are assessed for Dean's List consideration based upon course work over a three-quarter period. Criteria for part-time students are essentially the same as those for full-time students. However, at least 18 credit hours must be earned during the three-quarter period, and each student must have accumulated at least 24 credit hours in his or her RIT career.

Academic probation and suspension

All matriculated students at RIT are expected to meet or exceed certain minimal academic standards. Failure to do so will result in being placed on academic probation or suspension. All such actions are taken by college deans at the end of each quarter; once the action is made, it may be changed or revoked only by a dean. The RIT educational policy governing probation and suspension is quite specific (see the RIT *Institute Policies and Procedures*, Section D5.0, page 6). Three

grade point averages (GPAs) are calculated and used in probation/ suspension decisions:

Program Quarterly GPA = grade average of all courses taken in a term that are applicable to a student's degree requirements,

Principal Field of Study GPA = grade average of all courses a student has taken within his or her specialized field (usually from the student's home college),

Institute Cumulative GPA = grade average of all course work taken as either an undergraduate or graduate student at RIT.

Academic probation

A student will be placed on probation if his or her program quarterly grade point average falls below 2.0* (a C average) or if his or her grade point average in the principal field of study (based upon at least 20 credit hours attempted in the principal field at RIT) falls below 2.0*. To be removed from probation, the student must raise both averages to at least a 2.0.

Academic suspension

1. Any student who is on probation, as given above, and who is not removed from probation in the two succeeding periods of study in which credit is earned will be suspended.
2. Any student who has been placed on probation after having been removed from probation and whose program cumulative grade point average is below 2.0* will be suspended. Any student who has been placed on probation after having been removed from probation and whose program cumulative grade point average is 2.0* or above will be granted one quarter to be removed from probation before suspension.
3. Any student whose program quarterly grade point average falls below 1.00 will be suspended.
4. Students who have been readmitted to the original program, after having been suspended, and then go on probation will be suspended.

Suspended students generally must wait at least one year before reapplying for admission into an RIT degree program. While suspended, a student may not enroll in any RIT course work, unless the suspension is waived by an academic dean, and then may be limited to taking courses on a non-matriculated basis.

Class attendance

Students are expected to fulfill the attendance requirements of their individual classes. Absences, for whatever reason, do not relieve students from responsibility for the normal requirements of the course. In particular, it is the student's responsibility to make individual arrangements prior to missing class. Attendance at class meetings on Saturdays or at times other than those regularly scheduled may be required.

Student retention

Based on an average of the three most recent cohort survival statistics, RIT's student graduation rate is 58 percent for students entering at the first-year level and graduating from a four- or five-year program.

Excluding part-time and nondegree students, 87 percent of first-year, full-time day students register for their second year; and 86 percent of third-year students continue through graduation.

The statistics reported herein have been computed in a manner consistent with data reported to the State Education Department through the Institute's Office of Institutional Research and Policy Studies.

*The physician assistant program requires a 2.8 grade point average.

Counseling and Academic Services

RIT wants you to succeed in your college experiences. The Institute provides a variety of counseling and academic services to allow you to achieve your personal as well as educational goals.

Counseling services can help you with questions regarding your orientation to new college experiences, your academic program requirements, career planning and job placement, or other areas of concern to you. Personal and spiritual guidance is also available on campus.

You may find there are times when you need some special support to succeed in your classes. RIT provides a number of tutoring services, study centers, and learning resources, from the library to the computer labs. Media resources are also available to assist in class assignments.

Center for Religious Life

The Center for Religious Life is unique in the Campus community. Recognizing the balance of mind and spirit, the center's interfaith staff provide worship and observances in the diverse religious and cultural traditions represented within the campus community. These include Nondenominational, Baptist, Catholic, Hillel, and Lutheran. In a time of intellectual and spiritual growth, the center establishes an affirming environment for students, faculty and staff to explore and discuss values informed by religious beliefs.

The Kilian i. and Caroline F. Schmitt Interfaith Center

RIT's Interfaith Center, a gift of Kilian and Caroline Schmitt and other generous donors, is located on the east side of the Student Alumni Union. It is the focal point for the diverse religious traditions within the Institute, housing two chapels, meetings rooms and offices for the campus ministry staff.

For more information, contact the coordinator of the Interfaith Center by phone at 585-475-2135 (voice/TTY) or e-mail at efs0368@rit.edu.

Center for Student Transition and Support

The center assists new students with their transition and adjustment to RIT and, through specifically designed programs and services, works to foster the academic achievement, social integration and personal success of women, international, and first-year students. This is accomplished through four program areas: RIT Women's Center, International Student Services, New Student Orientation and the First-Year Enrichment Program. International Student Services and the Women's Center are located in the Student Alumni Union. The First-Year Enrichment Program is located in Grace Watson Hall. For more information about center programs and services, call 585-475-6943 (voice/TTY) or visit www.rit.edu/studenttransition.

First-Year Enrichment Program

As an extension of the new student orientation program, the First-Year Enrichment Program offers first-time students transitioning from high school to college an introduction to higher education, an opportunity to make connections with faculty and staff, and the chance to meet others and become involved members of the RIT community.

This required two-quarter course, which satisfies the wellness requirement for graduation, is designed to maximize the student's potential to achieve personal success and to adjust responsibly to the personal and interpersonal challenges presented by collegiate life. During the course students and instructors will explore selected topics in the following theme areas: college and transition, high-risk behavior and survival skills, personal awareness and growth, physical well-being, and active learning strategies. Each of these areas is complemented with co-curricular activities and programs to enhance the educational experience and many of these topics are revisited as students continue their education. Instructors will serve as performance coaches to their students. They will be proactive, reaching out to students, assisting with transitional issues, helping to focus academic and personal development goals, and fostering connection with their academic programs, college, and the Institute.

The First-Year Enrichment office is housed in Grace Watson Hall. For more information visit www.rit.edu/studenttransition.

International Student Services

The Office of International Student Services is the primary resource for over 1,200 hearing and deaf international students from 90 countries and for members of the campus community seeking cross-cultural information. The program provides assistance with immigration regulations and travel documents, helps international students adjust to the academic and cultural expectations in the United States and provides cross-cultural programming for international students and the campus at large. The staff works closely with Global Union, international student clubs and International House, (the special-interest house in the residence halls for both international and American students). Off-campus programs are coordinated with the Rochester International Council. For more information, call 585-475-6943 (voice/TTY) or visit the International Student Services Web site, www.rit.edu/internationalservices.

Women's Center

The Women's Center at RIT provides information, programming, support and advocacy to address a wide variety of issues affecting women, including academic, social, psychological, physical and spiritual needs of women; domestic violence, sexual assault, sexual harassment and personal safety; and exploration of gender-related issues. The Women's Center strives to provide a visible and accessible location and a supportive environment where students are encouraged to engage in dialogue, exchange viewpoints and find assistance.

Through its programs, speakers and workshops, the center addresses these topics: sexual assault, domestic violence, sexual harassment and personal safety; women and leadership; women in sports; gender and communication; life skills and financial management; current issues in feminism; and current issues in men's studies. The center also sponsors the Women's Mentoring Program, which connects new students with upper-class students.

The Women's Center is committed to developing and supporting graduate and undergraduate student leaders. Working in the center provides students with the opportunity to learn about gender issues, develop practical skills and collaborate with diverse campus and community organizations. Many types of volunteer opportunities are available. Students interested in paid work positions or volunteer work are encouraged to contact the center's coordinator.

The Women's Center is located in room A450 of the Student Alumni Union. The phone number is 585-475-7464 (voice/TTY), and e-mail may be sent to ritwom@rit.edu.

Cooperative Education and Career Services

The Office of Cooperative Education and Career Services supports the Institute's special emphasis on learning through experience. The cooperative education program was started at RIT in 1912. Since that time it has grown into one of the largest in the world.

Last year more than 1,300 employing organizations across the country participated in the program, hiring more than 2,800 RIT students involved in mandatory and optional co-op programs. Co-op gives the student the opportunity to obtain practical work experience and enhances knowledge acquired in the classroom.

In the Office of Cooperative Education and Career Services each student has a program coordinator who provides assistance with career advising and the job search from the beginning of the co-op process right through career entry upon graduation. The office also provides a variety of job search seminars, career and employer research materials, online job postings for co-op and full-time positions, on-campus interview opportunities and a reference service for graduating students. Services of the office remain available to alumni for a lifetime. Students are encouraged to visit the department Web site at www.rit.edu/co-op/careers for more information.

Office staff spend considerable time developing opportunities with employers nationwide, as well as monitoring and fostering current relationships. These linkages with business and industry enhance RIT's ability to provide an education that meets the needs of the job market and aids students and graduates in their pursuit of successful careers.

Counseling Center

The Counseling Center, located in the August Center, offers a variety of services to RIT students. These services include:

- Personal/psychological counseling
- Crisis intervention
- Career exploration counseling
- Career exploration resources
- DISCOVER (computer-assisted career guidance)
- Developmental programs and groups
- Testing
- Consultation
- Referral services

RIT Counseling Center hours

Counseling Center hours are 8:30 a.m. to 4:30 p.m., Monday through Friday. Services are confidential and free. For more information about services, please call 585-475-2261 (voice) or 585-475-6897 (TTY) or visit the Counseling Center Web site at www.rit.edu/~361www.

Personal/psychological counseling

Individual and group counseling are available for students who could benefit from meeting with a counselor to explore, for example, more effective ways of dealing with conflict and stress, managing feelings and emotions, developing satisfying relationships, communicating with others or coping with personal crises.

Crisis intervention

Crisis counseling and emergency services may be obtained by calling or visiting the Counseling Center during business hours and by calling Campus Safety at 585-475-3333 and asking to speak to the counselor on call after hours.

Career exploration counseling

Counselors can assist students in making thorough appraisals of their interests, abilities and personality traits so that they can use this information in developing educational and vocational plans. Tests of aptitude, interest and personality may be used in this assessment process.

Career exploration resources

Located in the reception area of the RIT Counseling Center, the career exploration resources include occupational information on a variety of careers, vocational and educational reference books, and DISCOVER. The center and its resources are available on a walk-in basis.

DISCOVER is a career guidance system that uses a computer to help students learn more about:

- the career planning and decision-making process
- themselves, especially their interests, abilities and work-related values
- careers that may be appropriate based on interests, abilities and/or values
- the world of work, including descriptions of more than 40 occupations
- graduate and professional school opportunities

Developmental programs and groups

The Counseling Center staff offers groups that assist students in their personal development. These groups offer a supportive environment in which to explore a variety of issues that typically affect the lives of students—such as forming relationships, handling loss, managing stress, clarifying values and choosing careers.

In addition, center staff members will present special programs to student groups and organizations. Presentations include communication skills, team building, leadership development and goal setting, among other topics.

Testing

The Counseling Center may administer a number of psychological tests and interest inventories as part of the counseling process. In addition, it administers a number of national tests; advance credit exams (CLEP) also are given.

Consultation

Staff members of the Counseling Center will provide consultation services to interested student groups, faculty and organizations regarding a number of areas within their scope and expertise.

Referral services

Staff can assist with referrals to community-based practitioners and resources when appropriate.

Educational Technology Center

The Educational Technology Center provides services that enhance and support the educational environment.

ETC's Media Production Services produces educational and informational media for faculty and staff. These include video, multimedia/Web, graphics, and photography/digital imaging production. Media Production Services also captions video and other digital media.

The Classroom Learning Technologies department deals with many aspects of classroom technology. Support covers the delivery and setup of projectors (slide, overhead, and video/data) as well as TV/VCR/DVD carts; access to and training on installed classroom equipment; and the operation of equipment in the academic auditoriums. ETC also supports the installation and maintenance of computer and video projection equipment and podiums in classrooms and lecture halls.

The Media Resource Center (MRC) provides media support to faculty, staff, and students. The MRC staff works with faculty to identify media within the collection and locate new media to support their curriculum needs. The MRC collection consists of a variety of media formats, including videotape, DVD, audiotape, and an art history slide collection. Media are available for use in the classroom or the MRC viewing area. Requests for captioning RIT-owned media (ETC or department collections) are coordinated by the MRC staff.

A satellite downlink service is also available for those who would like to view a live teleconference broadcast or have it recorded.

ETC is located on the lower level of Wallace Library. More than 70 students assist with production, classroom technology support, and office duties. Individuals are invited to drop in and explore these resources. For further information, call 585-475-2551 or visit www.rit.edu/etc.

English Language Center

The English Language Center offers both full- and part-time study of English to non-native speakers. Class offerings include conversation, grammar, writing, vocabulary, reading, pronunciation, presentation skills, business communication and TOEFL preparation. For more information about the center's program offerings, visit the English Language Center (1301 Eastman), call 585-475-6684 (voice/TTY) or visit the Web site at www.rit.edu/~370www or e-mail jbcelc@rit.edu.

Full-time program

The intensive English language program consists of 20 hours of class instruction and five hours of language lab per week at beginning, intermediate and advanced levels. There is a fee for this program. This intensive study program meets the immigration requirements for the Certificate of Eligibility 1-20 for F-1 student status.

Before a course of study can be selected, students are tested to determine their levels of English proficiency and to diagnose their specific language needs.

Part-time program and individualized instruction

In addition to the full-time program, students may register for one or more English language courses. The English Language Center also offers private English classes tailored to individual needs. Pronunciation and conversation as well as grammar, writing, reading and vocabulary may be studied in this manner. There is a fee for instruction.

Foreign language instruction

The English Language Center offers a program in which international students give private and group lessons in their native languages. The international student is supervised by a trained language instructor who assists in curriculum development and provides language teaching methodology. In addition to language, the international student can give lessons on the culture and customs of his or her country. Some of the languages offered in the past include Chinese, Japanese, Spanish, Portuguese, Hindi, Tagalog, Korean, French, and German. For more information about learning a new language or teaching your native language, call the English Language Center at 585-475-6684 or pick up an application at 1301 Eastman.

Translation service

The English Language Center's translation service provides quick and efficient translation of documents, reports, letters and manuals for RIT students, faculty and staff as well as businesses in the Rochester area. For a fee, documents of all types, general to technical, can be translated. Call 585-475-6684.

Honors Program

The RIT Honors Program provides a supportive and encouraging environment for students of intellectual curiosity and academic distinction. Students benefit by working closely and sharing academic experiences both in and out of the classroom with other Honors students and faculty.

The Honors Program is designed for students who 1) seek to challenge themselves in exemplary learning experiences such as undergraduate research projects, Honors seminars, and study abroad; 2) wish to extend and share their knowledge through participation in professional associations and conferences; 3) hope to join other outstanding students and faculty in a wide range of special activities throughout the year, including field trips, social events, and community service projects. Honors activities and courses are designed to enhance the professional dimension of the student's collegiate experience. The major components of the Honors Program include professional opportunities within the student's home college, enhanced general education courses, and complementary learning experiences. Special features include:

- Honors curriculum—special courses, seminars, projects, and advising are offered in the student's home college and in special honors courses in the College of Liberal Arts and College of Science.
- Research and experiential learning—the Honors Program offers opportunities to work with faculty on applied and interdisciplinary research projects.
- Honors advising—Each college has designated an experienced administrator or faculty member to serve as its Honors Program Advocate. The advocate will work with students one-on-one, advising them as they develop plans for professional and experiential learning opportunities such as research placements, co-ops, internships, and study abroad.

- Study abroad—Honors students are encouraged to pursue study abroad to add an international perspective to their education. Honors students work with the director of the Honors Program for guidance on how to include study abroad in their academic career.
- Honors residence—Students may choose to live in Honors housing in the residence halls. This option increases interaction with other Honors students outside the classroom.

Requirements: Students in the Honors Program are expected to participate in the Honors courses and co-curricular activities in their college and replace approximately half of their liberal arts requirements with Honors courses. Honors students are also required to participate in complementary learning experiences each year. All students who wish to continue in the program are subject to an annual review by the Honors Committee. Program continuation is subject to grade point average and other requirements.

Admission: Applicants who submit RIT's Application for Undergraduate Admission by February 1 are invited to apply for Honors Program admission if their high school grades, rank, and test scores place them among the top five percent of the applicants to the university. This normally requires grades and class rank of 95 percent or higher and SAT I scores totaling 1350 or higher. Students who are invited to apply for admission to the Honors Program are asked to submit supplemental application materials, including a teacher recommendation, two admission essays, and a listing of academic awards, college-level courses, and special enrichment programs in which they have participated. Late entry into the Honors Program is also possible after a student's second or fifth quarter at RIT.

Scholarship Availability: All students enrolled in the RIT Honors Program receive an Honors Program Scholarship. The current value of this scholarship is \$1,000 per year.

For more information about the Honors Program, contact Dr. Catherine Hutchison Winnie, Bausch & Lomb A-130, telephone: 585-475-7634; fax: 585-475-7633; e-mail: honors@mail.rit.edu; Web site: www.rit.edu/honors.

Information and Technology Services

Computing and network services at RIT are provided by Information and Technology Services (ITS).

Wireless, portal, and more

The campus-wide network includes wireless capabilities in open public areas such as the Student Union, Crossroads Cafe, Wallace Library and in every college. Popular features are e-mail and access to the Internet, including Internet 2, a second-generation Internet technology with increased broadband capabilities for better access to digital libraries, scientific instruments, and other research applications. Many faculty have incorporated these features into their curricula.

ITS partnered with several on-campus departments such as Student Affairs and Student Government to launch myRIT, the Institute's internal web portal found at: <http://my.rit.edu>.

Users can customize their own site on the portal with personal Web links in addition to enjoying such standard features as access to Student Government and RIT sporting events, University News, and the Student Information System, where individual student course information and grades are posted.

ITS manages numerous computer labs and "smart" classrooms (in cooperation with the Educational Technology Center) containing Windows and Macintosh workstations and printers. Most of these facilities are available to students for general computing use and to faculty for reserved class work. Lab assistants help people use the hardware and software available in the labs.

Computer security and safeguards

Computing system use is guided by the RIT Code of Conduct for Computer and Network Use. This document, located at www.rit.edu/computerconduct, reflects current issues related to ethical use of computing and network resources. ITS has put into place multiple safeguards to protect the Institute network environment and the integrity of individual user accounts.

Computer accounts are issued to students, faculty, and staff so that they can perform activities supporting educational goals and internal RIT functions. Students can obtain an account at the ITS HelpDesk or at the reference desk at Wallace Library by showing their RIT ID card. Forms for faculty and staff accounts are available by contacting the HelpDesk: www.rit.edu/its/help/forms.

Computer training and consulting services

ITS also provides consulting services, seminars, and computer training courses. Mobile learning assistants help faculty, staff, and students with specific computer tasks. ITS also offers computer-based training modules covering a wide variety of topics. Students, faculty, and staff can access numerous online courses in the areas of technology, e-business, and business/interpersonal skills. For more information on computer-based training or to log onto the system, go to www.rit.edu/cbt.

Student employment information and ResNet services

ITS employs more than 250 students and is one of the largest student employers at RIT. Contact Student Employment at www.rit.edu/~967www for more information about ITS job opportunities or go to Desktop Support Services (ITS) to learn about job information in on-campus labs: www.rit.edu/its/services/computer_labs.

The ResNet Office, an area within ITS, provides computer support to students in residential housing at RIT. This team can assist students with getting their computers onto the RIT network, accessing their RIT e-mail account, and troubleshooting technical problems that may arise. Call ResNet at 585-475-2600 (voice), 585-475-4927 (TTY); e-mail them at resnet@rit.edu, or visit <http://resnet.rit.edu>.

Modem access to the campus computer network

Both asynchronous and DialIP remote Internet connection service (14.4 to 56 Kbps): 585-427-2000. Also available is Virtual Private Network (VPN) for users on Roadrunner or DSL.

Contacting the HelpDesk

The ITS HelpDesk is located in room 1113 of the Gannett Building (7B). Contact HelpDesk staff via telephone or TTY:

585-475-HELP (4357) voice callers

585-475-2810 TTY callers

E-mail: helpdesk@rit.edu

Service hours

Fall, winter, and spring quarter hours:

Monday through Thursday 7:30 a.m. to 8 p.m.

Friday 7:30 a.m. to 5 p.m.

Saturdays Closed

Sundays Noon to 6 p.m.

Summer quarter, holidays, and quarter breaks

Monday through Friday 7:30 a.m. to 5 p.m.

Weekends Closed

Learning Development Center

The Learning Development Center offers academic support to students, faculty, and staff. The LDC consists of four programs: the College Program, the Disability Services Office, the Higher Education Opportunity Program, and the RIT/TRiO Student Support Services.

College Program

The College Program offers workshops, classes, and labs for all levels of students, from freshmen to graduates. In addition to basic skill development, it offers courses that teach students how to improve study techniques and how to assess and make the most of their individual learning abilities.

College Program services are free to RIT students. For more information concerning these services, contact the Learning Development Center at 585-475-6682 (voice/TTY).

Reading and Writing Department: The writing lab provides individualized instruction designed to improve students' ability to complete college writing assignments. Writing instructors work with students at every stage of the writing process. This is a "drop-in" lab; no appointments or referrals are necessary. Individual and small group assistance is available for reading text books and for speed-reading strategies.

Mathematics Department: The department is concerned with supporting students' progress in the learning of mathematics. General offerings include assessment for placement in appropriate courses, tutoring, and instruction in a variety of formats. An individualized math course offering diagnostic testing and carefully prepared review materials is offered. The math lab offers free tutoring in most math courses as well as "math-related" areas such as chemistry, physics and statistics. The lab has review packets on a variety of topics in algebra, trigonometry, and calculus as well as a list of math videos available in Wallace Library. Review sessions are offered each quarter on Techniques for Differentiation and Integration for Calculus I and II.

Study Skills Department: The focus of this department is on the development of good study skills to promote academic success. Diagnostic evaluation, individual instruction and mentoring, and tailor-made courses for various RIT groups are available. A series of mini workshops, the Lunch 'n' Learning Series, is offered each quarter. Topics covered include time management, listening and notetaking, text reading, test taking and preparation, and memory improvement.

Visit the study skills Web site: www.rit.edu/lponline.

College Restoration Program: The College Restoration Program is a full-time specialized program of instruction, with matriculated status, for students who have experienced academic difficulty and suspension from a college.

A course of action can be recommended only after the reason for academic difficulty has been established. If it is determined (after an interview and diagnostic and achievement tests have been administered) that CRP can be helpful, a very structured program, including one or two content courses and LDC instruction, is arranged.

The student meets regularly with an LDC faculty mentor to clarify directions and goals, to discuss relationships between the skills courses and to review progress.

The entire program is designed to strengthen the student's self-confidence. Successful completion of this program could qualify students for readmission to the college or department of their choice or for entrance into another educational program.

Although the College Restoration Program does not guarantee a participant readmission to his or her former college or admission as a transfer student at another school, the center provides recommendations and resumes of student achievement in the program to colleges upon request of the student.

For more information, contact the Learning Development Center at 585-475-6682 (voice/TTY).

Academic Assessment Program: The Academic Assessment Program helps students determine why their academic performance is not what they, or others, would like it to be. The variety of factors that may interfere with academic performance ranges from personal or interpersonal problems to unclear college major and career path choices to ineffective or underdeveloped study skills.

Outcomes of the assessment process include identification of the problem or problems and may include referrals to various campus support services. For more information or an appointment, contact the Learning Development Center at 585-475-6682.

Learning Support Services: Learning Support Services is committed to helping individuals recognize and access their natural learning abilities and offers academic coaching designed for students who anticipate difficulties navigating the complexities of the academic environment. LSS recognizes that each student is unique and responds to this by offering three levels of check-ins: weekly, bi-weekly or daily. Students may select their level of participation on a quarterly basis. This is a fee-based service. For more information, contact the LSS chair at 585-475-5296.

Academic Accommodations Office: This office provides the academic accommodations for students who have been approved for these services by the disability services coordinator. The most frequently used services include extended-time testing, readers, scribes, notetaking, and textbook taping.

Disability Services Coordinator's Office

RIT is committed to supporting members of our learning community who have disabilities. All students with disabilities who request accommodations must send appropriate documentation of the disability to the Disability Services Coordinator's Office. The coordinator will: 1) assess students' documentation; 2) review students' requests for accommodations; 3) recommend appropriate and reasonable accommodations; and 4) refer students to the appropriate service providers. The office works closely with the disability liaisons of each of the colleges at RIT to ensure support for students with disabilities within each college. The office coordinates services with Residence Life and works with Campus Safety, which supervises the Accessible Van Services (AVS) to provide transportation around campus for those who are mobility impaired. For more information, call the disability services coordinator at 585-475-7804 (voice) or -6988 (TTY).

Higher Education Opportunity Program

The Higher Education Opportunity Program (HEOP) is a New York State and RIT funded service that qualifies students for additional financial and academic support for up to five full years, not including periods during which students may be enrolled in cooperative education. This supplemental assistance is available for students who need extra time to complete their academic requirements. While both New York State and RIT provide financial support, HEOP students must also qualify for the New York State Tuition Assistance Program (TAP) and federal Pell Grant program and be personally responsible for loan and college work-study contributions. The HEOP program is dedicated to each individual student's academic success and personal growth.

To qualify, a student must meet strict academic and financial guidelines set by the New York State Education Department prior to attending college. Any student who has taken college courses following high school graduation, matriculated or not, is ineligible. Students must have graduated from high school or the equivalent and be New York State residents. Transfer students are eligible if they are coming from a like

program at another institution in the state: HEOP, EOP, SEEK or College Discovery. Transfers must apply to and be accepted by both the HEOP office and the Admissions office for entrance. Space in the program is limited.

Services for all students include personal, academic, financial and career counseling. Tutoring is available in all subjects, and the HEOP staff act as campus resources and advocates. Students accepted as freshmen must attend a three-week summer program prior to fall quarter entrance. They live on campus and attend a selection of skills-building classes carefully designed to facilitate their entry into standard RIT courses.

HEOP has existed on the RIT campus for more than 30 years. Across the state, the HEOP program has been applauded for its graduation rate. Inquiries should be directed to 585-475-2221 (voice/TTY).

RIT/TRiO Student Support Services

The goal of RIT/TRiO Student Support Services is to provide the necessary academic and personal support that will enable students who qualify to fully realize their potential and to successfully complete their college career. The federally funded program has been hosted at RIT for more than 20 years and includes the following components. Each has a distinct purpose but is integrally linked with the others.

The academic component offers a full complement of services—including tutoring, math mentoring, advisement and skills development—to assist students with academic concerns, to enable them to understand and refine their learning process and to use academic resources more effectively.

The counseling component works to bring students into the program and provides support that enables them to direct their energies into positive pursuits. A counselor assists each student in understanding all that is available to him or her and how to access the appropriate assistance. A counselor also will work with students on areas of general concern.

The programming component provides complementary experiences that enhance the student's academic and personal perspectives by drawing on RIT and other community resources. This component can provide the student with new opportunities for personal and professional growth.

The ultimate purpose of RIT/TRiO Student Support Services is to help students meet their unique challenges and become a part of the larger community. It works to make systems work. It often serves as a bridge between the learning community that it creates and RIT in order to foster success.

Eligibility for the program is determined by financial eligibility, physical or learning disability, and first-generation college status. Any full-time undergraduate student who is a U.S. citizen or who has a green card and meets one of the eligibility requirements may become a member of RIT/TRiO Student Support Services. For further information, contact the office at 585-475-2832 or -2833.

New Student Orientation

RIT provides all entering students with programs designed to prepare them for a successful transition and adjustment to college life and to further acquaint them and their families with the RIT community. Our programs will provide the opportunity to:

- Meet the faculty and dean of the student's college
- Address the academic and social issues involved in beginning college or transferring from one college to another
- Attend academic planning sessions
- Experience living on campus and learn about student services
- Understand the family's role in promoting student achievement and success
- Learn about financing a college education
- Participate in community and social activities

Our Fall Orientation Program is offered prior to the start of classes. The program provides opportunities to receive academic information and advisement, learn about support services and residential living, and meet faculty, staff, and other incoming students. The orientation program is required for all entering first year students.

Orientation is not just a week-long program but a year-long experience filled with opportunities for new students to become fully acquainted with, and comfortable in, the RIT community. For more information visit www.rit.edu/orientation.

North Star Center for Academic Success and Cultural Affairs

The North Star Center for Academic Success and Cultural Affairs, established in 2000, was created to improve student retention and graduation rates of African American, Latino American, and Native American (AALANA) students at Rochester Institute of Technology. In the best ideals of Frederick Douglass, the North Star Center also promotes the moral and intellectual development of all RIT students through cultural awareness and affirmation. The North Star Center also reflects RIT President Albert Simone's vision to create an ethnically and racially diverse environment—a microcosm of the knowledge, skills, character and culture needed for future civil society.

In support of its mission, The North Star Center for Academic Success and Cultural Affairs provides services and develops initiatives to enhance the student experiences of African American, Latino American, and Native American (AALANA) RIT students. The North Star Center provides personal advising, advocacy, leadership development opportunities, diversity education, cultural programming, and a connection to campus and community resources.

What makes the center unique among its counterparts nationwide is:

a) Focus on academic success: The center combines the resources of academic and student affairs. It specifically sets forth to not be just a multicultural center, which caters specifically to the social aspects of student development. Rather, it expands the concept of student development to include the development of the total student while always keeping first and foremost academic excellence.

b) Student advocacy and support: College liaisons, whose primary responsibility is to create and provide a supportive environment for academic success, are assigned to a specific college and interact on a daily basis with faculty, academic advisers, student affairs and social organizations. Essentially, they are knowledgeable about all aspects of the student's college, academic support services, degree requirements and social life.

The North Star Center also disseminates information to students and families about internships, scholarships, and job opportunities. In addition, collaboration with several campus units and student organizations brings prominent speakers and community leaders to campus to meet with students, faculty, and staff. North Star Center staff advises the Black Awareness Coordinating Committee and works closely with the Latin American Student Association, Caribbean Students Association, and other student groups. Visit our Web site at www.rit.edu/northstar.

NTID Resources for Deaf and Hard-of-Hearing Students

The National Technical Institute for the Deaf offers an array of educational and service activities for deaf and hard-of-hearing students.

These activities and services include career counseling, mental health counseling, student life programming, communication skills development in the form of speech-language instruction, speechreading, listening/audiological services and a state-of-the-art learning center.

NTID Learning Consortium

The NTID Learning Consortium is a partnership among academic departments and educational programs throughout NTID and RIT. The goal of this partnership is supporting student success in the college curriculum. Resources of the NTID Learning Center and the Self-Instruction Lab are an integral part of this consortium.

The NTID Learning Center (www.ntid.rit.edu/current/nlc.php) represents a creative combination of human, physical and technological resources through which consortium partnerships can be realized.

Learning Center resources include:

- regular tutorial and curricular support staffed by faculty and advanced students and directly tied to discipline-specific curricula and classroom activities. Tutoring is offered in a range of disciplines, including English, math, technical program majors, and computer software applications (tutorial and curricular support for students is available on a walk-in, scheduled or assigned basis, either individually or in small groups);
- educational workshops (either tied to credit-bearing courses or independent experiences) addressing skills, knowledge and attitudes important for success in college and beyond;
- a computer resource area supporting both tutorial activities and course assignments, as well as independent student work;
- a "smart classroom" that supports instructional innovation through incorporating computer and multimedia-based technologies and serves as a site for distance learning innovations;
- a video resource room supporting video conferencing;
- designated areas for individual and small-group tutoring and studying.

The Self-Instruction Lab (www.ntid.rit.edu/nlc/sil) is available to students as well as faculty and staff to support signed and spoken language communication. The lab offers flexible scheduling to meet learner needs as well as materials and equipment to support individual learning styles. Each of the lab's state-of-the-art instructional carrels is equipped with a color TV monitor and a VCR. The lab offers instructional materials in videotape, videodisc, CD-ROM, and audiotape formats that are designed to supplement classroom instruction and support independent practice and study. Video production capabilities also are available.

Speech and Language Department Services

The Department of Speech and Language provides curricular and cocurricular learning activities that focus on the development of a full range of communication competencies. These activities include individual speech/language assessment and instruction; speech/language lab activities supporting technical vocabulary and communication and second language learning; individualized use of multimedia and computerized visual feedback systems; and communication seminars and workshops. Through these activities, students can work on conversational interactions, job-related communication skills, technical and formal presentations, and job interviews.

The services of the department are open to all RIT students and are available through individual appointments with faculty or on a walk-in basis through the Integrated Communication Lab located in the Johnson Building. The Spoken Language Learning and Practice Lab (SLLPL) has individual workstations for pronunciation practice, computers for speech and language practice and visual feedback, and stations for videotape recording and playback. The faculty in the department are certified by the American Speech-Language-Hearing Association, and the program is accredited by the ASHA Professional Services Board.

Audiology Department Services

The Audiology Department offers a variety of workshops and information on topics related to hearing aids, cochlear implants, communication strategies, telecommunications and assistive technologies, auditory training, speechreading and job interviewing. Hearing and hearing aid evaluations are available through the Hearing Aid Shop (Johnson Building room 3130) and are provided by audiologists that are certified by the American Speech-Language-Hearing Association and licensed through the State of New York. Faculty are available on a daily basis in the Hearing Aid Shop to discuss issues related to hearing loss, tinnitus, cochlear implants and other areas. FM systems can be loaned to students for the academic year at no cost. Students can go to the Hearing Aid Shop to purchase hearing aid accessories, including batteries, earhooks, earmolds, get hearing aids or cochlear implants repaired as well as other services. In addition, students can schedule appointments for Audiology and Cochlear Implant Clinics with faculty and with consultant ophthalmologists and otologists in the Eye and Ear Clinic. Services are available to all students and most are provided at no cost.

NTID Counseling Services

NTID Counseling Services is committed to the goal of helping students realize their full potential for a successful college experience. In pursuit of this goal, each NTID-sponsored student is assigned a professionally trained counselor who provides a full complement of counseling, advising, assessment, advocacy and referral services. The counseling faculty are trained in counseling and career development theory and techniques, hold individual certifications from the National Board for Certified Counselors and follow the guidelines for ethical standards set forth by the American Counseling Association. Counselors assist students with student orientation, educational and career planning, adjustment to college life, study skill development, access and referral to on-campus and community resources, and a wide range of personal and interpersonal concerns. Counseling faculty also assist in coordinating special services for students with secondary disabilities. For additional information about NTID Counseling Services, call 585-475-2876 (voice/TTY) or send a fax to 475-6468.

NTID Mental Health Services

The RIT Counseling Center provides confidential mental health counseling to all hearing, deaf and hard-of-hearing students requesting assistance. Members of the center work closely with RIT's Student Health Center, Center for Residence Life, NTID Counseling Services Department, Campus Safety and other related campus units.

Some concerns that students may need help in resolving include depression, anxiety, family conflicts, intimate relationships, and sexual and personal identity matters. Workshops, discussion groups and group counseling experiences on topics such as stress management, dating/relationships and assertiveness training also are offered to assist students' mental health growth and development.

A 24-hour emergency crisis intervention service for students experiencing mental or emotional trauma is provided in conjunction with other relevant campus units. For additional information, contact the RIT Counseling Center at 585-475-2261 (voice) and 585-475-6897 (TTY).

NTID Student Life Team

The Student Life Team is committed to providing quality cocurricular programs designed to help students enhance their quality of life, sense of relevancy to their studies, and overall satisfaction with and success in college.

Through collaboration with other units within NTID and RIT, the use of creative program strategies and a strong commitment to utilizing student paraprofessionals, the SLT emphasizes cultural diversity, minority student support, leadership development, deaf culture and ASL, and contemporary social issues.

To learn more about the team and programs you may want to get involved with, please contact 585-475-6639 (TTY) or stop by the office suite on the first floor of Ellingson Hall.

NTID Center for Human Performance Support Team

The NTID Center for Human Performance Support Team is committed to providing quality services that maximize access for deaf and hard-of-hearing students who are engaged in the First-Year Enrichment course, Wellness for Life course, Wellness Activity courses, intercollegiate athletics, intramurals and recreation programs. Members of the team work closely with RIT's Center for Human Performance, Center for Student Transition and Support, and Student Health Center.

The support team members teach the RIT First-Year Enrichment course, Wellness for Life course, Wellness Activity courses, signing for themselves. They also provide advising and tutoring as well as consultation and advising for deaf and hard-of-hearing student athletes and RIT intercollegiate coaches. The support team's collaboration with the NTID Admissions Office allows potential NTID student athletes the opportunity to meet with members of the support team and RIT intercollegiate coaches and visit the athletic facilities.

Opportunity for deaf and hard-of-hearing students to develop leadership and professional skills exists through the peer educator/paraprofessional program under the direction of the Center for Human Performance Support Team. Through collaboration with other NTID and RIT units, the student paraprofessionals utilize a variety of creative strategies and programming efforts that support access, inclusion, team building, and education.

For additional information regarding NTID Center for Human Performance Support, call 585-475-6104 (voice/TTY) or 585-475-6530 (TTY).

NTID Summer Vestibule Program

First-year experiences for many students start with the Summer Vestibule Program, an orientation program for new deaf students that assists and prepares them for complex tasks of career awareness, decision making, adjustment to college life, and assessment of academic skills and competencies. During SVP, students learn about the programs offered at NTID and the other colleges of RIT, while faculty and staff members evaluate students' skills, abilities and motivation. Through this process, students gain information that assists their selection of an appropriate program and design of their individual academic plan.

Acceptance into SVP does not automatically guarantee admission to the program the student selects during SVP. The final decision on acceptance into a program of study for the fall quarter is the responsibility of each academic department. Admission to a program depends on successfully completing SVP, having requisite skills to begin the program and availability of space in the program.

During SVP, students participate in various activities, including orientation to college services and academic expectations,

career sampling, career planning, and placement assessment in mathematics and English. Recreational and leisure activities, including intramural sports, dances, picnics, swimming and captioned movies, also are a part of SVP.

While most deaf and hard-of-hearing students do attend SVP, there are some who are not required to attend based on clear career goals, previous college experience and past academic performance. An admissions committee reviews each student's credentials to determine if SVP is appropriate.

NTID Student Orientation Assessment and Registration program (SOAR)

The Student Orientation Assessment and Registration program is designed for deaf and hard-of-hearing students who have been accepted into an RIT bachelor's degree program. SOAR provides students with information on how to use the various NTID educational access services available to them, acquaints them with RIT's campus and services, and allows them to meet other new students and their department's chairperson and faculty members, who will assist them with fall quarter class registration.

Online Learning

A recognized leader in the delivery of online asynchronous (any time, anywhere) education, RIT began offering online education in the late 1980s and offered its first full degree in 1992.

Today RIT offers 37 degree and certificate programs – ten graduate degrees, five undergraduate degrees, five graduate certificates, and 17 undergraduate certificates. RIT offers more than 300 courses online each year. Students are encouraged to select and apply to an academic program but may enroll in courses without being a matriculated student.

All courses offered online meet the same rigorous objectives set for traditional classroom experience. Faculty who teach an online course often teach the same class in a traditional format. However, just as each professor establishes the learning outcomes for a traditional course, his or her individual style and goals exist in the online classroom. Most classes establish a weekly schedule for learning activities or a project-based learning approach with deliverables due after certain outcomes have been accomplished. These may include projects, exams, team-based projects, required asynchronous discussion, or building or using computer programs to demonstrate capabilities. Most classes also include required readings from textbooks, electronic reserves (from the library), Web pages, or downloadable documents (PDFs). Students interact with one another online to exchange ideas and collaborate.

All courses use Internet and Web-based technologies for the underlying course structure. Students log in frequently during the week and must have unrestricted access to the Internet, a computer, a telephone, and access to a VCR and TV monitor to participate in courses. Not all courses use the same technologies; some will take advantage of toll-free phone conferences, while others will use text-based chat. Others utilize CD-ROMs. Some use Web-based simulations, and some may require additional software.

Students have full access to customer and technical support through a toll-free phone number and e-mail. Online learners also have full access to the library and library services. Other online services include registration, access to student records, online ordering for all course materials through the campus bookstore, and academic advising. Registration can be completed online at <http://online.rit.edu>; via the RIT Information Center/SIS; touchtone telephone; fax; and mail.

RIT Online Learning serves students throughout the United States and in 40 other countries. Those living near Rochester can choose to take both online and traditional

courses as a way of increasing flexibility and remaining on target to completing a degree.

For more information, see Online Learning at <http://online.rit.edu> or call us at 1-800-CALL-RIT (225-5748, voice/TTY) or 585-475-5089 or 585-475-5896 (TTY).

RIT Libraries

RIT's Wallace Library is the primary information resource center on campus. A balanced combination of electronic networks and quality-oriented staff, coupled with a modern and accessible building, make RIT's up-to-date library a multimedia facility. Events are frequently hosted by the Library in The Idea Factory; a sprawling collaborative area on the first floor which is home to a Coral Reef aquarium, the Idea Gallery and The Soapbox.

Contained within the Library are the Educational Technology Center (ETC); the Media Resource Center; the RIT Archives; and the Cary Library, which contains more than 20,000 volumes on the history of printing, rare book illustration, book design and other aspects of the graphic arts.

The Library's web-based workstations provide access to a wide selection of resources. Users can access the Library's catalog, search many electronic commercial databases and surf the Internet. The Library's staff offers hands-on instruction for using various electronic and Internet resources. They will schedule specialized class instruction upon request. Interlibrary loan services and in-house book requesting are available online. The second floor computer lab provides access to additional computer workstations, image scanning and color copying.

A variety of seating options and small-group study rooms are available, which together, can accommodate more than 1,000 users. Part of the Library, Java Wally's cafe provides a relaxed setting for casual conversation as well another option for meetings or studying in its "After Hours Room."

For Library hours, call 585-475-2046 (voice); for Reference Desk, call 475-2563 (voice/TTY) or 475-2564 or e-mail 610wmlref@rit.edu; for Circulation Desk, call 475-2562 (voice) or 475-2962 (TTY).

Study Abroad Program

To prepare students for success in an increasingly global society, RIT offers a range of study abroad opportunities. Study abroad programs led by RIT faculty are in most cases offered in the summer. Many programs—including a summer program at RIT's campus in Dubrovnik, Croatia, and intensive language study programs in Japan and Germany—offer credit toward liberal arts requirements. Other programs are designed for specific colleges and majors; for example, the College of Imaging Arts and Sciences, the College of Business, and the College of Engineering.

Through affiliation agreements with other institutions, RIT also offers students the opportunity to enroll in study abroad programs in many geographic locations around the world while receiving RIT credit and financial aid. Affiliations with Syracuse University, SUNY/Oswego in Germany, the Budapest Semesters in Mathematics Program, the Denmark International Studies Program, and Arcadia University enable students from every major to find a study abroad program that meets their needs during the summer, semester, or academic year. Program locations include: the United Kingdom, Ireland, Italy, France, Denmark, Germany, Spain, Hungary, Greece, Hong Kong, Singapore, Australia, and New Zealand.

For more information about study abroad, contact Dr. Catherine Hutchison Winnie, Bausch & Lomb A-130, telephone: 585-475-7634; fax: 585-475-7633; e-mail: studyabroad@mail.rit.edu; Web site: www.rit.edu/studyabroad

Veteran Enrollment Services

Active service persons, reservists, members of the National Guard, veterans and their dependents often begin their educational programs through RIT's Veteran Enrollment Services. Transition from the military to a successful civilian career is dependent upon proper preparation, and education is the key to this transition process.

The veterans' enrollment services counselor is available to handle inquiries and assist veterans with VA- and college-related information in the Offices of Part-time and Graduate Enrollment Services on the first floor of the Bausch & Lomb Center. The office is easily accessible for both day and evening students. It is open from 8 a.m. to 6 p.m., Monday through Thursday, and until 4:30 p.m. on Friday. Students may visit the office or telephone 585-475-6641 to speak with the counselor.

Active-duty service men and women can apply through their commanding officers or the nearest post education service officer for active-duty benefits such as ACES tuition assistance or New G.I. Bill. The amount to be paid to these service members is equal to the monthly amount for single veterans, not to exceed the cost of tuition. Information on the Internet about RIT's online learning opportunities may also be of interest.

Reservists eligible for the Montgomery G.I. Bill for Reserves, ACES, student loan repayment program and/or other educational incentives are encouraged to apply through their commands for a Notice of Basic Eligibility, E)OD Form 2384. When received, the Notice of Basic Eligibility is forwarded to the Veterans Administration to ensure prompt payment. Questions regarding Reserve G.I. Bill benefits, loan repayment, tutorial or other programs that reservists and members of the National Guard may be entitled to can be directed to the office or to the service member's command.

Vocational Rehabilitation, offered to service-connected disabled veterans, is a priority program. These veterans are eligible for tuition, fees, books, supplies and other costs directly related to attending the program approved by the U.S. Department of Veterans Affairs. Additional monies are sent to these veterans each month to help offset the cost of living while attending school.

Veterans eligible for Veterans Educational Assistance Program, Chapter 32, should bring a certified copy of the DD214 to the office, where the benefit paperwork can be initiated. These benefits, also payable by the U.S. Department of Veteran Affairs, are prorated relative to the service member's contribution.

Chapter 30, commonly referred to as the New G.I. Bill, is a significantly different benefit from the aforementioned. While service members have contributed out of their monthly pay, they must have completed the initial term subsequent to separation in order to be eligible for the full amount of their G.I. Bill. This monthly amount is paid directly to the veteran and is self-certified once the enrollment has been reported by the institution.

All veterans and participants in veterans' dependent programs are eligible for counseling assistance and tutoring. Evaluations of military training for possible transfer credit are available as well. Veterans often find that this evaluation provides them with transfer credit that can be applied in their major or as elective credit toward graduation. Evaluations are processed as recommendations of transfer credit and are subject to academic department approval. Veterans are encouraged to discuss their evaluations with the academic department before enrolling.

Campus Life

What goes on in the classroom is one part of a college education; what happens outside the classroom is just as important. RIT is a remarkable and diverse university with faculty and staff who are concerned about students' success and who are very interested in challenging them to achieve their full potential. The Student Affairs Division hosts an array of stimulating and enjoyable programs and activities that complement classroom learning, provide recreation, and encourage growth and development toward becoming successful professionals and citizens.

The division consists of nine centers that provide programs and services that are integral to the learning process and complement the academic curriculum. The centers are: Campus Life, Religious Life, Counseling, Learning Development, Human Performance, Residence Life, Student Health, Student Transition and Support, and the English Language Center.

Life on campus is a living—as well as a learning—experience. Students, with the counseling of trained resident staff, have their own governing organizations and develop social programs. A wide variety of athletic, social and professional activities are available to all students.

Campus Living

RIT recognizes the significance of the on-campus living experience and its effect on the student's academic and social development. The Center for Residence Life therefore, in keeping with the educational mission of the Institute, has as its overall purpose the general well-being and growth of students. To ensure this goal, the atmosphere, conditions and services within our residence halls provide for much more than just a place to sleep. The antiquated term "dorm" is no longer an accurate description. Our residence halls offer a comprehensive campus living experience.

Many activities, programs and services are provided to residents by professional and paraprofessional staff members. To learn more about our staff, you can visit our Web site at www.rit.edu/sa/rl/. Events are planned and regularly conducted on each floor and, on a larger scale, in each quad area. Social and developmental activities are specifically designed to help students meet one another, make friends, and become familiar with campus resources and generally to ease their transition to college life. Programs are continually offered throughout the year on a variety of topics, including diversity awareness, time management, study skills, personal safety, wellness, decision making, and roommate agreements. Many other topics also are covered, each designed to better prepare students to grow and mature as complete individuals.

The Residence Hall Association represents all residential students and is a liaison between the student body and the administration. This association functions as the "resident community government," developing changes in policies and procedures that will benefit the resident population. RHA also provides students with a variety of services, facilities, programs, and equipment. One of these options is RITchie's, a free game room managed by RHA. It is a comfortable place

for students to relax and play video games, pool, air hockey, foosball, and a variety of board games. Students can play X-Box, Playstation 2, or Gamecube games as well as any of our other games for free. There is also an extensive rental movie library.

Residence hall living

Serving approximately 3,000 students, our smoke-free residence halls offer many living options to meet diverse individual needs, interests, backgrounds and maturity levels. Students may choose living arrangements according to their own lifestyles: for example, same gender, coeducational, wellness, alcohol/substance free, intensified study, over 21 years of age, honors, and mainstream (hearing and deaf/hard-of-hearing students living on the same floor). Also available are living options in Greek fraternities and sororities and special interest houses such as Art House, Business Leaders of Tomorrow, Computer Science House, Engineering House, the House of General Science, International House, Photo House and Unity House. Special membership in Greek or special interest houses is required, and dues may be charged.

All RIT on-campus housing facilities will be smoke-free beginning August 16, 2004. Smoking will not be permitted in student rooms, and indoor rooms/lounges or within a 25-foot proximity to the building.

RIT offers a variety of room types to the residence hall population, and room assignments are made by staff members in RIT's Housing Operations Office. Entering students are assigned to double rooms. A limited number of single rooms are available for upperclass students.

Incoming students—upon receiving their acceptance packet—must complete and return the Residence Hall Contract included in this mailing. First-year students are required to live in residence halls, unless they live with their families within a 30-mile radius of RIT. Occasionally, entering students initially may be assigned to temporary housing until on-campus housing becomes available. This is a temporary arrangement, and as space becomes available, students are quickly reassigned to on-campus housing. At the end of the first year in the residence halls, students participate in an annual housing selection process in order to reserve RIT housing for the following academic year. The RIT Inn, residence hall spaces and campus apartments are available through this process. RIT's housing contract is for the full academic year (fall, winter, and spring quarters). If a student should become enrolled in a co-op program as part of educational study, he or she is charged only for the period of actual occupancy. Additionally, all residence hall students must participate in a meal plan. Charges for meal plans are included in the Expenses and Financial Aid section of this bulletin.

Within the residence halls, all rooms and corridors are carpeted, and each room is provided with beds, desks, chairs and dressers according to the number of students assigned to that room. Window coverings and closet space also are provided. Each corridor has its own bathroom equipped with showers, and floors have community lounges, some with a television

and kitchenette and others with tables, chairs, and couches. All residence hall rooms are equipped with cable television access and free, direct, high-speed Ethernet connections to the campus computer systems and the Internet. In the Ellingson, Peterson, and Bell residential area, suites are available in which three bedrooms are connected by a common bathroom. Several laundry facilities are available in the residence halls. Students can use their flex debit or coins to operate the machines.

Campus living for sophomores and beyond

RIT offers housing in the RIT Inn, residence halls, and campus apartments for students in their sophomore year and beyond. All RIT housing is smoke-free. An annual housing selection process is held midway through the academic year for students to select their housing for the following fall. Students are offered housing based on their class status, with first-year students going first and the process ending with sixth-year students. Students are able to rank their preferences and preferred roommates, but RIT is unable to guarantee housing preferences.

RIT Housing Operations manages one of the nation's largest university-operated apartment systems, with approximately 3,000 students residing in nearly 1,000 individual townhouse and apartment units.

While undergraduate students compose the majority of apartment residents, a mixture of graduate and international students as well as single and married students can be found in each apartment complex. Apartment contracts run from September through May, but residents are permitted to leave for co-op employment without penalty.

Each complex is supported by Center for Residence Life staff who assist students in making a successful transition to independent, responsible living. Students will find programs ranging from social to educational with a focus on connecting them to both campus and community-wide resources, and many programs are geared toward the transition to post-college life. Residence Hall staff also follow up on health and safety, roommate, or community concerns. They are available 24 hours a day, seven days a week. To find out more about staff resources, visit www.rit.edu/sa/rl/.

All apartments are equipped with a refrigerator and electric stove but are otherwise unfurnished, except for University Commons, which is fully furnished. Furniture, however, may be leased from Housing Operations or local rental companies. Four of the five Institute apartment complexes are located less than a mile from the center of campus, one complex is located three miles south of the campus. All apartment complexes are serviced by RIT's shuttle bus system. Information regarding apartments, townhouses, and suites can be found on our Web site at <http://finweb.rit.edu/housing/>.

The RIT Inn is a unique housing option for slightly more than 300 upperclass students. The inn blends college housing with many of the perks of a first-rate hotel. This facility offers furnished, air-conditioned double rooms with high-speed Ethernet connections and free cable. In addition, there is an indoor/outdoor pool, fitness center, sauna, free light house-keeping, free reserved parking, whirlpool, coffee shop, and dining facility that accept students' food debit cards. Free shuttle service is provided for students residing at the inn, which is located three miles south of campus.

The Housing Connection

A service of RIT Housing Operations, the Housing Connection is designed to meet the general housing needs of the RIT community. It offers the only on-campus clearing-house for apartment residents in need of additional roommates, providing a continual updated listing of available roommates and their specific interests.

Housing Connection provides free maps, information pamphlets and telephones for users of the service. A trained staff member will assist students in their research for housing or roommates. For more information, call 585-475-2575 (voice/TTY) or visit the Web site, www.rit.edu/~hcwww.

Major Student Organizations

Student Government

The Student Government is the representative body for students. It works with RIT administration, faculty and staff to communicate the needs and desires of the student body and to communicate the decisions of the administration to RIT students. It encourages the student body to formulate and express its opinion, provides a series of services to student organizations, recognizes approximately 135 clubs and eight other major organizations and actively engages in the university's open governance system.

All full-time and part-time undergraduate and full-time graduate students become members of the Student Government when they pay the Student Activities Fee. For more information, please call 585-475-2204 (voice/TTY).

NTID Student Congress

The NTID Student Congress (NSC) is an organization comprised of deaf and hard-of-hearing students who represent and provide programs for members of their community. NSC helps interested students communicate their needs, ideas and concerns about campus life to faculty members, administrators and other student organizations within RIT; provides opportunities for developing new leadership skills; and encourages student activities and integration by providing deaf and hard-of-hearing students with opportunities to interact with their peers socially, academically, athletically and culturally.

Students interested in getting involved may stop in at the NTID Student Congress office or call 585-475-6277 (TTY) for more information.

Off-Campus and Apartment Student Association (OCASA)

OCASA is the representative student government for all RIT students who do not reside in a residence hall. The Off-Campus and Apartment Student Association, formed in 1978, is composed of both commuter students and students who live in the RIT-operated apartment complexes or in off-campus apartments. OCASA provides input from off-campus students to the RIT administration.

The OCASA main office, located in the Student Alumni Union RITreat, offers complementary services that include an area with PCs and Macintosh computers, a copier, fax machine, and various office supplies. Also available are a microwave, refrigerator, coffee, tea and hot chocolate. A daily newspaper and a variety of magazines are on hand. The satellite office in Colony Manor apartments offers PCs and Macintosh computers, a copier, and a fax machine.

Stop in at the OCASA office or call 585-475-6680 (voice/TTY) for more information.

College Activities Board (CAB) (<http://cab.rit.edu>)

The College Activities Board is a student-run organization responsible for providing a balanced program of social and recreational events for the campus community. CAB presents major concerts, festivals and off-campus trips each quarter. For information on CAB programs, stop by the office in the Student Alumni Union or call 585-475-2509 (voice/TTY).

Black Awareness Coordinating Committee (BACC)

The Black Awareness Coordinating Committee is organized to foster an awareness of the role of African American men and women in the total society and to create a greater understanding among African American students at RIT. Each year the committee sponsors various social and cultural programs designed to achieve these objectives. For more information, please call 585-475-5624 (voice/TTY).



The lobby of the Student Alumni Union (SAU) building.

Residence Halls Association (RHA)

RHA was created to represent all resident students and to a liaison between the student body and the administration. RHA strives to provide diverse programming for the students by supporting programs with Residence Life staff and other organizations. RHA also provides students with a variety of services such as a video library with over 600 videos and DVDs. RHA also operates Ritchie's, a student run arcade with a coffee house atmosphere located in the tunnel under Gibson Hall. The RHA office is located in the tunnel under Baker Hall and can be contacted at 585-475-6655 (voice/TTY) or www.rha.rit.edu.

Global Union

The diversity of RIT's global student body warrants an organization that encourages interaction among different ethnic groups. It promotes communication, cooperation and mutual support among all students. It intends to unify all its affiliated organizations and encourage pluralism and understanding. The Global Union provides a platform for expression for campus international and minority communities. It is RIT's multicultural student organization. For more information, call 585-475-2567.

Greek Council

Greek Council is the governing body that represents all members of the fraternity and sorority community. It deals with issues on their behalf in conjunction with the Panhellenic, Interfraternity and Pan-Hellenic Councils. The council is responsible for regulating standards and practices that affect the entire Greek system. It oversees the recognition procedure for special-interest groups that have the intention

of becoming fraternities and sororities, as well as recognition procedures for local and national Greek-letter organizations. Programs sponsored or cosponsored by the council include Greek Week, system-wide philanthropy/community service projects, a Greek league parallel to the intramural program, social programs and national education speakers. For additional information, call the Greek Council Office at 585-475-7028 (TTY), or the Center for Campus Life at 585-475-7123 (TTY) or -7058 (TTY).

WITR

WITR is an FM radio station operated by RIT students. It is licensed by the Federal Communications Commission as a noncommercial, educational station. It is also licensed to be on the air 24 hours a day with a power of 910 watts, which covers the Rochester area.

Students make up the staff, working in five major departments: engineering, news and public affairs, programming and promotions. WITR Radio has been operating for more than 30 years with two major goals: to provide a programming service to the RIT and surrounding community and to provide a noncommercial training ground for participating staff.

Participation in WITR can be an educational and enriching experience. It offers students practical experience in broadcasting, engineering and management. WITR disc jockeys gain the qualifications and experience to work in any radio station. Some former and current members now work full or part time at several commercial radio stations, while other members have attained positions with recording studios or are active representatives of record companies such as A&M, MCA, Sony, Mercury, and Polydor.

WITR promotes RIT events and public-service activities, including both on- and off-air participation in many events. It is a major source of local music in the Rochester community. WITR is the primary broadcast source of RIT sports, such as hockey, and campus events, such as the president's annual Institute address.

Student Government clubs
(<http://clubs.rit.edu>)

For more information about the following clubs, please contact the Student Government Office at 585-475-2204 (voice/TTY) or stop by the office in the RITreat. Look for the quarterly Club Day in the Student Alumni Union. The following is a list of recognized clubs that were active during the 2003-04 school year:

Aero-Design Club
Alpha Phi Omega
Alpine Ski Team
American Institute of Graphic Arts
American Marketing Association
Amateur Radio Club
Anime Club
Archery Club
American Society of Civil Engineers
Asian Culture Society
Asian Deaf Club
Ballroom Dance Club
Bike Club
Brothers and Sisters in Christ
Booster Club
Boulderers Club
Bowling Club
Breakdancing Club
Brothers and Sisters in Christ
Buddhism Sangha
Business Management Association
Campus Crusade for Christ
Caribbean Student Association
Catholic Young Adult Newman Network
Ceramics Guild
Chess, Poker, Checkers Club
Chinese Student Scholar Association
Criminal Justice Student Association
Collegiate Entrepreneurs Society
College Republicans
Creative Outlet
Deaf International Students Club
Ebony Club
Electronic Gaming Society
Electronic Vehicle Club
Emerging Black Artists
Empty Sky Go Club
Equestrian Club
Fast Action Paintball
Feminist Action on Campus for Every Student
Fencing Club
Forensic Science Club
Formula SAE Racing Team
Friends of Veterans
Gamma Epsilon Tau
Glass Club
Gospel Ensemble
Graduate Photography Association
Guild of Sequential Illustrators
Habitat for Humanity
Hillel/Jewish Student Union
Hispanic Deaf Club
Horizontal Ultimate Frisbee
Hospitality Association
Imaging Science and Technology
Information Technology Student Organization



Creative Outlet dance club students practice for a spring performance.
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Institute of Industrial Engineers
Interior Design Educational Association
International Business Group
International Socialist Organization
InterVarsity Christian Fellowship
Japanese Culture Organization
Kendo Club
Korean Christian Fellowship
Korean Student Organization
Lacrosse, Men's
Latin American Student Association
Life Science Club
MacRIT
Management of Information Systems Student Team
Martial Arts Club
Microelectronics Engineering Student Association
Mini-Baja
Model Railroad Club
Multi Disciplinary Robotics Club
Muslim Student Association
National Press Photographers Association
National Society of Black Engineers
New Media Fusion
NTID Computer Club
NTID Drama Club
Objectivist Club
Officers Christian Fellowship
Organization of African Students
Organization of the Alliance of Students from the Indian Subcontinent
Outing Club
Packaging Club
Physician Assistant Student Association
Pi RIT
Pool Club
Pre-medical Student Association
Projectile Motion
Psychology Club
PUB
RITep
RIT Comedy Troupe

RIT Dance Team
RIT FIRST
RIT Gay Alliance
RIT Patent Club
RIT Players
RIT Social Action Group
RIT Student Music Association
RITveg
Rochester Wargamer Association & Guild
RIT Weightlifting Club
Roller Hockey
Rugby, Men's
Rugby, Women's
Running Club
Scale Speed Team
Security Practices and Research Student Association
Signatures Magazine
Society of Hispanic Professional Engineers
Society of Manufacturing Engineers
Spectrum
Sport Modified Car Club
Student Dietetic Association
Student Environmental Action League
Students in Free Enterprise
Student Illustration Guild
Student Interpreters
Student Organization of Boulderers
Student Social Work Organization
Swing Dance Club
Table Tennis
Taiwanese Student Association
Technical Photographer Student Association
The Red Brick Network
True Gentlemen's Club
Ultrasound Student Association
Vietnamese Student Association
Volleyball, Men's
Water Polo, Men's
Water Polo, Women's
We Heart Doves
Wood Club

Student professional associations

Students can also become involved with departmental and professional associations. This includes groups such as Alpha Chi Sigma (national chemistry organization), Delta Sigma Pi (national business fraternity), and Gamma Epsilon Tau (national printing fraternity).

A number of national technical associations have student affiliate chapters on campus. These societies play an important part in campus life by bringing together students who have common interests in special subjects. Students should inquire with their academic department regarding the organizations for their academic interests.

Reporter magazine

Reporter, RIT's weekly news magazine, is the nation's only full-color weekly college magazine. *Reporter* delivers 32 pages of on- and off-campus news, features, entertainment, and sports coverage to the RIT community every Friday morning in a circulation of 6,000. The magazine is completely student-run and staffed, and all editorial, photographic, business, design, and production work is done entirely on-campus with the help of the Printing Application Lab's Heidelberg Press. A winner of numerous state and national awards, *Reporter* is highly regarded as one of the nation's most innovative college publications, respected for its high quality writing, photography, illustration, and design. Students of all educational backgrounds, majors, experience levels, and skills are encouraged to join the staff; a stipend is available for staff positions. *Reporter* is a member of the Associated Collegiate Press and the American Civil Liberties Union.

Student Alumni Union

The Student Alumni Union is designed specifically to service events sponsored by and for the entire campus community — students, faculty and administrative groups, alumni, and guests. The staff is available to assist and advise various individuals and groups in planning and coordinating their activities. The SAU information desk is located in the main foyer.

The three-level facility is the center of cocurricular activities and features the 500-seat Ingle Auditorium; a complete game room with billiards, foosball, and electronic games, and ESPN Sportzone; a music practice room; a unisex hair-styling and tanning salon; a stamp machine; a candy counter; a Ben & Jerry's ice cream shop; two separate dining areas consisting of the main cafeteria and the RITskeller; meeting rooms and lounges. Offices housed in the Union also include the Student Problem Resolution Office; Student Affairs; Office of Student Conduct and Mediation Services; the Center for Student Transition and Support (including Women's Center, First-Year Experience, International Students); the North Star Center serving African, Hispanic, Asian, and Native American Students; Black Awareness Coordinating Committee; Food Service; College Activities Board; The Center for Campus Life; Student Government; WITR radio station; the RIT Credit Union; *Reporter*; Off-Campus and Apartment Student Association; Staff Council; Global Union; and other student organization offices.

The RITreat

The RITreat is an area dedicated to students in the Student Alumni Union. The following resources can be found in the RITreat:

- Club and organization space
- Computers/word processors/fax machine
- Student Problem Resolution Office
- Student Government Office
- Mail folders for SG clubs and organizations
- Off-Campus and Apartment Student Association
- Study tables/lounge area
- Center for Campus Life
- Student Volunteer Office

Social events

During the course of the year, more than 400 student events are registered, mostly by clubs and organizations. In addition, major social events are a part of the campus culture and can be found on the RIT calendar at all times of the year. RIT sponsors a variety of events beginning with the Week of Welcome during Orientation and ending with the Senior Night social event for graduating seniors.

Between these bookend events, RIT sponsors a major Brick City Festival (also Parents Weekend and Alumni Weekend) and a Spring Fest with its traditional carnival. Major concerts are held four to five times a year. Past musical entertainers have included Our Lady Peace; Medesky, Martin and Wood; and Hoobastank. RIT has also hosted famous comedians such as Wayne Brady, Kevin Nealon, and Caroline Rhea. Cultural programs abound with the Cultural Spotlight Series and the Performing Artists' Series, featuring a variety of ethnic and cultural concerts (i.e., Sweet Honey in the Rock).

Numerous speakers have graced the campus, including Magic Johnson, Colin Powell, Oliver Stone, former presidents Gerald Ford and Jimmy Carter, and activist Ralph Nader. The RIT Players hold quarterly theater productions. Weekend evenings have their own traditions, including Thursday evenings in the Ritskeller. Other events are held annually, including the RHA Vegas Night, RIT Greek Week, and CAB Winter Concert. Every other year, the College of Liberal Arts sponsors a musical theater production, and NTID hosts the RIT/Gallaudet Weekend. The RIT campus is a melting pot of activity and fun for all students.

Student Volunteer Center

RIT students are known for their volunteerism, generosity, and skills. Just how much? Last year, 5,341 students came through the Student Volunteer Office to offer their time and gifts in the RIT community. Across the campus, \$75,652 was raised for charitable causes, and the office logged 103 campus charitable events. Come and join us for the fun and reward of giving. There are many opportunities to get involved with local nonprofit agencies. For information on volunteering and service learning opportunities at RIT, call the Student Volunteer Office at 585-475-6056 (voice/TTY).

Cultural Spotlight Series

The Cultural Spotlight Series is sponsored by the Center for Campus Life, and the Performing Artists Series. Contemporary and traditional events are programmed year round. Past series have included performances and artists such as Maya Angelou, Oliver Stone, Rochester Classic Jazz Band, the Tibetan Monks, Ladysmith Black Mambazo, the Rochester Philharmonic with Jeff Tyzik, and the Rev. Hezekiah Walker and the Love Crusade Choir, and Richard Smallwood and Vision.

Creative Arts Program

RIT Singers

An Institute-sponsored vocal ensemble, the RIT Singers is composed of 50 to 60 members and is open to students, faculty and staff. No auditions are necessary; new members are welcome during the first three weeks of each quarter. The ensemble performs classical and popular music and gives several concerts yearly as well as joint concerts with the orchestra and jazz ensemble. For more information, call 585-475-6087.

RIT men's "a cappella" ensembles

Selected through auditions, these are ensembles of eight singers. The current groups are Eight Beat Measure, Brick City Singers and Surround Sound. Rehearsals for both on- and off-campus appearances are adjusted to fit ensemble members' schedules. For more information, call 585-475-6087.

RIT Select Women's Ensemble

Selected through auditions, this is an ensemble of eight to 12 singers. Rehearsals for both on- and off-campus appearances are adjusted to fit ensemble members' schedules. For more information, call 585-475-6087.

RIT Gospel Ensemble

This group of approximately 25 members has developed a repertoire of black spirituals, modern gospel songs, interdenominational anthems and hymns. The group performs for religious services on campus as well as for special events.

For more information, call Campus Life, 585-475-6650 (voice/TTY).

RIT Philharmonia

The Philharmonia is open to all RIT students, faculty, staff and musicians from the surrounding area. The repertoire includes masterworks from the Baroque to the 20th century. Past performances have included a pops concert and chamber music. For more information, contact the director at 585-475-2014 or through his office at 06-A305 Liberal Arts to let him know you're interested in joining.

RIT Jazz Ensemble

Instrumentalists with a background in jazz will want to check out the RIT Jazz Ensemble. The Jazz Ensemble is open to all RIT students who play the following instruments: saxophone, trumpet, trombone, bass guitar, guitar, piano and drums. Performing a repertoire of varying styles, the ensemble presents quarterly concerts and performs for campus activities and academic functions. The ensemble rehearses at least once per week on Tuesday evenings in the SAU Music Room, 7-10 p.m. One credit hour is awarded for participation in the course. For more information, call 585-475-5366 or e-mail Dr. Jonathan Kruger at jhkgs1@rit.edu.

RIT Concert Band

The Concert Band is open to all RIT students who play traditional band instruments. Performing repertoire of varying styles, the ensemble presents quarterly concerts and performs for campus activities and academic functions. The ensemble rehearses at least one per week on Wednesday evenings in the SAU Music Room, 7-9 p.m. One credit hour is awarded for participation in the course. For more information, call 585-475-5366 or e-mail Dr. Jonathan Kruger at jhkgs1@rit.edu.

RIT/NTID Dance Company

The RIT/NTID Dance Company is a unique ensemble of deaf, hard-of-hearing and hearing students enriching the

educational life of the dancers by providing challenging and rewarding choreographic and performance opportunities. Membership in the company is open to the entire RIT community (dancers as well as non-dancers, from every level of ability and experience) at the annual audition in fall quarter.

The RIT/NTID Dance Company has presented a diverse repertoire consisting of full length ballets, student and faculty choreography in modern dance, jazz, and a variety of ethnic-based dance. It has also had guest choreographers and performers including Garth Fagan, Sahomi Tachibana, Tim Draper, Michael Thomas, Sean McLeod, Carolyn Dorfman, Thomas Warfield, Hong Kong based choreographer Andy Wong, deaf choreographer Christopher Smith, the Nrityagram Dance Ensemble of India and Jim Donovan – lead drummer for Rusted Root. As part of the NTID Performing Arts Outreach Program, the Dance Company tours annually in the U.S. For information contact Thomas Warfield, director of dance, at 585-475-6252 (voice/TTY) or at tfwnvc@rit.edu.

Panara Theatre

Students and faculty produce major plays and performances featuring deaf and hearing actors, dancers and technical staff. Call the box office at 475-6254 (voice/TTY).

Lab Theater – This includes experimental, new or unusual productions. New directors and student writers also use the space for developing their skills. For information, call 585-475-6250 (voice/TTY).

NTID performing arts course offerings

For information regarding acting, mime, technical theater, lighting, play creating, script translation or dance classes, call NTID's Performing Arts program, 585-475-6250 (voice/TTY).

Literary Series

A joint activity of the Institute Creative Arts Committee, College of Liberal Arts and various other campus organizations, the Literary Series brings both well-known and developing writers to campus. Students who wish to participate should call 585-475-2475 (voice/TTY).

Visiting Artists and Critics Series

This series is sponsored by the College of Imaging Arts and Sciences, the Creative Arts Program and the Student Affairs Office. Many of the country's leading artists and critics are included in the program, which deals with the issues of technology in art today. For more information, call 585-475-2646 (voice/TTY).

Margaret's House

Child Care Programs

Margaret's House is a NYS-licensed and nationally accredited child care center offering full-day quality care and education for children eight weeks to eight years of age. It includes a district-approved full-day kindergarten as well as after-school, vacation and summer programs. It is open to children of RIT students, faculty, and staff, and to members of the greater Rochester community. Margaret's House is located on campus and is open year round. Call for information and registration material.

- Infant and toddler programs: eight weeks to 36 months
- Preschool programs: three- and four-year olds
- Full-day kindergarten/after-school programs: five- to eight-year olds
- "Lil" Kids on Campus summer program for youngsters entering grades 1 through 4

Contact Roberta DiNoto at 585-475-5176 (voice/TTY) or rxdhcc@rit.edu.

Kids on Campus programs

Kids on Campus provides a variety of academic and sports activities. Programs are characterized by a dynamic, project-oriented approach to learning.

- Kids on Campus: for youngsters entering grades 5 through 10
- Full-day program offered during July

Kids on Campus programs are offered to all Rochester-area students. Call for information and registration material and check the Web site at <http://kidsoncampus.rit.edu>. Contact Susan Kurtz at 585-475-5987 or sfklc@rit.edu.

Center for Human Performance

Wellness for Life and Wellness Activity courses are offered during all academic quarters, including summer. First-Year Enrichment is offered in the fall and winter quarters only. (See *Center for Student Transition and Support*.) More than 60 wellness activity courses are available during the year. Course offerings vary each quarter. Registration for classes coincide with the dates and times for the academic departments. A nominal lab fee is charged for most courses. Please check quarterly schedule of courses for more information.

The following courses are offered as selections in the Center for Human Performance. (The university's Wellness graduation requirement is described on page 9 of this bulletin.)

Wellness courses

Wellness for Life, Wellness Challenge Exam

Fitness

Aerobics, Aquathenics, Conditioning, Weight Training, Jogging, Keiser Power Cycle Pacing, Swimming for Fitness, Water Polo, Water Relaxation, Aeroboxing, Pilates.

Lifetime recreation and leisure

Archery, Badminton, Dancing (Ballroom, Latin, Jazz, Tap, Swing), Dance Performance I & II, Fencing, Frisbee (Ultimate), Golf, Horseback/English, Horseback/Western, Ice Skating, In-Line Skating, Ice Hockey Drills, In-Line Skating Drills, Juggling, Basketball, Softball, Volleyball, Soccer/Indoor, Skiing (downhill), Snow Boarding, Swimming, Tennis, Yoga, Massage, Officiating, Billiards, Bowling, Racquetball, Scuba, Crew, Multicultural Dance, Country Line Dance, Crew, Team Handball, Ballet, and Roller Hockey.

Life support and safety

CPR, Care and Prevention of Athletic Injuries, First Aid, Life Guarding, Water Safety Instruction.

Martial arts

Aikido, Cardiokickboxing, Karate, Kung Fu, Qigong, Tai Chi, Brazilian Capoeira, Sparring, Self-Defense/Women.

Interactive adventures

Canoeing, Cross-country Skiing, Bouldering, Rock Climbing (indoor/outdoor/top rope setup), Snowshoeing, Hiking, New Games, Orienteering, Kayaking, Backpacking, Wilderness Skills, Camp Cooking.

Military sciences

Army ROTC (Leadership Drills, Leadership Lab), Air Force ROTC (Physical Training), Navy ROTC.



NTID support services

The NTID Support Team is committed to providing quality services that maximize access for deaf and hard-of-hearing students who are engaged in the First-Year Enrichment, Wellness of Life, and Wellness Activity courses, intercollegiate athletics, intramural and recreation programs. NTID team members teach courses (signing for themselves), provide tutoring, advising, and coordinate note taking services. Consultation/advising is available to deaf and hard-of-hearing, student athletes and RIT intercollegiate coaches. The team serves as a liaison between the NTID Admissions Office and the Center for Human Performance to provide potential deaf and hard-of-hearing student athletes the opportunity to meet with athletic coaches and visit our facilities.

The team provides opportunities for deaf and hard-of-hearing students to develop leadership and professional skills through the peer educator/paraprofessional program. Through collaboration with other units within NTID and RIT, the student paraprofessionals utilize a variety of creative strategies and programming efforts that support access, inclusion, team building, and education. For additional information regarding support services, call 585-475-6104 (voice/TTY) or 585-475-6530 (TTY).

Intramural activities

An extensive program of intramural activities is offered at RIT. Under the direction of the Center for Human Performance, activities include co-rec, as well as men and women's teams in basketball, volleyball, Softball, ice hockey, flag football, soccer, tennis, and golf. Also offered is a program for individual competitions in racquetball, table tennis, tennis, and badminton.

Recreation

RIT offers some of the finest recreational facilities available in colleges today. Indoor facilities feature four gymnasiums, an ice rink, an aquatics center (eight-lane competitive pool with moveable bulk-head diving area, recreational pool and hot tub) saunas, elevated indoor running track, racquetball courts, a multi-level physical fitness and weight training center, dance studio, recreational equipment room, wrestling room, boxing room, spinning room, game room (video games, billiards), a multi-purpose room, and a 60,000 square foot multipurpose field house that includes a 200 meter track.

Outdoor facilities include nine lighted tennis courts, archery range, nature trails, a climbing/bouldering wall (Red Barn) an all-weather track, numerous athletic fields and an artificial turf field. The equipment issue room provides towels, locks and quality equipment for recreation, intramurals and wellness activity class instruction.

Intercollegiate athletics

For eight decades, intercollegiate athletics has developed a tradition of excellence at RIT. The Institute's heritage in competitive athletics is a rich one. It has grown to become highly successful and widely recognized on the regional and national levels.

RIT has won more than 60 percent of its contests in each of the last three years. Some of the men's team accomplishments have come in soccer (12 NCAA appearances and runner-up honors in 1988), cross country (nine Eastern College Athletic Conference crowns and six top-10 finishes in the last seven NCAA championships), hockey (two national championships and seven ECAC titles), basketball (two ECAC championships in 1992-93 and 2002-03 and the Chase Scholarship title in 1994-95 and 1996-97), and lacrosse (seven Empire 8 crowns and an ECAC title).

Women's teams have also excelled. Volleyball boasts several Empire 8 crowns, third place in the 1993 NAAs and 2003 ECAC Champions. Women's Softball is a perennial state contender. Women's tennis is 212-103-3 over the past 24 years, and women's ice hockey won its first ECAC title in 1989. RIT is one of only a handful of schools in New York State to offer women's ice hockey on the varsity level.

Each year more than 450 athletes take part in 24 varsity sports offered at RIT. Fall competition features men's and women's cross country, women's volleyball, women's and men's soccer, and women's tennis. Winter sports include men's and women's basketball, swimming, hockey, and indoor track and men's wrestling. Spring competition features baseball, men's and women's crew, men's and women's track, men's and women's lacrosse, Softball, and men's tennis.

A National Collegiate Athletic Association (NCAA) Division III member institution, RIT competes against schools in the Northeast with similar academic and intercollegiate athletics philosophies. Known as the Tigers, RIT teams are also members of the Eastern College Athletic Association (ECAC), New York State Women's Collegiate Athletic Association (NYSWCAA) and the Empire 8 Conference.

Since varsity sports began at the Institute in 1915-16, RIT teams have won more than 50 conference titles, 20 ECAC crowns and three NYSWCAA championships. Individually, the Tigers boast six national champions, including Barry Zacharias (swimming), Mark Stebbins (twice in track), Michele Jones (track), Darrell Leslie (wrestling), and Matt Hamill (wrestling), a two-time NCAA champion.

Club sports

In addition to intercollegiate sports and intramural programs, RIT offers several club sports. The program is a division of RIT Student Government and the Center for Human Performance. Its purpose is to provide extramural/intercollegiate competition for recognized club sports, although some are solely for recreational or instructional purposes. Participation is open to all full- and part-time RIT students.

The following sports are offered for men and women: alpine skiing, bowling, bouldering, cycling, equestrian, fencing, field hockey, indoor soccer, juggling, martial arts, outing club, roller hockey, rugby, swing dance, ultimate frisbee, and water polo. Lacrosse and volleyball are also offered as club sports for men.

Student Health Center

The Student Health Center provides primary medical care on an outpatient basis. The staff includes physicians, nurse practitioners, registered nurses, health educators, alcohol/drug counselor and an interpreter for the deaf. Services are available by appointment. Health education programs are provided also.

The Student Health Center is located on the walkway linking the academic and residence hall areas of the campus. Students are seen Monday through Thursday, 8:30 a.m. to 7 p.m., and Friday, 8:30 a.m. to 4:30 p.m. by appointment. Emergencies are seen as need requires. Flours are subject to change and are posted.

The university requires students to maintain health insurance coverage—which they may purchase either on their own or through RIT—as long as enrolled at RIT.

The quarterly student health fee is mandatory for all full-time undergraduate students. All other students may pay either the quarterly fee or a fee for service. Some laboratory work ordered through the Student Health Center is not covered by this fee; there is a charge for this service. Prescription medicines may be purchased from local pharmacies or, for some specific prescriptions, from the Student Health Center. The health fee does not include prescription medications.

Questions about the Student Health Center or health insurance should be directed to the office at 585-475-2255 (voice); -5515 (TTY).

RIT Ambulance

RIT Ambulance is a New York State certified volunteer ambulance service that serves the campus community, including its adjoining apartment complexes. The organization, an auxiliary of the Student Health Center, is governed by RIT students and staff and is staffed by emergency medical technicians. Twenty-four-hour ambulance service is available seven days a week. If, for some reason, the RIT ambulance is not available, there may be a charge for services provided by another corps.

For *emergency* assistance and/or transport, the RIT ambulance can be dispatched through Campus Safety at 585-475-3333 (voice) and -6654 (TTY).

Health records

Medical records are confidential. Information will not be released without the student's written consent. Exceptions to this rule are made only when required by the public health laws of New York State.

New York State and RIT immunization requirements

New York State Public Law 2165 requires that all matriculated students enrolled for more than six quarter credit hours in a term and born after January 1, 1957, must provide RIT's Student Health Center with proof that they have received the appropriate immunizations against measles, rubella and mumps. Immunization requirements include two measles vaccinations, at least one month apart, with a live virus, after January 1, 1968, and after the first birthday; and one vaccination each against mumps and rubella (after January 1, 1969, and after the first birthday). Other immunizations required by RIT include meningococcal, Hep B, DPT, polio, Td booster, and PPD. Additional information concerning the necessary documentation and where it must be sent is included with the Admissions Office acceptance packet or available from the Student Health Center office.

Campus Stores

RIT operates two campus stores. The main store, Campus Connections, is located on the west side of the Student Alumni Union and sells everything from clothing to textbooks to computers. For current information about hours and special sales, call 585-475-6033. You can also visit the Campus Connections Web site at <http://bookstore.rit.edu>.

Campus Connections accepts cash, checks, MasterCard, VISA and RIT flexible debit cards for payment. Certain students may have arrangements with a government agency to pay for some of their books and supplies; this is handled at our service counter on the first floor.

The Candy Counter in the lobby of the Student Alumni Union sells candy, tobacco products, health and beauty aids, film, daily newspapers, snack items, ice cream and drinks. The Candy Counter accepts cash, checks, MasterCard, Visa, RIT flexible debit and food debit cards.

Campus Safety

The Campus Safety Department is open 24 hours a day and is located in Grace Watson Hall. To report an emergency on campus, call 333 (voice/TTY) or 475-3333 from the RIT apartment complexes. The department provides the following services:

Escort Service

Campus Safety strongly encourages students to use the Escort Service. The mobile Escort Service is available to anyone, seven days a week on a timed schedule between 11 p.m. and 3 a.m. Simply call the Campus Safety Department at 585-475-2853 or -6654 (TTY), or use one of the blue-light courtesy call boxes located across the campus.

Lost and Found and Operation ID

All campus lost and found property is stored by the Campus Safety Department. Each year Campus Safety disposes of a great deal of unclaimed property because it is not identifiable and the owners do not claim it. Students are encouraged to take advantage of the Operation ID program, which helps in the recovery of lost property by marking valuables and by registering them with Campus Safety.

Emergency notification

There may be times when emergency notifications need to be made. If this should occur, contact the Campus Safety Department at 585-475-2853 or -6654 (TTY). Campus Safety will locate the student and relay the message.

Campus courtesy call boxes

Campus courtesy call boxes, identified by a blue light, are located across the campus. These call boxes provide a direct line to Campus Safety 24 hours a day. The location of the call is automatically recorded at the Campus Safety Communications Center, making it possible for hard-of-hearing individuals to use the call boxes also. The call boxes may be used to request an escort, assist a motorist, report any suspicious persons or activities, or request access to a locked building or room.

Presentation programs

Throughout the year, Campus Safety hosts a variety of prevention programs on various topics, including fire safety (video and slide presentations), crime prevention, personal safety, alcohol awareness, driver safety programs and a state-certified defensive driving program. Call 475-2074 for more information.

Safety and security report

Additional information about Campus Safety services, security procedures and crime statistics can be found in the "RIT Campus Safety Annual Report," which can be obtained by calling 585-475-6963. Services are also explained on RIT's Web site at <http://ftnweb.rit.edu/campussafety/safetysecurityreport>.

The Advisory Committee on Campus Safety will provide, upon request, all campus crime statistics as reported to the United States Department of Education

Sexual assault information hotline

Confidential counseling services are available to anyone in need by calling 585-546-2777 (voice/TTY).

RIT provides a variety of security services and prevention programs to everyone on campus. Although each individual is ultimately responsible for his or her own personal safety, learning and practicing some basic precautions can enhance one's well being.

Transportation services

Campus Safety, in conjunction with the Rochester Genesee Regional Transit Authority, provides an on- and off-campus shuttle service 365 days a year. Schedules are available at all apartment offices, the Student Alumni Union information desk, the library, Campus Connections, Campus Safety, and the NTID information area. Schedules are also posted on the RIT Web page (<http://finweb.rit.edu/campussafety>). In addition, Campus Safety operates a van service for those with impaired mobility, Monday through Friday, 7 a.m. to 6 p.m., during fall, winter, and spring quarters. The Transportation Division also provides vans for the use of student groups, clubs, and organizations. For more information, call the Campus Safety Transportation Office at 585-475-7300 or 585-475-6006.

Vehicle registration

All vehicles operated on campus must be registered with Campus Safety, and stickers must be properly displayed on each vehicle. Institute fines are imposed for operators in violation of Institute parking and traffic regulations. The vehicle registration process can be initiated online at <http://finweb.rit.edu/campussafety>.

Handicap parking permits

Campus Safety honors ADA-approved handicap parking permits from every state. Handicap parking permits may be issued from Campus Safety to students who live in RIT housing. Commuters, faculty and staff should go to their local municipalities for handicap permits.

Public safety

Campus Safety conducts programs in fire safety practices and evacuation techniques (which are reinforced through fire drills held in accordance with New York State Education Laws), safety in the work place, environmental health, and defensive driving certification (recognized by New York State for insurance and point reductions).

Commission for Promoting Pluralism

The Commission for Promoting Pluralism was established to formulate a plan of action that would address seriously and deliberately the subject of pluralism and community building in every part of the university. Its evolution is the result of an identified need for RIT constituents to deepen their respect and appreciation for all people in the RIT community and beyond. This institutional focus attempts:

- to proactively identify and eliminate barriers that restrict equality throughout the RIT community;

- to develop and implement programs that promote commitment to equality and justice in campus-wide activities;
- to develop and nurture a support system that increases participation by all members of the RIT community.

Expectations for Community Behavior

- RIT is a *learning community* where time, energy and resources are directed toward learning and personal development.
- Members of the community live and work together to foster their own learning, as well as the learning of others, both in and outside the classroom.
- Within the community, members hold themselves and each other to high standards of personal integrity and responsibility.
- Individual members continually strive to exceed their personal best in academic performance and the development of interpersonal and professional skills and attributes.
- As a member of the community, each person continually conducts himself/herself in a manner that reflects thoughtful, civil, sober and considerate behavior.
- As a member of the community, each person respects the dignity of all persons and acts to protect and safeguard the well being and property of others.
- As a member of the community, each individual contributes to the continued advancement and support of the community, personally challenging behavior that is contrary to the welfare of others.
- Members of the community create a campus culture that values diversity and discourages bigotry, while striving to learn from individual differences.

Summary of Conduct Policies

The following broad areas of conduct for students, although not all-inclusive, indicate, in general terms, the standards of student conduct that are important to the educational mission of RIT and to the quality of campus life. The RIT Conduct Code and disciplinary process is printed in its entirety in *The Student Rights and Responsibilities Handbook*. All policies and procedures relating to student and organization conduct are printed in this document and should be reviewed by all RIT students.

Human rights and dignity

Students are expected to follow RIT's Policy Prohibiting Discrimination and Harassment. All students should practice high regard for the rights and dignity of other people, preventing all types of discrimination. RIT attempts to resolve conflicts between individuals and groups with differing backgrounds and views through discussion and clarification of values and attitudes. Students should not physically or verbally abuse any person on RIT premises or at RIT-sponsored or supervised events.

Computer use

Students are expected to follow RIT's Code of Conduct for Computer and Network Use. A variety of computing resources are available at RIT, ranging from application-specific micro-computers to central multiuser systems. Computer abuse is expensive and can have far-reaching consequences. Students should not intentionally disrupt the educational process through deletion of another's course assignment, dampen the creative process through theft of intellectual property, violate an individual's privacy or institutional confidentiality, or infringe on copyright.

Off-campus conduct

The conduct of RIT students off campus will be held to the same standards and policies as on campus. Any off-campus action that interferes with the completion of the educational mission of RIT or any member of the RIT community is subject to disciplinary action.

Academic honesty

Students are expected to follow RIT's Policy on Academic Dishonesty. Students should not engage, or allow others to engage, in any form of academic dishonesty. These acts include, but are not limited to, plagiarism in any form or using information and materials not authorized by the instructor during an examination.

Dishonesty includes furnishing false information to RIT and forgery. Alteration or use of RIT documents or instruments of identification with intent to defraud are prohibited.

Disruption of RIT activities

Students should refrain from unreasonable disruption or obstruction of teaching, research, administration, organizational activities, disciplinary proceedings or any other RIT activities.

Parking and traffic

All drivers on campus should follow RIT's Parking and Traffic Regulations. New York State motor vehicle and traffic laws are in effect on campus. RIT may enact supplemental parking and traffic regulations for RIT-owned properties. The regulations are intended to promote order and ease of movement of pedestrians and motorists and to safeguard people and property.

Regard for property

Students are expected to exercise appropriate care for RIT property and the property of others. Theft, damage or unauthorized possession of either RIT property or the property of a member of the academic community on RIT premises is subject to disciplinary action.

Library materials and laboratory facilities are of utmost importance to the completion of RIT's academic mission. Consequently, students should show considerable care in the handling of these items.

RIT officials

Students must furnish proof of enrollment through valid student identification card upon request from RIT officials. Students should comply with the directions or instructions of RIT officials acting in performance of their duties.

Safety

Safety is an issue about which all students should care deeply—not only the safety of oneself, but the safety of others. Students should behave sensibly to protect the welfare of others and to minimize hazardous situations. Safety is of critical importance at all places on the campus, but particularly important in the apartments and residence halls, where the carelessness of one individual can affect the lives of hundreds. Willful violations of safety, such as causing false fire alarms, will result in immediate disciplinary action according to judicial procedures.

Sexual harassment/sexual misconduct

RIT acknowledges that an individual student's sexual attitudes and values are a matter of choice; nonetheless, responsible sexual behaviors must take into account the dignity, privacy and rights of others. RIT's Policy Prohibiting Discrimination and Harassment and the RIT Sexual Assault Policy should be observed at all times. Moreover, no individual should be subjected to exploitative actions.

Sanctions Regarding Violations of RIT Student Alcohol Policy

If a student or student organization violates the RIT Alcohol Policy, the following judicial outcomes should be anticipated:

BEHAVIOR	CONSEQUENCES
<p>Possession of alcohol</p> <ul style="list-style-type: none"> • in residence halls and Greek houses regardless of age • under 21 years of age • possession of bulk alcohol 	<p>First offense: Disciplinary probation</p> <p>Second offense: Deferred disciplinary suspension/deferred removal and possible referral for a chemical dependency screening</p> <p>Third offense: Disciplinary suspension or removal from housing with appropriate conditions</p>
<p>Behavior that suggests the excessive consumption of alcohol</p>	<p>First offense: Probable deferred disciplinary suspension/deferred removal; possible referral to alternative educational sanction program; possible referral for a chemical dependency screening</p> <p>Second offense: Disciplinary suspension and/or removal from housing with appropriate conditions</p>
<p>Serious policy violations (including serving alcohol to minors, hazing events involving alcohol or dangerous behavior as a result of alcohol)</p>	<p>First offense: Probable disciplinary suspension and/or removal from housing with appropriate conditions</p>
<p>DWI on campus</p>	<p>First offense: Referral to local law enforcement agency and disciplinary suspension</p>
<p>Student organizational violations related to alcohol</p>	<p>First offense: Educational and/or community related sanctions; possible disciplinary suspension of organization and/or removal of recognition</p>

These guidelines are examples of responses that will most likely result when there have been violations of the RIT Alcohol Policy. Each incident is handled individually. The prior judicial background of the student(s) involved and the impact of the incident on the student and the RIT community is considered when decisions are rendered. In some cases, even first offenses, the impact of an incident may call for a more serious response.

A sanction of deferred suspension or higher will require the dependent student to notify his or her parents or legal guardians about the decision and have the parents/legal guardians contact the Office of Student Conduct and Mediation Services for verification.

Study environment

Students need a campus environment that is conducive to studying, especially in facilities that are designed primarily for study. Individuals should respect the rights of others to study and should be understanding of different study habits.

Student-sponsored events

In the planning and scheduling of events, students should consider the safety and overall welfare of members of the academic community. Students should not knowingly conduct events that might inhibit the completion of the academic mission of the Institute or any member thereof.

Student Alcohol and Drug Policy

RIT is a learning community. The best environment for learning occurs when the community promotes and supports healthy and responsible behavior among its members. Students are ultimately responsible for their behavior and must assume full consequences for it. This includes the responsible and legal use of alcohol. The goal of RIT's Student Alcohol and Drug Policy is to promote individual responsibility and advance the goals and expectations stated in the previous section, "Expectations for Community Behavior."

This policy applies to all student members of the RIT community and their guests. It also applies to all student activities on the RIT campus and to all RIT-sponsored events

where students are present. Faculty, staff and their guests are governed by a separate policy.

RIT students are subject to federal, state and local laws regarding alcohol and drug use. Serious civil and criminal legal liabilities can result from possession, use, serving, sale or unlawful manufacturing of drugs and/or alcohol. RIT will not protect individuals or groups from law enforcement by legal authorities with respect to drugs and alcohol use or abuse.

Individuals or organizations who hold private parties or sponsor private events where alcohol is served or consumed assume full personal responsibility and liability for compliance with the law and for conduct related to the consumption of alcohol by attendees, participants and guests. Officers of organizations that sponsor parties or events, or other hosts or people whose apartment, residence hall room or office is the site where drinking occurs, will be held responsible for complying with the provisions of this policy.

Provisions Governing the Possession and Use of Alcohol

1. Alcohol may not be illegally used, possessed, manufactured or exchanged on RIT-owned or -operated property or at RIT-sponsored events. No alcohol may be sold or exchanged for money on RIT property or at RIT-sponsored events without a New York State liquor license. The RITskeller will continue to be a licensed premise and will be permitted to serve alcohol to individuals who are at least 21 years of age.

2. The consumption or possession of alcoholic beverages is prohibited in all RIT residence halls (including Greek houses and house basements), regardless of age or circumstances.
3. The consumption or possession of alcoholic beverages is permitted in RIT-operated apartments only by those residents of the apartment who are at least 21 years of age. Alcohol possession and consumption is not permitted in common or public areas within apartment complexes. Parties in apartments are to be limited to invited guests of a number that is defined by building occupancy codes and that can be accommodated without disturbing the community. These numbers may be found in the RIT apartment contract for a particular facility or obtained from Apartment Management.
4. The guests at all privately sponsored parties where alcohol is to be served must be invited by direct personal invitation only. General "come all" posters, flyers, or mass electronic invitations will not be permitted for events designated as private parties. Only the Ritskeller or an institutionally designated space can be used for a community-wide event where alcohol is to be served to students or student groups.
5. Campus Safety and other RIT officials have the right to terminate events and take appropriate actions if they determine that it is probable that Institute policy and/or New York State law is being violated at any gathering on the RIT campus, in RIT operated facilities, or at campus-sponsored functions.
6. Bulk containers of beer (kegs or beer balls) are prohibited in all RIT-operated apartments. Such containers are permitted only in institutionally designated party areas where alcohol can be served for parties or special events or in areas that are covered by a New York State liquor license.
7. Open containers of alcohol are not permitted outdoors on the RIT campus without prior authorization. Authorization will be given in situations where alcohol is to be served in conjunction with an officially sponsored RIT student event. The authorization process for use of alcohol in these situations is coordinated through the Center for Campus Life in the Student Alumni Union. (See "Registration Procedures for Events Where Alcohol is Served/Consumed on the RIT Campus" for specifics.)
8. All student events and parties where alcohol is served, possessed or consumed must abide by all existing Institute policies and procedures regarding the use, possession, sale and distribution of alcohol and may be further restricted by existing municipal and state ordinances. Prior to planning any activity or event where alcohol is to be served, individuals/groups should consult the Center for Campus Life located in the Student Alumni Union regarding the provisions and restrictions governing alcohol use at RIT activities and events.
9. Student-sponsored parties/events where alcohol is served may be held in designated areas on the RIT campus. (Private parties held in RIT-operated apartments are covered in item 3.) Alcoholic beverages can be served at these student-sponsored parties and events on campus only by RIT Food Service or by an approved third-party vendor. Registration and authorization for such events can be obtained through the Center for Campus Life in the Student Alumni Union. The center coordinates the procedures for securing authorization from the State Liquor Board to sell/serve alcohol; this process takes a minimum of 10 business days.
10. Behavior which is dangerous to oneself or others and/or disturbs the learning and/or living environment in RIT-operated facilities or at any RIT-sponsored activity/event is strictly prohibited. Such behavior will result in Campus Safety intervention and campus judicial action.

Sanctions Regarding Violations of RIT Student Drug Policy

If a student or student organization violates the RIT Drug Policy, the following judicial outcomes should be anticipated:

BEHAVIOR	CONSEQUENCES
Use/possession of illegal drugs	<p>First Offense: Deferred disciplinary suspension; deferred removal or removal from RIT housing; possible referral for a chemical dependency screening; possible alternative education program</p> <p>Second Offense: Disciplinary suspension or dismissal; drug treatment while on suspension from the Institute</p>
Selling or trafficking of illegal drugs	Disciplinary suspension, dismissal or expulsion; referral to local law enforcement agencies

These guidelines are examples of responses that will most likely result when there have been violations of the RIT Drug Policy. Each incident is handled individually. The prior judicial background of the student(s) involved and the impact of the incident on the student and the RIT community are considered when decisions are rendered. In some cases, even though it may be a first offense, the impact of an incident may call for a more serious response.

A sanction of deferred suspension or higher will require the dependent student to notify his/her parents or legal guardians about the decision and have the parents or legal guardians contact the Office of Student Conduct and Mediation Services for verification.

11. Serving, selling or providing alcohol to persons who are under 21 years of age, or possession of alcohol by someone under 21 years of age, is prohibited by both New York State law and RIT regulations. Any person who exhibits behavior which suggests that excessive drinking has occurred cannot be served or permitted continued access to alcohol. Individuals who serve such individuals alcoholic beverages will face Campus Safety intervention, campus judicial action and possible civil and criminal prosecution.
12. Use of false or altered identification or other misrepresentation of one's age in order to possess or consume alcohol is explicitly forbidden.
13. In order to avoid the dangerous and possibly fatal effects of alcohol poisoning, an individual who has "passed out" or shows other signs of serious effects from alcohol consumption should immediately be brought to the attention of Campus Safety, RIT Ambulance, the Residence Life staff or some other person able to assist or to get assistance. Seeking such help is encouraged by RIT.
14. Students violating the RIT Student Alcohol and Drug Policy will be subject to the campus judicial process published in the "Student Rights and Responsibilities Handbook" and to the judicial actions and sanctions described in this policy. All guests or visitors to the campus must also comply with the provisions of this policy or risk removal from the campus and possible future restriction from campus property.

Provisions Governing the Possession and Use of Illegal Drugs

1. RIT explicitly prohibits use, possession, sale, manufacturing or trafficking of illegal drugs on RIT-owned or -operated property, or at RIT-sponsored events.
2. In order to avoid the dangerous and possibly fatal effects of drug overdose, an individual who has "passed out" or shows other signs of serious effects from drug use should immediately be brought to the attention of Campus Safety, RIT Ambulance, the Residence Life staff or some other person able to assist or to get assistance. Seeking such help is encouraged by RIT.
3. Students violating the RIT Student Alcohol and Drug Policy will be subject to the campus judicial process, published in the "Student Rights and Responsibilities Handbook," and to the judicial actions and sanctions described in this policy. RIT students will be held responsible for the behavior of their guests. All guests or visitors to the campus must also comply with the provisions of this policy or risk removal from the campus and possible future restriction from campus property.

Registration procedures for student-sponsored events where alcohol is served/consumed on the RIT campus

(The following procedures do not apply to private parties held in RIT-operated apartments.)

1. Student-sponsored events where alcoholic beverages are to be served require that an event registration form be initiated and approved. This process takes a minimum of 10 business days prior to the event. Such events can be arranged on a space-available basis. Inquiries regarding the availability of space/rooms for events where alcohol is permitted can be obtained at the Center for Campus Life, 2125 Student Alumni Union.
2. Alcohol can be provided, possessed or consumed by students only in institutionally designated spaces on the RIT campus. RIT Food Service or an approved third-party vendor must dispense all alcohol at these parties/events. Arrangements for private parties where alcoholic beverages are served can be made through the Center for Campus Life in the Student Alumni Union. Only individuals who are at least 21 years of age may register an event where alcoholic beverages are to be served.
3. Campus Safety will determine the security staffing levels for each event where alcoholic beverages are to be served. The required number of officers must be present for the duration of the event. The costs of these officers will be billed directly to the sponsoring/host organization. Campus Safety will discuss requirements for security with the sponsoring individuals or groups prior to the event.
4. The guests at all privately sponsored parties where alcoholic beverages are to be served must be invited by direct personal invitation only. General "come all" posters, flyers, or mass electronic invitations will not be permitted for events designated as private parties. Only the Ritskeller or an institutionally designated space can be used for a community-wide event where alcoholic beverages are to be served to students or student groups.
5. When alcoholic beverages are served at student-sponsored parties/events, non-alcoholic beverages and food must also be served. Guidelines may be obtained at the Center for Campus Life.
6. Individuals/officers of the student organization sponsoring the event will be held responsible for the behavior of guests. An officer of the organization must be present for the duration of the event. They will also be responsible for assuring that only individuals who are at least 21 years of age are consuming alcohol during the party/event.

7. Student organizers of a party/event should ensure that appropriate transportation is available for individuals who have been consuming alcohol during the party. They should ensure that individuals who have been drinking do not drive while intoxicated.

RIT Process for Student Misconduct

RIT has established well-defined processes for handling student misconduct cases while protecting the civil and academic rights of all members of the Institute community. Student conduct and appeals processes are administered through the Office of Student Conduct and Mediation Services. Sanctions imposed upon those found responsible for violating the RIT Conduct Code may range from a written warning to restitution to disciplinary suspension, dismissal and expulsion from the Institute. Students suspended from RIT may not enroll in any course work until such time as the suspension is waived by the Office of Student Conduct and Mediation Services.

RIT Mediation Services

RIT Mediation Services provides students the opportunity to resolve conflicts and disputes with trained, third-party mediators at the Institute. The Institute mediators are trained to facilitate confidential mediation sessions with voluntary participants from the RIT community. Information regarding RIT Mediation Services can be obtained from the Office of Student Conduct and Mediation Services.

Admission to Undergraduate Study

Admission to RIT is competitive, but our admission process is a personal one. We are interested in learning about your interests, abilities and goals in order to provide the best information and guidance we can as you select the college that is right for you.

Students applying for freshman admission for the fall quarter (September) may apply through an **Early Decision Plan** or **Regular Decision Plan**. The Early Decision Plan is designed for those who consider RIT their first choice college and wish to receive an early notification regarding admission. Early Decision requires that candidates file their applications and all supporting documents by December 1 in order to receive admission notification by January 15.

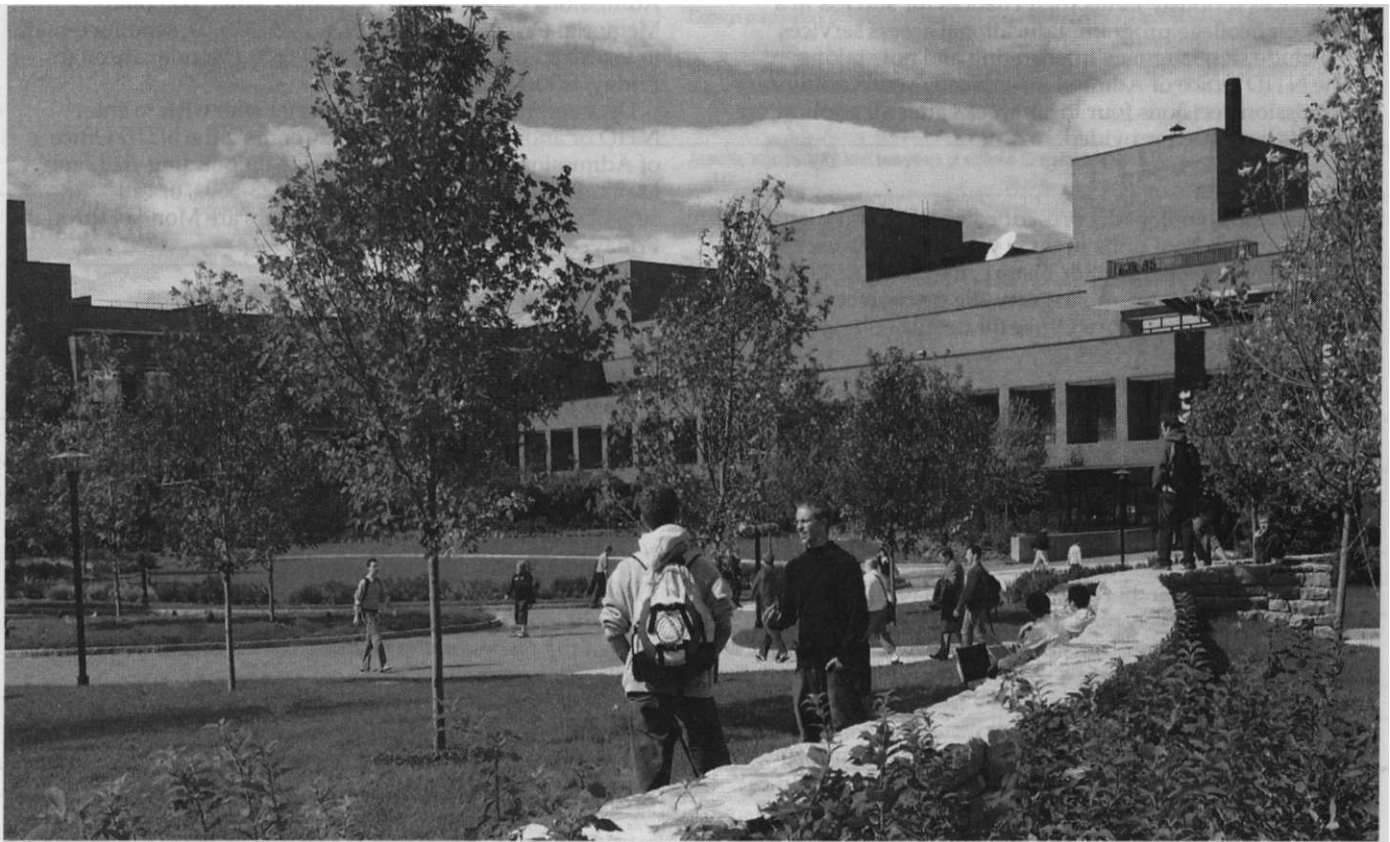
Freshmen who choose not to apply for Early Decision are considered under our Regular Decision Plan. Regular Decision applicants who have provided all required application materials by February 1 will receive admission notification by March 15. Applications received after February 1 will be reviewed on a "rolling" basis, with notification letters mailed four to six weeks after the application is complete.

All applications for transfer admission and all freshman applications for winter, spring or summer quarter entry are reviewed as they are received, and notification letters are mailed four to six weeks after the application is complete.

Specific instructions for completing the application process are contained in our application packet (also online). Be sure to read the instructions carefully before applying.

Factors considered in the admissions decision include, but are not limited to, past high school and/or college performance (particularly in required academic subjects), admission test scores, competitiveness of high school or previous college, and related experiences (work, military, etc.). Recommendations from those familiar with your academic performance and interviews with admissions counselors are often influential.

If you are accepted for admission, a \$200 nonrefundable enrollment deposit reserves a place in your class and is credited to your first-quarter costs at RIT. The due date for this deposit is indicated with each offer of admission.



Eastman Kodak Quad and the College of Imaging Arts and Sciences.

Application requirements

In order to complete the application process, you need to submit the following:

1. a fully completed application for admission (includes any required supplemental forms)
2. a nonrefundable \$50 application fee
3. an official high school transcript for all freshman applicants and for transfer students with fewer than 30 semester hours or 45 quarter hours completed at the time of application
4. official American College Test (ACT) or Scholastic Assessment Test (SAT-I) results for all freshman applicants
5. official transcripts of all completed college course work and a listing of any courses in progress (and not on the transcript) or courses to be completed before enrolling at RIT
6. a portfolio of original artwork as part of the application process for students applying for admission to academic programs offered by RIT's School of Art, School of Design, and School for American Crafts (see application form for additional instructions).

Applying to NTID

In addition to the six application requirements listed above for admission to RIT, deaf and hard-of-hearing students applying for admission to programs offered at the National Technical Institute for the Deaf (NTID) or to any other college of RIT must submit the NTID supplementary application. This application is required in order to qualify for educational access and support services, as well as NTID's federally-supported tuition rate. Eligibility for NTID access and support services, which is agreed upon by RIT and the U.S. Department of Education, includes these criteria:

- hearing loss—students must have a hearing loss in the better ear (unaided) of 70 decibels (ANSI, 1969) or greater across the 500 and 2,000 Hertz range.
- educational access and support services needs—students must have a hearing loss that without educational access services seriously limits their chances for success in a regular college program. Educational access services include sign language interpreting and note taking.

The NTID Office of Admissions typically sends notification of admission decisions four to six weeks after all application materials have been provided.

Early admission

Students who complete the prescribed number and distribution of high school units in three years, with the exception of fourth-year English and/or history, may seek admission under an Early Admission Program. Please contact the Undergraduate Admissions Office for details.

Transfer credit

Students who have completed studies at another accredited college before coming to RIT will be awarded transfer credit for all prior course work that is judged to be applicable to their RIT program. Usually a grade of C or better is required for a course to transfer.

Deaf and hard-of-hearing students may transfer into an NTID program, or they may qualify for transfer directly into a program in another RIT college with NTID sponsorship. Deaf students accepted to NTID's Summer Vestibule Program will have their transfer credit evaluated in the fall when they are accepted into a specific program.

Credit by exam

RIT grants credit for satisfactory scores on examinations covering objectives and contents parallel to the RIT courses for which students seek credit. Usually these are advanced placement (AP), college-level examination placement (CLEP), New York State proficiency examinations or RIT-prepared examinations.

Diagnostic testing in mathematics

Students who are not sure about the appropriate mathematics course with which to begin their studies at RIT may contact the department of mathematics and statistics at 585-475-5780 to arrange for a special mathematics diagnostic test.

New York State immunization requirement

New York State Public Law 2165 requires that all matriculated students enrolled for more than six quarter credit hours in a term and born after January 1, 1957, must provide RIT's Student Health Center with proof that they have received the appropriate immunizations against measles, rubella and mumps. Immunization requirements include two measles vaccinations, at least one month apart, with a live virus, after January 1, 1968, and after the first birthday; and one vaccination each against mumps and rubella (after January 1, 1969, and after the first birthday). Additional information concerning the necessary documentation and where it must be sent is included with the Admissions Office acceptance packet or available from the Student Health Center office.

Admissions services and campus visits

Selecting the appropriate college is a difficult decision, and visiting a campus often helps students form more accurate impressions. We encourage campus visits and personal admission interviews because they allow students to see our outstanding facilities firsthand and get answers to questions they may have while examining personal, academic, and career goals.

Experienced admissions counselors are available to provide information and assist students in exploring academic options. Students may choose to participate in Admissions Open House programs or arrange personal interviews and campus tours. These options are not required for admission.

An appointment for an admissions interview and campus tour may be scheduled by contacting the Undergraduate Admissions Office, Bausch & Lomb Center, 60 Lomb Memorial Drive, Rochester, N.Y., 14623-5604, sending e-mail to visit@rit.edu, or calling 585-475-6631 (Monday through Friday, 8:30 a.m. to 4:30 p.m.).

Deaf and hard-of-hearing students who wish to enter NTID or another RIT college may contact the NTID Office of Admissions, Lyndon Baines Johnson Building, 52 Lomb Memorial Drive, Rochester, N.Y. 14623-5604, or call 585-475-6700 (voice/TTY). Office hours are Monday through Friday, 8:30 to 4:30 p.m.

Part-time and Graduate Enrollment Services

These offices provide central information and counseling services for students interested in enrolling in graduate degree programs or in part-time undergraduate studies offered through RIT's various schools and colleges. We encourage you to contact them if you need assistance in selecting an academic program, exploring financial aid opportunities, registering for classes or receiving information about any aspect of part-time or graduate study at RIT.

Staff members are available to assist you from 8:30 a.m. to 6 p.m., Monday through Thursday, and from 8:30 a.m. to 4:30 p.m., Friday. We invite you to visit our Web site at www.rit.edu, call 585-475-2229 for enrollment information, or visit the offices on the first floor of the Bausch & Lomb Center on campus.

Freshman Admission Guidelines

College	Academic Programs	High School Preparation Required ¹
Applied Science and Technology	Engineering Technology: Civil, Computer, Electrical, Electrical/Mechanical, Manufacturing, Mechanical, and Telecommunications Engineering Technology programs; Undeclared Option ¹	Algebra, geometry, trigonometry, and two years of science (including physics or chemistry) required. Technology courses desirable.
	Environmental Management: Environmental Management, Safety Technology	Three years of mathematics, including trigonometry, and two years of science (including physics or chemistry).
	School of Hospitality and Service Management: Food Management, Hotel/Resort Management, Nutrition Management, Travel Management, Food Marketing and Distribution, Undeclared Option ²	College preparatory program including algebra, geometry, and two years of science. Chemistry required for Nutrition Management program.
	Multidisciplinary Studies: Applied Arts and Science	Freshmen should apply to RIT Exploration Program in the College of Liberal Arts.
	Packaging Science: Management, Technical and Printing Options	Algebra and two years of science required. Technical option requires geometry and trigonometry.
Business	Accounting, Finance, Graphic Media Marketing, International Business, Management, Management Information Systems, Marketing, Undeclared Business Option ¹	College preparatory program including algebra, geometry, and two years of science. Trigonometry and courses emphasizing writing skills also desirable.
Computing and Information Sciences	Applied Networking and System Administration	Algebra, geometry and two years of science required. Physics, chemistry, computing and technology courses recommended.
	Computer Science	Algebra, geometry, trigonometry and two years of science required.
	Information Technology, New Media/Information Technology	Algebra, geometry and two years of science required. Technology courses desirable.
	Software Engineering	Algebra, geometry, trigonometry, chemistry, and physics required.
Engineering	Computer, Computer/Software, Electrical, Electrical/Biomedical, Electrical/Computer, Industrial and Systems, Industrial/Ergonomics, Industrial/Manufacturing, Mechanical, Mechanical/Aerospace, Mechanical/Automotive, and Microelectronic Engineering programs; Engineering Exploration Program ¹	Four years of mathematics required (algebra, geometry, trigonometry, and precalculus). Physics and chemistry required for all programs. Biology also required for Electrical/Biomedical Engineering option.
Imaging Arts and Sciences	School of Art: Fine Arts Studio, Illustration, Medical Illustration, Undeclared Option ¹	Studio art experience in addition to a balanced academic program with courses in English, social studies, mathematics and science. Mechanical drawing is also desirable for Industrial or Interior Design applicants. Medical Illustration program requires two years of science (biology preferred). A portfolio of original artwork is required for all programs, with drawing skills being most important. Craft students should also show examples of work in their area of interest, if possible.
	School of Design: Graphic Design, Industrial Design, Interior Design, New Media/Design, Undeclared Option ¹	
	School for American Crafts: Ceramics/Ceramic Sculpture, Glass/Glass Sculpture, Metals/Jewelry Design, Woodworking/Furniture Design, Undeclared Option ¹	
	School of Film and Animation: Film and Animation	College preparatory program including two years of mathematics and two years of science.
	School of Photographic Arts and Sciences: Advertising Photography, Fine Art Photography, Photojournalism, Biomedical Photographic Communication, Imaging and Photographic Technology, Visual Media	College preparatory program including two years of mathematics and two years of science. Biology required for Biomedical Photographic Communication.
School of Print Media: Graphic Media, New Media/Publishing	Algebra, trigonometry, and two years of science (physics or chemistry preferred).	
Liberal Arts	Criminal Justice, Economics, International Studies, Professional and Technical Communication, Social Work, Psychology, Public Policy, RIT Exploration Program ⁵	College preparatory program including algebra, geometry, and two years of science required. Trigonometry also required for Public Policy.
NTID	Accounting Technology, Administrative Support Technology, Applied Computer Technology, Applied Optical Technology, Art and Computer Design, ASL-English Interpretation, Automation Technologies, Business, Business Technology, Computer Aided Drafting Technology, Computer Integrated Machining Technology, Digital Imaging and Publishing Technology, Laboratory Science Technology, Pre-baccalaureate Studies	General college preparatory courses in science, mathematics and English. See program descriptions for specific requirements, or contact NTID Department of Admissions, 585-475-6700 (voice/TTY).
Science	Applied Mathematics, Applied Statistics, Computational Mathematics	Algebra, geometry, trigonometry, and two years of science required. Additional mathematics recommended.
	Biology, Bioinformatics, Biotechnology	Algebra, geometry, trigonometry, biology, and chemistry required.
	Biochemistry, Chemistry, Environmental Chemistry, Polymer Chemistry	Algebra, geometry, trigonometry, chemistry, and one science elective required.
	Environmental Science	Algebra, geometry, trigonometry, biology, and chemistry required.
	Physics	Algebra, geometry, trigonometry, physics, and one science elective required.
	Biomedical Computing, Diagnostic Medical Sonography (Ultrasound), Physician Assistant	Algebra, geometry, trigonometry, and biology required for all programs. Chemistry or physics required or Biomedical Computing, and Ultrasound programs. Chemistry required for Physician Assistant program.
	General Science Exploration, ² Premedical Studies ⁴	Algebra, geometry, trigonometry, biology, chemistry, and physics are recommended.
Center for Imaging Science: Imaging Science	Algebra, geometry, trigonometry, chemistry and one science elective required. Calculus and physics desirable.	

¹ Students attending high schools in New York State should note that algebra, geometry, and trigonometry are the equivalent of Mathematics Course I, II, and III.

² A one-year program for students wishing to explore alternatives before selecting a specific degree program within this RIT college or school.

³ A one-year program for students undecided on a major who wish to explore program options in one or more of RIT's colleges.

⁴ Students interested in premedicine, predentistry, preveterinary, or preoptometry may select any major in the College of Science.

Transfer Admission Guidelines

College	Program at RIT	Co-op ¹	Entry Term	Appropriate Associate Degree Programs for Transfer	Transfer Course Recommendations without Associate Degree
Applied Science and Technology	Engineering Technology: Civil Engineering Technology	1	Fall preferred	Civil, Construction, Environmental, Architectural, Transportation or Surveying Technology; Engineering Science	Courses in mathematics, science and engineering technology.
	Computer Engineering Technology	1	Fall preferred	Computer Technology, Electrical or Electronic Technology or Computer Science	Courses in computer science, math, science and engineering technology.
	Manufacturing Engineering Technology	i	Fall preferred	Manufacturing, Mechanical, Drafting and Design, Robotics or Electromechanical Technology; Engineering Science	Courses in mathematics, science and engineering technology.
	Electrical Engineering Technology	1	Fall preferred	Electrical Technology, Electronic Technology, Engineering Science	Courses in mathematics, science and engineering technology.
	Mechanical Engineering Technology	1	Fall preferred	Mechanical, Design and Drafting, Air Conditioning or Electromechanical Technology; Engineering Science	Courses in mathematics, science and engineering technology.
	Telecommunications Engineering Technology	1	Fall preferred	Telecommunications, Electrical or Electronic Technology; Engineering Science	Courses in mathematics, science and engineering technology.
	Environmental Management: Environmental Management & Technology Safety Technology	1	Any quarter	Biology, Chemistry or Environmental Sciences; Business or Public Administration: Liberal Arts with math/science	Math through Calculus I, micro and macro economics, introductory courses in biology, chemistry and physics.
	School of Hospitality and Service Management Food Management Food Marketing & Distribution Hotel/Resort Management Nutrition Management Travel Management	1	Any quarter	Dietetics or Nutrition, Foodservice Management, Hotel/Resort Management, Travel/Tourism Management, Agriculture, Technology, Business or Liberal Arts	Courses in business and economics, foreign language, math, science and liberal arts. Science courses are required for Nutrition Management program.
	Multidisciplinary Studies: Applied Arts and Science	2	Any quarter	Transfer from associate degree programs considered on individual basis.	Courses in liberal arts, sciences and math.
	Packaging Science: Management Option Technical Option Printing Option	1	Any quarter	Business Administration, Marketing, Management, Graphic Arts, Engineering Science, Liberal Arts with math/science	Courses in business, mathematics, science, liberal arts, statistics or computer science.
Business	Accounting	1	Any quarter	Accounting or AS degree in Business Administration	Courses in economics, accounting, liberal arts, science and mathematics.
	Finance	1	Any quarter	AS degree in Business Administration or Liberal Arts	Courses in economics, liberal arts, science and mathematics.
	Graphic Media Marketing International Business Management Marketing				
	Management Information Systems	1	Any quarter	Data Processing/Management Information Systems or AS in Business Administration	Courses in liberal arts, math, science, economics and computer science.
Computing and Information Sciences	Computer Science Software Engineering	1	Fall preferred	Computer Science Engineering Science	Courses in computer science, calculus, liberal arts; calculus-based physics, chemistry or biology.
	Applied Networking and System Administration Information Technology New Media/Information Technology	1	Any quarter	Computer Applications, Computer Science Information Systems	Courses in programming, computer applications, calculus, lab sciences, liberal arts.
	Computer Engineering Electrical Engineering Electrical/Biomedical Option Electrical/Computer Option Industrial and Systems Engineering Mechanical Engineering Mechanical/Aerospace Option Mechanical/Automotive Option Microelectronic Engineering	1	Fall preferred	AS degree in Engineering Science (plus computer science electives for computer engineering applicants)	Pre-engineering courses such as calculus, calculus-based physics, chemistry and liberal arts. Computer science courses for computer engineering applicants.
Engineering	Transfer Adjustment: Electrical Engineering only		Summer only	AAS degree in Electrical Technology with one year of engineering calculus	
	School of Art: Fine Arts Studio Illustration Medical Illustration	4	Fall only	Related programs or studio art experience in desired disciplines. A portfolio of original artwork is required to determine admission, studio art credit and year level in the program.	Courses in studio art, art history and liberal arts. Portfolio of original artwork is required to determine admission, studio art credit and year level within the program.
Imaging Arts and Sciences	School of Design: Graphic Design Industrial Design Interior Design New Media/Design & Imaging				
	Transfer Adjustment: All Art and Design programs		Summer only	Summer courses can lead to third-year status in most programs.	

¹ Cooperative Education: 1-required, 2-optional, 3-internship or practicum required, 4-no specific requirement

Continued on next page

Transfer Admission Guidelines *(continued)*

College	Program at RIT	Co-op ¹	Entry Term	Appropriate Associate Degree Programs for Transfer	Transfer Course Recommendations without Associate Degree
Imaging Arts and Sciences	School for American Crafts: Ceramics/Ceramic Sculpture, Glass/Glass Sculpture, Metals/Jewelry Design, Woodworking/Furniture Design	4	Fall only	Transfer as a third-year student is uncommon, as comparable programs are not generally available at other colleges. A portfolio of original artwork is required.	Courses in art history, studio art and liberal arts. Portfolio of original artwork is required to determine admission, studio art credit and year level within the program.
	School of Film and Animation: Film and Animation	2	Fall preferred	No common program available.	Courses in liberal arts, science, design, drawing, and film, video or animation.
	School of Photographic Arts and Sciences: Biomedical Photographic Communications	3	Fall preferred	No common program available.	Courses in biology, photography and liberal arts. Portfolio required for photo credit.
	Imaging and Photographic Technology	1	Fall preferred	No common program available.	Courses in college physics, mathematics, photography and liberal arts. Portfolio required for photo credit.
	Imaging Systems Management	3	Fall preferred	AS in Business Administration or Management or AAS in Photography	Courses in business, economics and liberal arts.
	Advertising Photography, Fine Art Photography, Photojournalism, Visual Media	4	Fall preferred	Applied Photography, Portfolio required for photo transfer credit.	Courses in liberal arts, photography, design and art history. Portfolio required for photo transfer credit.
	Transfer adjustment: Available in all photography programs		Summer only	Transfer adjustment leading to second- or third-year status in most programs	
School of Print Media: Graphic Media New Media/Publishing	1	No summer entry	Transfer from associate degree programs considered on an individual basis.	Courses in liberal arts, college math, physics and chemistry, business	
Liberal Arts	Criminal Justice	2 or 3	Any quarter	Criminal Justice, Human Services or Liberal Arts.	Courses in criminal justice or related areas, liberal arts, math and science.
	Economics	2	Any quarter	AS degree in Business Administration or Liberal Arts.	Courses in business, liberal arts, math, science and computer science.
	International Studies	2	Any quarter	Liberal Arts with social sciences, sciences, languages.	Courses in liberal arts, social sciences sciences, languages.
	Professional and Technical Communication	1	Any quarter	Liberal Arts with emphasis in communication and a technical field such as business, photography or computer science.	Courses in liberal arts, math, science and computer science.
	Psychology	1 or 3	Any quarter	Liberal Arts with science or social science.	Courses in liberal arts, sciences, social sciences.
	Public Policy	1	Any quarter	Liberal Arts, Environmental Studies, Economics, Government, Science.	Courses in liberal arts, sciences, social sciences.
	Social Work	3	Any quarter	Human Services or Liberal Arts with Human Services minor.	Courses in liberal arts, math, and sciences.
NTID²	Accounting Technology, Administrative Support Technology, Applied Computer Technology, Applied Optical Technology, Art and Computer Design, ASL-English Interpretation, Automation Technologies, Business, Business Technology, Computer Aided Drafting Technology, Computer Integrated Machining Technology, Digital Imaging and Publishing Technology, Laboratory Science Technology, Pre-Baccalaureate Studies			Transfer requirements vary by program. Please contact NTID Office of Admissions 585-475-6700 (voice/TTY).	Transfer requirements vary by program.
Science³	Biology	2	Fall preferred	Biology or Liberal Arts with biology option.	Courses in liberal arts, sciences or math.
	Biomedical Computing	2	Fall preferred	Computer Science, Liberal Arts with biology option or General Science	Courses in liberal arts, sciences, math and computer science.
	Bioinformatics, Biotechnology	2	Fall preferred	Biotechnology or Liberal Arts with biology	Courses in liberal arts, sciences and math.
	Biochemistry, Chemistry, Environmental Chemistry Option, Polymer Chemistry	2	Any quarter	Liberal Arts with chemistry option: Chemical Technology, Laboratory Technology.	Courses in liberal arts, chemistry, math and physics.
	Diagnostic Medical Sonography	3	Fall preferred	Liberal Arts with science option: Allied Health; Radiologic Technology.	Courses in liberal arts, sciences, and math.
	Environmental Science	2	Fall preferred	Biology, Chemistry, Environmental Science, Liberal Arts with science option.	Courses in liberal arts, sciences and math.
	Applied Mathematics Computational Mathematics Applied Statistics	2	Any quarter	Liberal Arts with math/science option, Computer Science, Engineering Science, Sciences.	Courses in math, computer science and liberal arts.
	Physician Assistant	3	Fall only	Liberal Arts with science option: Allied Health areas.	Courses in liberal arts, sciences and math.
	Physics	2	Fall preferred	Liberal Arts with math/science option.	Liberal arts, physics, math, chemistry.
	Center for Imaging Science: Imaging Science	2	Fall preferred	No common program available.	Courses in calculus or higher mathematics, college chemistry, calculus-based physics and liberal arts.

¹ Cooperative Education: 1-required, 2-optional, 3-internship or practicum required, 4-no specific requirement

² For more information about transferring into one of NTID's programs, contact NTID's Department of Admissions, 585-475-6700 (voice/TTY).

³ Students interested in premedicine, predentistry or preveterinary may select any major in the College of Science. An adviser will assist in selecting appropriate course work.

Expenses and Financial Aid

Costs and Payment Procedures: Matriculated Day College Students

Charges for tuition, fees, room and board are computed on a quarterly basis. Quarterly bills are mailed approximately four weeks before the beginning of the quarter. A convenient electronic billing option is also available. Payment sent by mail should be made by check, payable to Rochester Institute of Technology. Payments can also be made online at <http://ipay.rit.edu/> Due dates for the 2004-05 school year are as follows:

Fall quarter August 25, 2004
Winter quarter November 23, 2004
Spring quarter March 2, 2005
Summer quarter June 1, 2005

Tuition assessment policies

1. Matriculated day college students are charged the day rate for ALL courses taken, including Evening Division courses and courses taken while on co-op.
2. Students on co-op will not be charged tuition for those quarters unless they are also enrolled in classes.

3. Nonmatriculated students are charged for the type of course taken (evening rate for Evening Division courses; the tier 2 day rate for day courses; graduate rate for graduate courses).
4. Students taking courses during summer quarter should refer to the Summer Quarter Bulletin for policies and procedures.

Online Payment Center

The Bursar's Office offers a Web-based payment application that accepts and updates payments on student accounts in real time and payments to food and flex accounts within one business day. Students/parents can conveniently make payments by supplying their student's RIT identification number and date of birth. Payments via Visa or MasterCard are accepted through a secure SSL Web site and updated accordingly. The URL for this e-commerce application is <http://ipay.rit.edu/> and there are links on both the Bursar's Office's Web page and the Info-Center/SIS.

FEE SCHEDULE 2004-05 (MATRICULATED DAY COLLEGE STUDENTS EXCEPT NTID) *

Tuition	Per Quarter	Per Year – 3 Quarters
Full-time Undergraduate (12-18 Credit Hrs.)		
Tier 1†	\$7,149	\$21,447
Tier 2‡	\$7,352	\$22,056
Part-time Undergraduate (Less than 12 Credit Hrs.)		
Tier 1	477/Cr. Hr.	477/Cr. Hr.
Tier 2	491/Cr. Hr.	491/Cr. Hr.
Student Activities Fee (Mandatory Charge)		
Full-time Undergraduate	58	174
Part-time Undergraduate	29	87
Student Health Fee (Mandatory Charge)		
Full-time Undergraduate	61	183
Residence Hall Room Charges §		
Double Occupancy	1,551	4,653
Single Occupancy	1,785	5,355
Board/Meal Plans **		
20-Meal Plan (Debit account optional) + 5 meal options	1,195	3,585
Any 14 Plus (Includes \$60 debit per qtr.) + 3 meal options	1,161	3,483
Any 12 Plus (Includes \$100 debit per qtr.) + 3 meal options	1,161	3,483
All Debit (upperclassmen only)	1,161	3,483

* See page 131.

† Tier 1: For day undergraduate students who matriculated and enrolled at the Institute prior to the 2003-2004 school year.

‡ Tier 2: For day undergraduate students who matriculated and enrolled at the Institute during the 2003-2004 school year and after.

§ Additional single-occupancy rates are available depending on square footage of rooms.

**Additional meal plans are also available providing for different meal and debit account amounts. Information can be obtained from RIT Food Service upon request.

Electronic Billing and Payment Presentation (EBPP)

The Bursar's Office offers an electronic billing option for both our quarterly and monthly billing statements. This option enables students and parents to access their billing statements through a secure SSL Web site and link to the Online Payment Center to conveniently make their payment. At the time of each billing, an e-mail is generated to those who select this option.

You may simply click on the URL and link to a PIN-number-protected site to access the bill. The Bursar's Office Web site at <http://finweb.rit.edu/Bursar/> offers directions if you are interested in our EBPP application.

Other fees

In addition to the fees specified below, certain groups of students may incur other fees, as follows:

Orientation fee	\$80
(one-time charge for new transfer students)	
Orientation fee	\$165
(one-time charge for new freshman students)	
Quarterly photo/print facilities fee	\$90
(charged to all full-time photo and print media students; \$45 per quarter charged to all part-time photo and print media students)	

Costs for books and supplies

These costs vary with the program followed and, to some extent, the electives chosen. In programs with minimal expenses (e.g., liberal arts, business, hospitality), books and supplies will average \$600 or more annually; in the arts and crafts, costs may range from \$900 to \$1,100; and in photographic illustration, a realistic allowance is \$2,000 per year in addition to cameras.

Student Accident and Sickness Insurance

All registered students are required to maintain medical insurance while attending RIT. Insurance coverage can be through RIT, a family member's policy or a personal policy.

A Student Accident and Sickness Insurance plan is available through RIT. There is a separate charge for this insurance. The plan provides coverage, within limits specified in the policy, for sickness and injury, outpatient services, emergency care and prescriptions.

Beginning with the 2004-05 year, enrollment in this plan is voluntary for all students except registered F-Visa international students.

There is no need to waive coverage if coverage is not desired. Students who want to enroll in this plan may enroll online or by mail. An open enrollment period is available at the beginning of each academic quarter. Payment can be made by check, money order, credit card or the premium can be added to the student's account.

F-Visa international students will be automatically enrolled.

For plan and enrollment information visit www.universityhealthplans.com or call 800-437-6448. The RIT Student Accident and Sickness Insurance is not required to receive services at the RIT Student Health Center.

Vocational Rehabilitation

1. Students receiving Vocational Rehabilitation support for fees and tuition must file authorization with RIT's VR billing supervisor before registration. If authorization has not been received before registration, students must either obtain from their VR counselors a letter of commitment stating the dollar amount that is authorized and present it to the VR billing supervisor or be prepared to pay for the charges in question. If authorization is received after a student has paid the charges, he or she will receive a refund.
2. Students must pay all charges not paid by VR before the quarterly due date.
3. VR counselors should specify each charge that they are covering on their authorization forms.
4. Clarification of VR authorization and/or billing procedures should be addressed to:
Rochester Institute of Technology
NTID/VR Supervisor
Bursar's Office
25 Lomb Memorial Drive
Rochester, N.Y. 14623-5603
NTID students receiving monthly Social Security benefits can make arrangements to pay at the Bursar's office. Students need to sign a promissory note quarterly with the Bursar's office. For additional information, call 585-475-2080 (voice/TTY) or -5489 (voice/TTY).

Financial standing

Students, former students, and graduates are in good financial standing when their account is paid in full in the Bursar's Office. A late payment fee will be charged to all student accounts that become past due. This includes, but is not limited to, the deferred payment accounts that become past due. Those whose account is not paid in full will not receive transcripts, diplomas, or other forms of recognition or recommendation from the Institute.

THE INSTITUTE RESERVES THE RIGHT TO CHANGE ITS PRICES AND PRICING POLICIES WITHOUT PRIOR NOTICE.

Costs and Payment Procedures: Evening Division Students

Charges at RIT are computed on a quarterly basis. Quarterly bills are mailed approximately four weeks before the beginning of each quarter. Payments sent by mail should be made by check, payable to Rochester Institute of Technology. Payments can also be made online at <http://ipay.rit.edu>. Registration and billing procedures are published each quarter in the "Schedule of Courses." Due dates for the 2004-05 school year are as follows:

Fall quarter	August 25, 2004
Winter quarter	November 23, 2004
Spring quarter	March 2, 2005
Summer quarter	June 1, 2005

FEE SCHEDULE (Matriculated Evening Division students)

Undergraduate Tuition \$330/credit hour

Other fees

Some courses require additional charges to cover laboratory, studio or supply fees. (Consult the registrar's quarterly schedule for those courses with additional fees.)

Tuition assessment policies

1. Matriculated students are assessed the tuition rate associated with their program, regardless of the courses taken.
2. Nonmatriculated students are assessed tuition consistent with the program(s) in which their course(s) are offered.
3. Students taking courses during summer quarter should refer to the Summer Quarter Bulletin for policies and procedures.

Refund Policies

The acceptable reasons for withdrawal with *full refund* during the quarter are:

1. Active military service: A student called to active military service during the first eight weeks of the term may receive a full tuition refund. If called after the eighth week, he or she may elect to complete the course by making special arrangements with both the instructor and department or may withdraw and receive a full tuition refund. If he or she withdraws, the course must be repeated at a later date.
2. Academic reasons: Students sometimes register before grades for the previous quarter are available. If such a student later finds that he or she is subject to academic suspension or has failed prerequisites, the student will be given a full refund upon withdrawal.
3. If part-time students drop a course during the official drop/add period (first six days of classes in any quarter), they may contact the Bursar's Office for a full refund for the course dropped.

A full-time student must officially withdraw from **all courses or take a leave of absence from the Institute in order to be eligible for a partial tuition refund**. Students must complete a leave of absence or withdrawal, which can be initiated with their academic department. A partial refund will be made during a quarter if withdrawal/leave of absence is necessitated for one of the following reasons:

1. Illness, certified by the attending physician, causing excessive absence from classes
2. Withdrawal for academic or disciplinary reasons at the request of the Institute during a quarter
3. Transfer by employer, making class attendance impossible
4. Withdrawal for academic, disciplinary or personal reasons at the request of the student, approved by the student's adviser or department representative and the bursar.

Partial refund schedule: Tuition

Partial refunds will be made according to the following withdrawal schedule and percentage of tuition reduction:

1. During official drop/add period (first six days of classes) – 100 percent tuition reduction
2. From the end of the official drop/add period through the end of the second week of classes – 70 percent tuition reduction
3. During the third week of classes – 60 percent tuition reduction
4. During the fourth week of classes – 50 percent tuition reduction
5. During the fifth week of classes – 25 percent tuition reduction
6. Sixth and subsequent weeks – no tuition reduction

NOTE: NONATTENDANCE DOES NOT CONSTITUTE AN OFFICIAL WITHDRAWAL.

A student is not "officially withdrawn" until he or she receives a copy of the withdrawal form. The date on which a withdrawal form is properly completed will be the date of

"official withdrawal" used to determine the refundable amount.

If the student drops his or her course load from full-time (12 or more credits) to part-time (less than 12 credits) status during the official drop/add period, he or she may contact the Bursar's Office for a refund based on the difference between the full-time tuition charge and the total per-credit charge for the part-time load.

No refund will be made for classes dropped after the official drop/add period unless the student is officially withdrawing from the Institute.

Advance deposits are not refundable.

If institutional charges are reduced due to withdrawals, financial aid programs are reimbursed before a cash refund is issued to the student. The student is also responsible for any unpaid balance at the time of withdrawal. Aid programs are reimbursed in the following sequence: Federal Direct Loans, Perkins Loans, Federal Pell Grants, Federal SEOG, other financial aid, state aid, institutional aid. If a credit balance still remains, the student is then issued a refund.

For further information or comments regarding refund policies and specific withdrawal dates, contact the Bursar's Office.

Appeals process

An official appeals process exists for those who feel that individual circumstances warrant exceptions from published policy. The inquiry in this process should be made to Richard Schonblom, Bursar.

Any student who intentionally defrauds or attempts to defraud the Institute of tuition, fees, or other charges, or who gives false information in order to obtain financial aid, is subject to legal liability, prosecution, and Institute disciplinary action.

Room and board*

To complete a withdrawal from RIT, a resident student must check out with Housing Operations. All students on a meal plan should check out with the Food Service administrative office, located in the Student Alumni Union, room A520 (lower level). Refunds, when granted, are from the date of official check out.

Partial refund schedule: Room and board

Room

1. During the first week of classes – 90 percent of unused room charge
2. During the second week of classes – 75 percent of unused room charge
3. During the third week of classes – 60 percent of unused room charge
4. During the fourth week of classes – 50 percent of unused room charge
5. Fifth and subsequent weeks – no refund

Board

1. Within the first four weeks, 75 percent of the unused meal/debit charges is refunded.
2. After the fourth week (during week five through the end of week eight), 50 percent of the unused meal/debit charges is refunded.
3. During the last two weeks of classes, no refund is given.

* Room and board policies are established by the Center for Residence Life and Food Service.

Financial Aid

We feel strongly that no qualified student should refuse to consider RIT because of cost. With this in mind, RIT offers a full range of traditional financial aid programs and a number of innovative financing plans as well.

In 2002-2003, more than 9,500 full-time undergraduate students received financial aid awards from RIT. These students qualified for over \$137 million in financial assistance from federal, state and institutional sources. Many families also took advantage of RIT's monthly, interest-free payment plan and a prepayment plan that guarantees participants no increase in tuition (the RIT Tuition Prepayment Plan).

Your financial need

Eligibility for need-based financial aid at RIT begins with three basic requirements: graduation from high school or its equivalent, enrollment in a degree program (matriculation), and demonstration of financial need. Most financial aid programs also require at least half-time enrollment.

Financial need is the difference between the cost of education and the amount a student and his or her family are expected to contribute toward those educational costs (the expected family contribution). The formula used to calculate the expected family contribution is called the federal methodology, and use of the formula is required when colleges are determining a student's financial need for any federal financial aid programs. Financial aid programs are designed to supplement the expected family contribution.

The Free Application for Federal Student Aid (FAFSA) should be completed in order to determine a student's financial need. Information on the FAFSA is used to calculate the expected family contribution. All colleges and universities who award federal financial aid use the FAFSA. The FAFSA is available in high school guidance offices, college financial aid offices and in most public libraries. Students can also complete the FAFSA online at www.fafsa.ed.gov/.

Determination of financial aid eligibility can be complex; therefore, families are encouraged to contact the Office of Financial Aid with any questions or concerns. It is impossible for families to determine their eligibility for financial aid on their own. If students are denied financial aid from one source that does not necessarily mean that they will be denied financial aid from another source. Students and families are encouraged to pursue all available sources of financial aid.

Application

The process of applying for financial aid should begin in January of the year the student plans to attend college. It is important that freshman and transfer applicants file the FAFSA by March 1 in order to receive full consideration. Current RIT students should file the FAFSA and the RIT Financial Aid Form by April 1 in order to receive full consideration.

Students must reapply for financial aid each year by completing the FAFSA and the RIT form. Additionally, students must maintain minimum standards of satisfactory academic progress as described on page 378. The Office of Financial Aid will make every effort to provide a similar amount of financial aid provided students apply on time and demonstrate a similar amount of financial need.

Notification

Freshman and transfer students may expect notification of financial aid awards beginning March 15. Current RIT students may expect award notification beginning in June.

Types of aid

At RIT there are four general categories of financial aid: scholarships, grants, loans and employment. An applicant for financial aid is considered for each of these categories.

- **Scholarships** are generally awarded on the basis of academic record. RIT awards many such scholarships each year. Other typical scholarship sources are competitions, corporations, private donors, foundations, fraternal organizations, unions, and local and state governments.
RIT offers academic merit scholarships to both freshmen and transfer students. For example, Presidential scholarships and Computing Medal scholarships are awarded to freshmen. Trustee scholarships and Phi Theta Kappa scholarships are awarded to transfer students. Winners are chosen on the basis of their academic record, recommendations, extracurricular activities and requirements for their intended major. The combined value of merit scholarships from all sources cannot exceed tuition. Please contact the Undergraduate Admissions Office for more details on these programs.
- **Grants** are gifts of financial assistance that are awarded on the basis of demonstrated need. RIT awards institutional grants that vary from \$500 to \$15,000 for the academic year. RIT also awards grants under the federally funded Supplemental Education Opportunity Grant (SEOG) program. The federal Pell Grant and New York Tuition Assistance Program (TAP) are additional examples of grants. Many other states offer grants, as well.
- **Student loans** are monies provided through a formal financial obligation that must be repaid. You need to be aware of the interest charges, the method of payment after graduation and the effect that loans will have on your ability to meet all of your later financial obligations. Student loans are generally not repaid until after graduation or termination of study.

Many students will utilize the Subsidized Federal Direct Loan or the Unsubsidized Federal Direct Loan in meeting their costs. RIT also awards Federal Perkins Loans. These programs are administered by the Office of Financial Aid for eligible students as part of financial aid awards.

Parents are also eligible to participate in several educational loan programs designed to make funds available for college expenses. Federal PLUS Loans are available to supplement other aid programs in meeting educational costs. While the parent loan is not based on need, the amount borrowed in any year cannot exceed educational costs minus other financial aid received.

RIT has also developed special loan programs with private lenders to assist families in meeting educational expenses. These loans are available to both parents and students, using variable or fixed rates of interest. Additional information is available from the Office of Financial Aid.

- **Employment** opportunities are also available to assist RIT students in meeting college expenses. Whether or not students seek financial aid, they may choose to defray some of their expenses through student employment while attending the Institute.

As part of a financial aid award at RIT, students may be offered employment in the Federal Work-Study program. More than 5,000 students are employed on campus each year. The Student Employment Office also helps a number of students secure part-time employment off campus. **Full-time salaried employment through RIT's cooperative education program can also contribute to meeting college expenses.** RIT students on co-op earned in excess of \$20 million from employment last year. Students are encouraged to contact the Office of Cooperative Education and Career Services for additional salary data.

- **NTID Grant-in-Aid**
Federal Grant-in-Aid funds, awarded on the basis of financial need, are an important source of financial aid for NTID-sponsored students who do not have adequate financial resources from the sum of their parental and personal contributions and assistance from outside agencies to cover educational costs.
- **Outside Scholarships**
The Office of Financial Aid encourages students to apply for scholarships awarded by private organizations. This is an excellent source of funding and may reduce the need to borrow. In many cases, no alterations to a student's financial aid award are necessary. If we are required by federal regulations to amend a financial aid award as a result of receipt of an outside scholarship, we will make every effort to reduce the student's loan or work award before reducing RIT need-based grants.

Payment plans

The RIT Monthly Payment Plan combines the elements of a deferred payment plan and a prepayment plan to allow students and their families to finance educational costs over a 10-month period. Participating families make their first payment by August 1 preceding the academic year in which it would be utilized. Fixed costs include: tuition, fees, residence hall charges and RIT meal plans. The enrollment deposit required of all new undergraduates and the advance housing deposit, required of returning students, will be credited against annual charges. Financial aid may also be deducted from student charges to reduce the amount financed through the plan. Applications cannot be accepted after the first day of fall quarter classes for the academic year.

Additional information as well as applications for the monthly payment plan may be obtained from the Bursar's Office.

RIT also offers a Tuition Prepayment Plan, a prepaid plan that guarantees no tuition increases for the equivalent of two or four years (six or 12 academic quarters) of undergraduate education. The cost for the plan is established each year but is generally less than tuition at the current rate. The plan is available to matriculated full-time undergraduate RIT students who are not receiving any form of RIT need-based grants. Additional information is available from the Office of Financial Aid or the Bursar's Office.

NTID-sponsored students may contact the NTID/VR Billing Department at 585-475-2080 (voice/TTY) or 585-475-5489 (voice/TTY) for more information about payment options.

Academic Progress Requirements for State Aid Programs

New York State Tuition Assistance Program (TAP)

In order to receive a Tuition Assistance Program grant, an individual must be admitted as a full-time matriculated student, meet New York State residency and income requirements, must pursue the program of study in which he or she is enrolled, and must make satisfactory progress toward completion of his or her program of study. The three tables on page 379 list the approved standards of satisfactory progress for associate, bachelor's, and graduate degrees, respectively.

In addition to accruing degree credits and earning a minimum grade point average as specified in the tables on page 379, TAP recipients must:

1. Complete 6 credits per quarter to receive TAP payments 2 to 4
2. Complete 9 credits per quarter to receive TAP payments 5 to 7

3. Complete 12 credits per quarter to receive TAP payments 8 to 12.

Completion of a course is defined as meeting course requirements and receiving a letter grade of A, B, C, D, or F.

In addition, state regulations mandate that if a student repeats a course in which a passing grade acceptable to the institution was previously received, the repeated course does not count toward the minimum 12-credit-hour course load required for TAP and other state programs.

Waiver of academic progress standards for TAP

Students who have been denied Tuition Assistance Program benefits due to failure to maintain satisfactory standards of academic progress may *request* a one-term waiver of those standards. State regulations require that these waivers be granted only under extraordinary circumstances. Students failing to meet satisfactory progress standards will be given the opportunity to contact an institutional representative in the Office of Financial Aid to discuss their situation. The institutional representative will require documentation as appropriate and establish deadlines for submission of this documentation.

Under the regulations established by the Commissioner of Education, the decision of the institutional representative will be final. Students, who in the judgment of the institutional representative, satisfactorily meet the criteria for the waiver may have one waiver at the undergraduate level. One waiver may also be granted at the graduate level. Those wishing to apply for waivers must do so during the quarter in which notification of TAP denial was sent.

Reasons for which a waiver may be granted include the following:

1. Verifiable illness of the student or member of the student's immediate family during the quarter in which academic standards were not met
2. Death of a member of the student's family during the quarter in which standards were not met
3. Divorce/separation within the student's immediate family creating a demonstrable financial/emotional disruption sufficient to affect progress
4. Students may submit waiver applications for circumstances that the student feels were extenuating. Applicants must explain why circumstances were extenuating and beyond their control.

These regulations are subject to legislative change.

Academic Progress Requirements for Federal Aid Programs

Federal regulations require financial aid recipients to maintain minimum standards of satisfactory academic progress for continued receipt of federally sponsored aid. All students receiving federal assistance must maintain matriculated status in a degree program. Regulations require a maximum time frame for degree completion, a quantitative measurement (credits earned toward a degree), and a qualitative measurement (cumulative grade point average). The annual review of academic progress considers all terms of enrollment, including terms in which no federal aid was received.

Full-time students who have never attended another college are allowed a maximum of six academic years (18 full-time academic quarters) to attain the bachelor's degree. Those pursuing associate degrees are allowed three academic years (nine academic quarters) for degree completion.

Students enrolled in eligible certificate or diploma programs in colleges other than NTID must complete credit hours on a full-time equivalent basis. Certificate/diploma program students are allowed a maximum of 150 percent of the published number of quarters required to complete their program.

Academic progress is reviewed at the end of spring quarter each year and includes a review of cumulative grade point average and degree credits completed. Minimum cumulative grade point average standards for full- and part-time students in RIT or NTID programs are as follows:

Completion of:

- First quarter – Minimum Cumulative GPA = 1.0
- Second Quarter – Minimum Cumulative GPA = 1.2
- Third Quarter – Minimum Cumulative GPA = 1.4
- Fourth Quarter – Minimum Cumulative GPA = 1.6
- Fifth Quarter – Minimum Cumulative GPA = 1.8
- Quarters 6 to 18 – Minimum Cumulative GPA = 2.0

Full-time students in colleges other than NTID are expected to complete 30 degree credits after every three academic quarters as detailed on the following page.

Completion of:

- First Academic Year (3 Academic Qtrs.) – 30 degree credits required
- Second Academic Year (6 Academic Qtrs.) – 60 degree credits required
- Third Academic Year (9 Academic Qtrs.) – 90 degree credits required
- Fourth Academic Year (12 Academic Qtrs.) – 120 degree credits required
- Fifth Academic Year (15 Academic Qtrs.) – 150 degree credits required
- Sixth Academic Year (18 Academic Qtrs.) – 180 degree credits required

Part-time students must accumulate credit hours on a full-time equivalent basis.

Students enrolled in certificate, diploma or associate degree programs at NTID must meet the same grade point average standards as are required for other RIT colleges. However, for NTID programs, the qualitative standard is based on successful completion of 66 percent of annual credit hours attempted. In addition, the maximum time frame for program completion is equal to attempting a maximum of 150 percent of the published credit hours required for a particular NTID certificate, diploma or degree.

The federal standards of satisfactory academic progress listed are applicable to the following aid programs: Federal Work-Study, Federal Pell Grants, Federal SEOG Grants, Federal Perkins Loans, Federal Direct Subsidized Loans, Federal Direct Unsubsidized Loans, and Federal Direct PLUS Loans.

Student loan recipients should also note that all Federal Direct Loan Programs have specific annual and cumulative maximum amounts. The loan limits are listed in the Undergraduate Financial Aid Programs 2004-05 chart on page 381 and in the U.S. Department of Education "Student Guide." Copies of the guide are available in the Office of Financial Aid.

Notification and appeal

Students whose academic progress is not in compliance with federal requirements will be notified of the deficiency and advised of the appeal process. Copies of the policy are available upon request.

Standard of Satisfactory Progress for the Purpose of Determining Eligibility for New York State Student Aid*

Associate Degree – Quarter System

Before being certified for this payment	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
a student must have accrued at least this many credits	0	3	9	20	32	44	56	68	80
with at least this grade point average	0	.50	.75	1.00	1.20	1.30	2.00	2.00	2.00

Bachelor's Degree – Quarter System

Before being certified for this payment	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th
a student must have accrued at least this many credits	0	3	9	20	32	44	56	68	80	92	104	116	132	148	164
with at least this grade point average	0	.50	.75	1.00	1.20	1.30	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

† Only students in the HEOP program at RIT are eligible for more than 12 quarters of undergraduate awards.

Graduate Degree – Quarter System

Before being certified for this payment	1st	2nd	3rd	4th	5th	6th
a student must have accrued at least this many credits	0	12	24	36	48	60
with at least this grade point average	0	2.00	2.50	2.70	2.80	2.90

* Information correct as of March 2004

Academic Progress Requirements for RIT Grants and Scholarships

Academic progress requirements for full-time students receiving RIT-sponsored grants and scholarships that are need-based are consistent with the requirements for federal aid programs. Academic requirements and award duration for merit or special-purpose scholarship programs sponsored by RIT may differ from those used in RIT's need-based programs. Recipients are advised of merit scholarship terms and conditions at the time awards are made.

Additional Eligibility Requirements

Transfer students

Cumulative grade point average requirements are the same as for nontransfer students (i.e., students must obtain a 2.0 GPA at the end of six academic quarters). Transfer students also are expected to accumulate 30 degree credits for each three-quarter academic year. However, the maximum number of quarters allowed for full-time students to accumulate remaining degree credits may be reduced. For every 10 credits, or fraction thereof, granted as transfer credit by RIT, the maximum number of quarters to accumulate remaining degree credits is reduced by one. For example, a student transferring from another college and granted 30 transfer credits would have 15 rather than 18 quarters to accumulate remaining degree credits; the same student transferring to an associate degree program would be allowed six rather than nine quarters to complete the degree. The calculations used in the reduction in maximum quarters allowed for degree completion apply to both federal aid programs and RIT-sponsored awards (18 academic quarters maximum).

Part-time students

Students registering for six to 11.5 credits per quarter and receiving federal financial assistance must meet the same grade point average requirements as full-time students (i.e., attainment of a 2.0 GPA after six academic quarters). The established time frame for part-time students is 12 academic years (36 half-time quarters) for completion of bachelor's degree requirements. Associate degree candidates are allowed six academic years (18 half-time quarters) for degree completion. At the end of each three-quarter academic year, 15 credits must be accumulated toward the degree. Quarters in which a student is registered for less than six credit hours will be counted on a prorated basis toward the maximum time frame.

Student responsibilities

Recipients of financial aid are responsible for reporting any significant changes in their financial situation during the year to the director of Financial Aid, who will review and may revise the applicant's financial aid accordingly.

Financial Aid Refund Policy

Return of federal funds

In accordance with federal regulations, the Office of Financial Aid recalculates quarterly federal aid eligibility for students who withdraw, drop out, are suspended, or take a leave of absence prior to completing 60 percent of a quarter. "Withdrawal date" is defined as the actual date the student initiated the withdrawal process, or the student's last date of recorded attendance, or the midpoint of the quarter for a student who leaves without notifying the institution. Recalculation is based on the percent of earned aid using the following formula: number of days completed up to the withdrawal date/total days in the quarter. Aid returned to federal programs is then equal to (100 percent minus the percentage earned) multiplied by the amount of federal aid disbursed.

Funds are returned to the federal government in the following sequence: Federal Direct Unsubsidized Loans, Federal Direct Subsidized Loans, Federal Parent Loans, Federal Perkins Loans, Federal Pell Grants, Federal SEOG, other federal aid.

Late disbursement

If the student is otherwise eligible, the first disbursement of Federal Direct Subsidized Loan or Federal Direct Unsubsidized Loan proceeds is allowed up to 120 days after the student has ceased to be enrolled. Subsequent disbursements are not allowed.

State scholarships

Regulations vary. Any adjustments are done in accordance with the specific requirements of the sponsoring state.

Privately funded grants and scholarships

In the absence of specific instructions from the sponsor, 100 percent of the quarterly award will be credited to the student's account.

RIT grants and scholarships

If a credit balance remains after all federal, state and private adjustments, a percentage of the remaining credit balance is returned to the RIT scholarship account according to the following formula:

$\frac{\text{Scholarship}}{\text{Scholarship Plus Student Payments}}$	=	$\frac{\text{Percent Returned to Scholarship Program}}{\text{to Scholarship Program}}$	X	$\frac{\text{Remaining Credit Balance}}{\text{Credit Balance}}$
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UNDERGRADUATE FINANCIAL AID PROGRAMS 2004-05*

RIT FINANCIAL AID	WHO IS ELIGIBLE ?	CRITERIA FOR SELECTION	HOW MUCH? †	HOW AND WHEN TO APPLY
RIT grants and need-based scholarships	Full-time students who demonstrate financial need.	Awards based on academic record and financial need.	Amounts vary depending on student's financial need.	File FAFSA ‡ by priority deadline. §
Presidential Scholarships Computing Medal Scholarships SAE Scholarships National Merit Scholarships	Prospective freshmen who apply for admission by February 1 and meet selection criteria.	Awards based on academic record, recommendations, activities and requirements for intended major. Awards are not dependent upon financial need.	Amounts range from \$1,000 to \$10,000 per academic year. Awards based on three quarters of full-time study per academic year and are renewable with a GPA of 3.0 or higher.	Must apply for admission to RIT by February 1 to be considered.
RIT-Urban League, Ibero/PYRD and Minority Transfer Scholarship Programs	Awarded to African American, Latino, or Native American students meeting selection criteria.	Applicants must demonstrate financial need, academic achievement and leadership potential.	\$3,000 per academic year for full-time study. Renewable.	File FAFSA ‡ by priority deadline. §
RIT Phi Theta Kappa Scholarships	Transfer students elected to Phi Theta Kappa at previous college.	Must document Phi Theta Kappa membership.	\$3,000 per academic year for full-time study. Renewable with GPA of 3.0 (B) or higher. Maximum of 7 quarters.	Contact RIT Undergraduate Admissions Office for scholarship information.
RIT Endowed Scholarships	Full-time RIT students meeting selection criteria.	Selection criteria established by the donor for each program. Most awarded to upperclassmen based on financial need and academic performance at RIT.	Amounts vary.	File FAFSA ‡ by priority deadline. §
RIT Nathaniel Rochester Society (NRS) Scholarships	Awarded to RIT upperclassmen with high academic achievement.	Winners selected from students enrolled full time who have completed a minimum of 72 credit hours at RIT with a GPA of 3.4 or higher. Winners selected by NRS Scholarship Committee.	Maximum award is \$2,000 for six quarters of academic study.	Call 585-475-4958 or download application through RIT home page. File scholarship application in March.
RIT Trustee Scholarship	Transfer students meeting merit criteria.	Awarded to transfer students with a GPA of 3.2 or higher (as computed by RIT) and entering RIT at third-year level or higher in their program.	\$3,000-4,500 per academic year, for full-time study. Renewable with a GPA of 3.0 or higher. Maximum of 7 quarters.	Provide all required admissions credentials by: April 1 for summer/fall entry; October 1 for winter entry; January 15 for spring entry.
NTID Grant-in-Aid	Full-time students enrolling in RIT's National Technical Institute for the Deaf (NTID).	Must demonstrate financial need due to insufficient support from outside sources.	Minimum award is \$100; maximum award varies.	File FAFSA ‡ by priority deadline. §
RIT/NTID Grant	NTID students who meet need criteria and who are enrolled in RIT bachelor's degree programs	Must demonstrate financial need and be enrolled in RIT bachelor's degree program.	Minimum award \$100.	File FAFSA ‡ by priority deadline. §
RIT-NY State Higher Education Opportunity Program (HEOP)	Must be a NYS resident, attend a NYS college sponsoring the program, and meet opportunity program guidelines.	Must meet economic and educational eligibility criteria of the program. Contact RIT HEOP Office at 585-475-2221.	HEOP awards are based on individual need and available funding; undergraduates only.	Students must be accepted to RIT through HEOP. Must file FAFSA ‡ form.
RIT/ROTC Room Subsidy	Army, Air Force, and Navy ROTC cadets awarded three- or four-year scholarships prior to enrollment.	Award amount may be affected by Pell Grant, veteran's benefits, and other RIT or private awards.	Varies up to value of a double room and standard meal plan.	File FAFSA ‡ by priority deadline. §
RIT Employment Program	All students enrolled at least half time in a degree program.	No financial need requirement. Hiring criteria may vary.	Varies, depending on hours worked and wage rate.	Contact RIT Student Employment Office.
RIT Part-time Studies Grant	Matriculated students registered for 1-11 credits each term in an undergraduate program.	Need considered, but no fixed income maximum.	Amounts vary.	File FAFSA ‡ by priority deadline. §
RIT Computing Medal Scholarships	RIT Computing Medal winner from a participating high school.		\$3,000 per academic year. Renewable.	Must apply for admission to RIT by February 1 to be considered.

* Information is correct as of March 2004.

† Scholarship amounts indicated are based on RIT tuition rates. Awards may be prorated for NTID-sponsored students.

‡ Free Application for Federal Student Aid

§ Priority deadline is March 1 for entering freshmen and transfer students and April 1 for continuing students. RIT aid form is also required for returning students. Filing by these deadlines will ensure priority consideration for all RIT programs. Applications filed after this date will receive consideration as long as funds are available.

FEDERAL FINANCIAL AID PROGRAMS*	WHO IS ELIGIBLE ?	CRITERIA FOR SELECTION	HOW MUCH ?	HOW AND WHEN TO APPLY
Federal Pell Grant	Undergraduate students who are pursuing their first bachelor's degree and meet federal need criteria.	An expected family contribution that qualifies the student for an award, as determined by a system approved by Congress.	Awards may range from \$400 to \$4,050, depending on the cost of attendance and the amount of money appropriated in the federal budget.	File FAFSA. † Forms available at financial aid offices and high school guidance departments.
Federal Supplemental Educational Opportunity Grant (FSEOG)	Undergraduate students who are pursuing their first bachelor's degree, and meet federal need criteria.	Students with high financial need. (Normally those who qualify for Federal Pell Grant.)	\$100 to \$4,000 per year.	File FAFSA. ††
Federal Perkins Loan	College students who meet financial need requirements established by the federal government.	An expected family contribution that qualifies the student for an award, as determined by a system approved by Congress.	Up to \$4,000 per year. (\$20,000 limit for undergraduate study.) Awards are subject to the availability of funds.	File FAFSA. ††
Federal Work-Study Program	College students in full-time and part-time degree programs with financial need. Most jobs provided through departments on campus.	An expected family contribution that qualifies the student for an award, as determined by a system approved by Congress.	Varies, depending on hours and wage rate. RIT wage scale begins at \$5.82/hour.	File FAFSA. ††
Federal Direct Loan Program (1) Subsidized (2) Unsubsidized	(1) Subsidized Federal Direct Loans are based on demonstrated need. Federal government pays the interest while you attend school on at least a half-time basis and for six months afterward (grace period). (2) Unsubsidized Federal Direct Loans are available to those unable to demonstrate need. Loans accumulate interest during periods of enrollment.	An expected family contribution that qualifies the student for an award, as determined by Congress. Cost of attendance minus other financial aid.	Undergraduates limited to \$2,625 for first year, \$3,500 for second year, \$5,500 for third, fourth and fifth years; cumulative borrowing limit of \$23,000. Independent undergraduates have additional unsubsidized eligibility of \$4,000 for first and second years, \$5,000 for third, fourth and fifth years; additional cumulative borrowing limit of \$23,000.	File FAFSA. †† Forms available at financial aid offices and high school guidance departments.
Federal Direct Parent Loan for Undergraduate Students (PLUS)	Parents of dependent undergraduate students.	Parents of dependent undergraduates with good credit histories.	Student's total cost of attendance minus financial aid.	Contact RIT for PLUS loan application. Completed form should be submitted to Financial Aid Office.
Reserve Officer Training Corps (ROTC) Scholarships	Army, Navy, and Air Force offer financial assistance to qualified students.	Competitive; selection based upon high school record and other criteria.	Up to full tuition, plus fees, an allowance for books, and a monthly stipend awarded to qualified men and women.	Contact high school guidance counselor or call Army ROTC, 585-475-2881; Air Force ROTC, 585-475-5196; Navy ROTC, 585-275-4275.
Veterans Administration	Eligible veterans and children of deceased veterans or service-connected disabled veterans.	Contact any Veterans Administration Office for information, details and forms.	Varies.	Contact any Veterans Administration Office in your area or call 1-800-635-6534.
Aid to Native American Indians	U.S. Bureau of Indian Affairs offers grants to needy applicants who are at least 1/4 American Indian, Eskimo or Aleut.	Must meet eligibility requirements.	Awards may vary depending on need and availability of funds.	Applications are available from: U.S. Department of Interior Bureau of Indian Affairs Federal Bldg. Room 523 100 South Clinton Street Syracuse, New York 13202

* Additional information covering federal financial aid programs is provided in U.S. Department of Education Student Guide. Contact RIT Financial Aid Office to request a copy.

† Free Application for Federal Student Aid

‡ Priority deadline is March 1 for entering freshmen and transfer students and April 1 for continuing students. RIT aid form is also required for returning students. Filing by these deadlines will ensure priority consideration for all RIT programs. Applications filed after this date will receive consideration as long as funds are available.

STATE OF NEW YORK FINANCIAL AID PROGRAMS	WHO IS ELIGIBLE ?	CRITERIA FOR SELECTION	HOW MUCH ?	HOW AND WHEN TO APPLY
Tuition Assistance Program (TAP) Award amounts listed apply to first-time recipients. TAP award amounts are dependent upon action in the State Budget.	U.S. citizen or permanent resident and also New York State resident enrolled (matriculated) for 12 credits or more in degree program; cannot be in default on any guaranteed education loan. Must attend a college or school in New York State.	Undergraduate students who are dependent or independent and married OR have tax dependents: \$80,000 NET taxable income or less. Single independent with no dependents: \$10,000 NET taxable income or less. Income adjusted for number of family members in full-time college attendance.	TAP awards based on net taxable income. Awards for first-time recipients range from \$500 to \$5,000 per year for dependent undergraduates or independent students with dependents. Single independent students' (without dependents) awards range from \$500-\$3,025.	In addition to the FAFSA, you must file a New York State TAP application. The Express TAP Application will be sent to you as a result of filing the FAFSA. Toll-free number for additional information is 1-888-NYS-HESC. May 1,2005 deadline for 2004-2005.
Regents Award for Child of Veterans (CV) and Child of Correction Officer Awards (CO)	Children of veterans who are deceased, disabled, or missing in action as a result of service during World War I, World War II, Korean Conflict, or Vietnam (CV), or who died as a result of injuries sustained in line of duty (CO).	Must meet eligibility requirements. Contact your local Division of Veterans Affairs for information or call 1-800-635-6534 (New York State Division of Veteran Affairs).	\$450 per year, for up to five years, depending on the normal length of the program.	Same as TAP, above. In addition, file the CV or CO Award Supplement available on request from NYSHESC. May 1,2005, deadline for 2004-05.
Memorial Scholarships for Children and Spouses of Deceased Police Officers, Firefighters, EMS Workers, and World Trade Center Memorial	Child or spouse of person who died in service or was a victim of September 11 terrorist attacks.	Must meet eligibility requirements. Must submit documentation supporting eligibility as noted in special supplement.	Award amounts are based on tuition and non-tuition costs of attendance. In combination with certain other state and federal grants, may equal the average cost of attendance at the State University of New York	Same as TAP, above. In addition, file the appropriate award supplement, available on request from NYSHESC. May 1,2005, deadline for 2004-05 awards.
Aid to Native Americans	Member on the official tribal roll of a New York State tribe or child of a member.	Must provide documentation.	Up to \$1,000 per year for a maximum of four years or five years in certain programs.	Contact: Native American Indian Education Unit, New York State Education Dept., Education Bldg. Annex, Rm. 478, Albany, NY 12234, 518-474-0537.
Vietnam Veterans Tuition Award Program Persian Gulf Veterans Tuition Award Program	Recipients must meet New York residency requirements and have served in the armed forces in Indochina or the Persian Gulf during specified periods of hostility.	Students who complete all eligibility requirements including filing for TAP and Pell grants may receive up to maximum minus any TAP awarded.	Awards are \$1,000 per year for full-time study or \$500 per year for part-time study. Awards are available for undergraduate or graduate study.	Same as TAP, above. In addition, file the Vietnam Veterans Tuition Award Supplement or Persian Gulf Veterans Tuition Award Supplement to establish eligibility. Call NYSHESC at 1-888-NYS-HESC for information.
Regents Professional Opportunity Scholarship	U.S. citizen and permanent New York State resident as defined by legislation. For certain approved professional programs, e.g., accounting, engineering, physician's assistant. Must agree to practice for 12 months in chosen profession in New York State for each annual payment received.	Recipients must be chosen in the following order of priority: 1. Economically disadvantaged minority group members historically underrepresented in the approved profession. 2. Minority group members underrepresented in profession. 3. Candidates enrolled in or graduates of SEEK, EOP, HEOP.	\$1,000 to \$5,000 per year. TAP and some other benefits may supplement this award.	Contact: Bureau of HEOP/VATEA Scholarships, New York State Education Dept., Education Bldg. Annex, Rm. 1071, Albany, NY 12234, 518-486-1319.
New York State Primary Care Service Corps Scholarship	U.S. citizen and permanent New York State resident. Must agree to practice in state facility for 18 months for each year of aid received.	Awards based on academic performance, work experience and interest in institutional work.	Up to \$15,000 per year, depending on educational expenses. Must be within 24 months of graduation or certification in order to apply.	Contact: New York State Primary Care Service Corps, Corning Tower, Rm. 1084, Empire State Plaza, Albany, NY 12237,518-473-7019.
Robert C. Byrd Honors Scholarship Program (federally funded)	U.S. citizen and permanent New York State resident, attending New York State or out-of-state college.	Must demonstrate outstanding academic achievement & show promise of continued academic achievement. Scholarships are based on SAT or ACT scores.	\$1,500 per year. 310 awards statewide (10 to each of 31 Congressional Districts).	Contact: Bureau of HEOP/VATEA Scholarships, New York State Education Dept., Education Bldg. Annex, Rm. 1071, Albany, NY 12234, 518-486-1319.
New York Scholarships for Academic Excellence	U.S. citizen or eligible non-citizen. Permanent New York State resident must attend New York college or school.	Secondary school academic record.	\$1,500 to top graduating senior of each high school in the state. \$500 to other academically gifted students.	Contact high school guidance office.
New York Lottery Leaders of Tomorrow Scholarship	U.S. citizen. Graduate of New York State high school. Must attend New York State college or school.	Must maintain B average for seven semesters of high school. Demonstrate leadership skills, involvement with extracurricular and community activities.	One award for each high school in the state. \$1,000 per year. Maximum of four years.	Contact high school guidance office.
Aid for Part-time Studies (New York State Funded)	Matriculated undergraduates registered for 6-11 credits per term.	Financial need (based on taxable income as defined in current guidelines).	\$2,000 maximum per academic year. Funding dependent upon state allocation.	Submit Aid for Part-time Studies Application to RIT Financial Aid Office.

Named Scholarships

Each year the university awards "named" scholarships made possible through the generosity of hundreds of individuals and organizations. Awards are made by RIT's Financial Aid Office or RIT academic departments in accordance with the special criteria of each scholarship. All applicants for financial aid are automatically considered for scholarships for which they meet the established criteria.

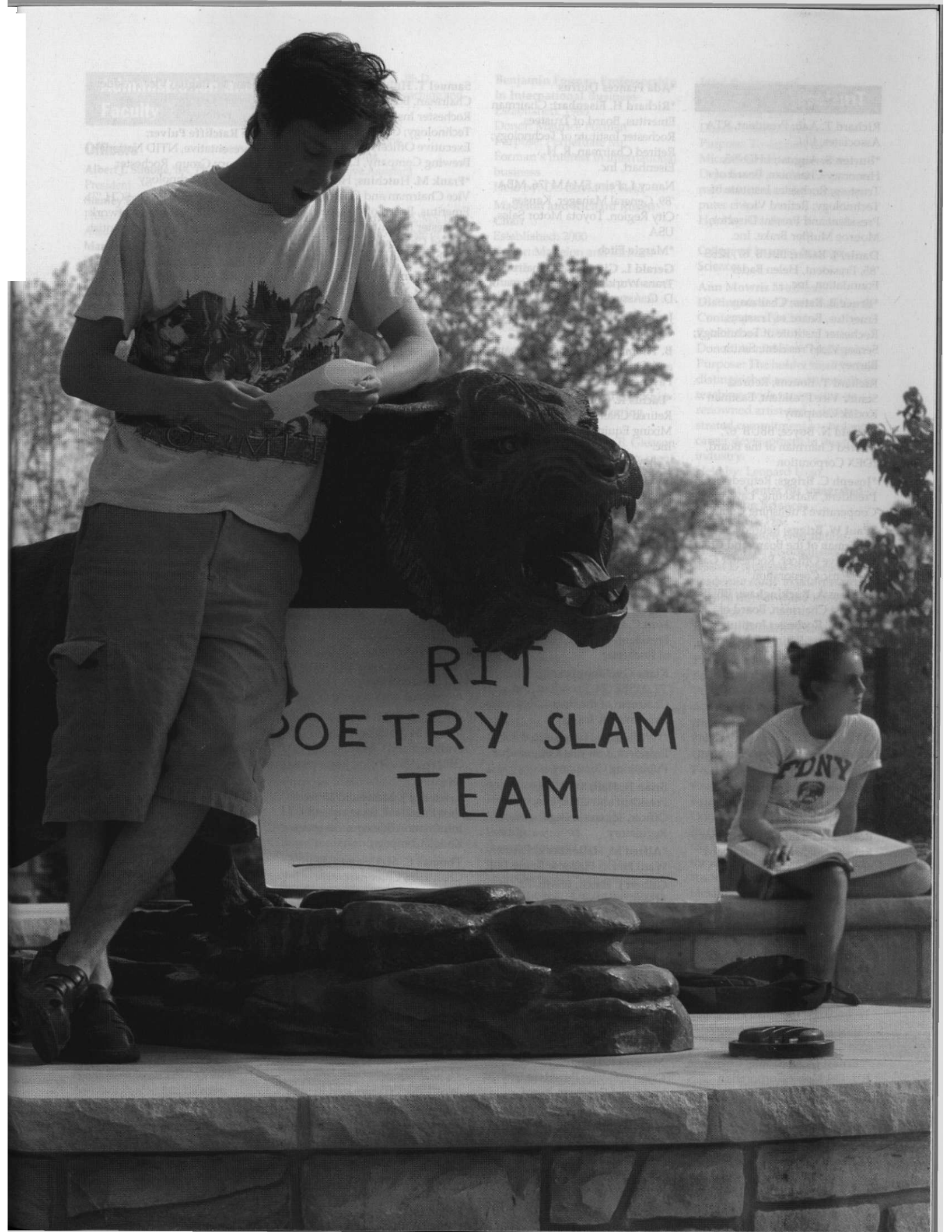
Harriet Thayer Adams Scholarship	Harold Cadmus Memorial Scholarship	Epson Photographic Awards
Max Adler Scholarship	Deborah Cahn Memorial Scholarship	Eyer Foundation Scholarship
George Alden Scholarship Fund	Caldwell Manufacturing Scholarship	Max Factor Scholarship
Mary R. Alexander Scholarship	Richard Capilla Scholarship	John Doane Fay Scholarship
Fanny Knapp Allen Scholarship	Chester Carlson Scholarship	Rose & George Feigenbaum Scholarship
Altier & Sons Scholarship	Howard F. Carver Scholarship	William & Mildred Feinbloom Scholarship
American Color Graphics Scholarship	Howard T. Case Scholarship	Ruth H. Fenyvessy Scholarship
Amzalek Ames Scholarship	Theodore Chapman Scholarship	Joseph Ferraro Memorial Scholarship
Avery-Dennison Corp. Scholarship	Donald E. Chase	Fisons Corporation Scholarship
Avis Mason Andrews Graduate Scholarship	Virginia Chase Memorial Scholarship	Flora J. Foley Scholarship
Robert Anderson Scholarship	John & Ruth Christie Scholarship	Food/Hotel/Tourism Hospitality Foundation Scholarship
Betsy L. Andrews Scholarship	Citicorp/Citibank Scholarship	Maurice & Maxine Forman Scholarship
Clara L. Andrews Scholarship	Adele Hathaway Clark Scholarship	Dr. Eugene Fram Scholarship
Ezra R. Andrews Scholarship	Florence Clark Scholarship	Ron Francis Scholarship
Kate Rider Andrews Scholarship	H. E. Clark Scholarship	Freedom Forum Scholarship
Randall Andrews Scholarship	Class of '69 Scholarship	R. T. French Scholarship
Howard Applegate Scholarship	Albert G. Coenen Scholarship	Richard A. Freund Scholarship
Lee Augustine Memorial Scholarship	Eugene Colby Scholarship	Ann Wadsworth Frisina Memorial Scholarship Fund
Avanti-Case Hoyt	Wells Coleman Scholarship	Dr. Robert Frisina Award
Ralph Avery Scholarship	Coleman Corporation Scholarship	The Max and Helene Frumkes Memorial Scholarship
Alfred Bader COB International Study Program	Ward D. Collister Scholarship	Karl Fuchs Scholarship
Helen Bader Foundation	Comstock Foundation Scholarship	Fuji Corporation Scholarship
Joseph Bader Scholarship	Continental Corporation Scholarship	Garlinghouse Scholarship
David Baldwin Scholarship	Jerome Countryman Memorial	Gegeheimer/McClure Scholarship
Thomas Ward Ball Scholarship	Lillian Cowin Scholarship	Frank Geist Scholarship
George & Theresa Barlow Endowed Scholarship	Walter Crighton Scholarship	General Motors Scholarship
John & Mary Bartholomew Scholarship	Alvin Cronig Scholarship	Sarah Margaret Gillam Scholarship
Bruce and Nancy Bates Scholarship	Bryon Culver Scholarship	Jean Gillings Scholarship
Bausch & Lomb Scholarship	Curtice Burns Scholarship	Gitner Family Scholarship
John Bausch Scholarship	Robert R. and Donna E. Davila Endowed Scholarship Fund	George & Anne Gleason Memorial Scholarship
Clarence & Birdice Beal Scholarship	Alfred L. Davis International Student Scholarship	E. B. Gleason Scholarship
Alice Beardsley Scholarship	Alfred L. & Ruby C. Davis Continuing Education Scholarship	Kate Gleason Scholarship
Richard Benjamin Memorial Bennett Award	Alfred L. & Ruby C. Davis Leadership Award	Arthur King Goldsmith Scholarship
Ruth L. Bernhardt Scholarship	Nancy J. Davis Scholarship	Good Samaritan Association Scholarship
Fanny R. Bigelow Scholarship	James DeCaro Scholarship	Allen & Gloria Gopen Scholarship
Roscoe Bills Scholarship	De Ridder Corporation Scholarship	George Gordon Scholarship
Howard Bingham/Eastman Kodak Scholarship	Del Rosso Family Scholarship	Isaac Gordon Scholarship
Helen & Frederick Blaessig Memorial Scholarship	Eliot Derman-GTS Scholarship	Gould Pumps Inc. Award
Joseph & Helen Blatecky Scholarship	Ronald Dodge Engineering Scholarship	Graflex Scholarship
Harriet Blickwede Scholarship	Ronald Dodge NTID Scholarship	Phillip L. Graham Scholarship
Boeing Company Scholarship	Doolittle/Merril Scholarship	Gravure Foundation Scholarship
Austin Bonis Scholarship	Joseph F. and Helen C. Dyer Scholarship Fund	Edward Hableib Scholarship
Donald & Jaris Boyce Scholarship	ECI Systems & Engineering	Hakes Assoc. Scholarship
Farid Bozorgi Scholarship	Eberly Family Scholarship	Hale Foundation Packaging Scholarship
Braverman Scholarship	Robert Elder Scholarship	Ezra Hale Scholarship
Joseph Briggs Endowed Scholarship	Eisenhart Memorial Scholarship	William B. Hale Scholarship
Chester W. Brink Scholarship	Ellingson Foundation Scholarship	Mildred F. Hall Scholarship
Stephen Briody Scholarship	Isabel & Benjamin Emerson Scholarship	Sil Hall Scholarship
Harold Brodie Scholarship	Fred Emerson Foundation Scholarship	
Steffan Brown Scholarship	Engineering Women of Rochester Scholarship	
Nettie Bullis Scholarship	Raymond Englert Scholarship	
Business Alumni Scholarship	Gerald Ephraim Scholarship	
Orilla Butts Scholarship		

Named Scholarships *(continued)*

Carter Harmon Scholarship
Harris Semiconductor Scholarship
Dr. Howard N. Harrison Scholarship
Franz Haverstick Scholarship
G. Sherwin Haxton Scholarship
Safford Hazlett Scholarship
Healthcare Purchasing Scholarship
William Randolph Hearst Endowed
Scholarship for Financially
Disadvantaged Deaf Students
at NTID
Heidelberg/RIT Scholarship
Sol Heumann Scholarship
John & Catherine Hill Scholarship
Francis Sallie Ann Hilliard Scholarship
Laura Church Hillman Scholarship
Hoffend Scholarship Fund
Hogadone & Larwood Scholarship
Charles C. Horn Scholarship
Frank Horton Scholarships
The Ralph Hymes Endowed
Scholarship Fund
Arthur Ingle Scholarship
Louis & Sylvia Jackson Scholarship
Sharyn & Steven Janis Scholarship
Jack Jenkins Endowment Scholarship
Lucille R. Jennings Scholarship
Leo Joachim Scholarship
Helen Lucille Jones Memorial
Scholarship
John Wiley Jones International
Scholarship
Michael Jones Memorial Scholarship
Abraham & Teresa Katz Scholarship
David T. Kearns Endowed Fund for
Technical Excellence
Henry & Mary Kearse Memorial Fund
Stephen J. Kersting Memorial
Scholarship
Katherine Keyes Scholarship
Drew & Francis King Scholarship
Ruth Klee Award
David Klieman Scholarship
Kodak Professional Imaging Award
Lowell Koenig Scholarship
Jack Kronenbert Scholarship
Sara L. Kuhnert Scholarship
Lancer Graphics Scholarship
Francis Lang Scholarship
LeChase Corp. Scholarship
Leenhouts Family Scholarship
Lehigh Press Scholarship
Chester H. Lehmann Scholarship
Richard B. Lewis Memorial Scholarship
The Edward H. Lichtenstein Memorial
Endowed Scholarship Fund
Abe Lincoln Scholarship
Elizabeth Ellen Locke Scholarship
Lomb Citizen Soldier Scholarship
Lomb People Scholarship
Los Angeles Times Mirror Scholarship
Arthur E. Lowenthal Scholarship
Eugene M. Lowenthal Jr. Memorial
Scholarship
Max Lowenthal Memorial Scholarship
Patrick T. Lynch Memorial Scholarship
M/E Engineering
Barbara MacCameron Scholarship
Lois C. Macy Scholarship
Magazine Publishers Scholarship
Jack & Judy Maltby Scholarship
Manufacturers Hanover Scholarship
Donald Margolis Scholarship
Marine Midland Fellowship
William Mariner Scholarship
Clara Martin Scholarship
Dr. James C. Masters Endowed
Scholarship Fund
McGowan Foundation Awards
John McIntee Scholarship
Mcintosh Education Fund
Dean McWhirter Memorial Scholarship
Alice Melnyk Scholarship
Bernadette Merkel Memorial
Scholarship
Norman Miles Scholarship
Norman Miller Electrical Engineering
Scholarship
Barbara Milliman Scholarship
Abraham & Sadie Milstein Scholarship
Earl Morecock Scholarship
Bernice Skinner Morelock Scholarship
Clifford Waite Morgan Scholarship
Catherine Morse Scholarship
Charles W., Sue L., Freda L. Muffitt
Endowed Scholarship Fund
Morris Mulligan Memorial Fund
Dr. Gengi Murai Scholarship
Michelle Nageotte Scholarship
Nathaniel Rochester Society
Scholarships
Don Naylor Scholarship
C. B. Neblette Memorial Scholarship
Grace B. Norton Scholarship
NTID Alumni Association Endowed
Scholarship Fund
NTID Architect/Tech Award
NTID Business Careers Scholarship
NTID Foundation Endowed
Scholarship
NTID Performing Arts Scholarship
NTID Printing Production Scholarship
NTID Science/Engineering Scholarship
NTID Visual Communication
Scholarship
Carol Oelkers
Florence Ohringer Art Scholarship
Milton & Ray Ohringer NTID
Scholarship
Omnova Foundation
Pactiv Corp. Scholarship
Robert Panara Scholarship
Daniel Pasto Scholarship
Mohal Patel Scholarship
Barbara Paul Memorial Scholarship
William Farley Peck Scholarship
Gerald & Pamela Pelano Scholarship
Martha Perry Scholarship
Philips ECG Inc. Scholarship
Edward A. Pike Scholarship
Eugene and Wanda Polisseni Award
Polyfibron Technologies
A. C. Powers Memorial Scholarship
Praxair Scholarship
David Presco Scholarship
John Myers Pritchard
Pulver Endowed Scholarship
Q.C. I. Corporation Scholarship
Queens Group Scholarship
Quintech Scholarship
Byron J. Ramseyer
Eustis and Thelma Rawcliffe-
Redcom Scholarship
Bill Reedy Memorial Scholarship
Kenneth & Margaret Reek
Scholarship
Russell Reilly Scholarship
R. Bruce Reinecker Scholarship
Jack Renfro Scholarship
RGS Scholarship
Edward J. Ries Memorial Scholarship
RIT Alumni Network
RIT Greek Organization Scholarship
RIT International Student Association
Frank Ritter Memorial Scholarship
Robbins & Meyers Scholarship
Archibald & Mary Robinson
Scholarship
Rochester Sales & Marketing Executives
Scholarship
Rock-Tenn Packaging Scholarship
Ian Rodgers Memorial Scholarship
Roosevelt Paper Scholarship
Robert Root Award
Willis Jennings Rose Scholarship
Rebecca Rosenberg Scholarship
Rubens Family Foundation
Bud & Joan Rusitzky
Laura Bradford Russell Scholarship
David & Fannie Rutty Memorial
Scholarship
Stuart L. Saikkonen Memorial
Scholarship
Janet R. Salitan Liberal Arts Scholarship
Esther G. Sanders Scholarship
Nelson & Celeste Sanford Memorial
Scholarship
Elizabeth Dunlap Sargent Scholarship
Ryoichi Sasakawa Scholarship
Paul & Katherine Schmidt Scholarship
Robert Pitman Schmidt Scholarship
Charles W. Schmitt Scholarship

Named Scholarships *(continued)*

Kilian & Caroline Schmitt International Scholarship
William J. Schmitt Memorial Scholarship
Ruth S. Schumacher Fund
Marlene E. Scott Memorial Scholarship
Scripps-Howard Endowed Scholarships
Wilfrid & Isabel Searjeant Scholarship
Eric Senna Scholarship
Sarah Shelton Scholarship
Helen Monar Short Scholarship
Igor Shot Scholarship
F. Ritter Shumway Scholarship
S. Richard Silverman International Scholarship
Fred Simmons Scholarship
Louis & Nellie Skalny Scholarship
Susan Smigel International Student Scholarship
Southwest Printing Management Fund
Harry Speck Scholarship
Karl Sperber Scholarship
Sprint Scholarship Fund @ NTID
Alfred L. Stern Fund
Hattie M. Strong Scholarship
Pearl Hewlett Stutz Scholarship
Solon E. Summerfield Foundation Scholarship
William Swart Award
Michael Swartzman Memorial Scholarship
George Tanzer Memorial Scholarship
James Tennant Memorial Scholarship
Michael Thomas Endowed Scholarship Fund in the Performing Arts
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Louis C. Tiffany Foundation
Erik Timmerman Scholarship
Hollis Todd Scholarship
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Frank Vereka Scholarship
Vietnam Veterans "Group O" Scholarship
Charles and Andrea Volpe Scholarship
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Dewitt Wallace Scholarship
A. Stephen Walls Scholarship
Walls, Olsen Memorial Scholarship
Waste Management Scholarship
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Cy Welcher Scholarship
Edwin Welter Fund
Western New York Village Superintendents Scholarship
Weyerhaeuser Fellowship
Nelson Whitaker Scholarship
Whitman Family Scholarship
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Eloise Wilkin Memorial Scholarship
Elizabeth W. Williams Endowed Fund for the Performing Arts
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Wallace & Paula Wilson Scholarship
John J. Wittman II Scholarship
Joseph & Loretta F. Wolf Scholarship
Louis S. and Molly B. Wolk Foundation Endowed Scholarship Fund for Deaf Students at RIT
Rose Wollner Scholarship
Rudolph Wollner Scholarship
Woman's Club of Rochester Endowed Scholarship Fund
Women in Printing Scholarship
Women's Council Endowed Scholarship for Hearing-Impaired Students at RIT
William D. Wright Scholarship
Xerox Endowed Scholarship
Richard and Lois Zakia Scholarship
Jeffrey W. Zielasko Scholarship
Donald Zrebiec Scholarship



RIT
POETRY SLAM
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"Honorary Board Member

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Student Ombudsperson

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College of Applied Science and Technology

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College of Liberal Arts

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Kate Gleason College of Engineering

Joan B. Stone, BS, MS, Ed.D.
College of Imaging Arts and Sciences

Distinguished Professorships

College of Applied Science and Technology

Russell C. McCarthy Professorship in Engineering Technology
Established: 1979
Held by: S. Martian Ramkumar

Paul A. Miller Professorship in Continuing Education
Established: 1981
Donor: RIT Board of Trustees
Purpose: Established in honor of former RIT President Paul A. Miller, recognizes RIT faculty making distinguished contributions to continuing education with record of matching Institute intellectual and educational resources with needs of students and the community
Held by: Open

College of Business

J. Warren McClure Research Professorship in Marketing
Established: 1977
Donor: Mr. and Mrs. J. Warren McClure
Purpose: To perpetuate Mr. McClure's professional interest in the field of marketing
Held by: Dr. Eugene H. Fram

Benjamin Forman Professorship in International Business
Established: 1986
Donor: Maurice Forman
Purpose: Perpetuate Mr. Forman's interest in international business
Held by: Dr. David M. Reid

Madelon and Richard Rosett Chair

Established: 2000
Donor: Madelon and Richard Rosett
Purpose: To support a professorship of a nationally prominent scholar in any field of business
Held by: Dr. John E. Ettl

Kate Gleason College of Engineering

James E. Gleason Professorship in Mechanical Engineering
Established: 1967
Donor: Estate of James E. Gleason
Purpose: To provide a permanent memorial for Mr. Gleason, who served as a trustee of RIT from 1930 until 1964, and to strengthen RIT in the field in which he received his education
Held by: Dr. Satish Kandlikar

Gleason Professor
Established: 1993
Donor: Gleason Memorial Fund
Purpose: To provide for a faculty member to lead a research and development program in electrical engineering
Held by: Dr. Sergey Lyshevski

Kate Gleason Chair & Associate Professor
Established: 1999
Donor: Gleason Foundation
Purpose: To honor Kate Gleason and increase the visibility of engineering for young women
Held by: Dr. Margaret Bailey

Motorola Professorship
Established: 1994
Donor: Motorola, Inc.
Purpose: To support RIT's Microelectronic Engineering Department and to further develop the partnership that has developed between Motorola and the microelectronics program
Held by: Dr. Lynn F. Fuller

Earl W. Brinkman Professor of Screw Machine Technology
Established: 1995
Donor: Brinkman Family Charitable Trust and an anonymous foundation
Purpose: To create a lasting memorial to Earl W. Brinkman, an innovative leader in the screw machine industry who retired from Davenport Machine Company in Rochester, N.Y., in 1979 after devoting 53 years to the company
Held by: Dr. Nabil Z. Nasr

Intel Professor of Research and Technology
Established: 2000
Donor: Intel Corporation
Purpose: To support RIT's Microelectronic Engineering Department and to develop new methods of manufacturing computer chips
Held by: Dr. Bruce W. Smith

College of Imaging Arts and Sciences

Ann Mowris Mulligan Distinguished Professorship in Contemporary Crafts
Established: 1999
Donor: Ann Mowris Mulligan
Purpose: The holder must have a distinguished record of excellent teaching, wide recognition as a renowned artist and a demonstrated commitment to students' career development in the craft industry.

Held by: Leonard Urso

Gannett Center for Integrated Publishing Sciences
Established: 1987
Donor: Gannett Foundation
Purpose: The distinguished professor is engaged in research and academic study to address problems in the news and information business.

Held by: Barbara Pellow

Artist-in-Residence Professorship
Established: 1984
Purpose: To work with apprentice woodworkers and participate in conferences and lectures at RIT
Held by: Wendell Castle

Charlotte Fredericks Mowris Professorship in Contemporary Crafts

Established: 1973
Donor: Mrs. Charles F. Mowris
Purpose: To perpetuate interest in the School for American Crafts through the work of faculty and students as talented craftspeople
Held by: Albert Paley

Melbert B. Cary Jr. Professorship in Graphic Arts
Established: 1969
Donor: Mary Flagler Cary Charitable Trust

Purpose: To provide a permanent memorial for Mr. Cary as a former president of the American Institute of Graphic Arts and to perpetuate his interest in the field
Held by: Open

Gravure Research Professor
Established: 2004
Purpose: To promote gravure education in the curriculum
Held by: Robert Chung

James E. McGhee Professorship in Photographic Management
 Established: 1967
 Donor: Master Photodealers and Finishers Association and friends of Mr. McGhee
 Purpose: To provide a permanent memorial for Mr. McGhee, a former vice president of Eastman Kodak Company and lifelong friend of the photofinishing industry
 Held by: Nitin Sampat Paul and Louise Miller
Distinguished Professorship in Newspaper Operations Management
 Established: 1979
 Donor: Frank E. Gannett Newspaper Foundation
 Purpose: To honor the former chairman of the board of the Gannett Company and perpetuate his interest in good management practices in the newspaper industry
 Held by: Michael Kleper
 Roger K. Fawcett Distinguished Professorship in Publications Color Management
 Established: 1991

Donor: World Color Press, Fawcett family and industry colleagues
 Purpose: The endowed chair, the only one of its kind in the nation, was established to address color quality and productivity in both the magazine and newspaper publishing industries, as well as promotion of RIT color research activities.
 Held by: Frank Romano

College of Liberal Arts

Caroline Werner Gannett Professorship in the Humanities
 Established: 1974
 Donor: Mrs. Frank E. Gannett
 Purpose: To perpetuate Mrs. Gannett's lifelong interest in education, especially in those fields of study that have a humanistic perspective
 Held by: Open
 Arthur J. Gosnell Professorship in Economics
 Established: 1985
 Donor: Family and friends of Arthur J. Gosnell
 Purpose: To perpetuate the memory of Arthur J. Gosnell through recognition of the importance of good teaching in economics and by facilitating research into public policy questions
 Held by: Open

Ezra A. Hale Professorship in Applied Ethics
 Established: 1989
 Donors: William B. and Patricia F. Hale and Lawyers Cooperative Publishing Company
 Purpose: To establish a permanent memorial to a long-time and valued friend of RIT, Ezra A. Hale, and to provide instruction in applied ethics in keeping with his beliefs in sportsman-like conduct, fair play, and honesty
 Held by: Dr. Wade L. Robison
William A. Kern Professorship in Communication
 Established: 1971
 Donor: Rochester Telephone Corporation
 Purpose: To commemorate the 100th anniversary of that company and to provide a memorial for a former president of the company and a man who served as an RIT trustee from 1959 to 1964
 Held by: Dr. Diane S. Hope

College of Science

Richard S. Hunter Professorship in Color Science, Appearance, and Technology
 Established: 1983
 Donors: Mr. and Mrs. Richard S. Hunter
 Purpose: To enable RIT to increase its research and educational efforts in the areas of color science, technology, and appearance science in order to benefit the industry and science of color
 Held by: Dr. Roy S. Berns
Frederick and Anna B. Wiedman Professorship
 Established: 1985
 Donor: Frederick Wiedman Jr.
 Purpose: To establish a permanent memorial to Frederick and Anna B. Wiedman, lifelong residents of Rochester and long-time friends of RIT
 Held by: Dr. John R. Schott
Xerox Professorship in Digital Color Imaging Systems
 Established: 1996
 Donor: Xerox Corporation
 Purpose: Established to expand color imaging activities within the Chester F. Carlson Center for Imaging Science. The Xerox Professor teaches courses in color imaging systems, mentors graduate students in imaging and color science, initiates new funded research and collaborates with existing faculty and research associated with the Munsell Color Science Laboratory.
 Held by: Dr. Mark D. Fairchild

Division of Academic Affairs

Frederick H. Minett Professorship
 Established: 1978
 Purpose: Brings distinguished Rochester-area professionals to share professional knowledge and experience with RIT students and faculty
 Held by: Open

Faculty

College of Applied Science and Technology

Wiley R. McKinzie, BA, University of Wichita; MS, State University of New York at Buffalo—Dean; Professor
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 Stacy A. Siegel, BS, MS, Rochester Institute of Technology—Assistant Dean

Civil Engineering Technology/Environmental Management and Safety

Civil Engineering Technology

Abi Aghayere, BS, University of Lagos; MS, Massachusetts Institute of Technology; Ph.D., University of Alberta; PE—Associate Professor
 G. Todd Dunn, BS, Dartmouth College; MSCE, University of California; PE—Associate Professor
 Robert H. Easton, BS, U.S. Military Academy; MSCE, Iowa State University; PE—Associate Professor
 William C. Larsen, BS, MSCE, Dartmouth College; PE—Associate Professor

Robert E. McGrath Jr., BCE, Rensselaer Polytechnic Institute; MSCE, Syracuse University; PE—Professor Emeritus
 Mark Piterman, MCE, Odessa Marine Engineers Institute—Professor Emeritus
 Maureen S. Valentine, BSCE, Tufts University; MCE, Virginia Polytechnic Institute; PE—Chair, Civil Engineering Technology, Environmental Management and Safety; Associate Professor
 Scott B. Wolcott, AAS, State University of New York at Canton; BS, MS, State University of New York at Buffalo; PE—Associate Professor

Environmental Management and Safety

Josh Goldowitz, BS, State University of New York at Binghamton; MS, University of Arizona—Associate Professor
 John Morelli, BS, Syracuse University; MS, Ph.D., State University of New York College of Environmental Science and Forestry, PE—Associate Professor
 Joseph M. Rosenbeck, CSP, CIH, MS, BS, Central Missouri State University—Associate Professor
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Steve Bowman, BS, The American University; MS, George Washington University
 Gregory Jones, BS, Auburn University; MS, Rochester Institute of Technology
 Alan Knauf, BSCE, Massachusetts Institute of Technology; JD, University of Michigan Law School
 Ed Mullen, BS, Clarkson University
 George Thomas, BS, Clarkson University; MS, Johns Hopkins University
 Tom Wickerham, BA, Thiel College

Electrical, Computer and Telecommunications Engineering Technology

W. David Baker, BSEE, Monmouth College; MS, Rochester Institute of Technology—Professor Emeritus
 Walter J. Bankes, BS, Kent State University; MS, University of Arizona—Professor
 Richard C. Cliver, BSEE, Rochester Institute of Technology; MSEE, University of Rochester—Assistant Professor
 Steven A. Ciccarelli, BSEE, MS, Rochester Institute of Technology—Assistant Professor
 Thomas Dingman, BSEE, MS, Rochester Institute of Technology—Professor
 Michael Eastman, BT, MS, Rochester Institute of Technology—Associate Professor
 Ronald Fulle, BA, State University of New York at Oswego; MS, University of Colorado at Boulder—Associate Professor
 Chance M. Glenn, BS, University of Maryland at College Park; MSEE, Ph.D.EE, John Hopkins University—Associate Professor

James J. Hurny, BSEE, Carnegie Institute of Technology; MBA, MSET, Rochester Institute of Technology—Assistant Professor
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 David Krispinsky, BE, MSE, Youngstown State University—Associate Professor
 Jeffrey S. Lillie, BS, Rochester Institute of Technology; MSEE, University of Rochester—Assistant Professor
 Carol A. Richardson, BSEE, University of Wyoming; MSEE, Union—Chair, Electrical, Computer and Telecommunications Engineering Technology; Professor
 Charles L. Swain, BSEE, Pennsylvania State University; MS Elmira College; MSEE, Pennsylvania State University—Associate Professor
 Anthony P. Trippe, PE, BS, Rochester Institute of Technology; MS, Fairleigh Dickinson University (DBA U.S. International University)—Assistant Professor
 Thomas Young, BA, Hunter College; MS, New York University; MSEE, Rochester Institute of Technology—Professor
 George H. Zion, BS, MS, Rochester Institute of Technology—Professor

Manufacturing and Mechanical Engineering Technology/Packaging Science

George H. Sutherland, BSME, Alberta; MEng, McMaster University; Ph.D., Stanford University; PE—Chair, Professor
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 Guy Johnson, BS, Pennsylvania State; MS, Syracuse University—Professor
 Seung H. Kim, BS, Hanyang University; MS, Ph.D., University of Illinois—Assistant Professor
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SFC Daniel Jackson, Training NCO
Gary Mastroleone – Personal Administrative
Maj. Donald Powell, BA, State University of New York College at Geneseo – Assistant Professor
Capt. Ted Thomas, BA, Niagara University – Assistant Professor
SSG James K. Tibbit, AS, Columbia College – Logistics Manager
Master Sergeant Robert Yelder, AS (pending), El Paso College – Senior Enlisted Instructor

Air Force ROTC

Col. Lansing E. Dickinson, BS, MEd, Edinboro College; MS, University of Arkansas – Professor
Maj. Kerry Dunham, BS, University of Wyoming; MS, Troy State – Assistant Professor
Staff Sergeant Regina Gourdine, NCOIC, Information Management
TSgt. Sean P. Jones, NCOIC, Cadet Personnel
Capt. Erika Foster, BS, USAFA; MS, University of Oklahoma – Assistant Professor
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Ann M. Hager, BS, Nazareth College; MA, University of Rochester—Assistant Professor
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Joseph Stanislaw, AAS, BS, Rochester Institute of Technology; MS, Stevens Institute of Technology—Instructor
Michael H. Steve, BA, University of Rochester; MS, Ph.D., Florida State University—Assistant Professor
Mark L. Wambach, BA, St. John Fisher College; MS, Rochester Institute of Technology—Assistant Professor

Center for Human Performance Support

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Liberal Arts Support

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Jill Bradbury, BA, University of California, Irvine; MA, Ph.D., Brown University—Assistant Professor
Pamela R. Conley, AAS, Rochester Institute of Technology; BA, Gallaudet University; MS, University of Rochester; MA, State University of New York College at Brockport—Assistant Professor
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Sybil R. Ishman, BA, University of North Carolina at Greensboro; MA, Ph.D., University of North Carolina at Chapel Hill—Assistant Professor
Susan K. Keenan, BA, MA, University of Rochester; M.Ed., Ed.D., Columbia University—Assistant Professor
Pamela Kincheloe, BA, Rollins College; MA, University of North Carolina at Chapel Hill; Ph.D., Southern Illinois University—Assistant Professor
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Gail A. Rothman-Marshall, BA, State University of New York at Albany; MS, State University of New York College at Brockport; Ph.D., State University of New York at Buffalo; NCC; CCMHC—Associate Professor
Rose Marie Toscano, BS, Portland State University; MA, University of Rochester—Professor
Jeanne Yamonaco, BA, MS, Nazareth College—Visiting Instructor

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Science/Engineering Support

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Imaging Arts and Sciences Support

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Dawn Tower DuBois, BS, MS, Rochester Institute of Technology—Assistant Professor
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Mary C. Vreeland, BA, American University—Artist-in-Residence; Acting
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American Sign Language and Interpreting Education

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Anthony E. Spiecker, AAS, BET, MS, Rochester Institute of Technology—Assistant Professor

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Katherine A. Voelkl, BFA, MS, Rochester Institute of Technology—Associate Professor
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William J. Rudnicki, AAS, University of Buffalo; BS, MBE, State University of New York at Buffalo; Ed.S., Michigan State University; Ed.D., Northeastern University—Associate Professor; Chairperson
Mary Louise Basile, BA, LeMoyne College; MA, State University of New York at Albany; MBA, Rochester Institute of Technology—Professor
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RIT Terminology

Academic probation—A formal warning from your college dean that you are in danger of being suspended or dismissed from RIT because your grade point average (GPA) has fallen below 2.00 (C average). (See page 346 for a more complete description.)

Accredited—An academic program, school or university that has been reviewed by an appropriate educational association and meets its standards of quality in academics and services is "accredited." RIT is accredited by the Middle States Association of Colleges and Schools, and several of its academic departments and programs have received additional accreditation by national associations within their discipline.

Audit—Attending a course without receiving an evaluation grade (such as A, B, etc.) or receiving credit. To audit a course, you must formally register for it and have the permission of the department. Audited courses may not be used to fulfill degree requirements, although the course and an audit notation of Z will appear on your official transcript.

Cooperative education (co-op)—The opportunity to work in a full-time, paid position related to your field of study. Co-op is a formal component of many RIT programs. Co-op experiences are divided into "blocks" of one quarter each and do not carry credit. They are usually scheduled during your final two years of study and should be carefully coordinated with the help of your adviser, the Office of Cooperative Education and Career Services and your employer. Registration is required.

Credit by exam or experience—Academic credit awarded based on evaluation of a comprehensive examination, interview or record review.

Credit hour—The numerical value assigned to courses, internships and other educational experiences. RIT follows a quarterly academic calendar, so its base measure is the *quarter* credit hour, which generally equals two-thirds of a semester hour.

Curriculum—The set of courses that, when finished successfully, can qualify a student for an academic degree. The curricula for all of RIT's degree programs have been registered with the New York State Education Department.

Discipline—A distinct academic area of study. At RIT, most programs are interdisciplinary, or include course work from a variety of areas of study.

Distance (or online) learning—A means of earning a certificate or degree off campus through methods such as cable TV broadcasts and videotapes of lectures; teleconferences; computer conferences; and online computer services such as electronic blackboards, picture phones and e-mail. These technologies enable RIT's distance-learning students to follow the same quarter system of study as on-campus students.

Drop/add—Formally changing the set of courses in which you are enrolled in any quarter by adding or removing yourself from an official class list for a course. You may add or drop a course until the end of the sixth class day of a quarter, as specified on the academic calendar. If you do not officially resolve your registration status, you may receive a failing grade for a course you have stopped attending or not receive credit for a course you have begun attending.

Dual degree program—A program combining the course curricula from a bachelor's degree program and a master's degree program. This produces a streamlined curriculum that allows selected students to earn both a bachelor's and master's degree at the same time.

Evening program—An academic program specifically designed for students who attend college part time. The RIT Budget Committee has approved specific evening programs as eligible for "evening division" tuition rates.

Full-time student—A student registered for at least 12 quarter credit hours of course work per quarter (excluding audits and credits by exam or experience) or

registered for a cooperative education work block during the quarter.

Good standing—A student eligible to enroll in courses (not suspended) as verified by the Office of the Registrar. Certain financial aid programs have specific "standards of progress" by which students are determined to be in "good standing" and therefore eligible for aid. See Academic Progress Requirements beginning on page 378.

Half-time student—A student registered for six to 11 credit hours during a quarter.

Internships/field instruction—An experiential learning program in which students are placed into a public or private agency to work with professionals in their field of study. The student is eligible for academic credit for the work and is supervised and supported by a mentor while in the position.

Lower-division course—An undergraduate course typically taken during the first or second years of study (100 to 300 level).

Matriculated—A student who has been formally accepted into an academic program and begun a course of study. You must be matriculated in order to receive degrees or other formal awards from RIT.

New student orientation programs—Orientation is held a week before the start of academic classes for students who will enter RIT during the upcoming academic year and their parents. Tours of campus; meetings with key staff, faculty advisers, and fellow students; and opportunities to change courses are some of the many activities offered.

New York State Immunization Certification—New York State Public Law 2165 (June 1989) requires RIT to either verify that students have been immunized according to state health law (see pages 363 for specifics) or deny them access to RIT facilities. For more information, contact the RIT Student Health Center.

Part-time student—A student registered for at least one course during a quarter, excluding audits and credits by exam/experience.

Residency—Term for the minimum number of credit hours a student must earn at RIT to be eligible for academic certification and completion of degree requirements. The residency requirement ensures that RIT faculty have sufficient opportunity to evaluate your academic abilities.

Summer Vestibule Program—An orientation and evaluation program designed and offered especially for incoming NTID students with hearing impairments.

Suspension—Dismissal from RIT for either academic or disciplinary reasons, which bars a student from enrolling in any RIT courses while the suspension is in effect. If you are suspended for academic reasons, you must usually wait for at least a year before applying for readmission (see page 346). If you are suspended as a result of action by the judicial and appeals processes, you may not be readmitted until the dismissal is formally waived by the Office of Student Conduct and Mediation Services.

Upper-division course—An undergraduate course usually taken during the last two to three years of study (400 to 600 level).

Withdrawal from a course—Official record of a student's decision not to continue a class for a given quarter *after* the six-day drop/add deadline. You may withdraw from a course at any time through the sixth week of the quarter (time frames are adjusted for sessions of fewer than 10 weeks). After the end of the sixth week, you may withdraw only with written approval of the course instructor and chairperson of your department of study. In either case, the course remains on your record with a notation of "W," and you are still financially responsible for the course tuition.

Index

A			
ASL-English Interpretation	133		
Academic			
Accommodations Office	351		
Assessment Program	351		
Programs of Study	10		
Progress Requirements	378		
Accounting Major	47		
Accounting Technology, NTID	141		
Accreditation			
(see also individual programs)	4		
Administrative Support Technology, NTID	142		
Admission			
Applying for, NTID	370		
General	369		
Guidelines, Freshman	371		
Transfer	372		
Requirements, NTID	131		
Advertising Design Diploma	82		
Advertising Photography	88		
Advertising and Public Relations	94		
Aerospace			
Engineering Option	70		
Studies, Department of	44		
Air Force Reserve Officer Training Corps (AFROTC)	44		
Alcohol and Drug Policy	366		
American Crafts, School for	75,81		
Apartment Housing	357		
Application Requirements	370		
Applied			
Arts and Science Degrees	37		
Computer Technology, NTID	135		
Mathematics	118		
Networking and System Admin	57		
Optical Technology Program, NTID	154		
Science and Technology, College of	13		
Course Descriptions	162		
Statistics	120		
Army Reserve Officer Training Corps (ROTC)	42		
Art and Computer Design, NTID	139		
Art, School of	75,77		
Arts and Sciences Curriculum			
NTID	129		
Requirements	129		
Audiology Department, NTID	353		
Auditing Courses	346		
Automation Technologies, NTID	147		
Automotive Engineering Option	70		
B			
Biochemistry Program	115		
Bioinformatics	109		
Biological Sciences	108		
Biology Program	108		
Biomedical			
Computing Program	122		
Photographic Communications	85		
Biotechnology Program	108		
Bioinformatics Option	109		
Black Awareness Coordinating Committee	358		
Books and Supplies, Costs	375		
Bookstore (see Campus Stores)			
Buckley Amendment	345		
Business			
College of	45		
Course Descriptions	188		
and Management	38		
NTID	144		
Technology, NTID	143		
C			
Campus			
and Community	5		
Life	356		
Safety Department	364		
Stores	364		
Visits	131,370		
Career Exploration Studies, NTID	128		
Ceramics and Ceramic Sculpture	81		
Chemistry Programs	112		
Child Care (see Margaret's House)			
Civil Engineering Technology	15		
Class Attendance	346		
College			
Activities Board	357		
Program	351		
Restoration Program	351		
Colleges			
and Degrees	3		
Applied Science and Technology	13		
Business	45		
Computing and Information Sciences	52		
Engineering	61		
Imaging Arts and Sciences	75		
Liberal Arts	93		
National Technical Institute for the Deaf	127		
Science	105		
Combined Bachelor's/Master's Degree Programs			
Bioinformatics	109		
Biomedical Computing	122		
Business	46		
Chemistry	112		
Computer Engineering	64		
Computer Engineering Technology	18		
Computer Science	53		
Electrical Engineering	65		
Environmental Science	110		
Graphic Media	90		
Industrial and Systems Engineering	68		
Mathematics and Statistics	118		
Mechanical Engineering	69		
Polymer Chemistry	117		
Commission for Promoting Pluralism	364		
Communication Program	94		
Computational Mathematics	120		
Computer			
Aided Drafting Technology, NTID	150		
Engineering	64		
Engineering Technology	18		
Graphics Certificate	41		
Integrated Machining Technology, NTID	152		
Science	53		
Use, Code of Conduct	350,365		
Computing and Information Sciences, B. Thomas Golisano College of	52		
Course Descriptions	190		
Computing Services (see Information and Technology Services)			
Confidentiality of Student Records	345		
Cooperative Education and Career Services	348		
Requirements	9		
(see also individual programs)			
Costs of Attending RIT through NTID	131		
Counseling			
Center	348		
Services, NTID	132,353		
Course			
Descriptions	162		
Number Index	161		
Registration	346		
Crafts	81		
Creative Arts Program	361		
Credit by Exam	370		
Criminal Justice Program	97		
Curriculum			
Liberal Arts	7		
Mathematics and Science	8		
D			
Day Care (see Margaret's House)			
Deaf Studies, NTID	310		
Deaf Studies Certificate	156		
Deans	389		
Dean's List Eligibility	346		
Design, School of	75, 78		
Diagnostic Medical Sonography (Ultrasound) Program	124		
Digital Imaging and Publishing Technology, NTID	145		
Disability Services Coordinator	351		
Distinguished Professorships	389		
Drug and Alcohol Policy	366		

E			
Early Decision Plan	369		
Economics Program	99		
Educational Technology Center	349		
Electrical			
Engineering	65		
Engineering Technology	17		
Mechanical Engineering Technology	21		
Emergency Management Certificate	35		
Engineering			
Kate Gleason College of	61		
Course Descriptions	202		
Science	63		
Technology	14		
English Language Center	349		
Environmental			
Chemistry Option	114		
Management Science Certificate	33		
Management and Technology	32		
Science Program	110		
Expenses and Financial Aid	374		
Evening Division	375		
Extended Studies Diplomas			
in Art, Design	82		
F			
Faculty	390		
Emeriti	407		
Fee Schedule	374		
Film and Animation, School of	75, 83		
Film/Video/Animation	83		
Finance Major	48		
Financial Aid	377		
Academic Progress Requirements	378		
Programs (Chart)	381		
Refund Policy	380		
Fine Art Photography	88		
Fine Arts			
Diploma	82		
Studio	77		
First-Year Experiences Program, NTID	129		
First-Year Enrichment Program	9, 347		
Food			
Management	29		
Marketing and Distribution	30		
Foreign Language Instruction	349		
Furniture Design, Woodworking and	81		
G			
General Education			
Liberal Arts	7		
Mathematics and Science	8		
Glass and Glass Sculpture	81		
Gleason, Kate, College of Engineering	61		
Golisano, B. Thomas, College of			
Computing and Information Sciences	52		
Grading System	345		
Graduate Enrollment Services	370		
Graduation Requirements	7		
Grant-in-Aid, NTID	378		
Graphic			
Design	78		
Media	90		
Media Marketing	51		
Greek Council	358		
H			
Health			
Center	363		
Records	363		
Systems Administration	32		
Healthcare Billing and Coding Technology, NTID	144		
Higher Education Opportunity Program (HEOP)	351		
Honors Program	349		
Hospitality and Service Management	28		
Hotel and Resort Management	30		
Housing Connection	357		
Housing Operations	357		
Human Performance, Center for	9, 362		
Course Descriptions	336		
I			
Illustration Major	77		
Imaging			
Arts and Sciences, College of	75		
Course Descriptions	211		
and Photographic Technology	86		
Science	125		
Systems Management	87		
Immunization Requirements	363, 370		
Industrial			
Design Major	79		
Environmental Management Certificate	33		
and Science Technologies, NTID	147		
and Systems Engineering	68		
Information			
Technology	58		
New Media Option	59		
and Technology Services	350		
Intercollegiate Athletics	363		
Interior Design	79		
International			
Business Major	48		
Studies Program	100		
Student Services	347		
Introductory Programming Certificate, NTID	156		
J			
Jewelry Design, Metals and	81		
L			
Laboratory Science Technology, NTID	153		
Learning			
Consortium, NTID	353		
Development Center	351		
Support Services	352		
Liberal Arts			
College of	93		
Course Descriptions	246		
General Education Curriculum	7		
Library			
Cary	355		
Wallace	6, 355		
M			
Management (also see Quality Management)			
Certificate	39		
Development Program	38		
Diploma	39		
Major	49		
Management Information Systems Major	49		
Web Systems Development Certificate	50		
Manufacturing and Mechanical Engineering Technology/ Packaging Science	21		
Margaret's House (Child Care)	361		
Marketing Major	50		
Mathematics			
and Science General Education Curriculum	8		
and Statistics Programs	118		
Mechanical Engineering	69		
Aerospace Option	70		
Automotive Option	70		
Technology	24		
Mechanical Technology, AAS	25		
Mediation Services	368		
Medical			
Illustration	77		
Sciences Programs	122		
Mental Health Services, NTID	133, 353		
Metals and Jewelry Design	81		
Microelectronic Engineering	72		
Military Science, Department of	42		
Multidisciplinary Studies, Center for	35		

(NTID).....	127	Psychology Program.....	100	Health Center.....	363
Course Descriptions.....	308	Public Relations Communications Certificate.....	40	Housing.....	357
New Media		Public Policy Program.....	101	Organizations.....	357
Design and Imaging.....	81	Q		Professional Associations.....	360
Publishing.....	91	Quality Management Certificate.....	40	Records.....	345
North Star Center for Academic Success & Cultural Affairs.....	352	R		Retention.....	346
Notification		Refund Policies.....	376	Sickness Insurance Plan.....	375
and Appeal, Academic.....	377	Registration.....	346	Support Services.....	352
Emergency.....	364	Religious Life, Center for.....	347	Transition and Support, Center for.....	347
Nutrition Management.....	31	Reporter Magazine.....	360	Volunteer Center.....	360
O		Required Courses, NTID.....	129	Study Abroad Program.....	355
Off-Campus and Apartment Student		Research Projects, Sponsored.....	4	Summer Vestibule Program, NTID.....	354
Association.....	357	Reserve Officer Training Corps (ROTC)	42	Suspension, Academic.....	346
Officers.....	389	Residence Halls.....	356	T	
Online Learning.....	354	Association.....	358	Technical	
Optical Technology Program, NTID.....	154	Residence Life, Center for.....	356	Communication Certificate.....	41
Orientation		Retention.....	346	Education Programs, NTID (chart).....	134
New Student.....	352	RIT Exploration Program.....	104	Telecommunications Engineering	
and Registration, NTID.....	354	RIT Libraries.....	6,355	Technology.....	20
P		S		Terminology.....	409
Packaging Science.....	26	Safety and Health Technology Certificate ..	35	Transcripts.....	345
Part-time		Safety Technology.....	34	Transfer Credit.....	370
Enrollment Services.....	370	Scholarships.....	377,384	Translation Service.....	347
Studies		School for American Crafts.....	75,81	Travel and Tourism Management.....	31
Engineering Science.....	63	School of		Trustees.....	388
Extended Studies in Art and Design...82		Art.....	75,77	Tuition Assistance Program (TAP).....	378
Undergraduate Programs.....	10	Design.....	75, 78	and HEOP.....	351
Payment		Film and Animation.....	75, 83	u	
Plans.....	378	Photographic Arts and Sciences	75,84	Ultrasound (see Diagnostic Medical Sonography)	
Procedures.....	374	Print Media.....	75,89	Undeclared Options	
Performing Arts Certificate, NTID.....	156	Science, College of.....	105	Engineering.....	63
Photographic		Course Descriptions.....	284	Engineering Technology.....	14
Arts and Sciences, School of.....	75,84	Sexual		• General Science Exploration Option	107
Photojournalism.....	88	Assault Information Hotline.....	364	RIT Exploration Program.....	104
Physician Assistant Program.....	123	Harassment/Misconduct Policies.	365	Undergraduate Programs, Full- and Part-time.....	10
Physics Program.....	121	Small Business Management Certificate	40	V	
Policies and Procedures, Academic. . . .	345	Social Work Program.....	103	Vehicle Registration.....	364
Polymer Chemistry.....	117	Software Engineering.....	55	Veteran Enrollment Services.....	355
Portfolio Guidelines.....	76	Speech and Language, NTID.....	353	Visits to Campus.....	370
Pre-baccalaureate Studies, NTID. . . .	128,157	Sports	363	Vocational Rehabilitation.....	375
Course Descriptions.....	336	Statistics and Mathematics Programs. . . .	118	W	
Premedical Studies.....	106	Student		Wallace Library.....	6,355
Print Media, School of.....	75,89	Alumni Union.....	360	Wellness Education Requirements.....	9
Probation, Academic.....	346	Clubs and Organizations.....	358	Withdrawal from Courses.....	346
Professional		Conduct & Mediation, Office of.....	368	Women's Center.....	348
and Technical Communication.....	94	Conduct Policies.....	365	Woodworking and Furniture Design.....	81
Photographic Illustration.....	89	Congress, NTID.....	357		
Professorships, Distinguished.....	389	Government.....	357		

Notes

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