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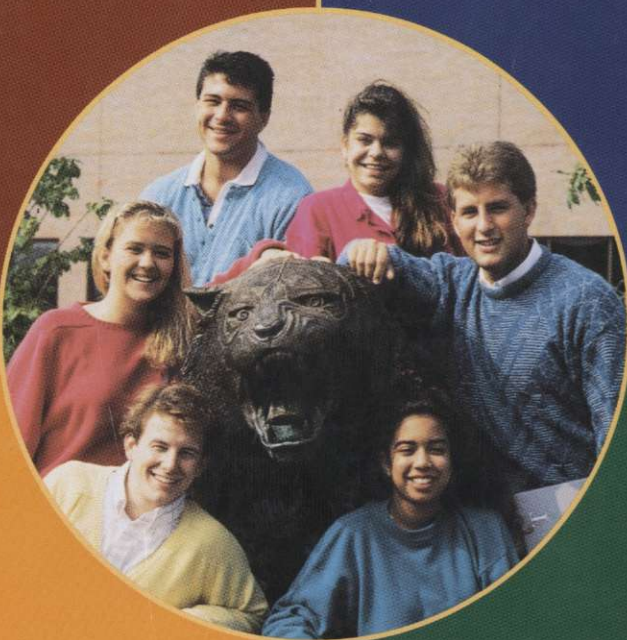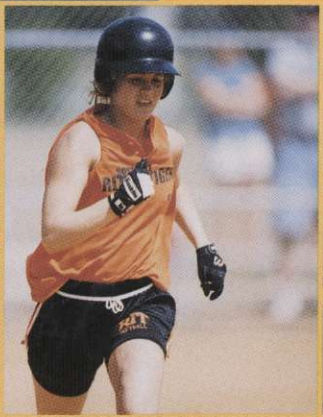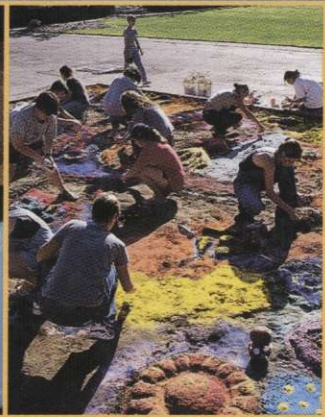## TOMORROW'S EDUCATION
TODAY

**2000–2001
Undergraduate
Bulletin**

Rochester Institute of Technology
2000-2001 Institute Calendar

FALL QUARTER (20001)

April 17-September 13
Fall Registration. Use telephone, Student Information System, walk-in or mail-in options. Students will be billed.*

September 6
Day and evening classes begin

September 9
Saturday classes begin

September 13
Last date to drop/add courses

October 13
Last date to withdraw with a "W" grade

November 11
Last Saturday class

November 14
Last day class

November 15
Reading Day (no *day* classes)

November 16,17,18, 20
Final exams—day classes

November 21
Last evening class

November 22-29
Fall/Winter break

WINTER QUARTER (20002)

October 9
Winter Registration. Use telephone.

December 6
Student Information System, walk-in or mail-in options. Students will be billed.*

November 30
Day and evening classes begin

December 2
Saturday classes begin

December 6
Last date to drop/add courses

December 20
Last day of classes before break

January 3
Day and evening classes resume

January 6
Saturday classes resume

January 19
Last date to withdraw with a "W" grade
Last Saturday class

February 20
Last day class

February 21
Reading Day (no *day* classes)

February 22, 23,24, 26
Final exams—day classes

February 27
Last evening class

February 28-March 11
Winter/Spring break

SPRING QUARTER (20003)

January 15-March 19
Spring Registration. Use telephone, Student Information System, walk-in or mail-in options. Students will be billed.*

March 12
Day and evening classes begin

March 17
Saturday classes begin

March 19
Last date to drop/add courses

April 20
Last date to withdraw with a "W" grade

May 18
Last day class

May 19
Last Saturday class

May 21, 22, 23,24
Final exams—day classes

May 25
Last evening class

May 26
Commencement

May 27-June 3
Spring/Summer break

SUMMER QUARTER (20004)

April 9-June 11
Summer Registration. Use telephone, Student Information System, walk-in or mail-in options. Students will be billed.*

June 4
Day and evening classes begin

June 9
Saturday classes begin

June 11
Last date to drop/add summer quarter courses

July 4
Holiday (no classes)

July 13
Last date to withdraw with a "W" grade

August 11
Last Saturday class

August 13
July 4th Make-up Day
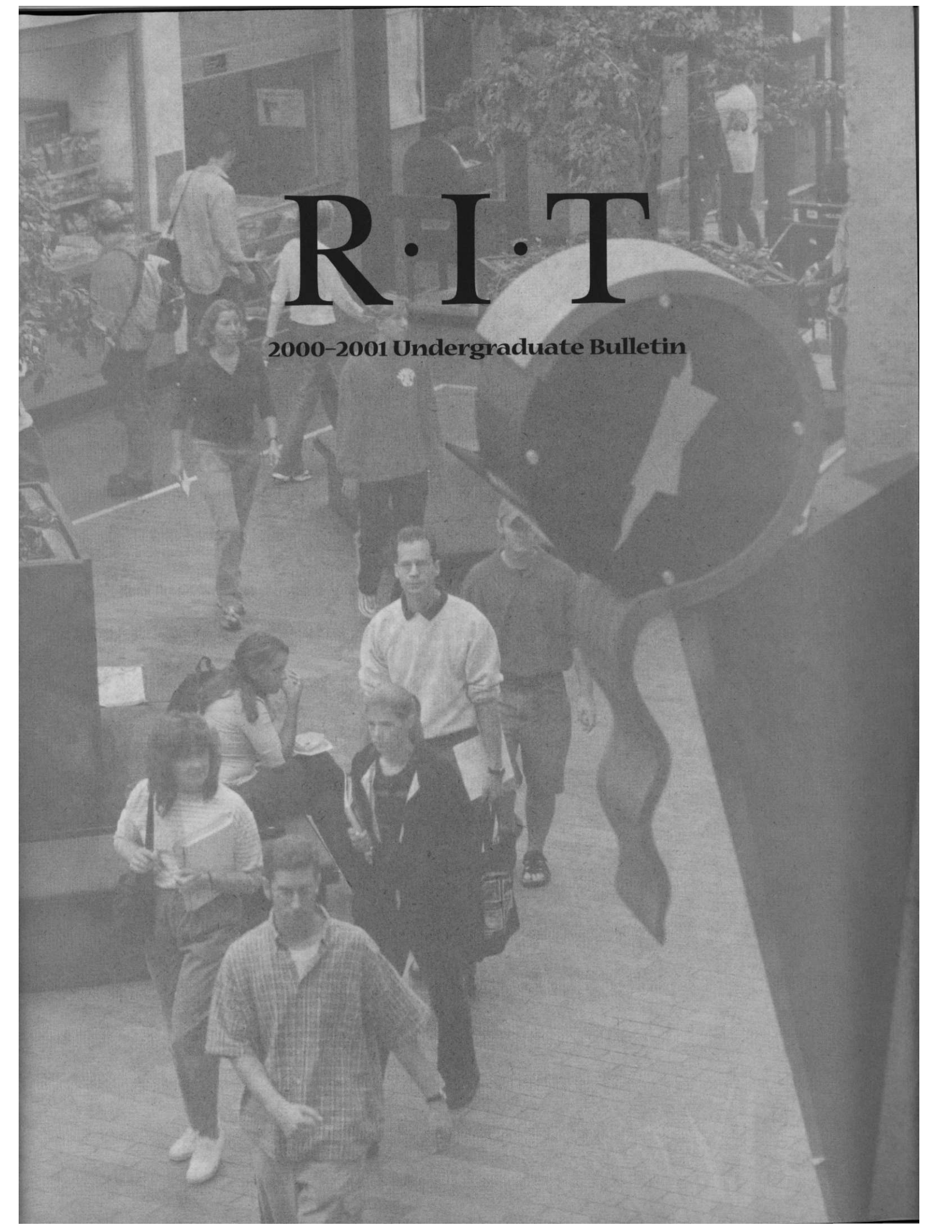
August 13
Last day class

August 14,15,16
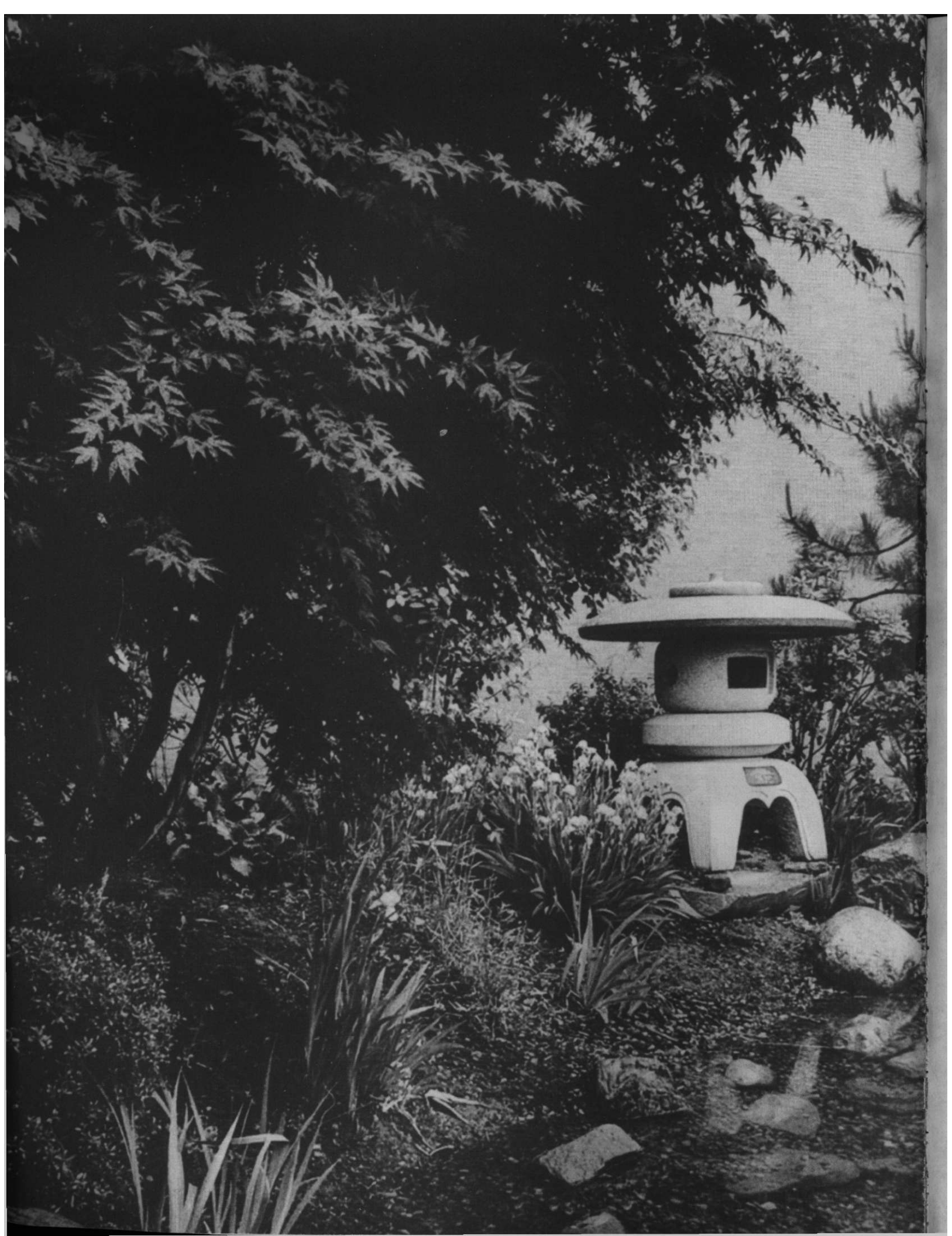Final exams—day classes

August 17
Last evening class

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

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2000–2001 Undergraduate Bulletin

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 2000-2001 academic year. The purpose of this bulletin is to provide students with a solid base of information to use in planning their undergraduate education.

Master's and doctoral degree programs, plus other post-baccalaureate offerings, are fully 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 and 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 of the same publication. Because of this, Rochester Institute of Technology does not assume a contractual obligation with its students for the contents of this *Undergraduate Bulletin.*

For more information concerning undergraduate study at RIT, contact:

Rochester Institute of Technology
Office of Admissions
Bausch & Lomb Center
60 Lomb Memorial Drive
Rochester, N.Y. 14623-5604
716-475-6631
http://www.rit.edu

Contents

An Introduction to
Rochester Institute of Technology

Respected internationally as a world leader in career-oriented and professional 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.

More than 200 different programs—including such distinctive offerings as microelectronic and software engineering, imaging science, information technology, film/video/animation, biotechnology, physician assistant, printing management, international business management, 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 80 foreign countries.

Approximately 9,500 full-time undergraduate students, 2,400 part-time undergraduate students and 2,200 graduate students attend RIT. More than 80,000 RIT alumni can be found around the globe.

Approximately one-third of our undergraduates are transfer students from two-year colleges or other four-year institutions. More than one-third are women, and adult students make up a significant proportion 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.

A nationally respected leader in professional and career-oriented education, RIT has been described as one of America's most imitated institutions. It 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."

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. Approximately 7,000 employment positions are listed with our Cooperative Education and Career Services Office each year, and more than 600 companies visit RIT to conduct over 6,500 employment interviews.

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

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 students understand both technological developments and the larger philosophical and ethical issues presented by technology.

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

Colleges and Degrees

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

The College of Applied Science and Technology (pages 15-59) offers a wide variety of degrees, diplomas and certificates to full- and part-time students. Programs and courses are offered during the day, during the evening, on Saturdays and by distance delivery. Bachelor of science programs include computer science; information technology; software engineering; civil engineering technology; electrical, computer and telecommunications engineering technology; computer integrated manufacturing and mechanical engineering technology; electrical-mechanical engineering technology; food, hotel, travel and nutrition management; packaging science; environmental management and applied arts and sciences (the "flex" degree). 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 computer science program continues to be recognized as one of the nation's top programs, and the computer integrated manufacturing 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 60-66) offers BS degree programs in accounting, finance, international business, management, management information systems, marketing and photographic marketing management. An emphasis on technology, a commitment to quality, and a global perspective are the foundations upon which our programs are built. It is one of few business colleges to offer a cooperative education program. The college awards BS, MBA and MS degrees and has earned accreditation from the International Association for Management Education/AACSB. An accelerated BS/MBA option offers outstanding undergraduates an opportunity to complete both degrees in five years.

The Kate Gleason College of Engineering (pages 67-79) offers BS degree programs in computer, electrical, industrial, mechanical, microelectronic and software engineering. Degree options also are offered for students interested in specializing in areas such as ergonomics, manufacturing, aerospace or automotive engineering. The 1999 "America's Best Colleges" edition of *U.S. News & World Report* magazine ranked the college fifth among engineering colleges in the United States that do not offer the Ph.D. degree. 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 undeclared engineering program in the first year. Accelerated degree programs (combined BS and master's) are available in most departments.

The College of Imaging Arts and Sciences (pages 80-99) 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 Printing Management and Sciences. 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 top-ranked university in the nation for printing/publishing and for the study of photography. *U.S. News & World Report* magazine ranks RIT's master degree program in photography number one and the master's degree program in film 12th in the nation.

The College of Liberal Arts (pages 100-109) provides a comprehensive program of liberal education that is the foundation for all RIT students' educational experience. In addition to the core requirements, students must elect a concentration or a minor from a wide variety of liberal arts disciplines in the humanities, social sciences, or behavioral sciences. The college also offers bachelor of science degrees in social work, criminal justice, economics, psychology, and professional and technical communication and a master of science degree in school psychology. A one-year career decision program is offered for students who are undecided about which RIT degree program to pursue.

The College of Science (pages 110-132) 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 allied health sciences, including a physician assistant program, biotechnology, polymer chemistry and other unique programs. In addition, an undeclared science option is popular with new students who want more time to decide on their major. For those who are considering a professional school of medicine, the premedical core is a set of courses required for admission to most medical, dental and veterinary schools in the United States. The

college awards associate, bachelor of science and master of science degrees, as well as the nation's only doctoral program (Ph.D.) in imaging science.

The National Technical Institute for the Deaf (pages 133-158) provides technical and professional programs for approximately 800 deaf students enrolled in diploma or associate degree programs and provides extensive educational access services for more than 400 deaf students who are pursuing a bachelor's or master's degree or taking courses in RIT's six other colleges. Within NTID, students may choose a variety of options/concentrations in accounting technology, administrative support technology, applied art and computer graphics, applied computer technology, business careers, computer integrated machining technology, digital imaging and publishing technology, healthcare billing and coding technology, industrial computer electronics, and ophthalmic optical finishing technology. They can earn a diploma or associate degree through these programs.

Accreditation

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

The Commission of 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
5EB North Mezzanine
Albany, New York 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.

Research Activities

Sponsored research is a vital and integral component of RIT's research activity. Faculty and students undertake research for a variety of important reasons—to add to the body of knowledge, for professional development and to strengthen academic programs. Sponsored research, programs and projects enhance the Institute's academic programs, broaden its research resources, provide the opportunity for student participation in research, permit university/industrial partnerships and exchange of ideas, and serve the wider community in a variety of ways.

Moreover, grants and contracts provide a substantial revenue source for the university. External funding for research comes from federal and state agencies, private foundations and corporate sponsors. RIT's most active sponsors include the National Science Foundation (NSF), the National Institutes of Health (NIH), the Department of Education, the Department of Defense, National Aeronautics and Space Administration (NASA), the Central Intelligence Agency (CIA), IBM, Eastman Kodak Company and the Society of Manufacturing Engineers (SME).

Campus and Community

Home to nearly 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 convenient local transportation 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 nationally known 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 five miles from the New York State Thruway (Interstate 90), the RIT campus is situated in the suburb of Henrietta, only a few minutes from downtown Rochester.

The campus architecture has been described as "aesthetically flawless ... an almost indecent collection of perfect components," including "10 million Belden iron-spot bricks." A variety of outdoor sculpture and wall tapestries, a Japanese garden and masses of spring-flowering trees soften and add interest to the landscape.

Excellent facilities and up-to-date equipment add to the quality of academic life. RIT is a leader in instructional 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, microcomputer labs, all residence hall rooms, and most on-campus apartments. *Yahoo! Internet Life* magazine has named RIT one of "America's Most Wired Colleges."

Wallace Library is a multimedia resource center with access to more than 750,000 items. The library's Web-based workstations provide access to a wide selection of resources. Users

RIT's 1,300-acre suburban campus features modern academic buildings, a state-of-the-art library, newly renovated residence halls, a student union, fitness center and outdoor courts and athletic fields.

can access Wallace's catalog, search many electronic commercial databases and surf the Internet. The staff offers hands-on instructional sessions for using various electronic and Internet resources.

The VIA (VAX Internet Area) 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 private 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.

RIT 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 pre-press 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 and computer engineering facilities in the United States. An $8 million addition to the College of Science opened in spring 1998, and more than $50 million is being invested in ongoing residence hall renovation projects.

Housing and Recreational Facilities

Serving approximately 2,800 students, RIT's residence halls offer many living options to meet the diverse needs, interests and backgrounds of our students. Students may choose living arrangements according to their own lifestyles, including floor assignments by same gender, coeducational, wellness, nonsmoking, alcohol/substance free, intensified study, over 21 years of age, mainstream (hearing and deaf students living on the same floor). Living options in Greek fraternities and sororities and special-interest houses such as Art House, Community Service Clubhouse, 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's Apartment Life program features 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. Apartment housing is available to students in five RIT apartment complexes. Campus data network access is provided in University Commons, Perkins, Colony Manor, and the high rise at Racquet Club.

Our Student Life Center opened its doors in 1992, providing recreational facilities that include a gymnasium, fitness center, racquetball courts and an indoor track. Other indoor facilities include two more gyms, a swimming pool, 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.

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 physical education. Most RIT students will need to satisfy a physical education 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 the capstone senior seminar in the liberal arts.
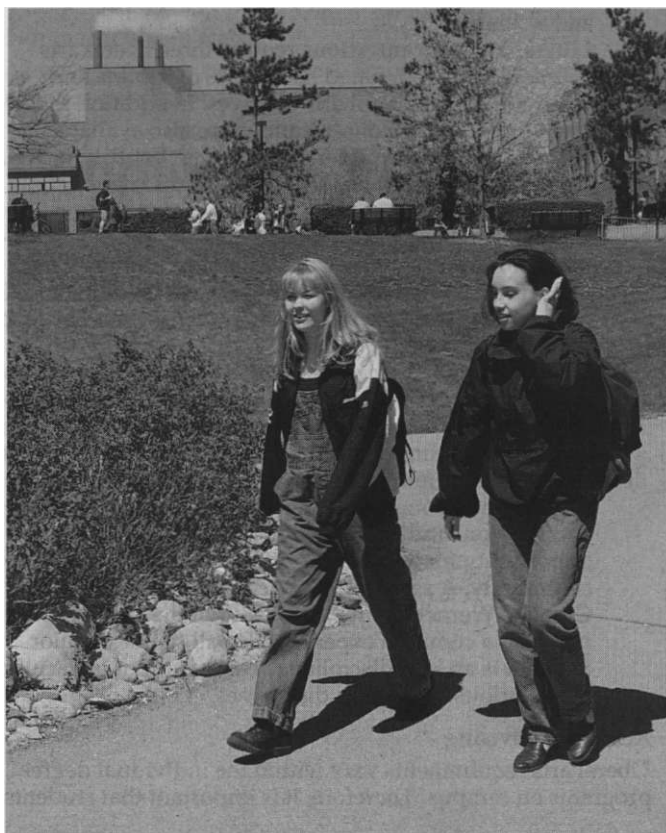
The physician assistant program requires a program cumulative grade point average of 2.8 or better.

I. The introductory core totals 28 credit hours composed of the following 200- to 300-level courses:
- 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, musical arts, film arts or theater arts
  History: one course required from either modern American or modern European history
  Philosophy (ethics, critical thinking or selected issues in philosophy) or science, technology and values
- Two courses from the four areas of social sciences (8 credits)
  Political Ideologies 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)
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, communication and culture, creative writing, criminal justice, economics, European history, French, German, history of the modern world, international relations, literature, mass media, philosophy, psychology, science, technology and environmental studies, sociology/anthropology, Spanish and writing.
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, environmental studies, foreign language culture (Arabic, Chinese, French, German, Japanese, Russian and Spanish), global studies, language communication, Latino/Latina-Latin American, 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 group setting 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 Caroline Werner Gannett Professor in the Humanities provides a common experience for all seniors. 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. Staff are available every day in the College of Liberal Arts' Academic Advising Office, 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.

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:

Political Ideologies 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.) 400- to 500-level	Course I (4 cr.) 400- to 500-level
Course II (4 cr.) 400- to 500-level	Course II (4 cr.) 400- to 500-level
Course III (4 cr.) 400- to 500-level	Course III (4 cr.) 400- to 500-level
Course IV (4 cr.) 400- to 500-level	1 Elective (4 cr.) 400- to 500-level
Course V (4 cr.) 400- to 500-level	1 Elective (4 cr.) 400- to 500-level
1 Elective (4 cr.) 400- to 500-level	1 Elective (4 cr.) 400- to 500-level
;	

Required Senior Seminar Course

(2 of 54 credit hours)

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 physical fitness and recreation in today's society. To meet this need, RIT offers an exceptional program of courses to help the student develop and maintain fitness, acquire physical skills in a variety of lifetime activities, and provide principles and elements for utilizing free time in an enjoyable and constructive manner.

The wellness education requirement is built on the premise that the attainment of good physical and mental health and fitness are basic elements in the pursuit of excellence in many aspects of life. The learning experiences provided through the wellness curriculum are an integral part of the total educational experience at RIT.

Baccalaureate degree
All candidates for the baccalaureate degree must successfully complete two different activity courses. (There are many to choose from.)

Associate degree
All candidates for the associate degree are required to successfully complete one activity course.

The first-year enrichment course will be required of all incoming freshmen beginning fall quarter 2000.

Transferred activity
In general, physical education courses taken at other schools will be accepted in transfer at RIT. Students transferring to RIT as third- or fourth-year students are required to successfully complete one wellness course and one activity course if they do not have sufficient physical education transfer credits or have not earned a baccalaureate degree at another institution. Decisions regarding college transfer of health, wellness or activity courses will be based on the course description of the college from which the student is transferring and reviewed for decision by the physical education director.

Other forms of physical education experience may be evaluated by the Center for Human Performance and accepted in lieu of PE course work, as long as the experience was completed no more than one year before matriculation.

Permanent medical excuse
A medical excuse may exempt a student from participation in the required *activities* segment of the physical education requirement. This will be granted only by RIT's Student Health Center. One copy of the medical excuse should be filed with the Center for Human Performance and the other copy taken to the student's academic department. Medical excuses from a family physician will not be accepted. **Note:** the wellness component will still be required.

Intercollegiate athletics
Students participating in the Institute's intercollegiate athletic programs will be granted activity course credit for the season(s) of participation.

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

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

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

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 2000-2001 academic year. The purpose of this bulletin is to provide students with a solid base 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 student financial aid awards.

Undergraduate Programs	College	Cert.	Dipl.	AOS	AS	AAS	BFA	BS	Eve. Option	Page
Applied Accounting	NTID		5002			5002				149
Applied Art & Computer Graphics	NTID		5012	5012		5012				141
Applied Arts & Science	Applied Science & Technology		5699			5699		4999	Y	48
Applied Computer Technology	NTID		5101	5101		5101				143
ASL-English Interpretation	NTID					5500				140
Biochemistry§	Science							0414		117
Biology	Science				5604			0401		113
Biomedical Photographic Communications	Imaging Arts & Sciences					5299		1217		90
Biotechnology	Science				‡			0499		114
Business Administration	Applied Science & Technology					5001			Y	52
Accounting	Business, Applied Science & Technology					5002		0502	Y	62
Finance	Business							0504	Y	62
International Business	Business							0513	Y	65
Management	Business							0506	Y	63
Management Information Systems	Business							0599	Y	64
Marketing	Business, Applied Science & Technology					5004		0509	Y	64 52
Photo Marketing Management	Business							0509	Y	65
Business Occupations	NTID	5005								149
Business Systems Analysis	Business	5103								66
Business Technology	NTID			5004						152
Ceramics & Ceramic Sculpture	Imaging Arts and Sciences					5610	1009			86
Chemistry§	Science				5619			1905	Y	115
Communication, Technical										
Basic	Applied Science & Technology	5008							Y	53
Advanced	Applied Science & Technology	5008							Y	53
Communication, Professional & Technical	Liberal Arts							0601		106
Communications, Public Relations										
Graphic Communication	Applied Science & Technology	5008							Y	53
Professional Writing	Applied Science & Technology	5008							Y	53
Computer Integrated Machining Technology	NTID		5312	5312						153
Computer Science§	Applied Science & Technology				5101			0701	Y	16
Computing, Biomedical	Science							1217		127
Craft Major, Double	Imaging Arts & Sciences						1009			86
Criminal Justice	Liberal Arts							2105		101
Deaf Studies	Applied Science & Technology	5506							Y	55
Design										
Graphic	Imaging Arts & Sciences					5012	1009			83
Industrial	Imaging Arts & Sciences					5012	1009			85
Interior	Imaging Arts & Sciences					5012	1009			85
Diag. Medical Sonography (Ultrasound)	Science	5299				‡		1299		130
Digital Imaging & Publishing	Imaging Arts & Sciences	5009								99
Digital Imaging & Publishing Technology	NTID		5007	5007		5007				154
Economics	Liberal Arts							2204		105
Electromechanical Technology†	NTID					5311				
Emergency Management	Applied Science & Technology	5508								56
Engineering										
Computer Engineering§	Engineering							0999		70
Electrical Engineering§	Engineering							0909		71
Industrial Engineering§	Engineering							0913		75
Mechanical Engineering§	Engineering							0910		76
Microelectronic Engineering	Engineering							0999		78
Software Engineering	Applied Science & Technology Engineering							0999		79, 18
Engineering Science	Engineering				5609				Y	68
Engineering Technology										
Civil Engineering Technology	Applied Science & Technology							0925		23
Computer Engineering Technology	Applied Science & Technology					5399		0925	Y	27
Electrical Engineering Technology	Applied Science & Technology							0925	Y	25
Electrical Technology	Applied Science & Technology					5310			Y	26
Electrical/Mechanical Engineering Technology	Applied Science & Technology							0925	Y	30
Manufacturing Engineering Technology (CIM)	Applied Science & Technology							0925	Y	30
Mechanical Engineering Technology	Applied Science & Technology							0925	Y	35
Mechanical Technology	Applied Science & Technology					5315			Y	35
Telecommunications Engineering Technology	Applied Science & Technology							0925		28

Undergraduate Programs	College	Cert.	Dipl.	AOS	AS	AAS	BFA	BS	Eve. Option	Page
Environmental Management & Technology	Applied Science & Technology							0420	Y	43
Environmental Science§	Science							0420		120
Film/Video/Animation	Imaging Arts & Sciences					5008	1010	1010		88
Fine & Applied Arts	Imaging Arts & Sciences		5012						Y	87
Fine Arts Studio	Imaging Arts & Sciences					5610	1002			83
Food Management	Applied Science & Technology					5404		1307		39
Food Marketing & Distribution	Applied Science & Technology							1307		40
General Management	Applied Science & Technology					5004			Y	51
Glass & Glass Sculpture	Imaging Arts & Sciences					5012	1009			86
Graphic Communications	Imaging Arts & Sciences					5009		0699		94
Healthcare Billing & Coding Technology	NTID		1202	1202						146
Health Systems Administration	Applied Science & Technology	5299							Y	54
Hotel and Resort Management	Applied Science & Technology					5010		0508		40
Illustration	Imaging Arts & Sciences					5610	1002			83
Imaging Science	Science							1011		132
Imaging & Photographic Technology	Imaging Arts & Sciences					5007		1011		91
Imaging Systems Management	Imaging Arts & Sciences							0599		92
Industrial Draftingt	NTID		5303							
Industrial Drafting Technologyt	NTID			5303		5303				
Information Technology	Applied Science & Technology					5101		0699	Y	19
Introductory Programming	NTID	5103								
Logistics & Transportation Mgmt.	Applied Science & Technology					5004			Y	51
Management Development	Applied Science & Technology	5004	5004						Y	50
Management Information Systems	Business	5103							Y	66
MIS Technology	Business	5103							Y	66
Mathematics										
Applied Mathematics§	Science				5617			1703		124
Computational Mathematics§	Science							1703		125
Medical Illustration	Imaging Arts & Sciences						1299			83
Medical Technology	Science				‡			1223		128
Metals & Jewelry Design	Imaging Arts & Sciences					5012	1009			86
New Media										
New Media-Design & Imaging	Imaging Arts & Sciences						0605			86
New Media-Information Technology	Applied Science & Technology							0699		20
New Media-Publishing	Imaging Arts & Sciences							0605		98
Newspaper Operations Management	Imaging Arts & Sciences							0699		97
Nuclear Medicine Technology	Science	5299			‡			1299		129
Nutrition Management	Applied Science & Technology					5404		1306		42
Office Technologies	NTID		5005			5005				151
Ophthalmic Optical Finishing Technology	NTID			5212		5212				147
Organizational Development										
Human Resource Development	Applied Science & Technology	5004							Y	51
Organizational Change	Applied Science & Technology	5004							Y	49
Training Design	Applied Science & Technology	5004							Y	49
Packaging Science	Applied Science & Technology							4999		36
Personnel Administration	Applied Science & Technology					5004			Y	51
Photographic Illustration, Professional	Imaging Arts & Sciences					5007	1011			93
Advertising Photography Option	Imaging Arts & Sciences									93
Fine Art Photography Option	Imaging Arts & Sciences									94
Photojournalism Option	Imaging Arts & Sciences									93
Physician Assistant	Science							1299.10		128
Physics	Science				5619			1902		126
Polymer Chemist^	Science							1907		119
Printing & Applied Computer Science	Imaging Arts & Sciences							0699		99
Production Management	Applied Science & Technology					5004			Y	
Psychology	Liberal Arts							2001		108
Quality, Basic	Applied Science & Technology	5004							Y	50
Quality Implementation	Applied Science & Technology	5004							Y	50
Safety Technology	Applied Science & Technology	5312						0420		45
Social Work	Liberal Arts							2104		103
Statistics, Applied§	Science							1702		123
Structural Design	Applied Science & Technology	5399								
Travel & Tourism Management	Applied Science & Technology						0510.10			41
Travel Management	Applied Science & Technology						5011.10			41
Web Site and Intranet Design	Business	5103								66
Woodworking & Furniture Design	Imaging Arts & Sciences				5317	5012	1009			86

* *Higher Education General Information Sun/ey*
† *This program has been approved for discontinuance. No new students will be admitted in 2000-01.*
‡ *Students in these programs may receive an AS in general science (HEGIS #5649) upon successful completion of the first two years.*
§ *Dual degrees (BS/MS) option also available*

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 adult students. Modem technology, whether in the development, integration or implementation stages, is a focal point in each CAST program. This technology is 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 and the enhancement of customer satisfaction in the service sector.

The college includes computer science; information technology; 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; applied arts and science; and software engineering sponsored jointly with the College of Engineering. The college has 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.

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. A building completed in 1999 now houses the laboratories for electrical, computer and telecommunications engineering technology (electronics, electronic design, local area networks, digital systems and telecommunication systems); manufacturing and mechanical engineering technology (mechanical systems and materials); and five from information technology (networking, systems administration, Cisco, browser and production). The soils and environmental laboratories from civil engineering technology have been upgraded and relocated to larger facilities.

Extensive computer facilities are available for all programs. Specialized facilities for computer science (seven labs), software engineering (two labs) and seven new labs in information technology (in addition to those in the new building) provide computer majors with the roles required by industry.

The college's student-run kitchen and restaurant, remodeled in 1997, 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, which does not require co-op, 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.
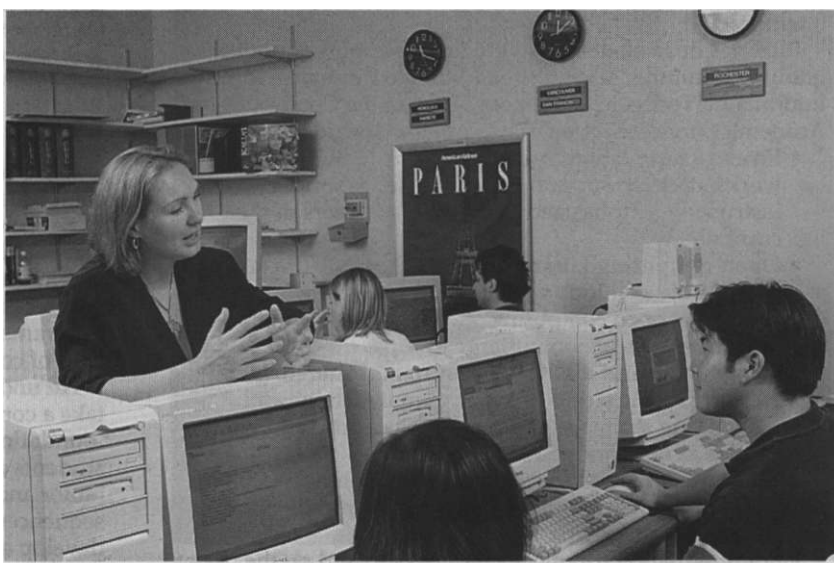
RIT has one of only a few live American Airlines SABRE computerized reservation systems available on a college campus. Travel and tourism management students can access worldwide flight information, accommodations, rental car agencies, and charter firms.

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.

Computer Science

Walter A. Wolf, *Chair*

The department of computer science offers a program 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. The laboratories that support these experiences are limited to 15 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 Technology Services, listed in the Counseling and Academic Services section of this catalog) include:
   • Five teaching laboratories, each with 16 SUN Ultra workstations to support formal, closed laboratory instruction, emphasized in the first two years of the curriculum;
   • Open computing laboratory with 10 SUN Ultra and 12 SGI Indy and Indy modeler and Indigo 2 workstations to support open computing and occasional formal, closed laboratory instruction for large groups;
   • Networking and distributing systems laboratory focusing on the study of data communications and networking strategies utilizing workstations and file servers as networking tools;
   • CS learning laboratory, an area for students and faculty to meet informally for help sessions, team meetings and other discussions.
   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 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. Dial-in modems allow students remote access to our computers and networks as well as 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 Computer Science Accreditation Board (CSAB), 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.

On the first day of class each quarter, computer science professor Margaret Reek takes photographs of her students, combines them with some biographical information, and puts them on a class Web page.

   Computer science covers a wide spectrum of the field of computing. A computer scientist can specialize in areas such as data communications and networking, software engineering, parallel computation, digital systems design and computer architecture, systems software, computing theory, computer graphics 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 is required to take 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, choosing one of eight concentration sequences. 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

First Year	*Quarter Credit Hours*
Freshman Seminar 0603-101	1
Computer Science 1,2,3 0603-231,232,233	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 0502-225,226	8
Liberal Arts * [1]	8-16
Physical Education Electives †	0

Second Year	
Computer Science 4 0603-334	4
Software Engineering 3010-361	4
Intro, to Digital Design 0603-351	3
Computer Organization 0603-352	3
Professional Communication for CS & SE 0603-341	4
University Physics III & Lab 1017-313,377 or	
Organic Chemistry & Lab 1011-213,207 or	4-12
General Biology & Lab 1001-201,202,203,205,206,207	
Discrete Mathematics I, II 1016-265,366	8
Probability & Statistics 1016-351	4
Liberal Arts * [1]	0-8
Free Elective [5]	4
Physical Education Electives †	0

Third, Fourth, Fifth Years	
Introduction to Computer Science Theory 0603-380	4
Operating Systems I 0603-440	4
Data Communications & Networks I 0603-420	4
Programming Language Concepts 0603-450	4
Computer Science Concentration [2]	8-12
Computer Science Electives [3]	12-16
Non-CS Concentration [4]	16
Liberal Arts *	26
Science Electives	8
Free Elective [5]	4
Cooperative Education (4 quarters required)	Co-op
Total Quarter Credit Hours	193-196

HI 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.

12] The computer science concentration consists of one of the following course sequences:
Software Engineering
Engineering of Software Subsystems 3010-362
Principles of Software Architecture & Design 3010-440
and any one of the following courses:
Formal Methods for Specification b Design 3010-420
Principles of Concurrent Software Systems 3010-441
Software Process & Product Metrics 3010-450
Software Verification & Validation 3010-452
Networking and Distributed Systems
Systems Programming 10603-406
Data Communications & Networks II0603-541
Data Communications & Networks ID 0603-542
Parallel Computing
Parallel Computing 10603-531
Parallel Computing II0603-532
Computer Graphics
Computer Graphics 10603-570
Computer Graphics II0603-571
Artificial Intelligence
Artificial Intelligence 0603-455
and any two of the following courses:
Computer Vision
Neural Networks & Machine Learning
Genetic Algorithms
Expert Systems 0603-456
Digital Systems Design
Digital System Design 0306-561
Computer Architecture 0603-520
Intro, to VLSI Design 0306-630
Computer Science Theory
Complexity & Computability 0603-481
Analysis of Algorithms 0603-515
and any one of the following courses:
Cryptography 0603-482
Neural Networks & Machine Learning
Genetic Algorithms
Topics in CS Theory
Systems Software
Systems Programming 10603-406
Language Processors 0603-580
and any one of the following courses:
Systems Programming II0603-506
Operating Systems II0603-544

13] 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.

15] Any course open to computer science majors may be taken as a free elective.

' See page 10 for liberal arts requirements.

† See page 11 for policy on physical education.

Computer science students learn how to work on their own and as part of a project management team.

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

COMPUTER SCIENCE	Quarter Credit Hours
Computer Science 1,2,3,4 0603-231,232,233,334	16
Professional Communication for CS & SE 0603-341	4
Software Engineering 3010-361	4
Intro, to Digital Design 0603-351	3
Computer Organization 0603-352	3
MATHEMATICS & SCIENCE	
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, m 1001-201,202,203, 205,206,207	12
LIBERAL ARTS	
Writing & Literature I, H 0502-225,226	8
Humanities Electives	12
Social Science Electives	8
Total Quarter Credit Hours	94-97

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

COMPUTER SCIENCE	Quarter Credit Hours
Computer Science 1,2,3,4 0603-231,232,233,334	16
Professional Communication for CS & SE 0603-341	4
Software Engineering 3010-361	4
Intro, to Digital Design 0603-351	3
Computer Organization 0603-352	3
Intro, to CS Theory 0603-380	4
Programming Language Concepts 0603-450	4
Data Communications & Networks I 0603-420	4
Operating Systems I 0603-440	4
Computer Science Concentration	8-12
Computer Science Electives	12-16
LIBERAL ARTS	
Writing & Literature I, II 0502-225,226	8
Humanities Electives	12
Social Science Electives	8
Liberal Arts Electives *	12
Liberal Arts Concentration *	12
Senior Seminar *	2
MATHEMATICS & SCIENCE	
Calculus I, n, ID 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, II, III 1011-211,212,213,205,206,207	12
or	
Biology I, II, III 1001-201,202,203,205,206,207	12
OTHER	
Free Electives	8
Non-CS Concentration	16
Co-op Work Experience (4 quarters)	Co-op
Total Quarter Credit Hours	193-196

* See page 10 for liberal arts requirements.

Software Engineering

Michael J. Lutz, 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.
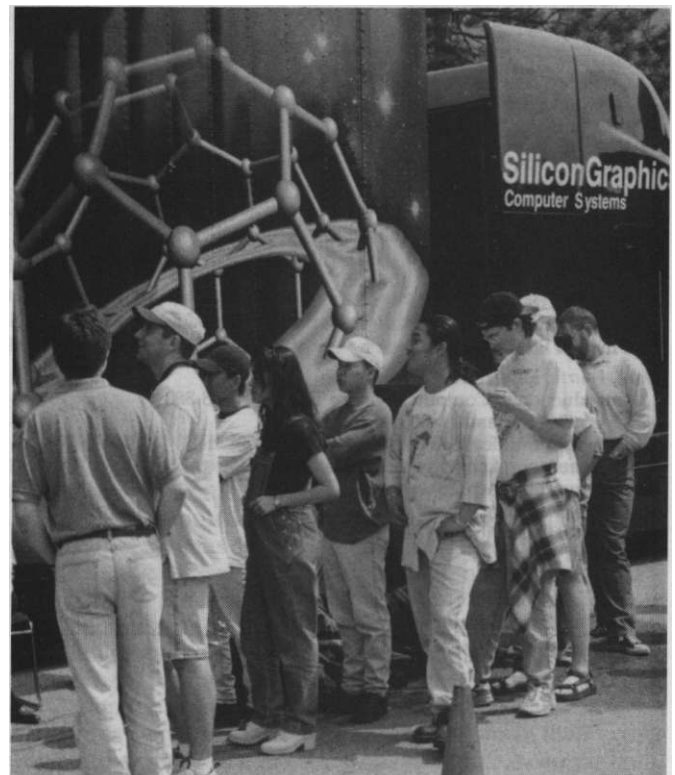
Exciting industry facilities like Silicon Graphics's "Magic Bus"—a multi-million-dollar tractor-trailer filled with dazzling computer equipment—frequent RIT's campus.

Laboratories

Students in software engineering have access to general campus-wide computing facilities, as well as the specialized laboratories supporting both computer science and computer engineering. These laboratories house state-of-the-art equipment for small-group instruction and experimentation.

All of these laboratories are connected to the campus-wide network and from there to the Internet. Students can use their accounts to access Internet resources such as electronic mail, file transfer and the World Wide Web. Indeed, many departments on campus use the Internet as a means of dissemination and communication.

Cooperative education

All students in the software engineering program must complete five quarters of cooperative education prior to graduation. Student 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 their last academic quarter.

Software engineering, BS degree, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 3010-101	1
Computer Science 1,2,3 0603-231,232,233	12
Calculus I, n, III 1016-251,252,253	12
College Chemistry I 1011-208	4
University Physics I, II & Lab 1011-311,312,375, 376	10
English Composition 0502-220	4
Liberal Arts *	8
Physical Education Electives †	0

Second Year	
Engineering of Software Subsystems 3010-362	4
Computer Science 4 0603-334	4
Professional Communications 0603-341	4
Software Engineering 3010-361	4
Assembly Language Programming 0306-250	4
Introduction to Digital Systems 0306-341	4
Differential Equations 1016-306	4
Discrete Mathematics I, II 1016-365, 366	8
University Physics III & Lab 1017-313,377	5
Liberal Arts *	8
Physical Education Electives †	0

Third, Fourth, Fifth Years	
Principles of Software Architecture 3010-440	4
Formal Methods of Specification & Design 3010-420	4
Software Requirements & Specification 3010-455	4
Software Engineering Project 1,2 3010-561,562	8
Software Engineering Electives ‡	20
Scientific Applications Programming 0603-319	4
Programming Language Concepts 0603-450	4
Computer Architecture 0306-522	4
Human Factors 0303-516	4
Probability & Statistics 1016-351	4
Application Domain Electives §	12
Free Elective	4
Liberal Arts *	18
Cooperative Education (5 quarters required)	Co-op
Total Quarter Credit Hours	194

* See page 10 for liberal arts requirements.
† See page 11 for physical education polio/.
‡ Students must choose five of the following six courses:
  Principles o/Concurrent Software Systems 3010-441
  Principles of Distributed Software Systems 3010-442
  Principles of Information Systems Design 3010-443
  Software Process & Product Metrics 3010-450
  Software Verification & Validation 3010-452
  Software Engineering Process 3010-456
§ Each student must complete a three-course sequence in an application domain related to software engineering. Current domains include electrical engineering, industrial engineering, mechanical engineering, communications and networks, embedded systems, commercial applications, and imaging and publishing technology.

Information Technology

Edith A. Lawson, 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. For the first time in the history of computing, 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 multi-media 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 three general competencies: 1) facility with current tools and technologies for networking, databases, application development, digital media and electronic publishing; 2) experience with the process of technology deployment in a user community, including needs assessment, design, development, technology transfer and ongoing support; 3) an individual professional focus in some area like inter-networking, multimedia development, training and human performance, programming or technical communication.

Layered over the curriculum are two major themes: the importance of communication skills and the acceptance of multiplatform, distributed computing environments. As important as technological skills clearly are, an information technologist's communication skills may be even more important in the long run. Specific technologies come and go, but the ability to communicate effectively remains critically important for IT professionals as they focus the technology that they command on real-world problems.

A cooperative education requirement enhances the academic requirements with real-world experience.

Program overview

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 adviser. The concentrations are intended to educate the student in areas in which he or she intends to work. Predefined concentration areas include data communications and networking, system administration, inter-active multimedia design, training and human performance, database implementation and administration, and applications programming. 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

There are two degrees available on a part-time basis in the information technology department—the AAS and the BS in information technology.

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 0602-201	1
Intro, to Multimedia: Internet & Web 0602-320	4
Intro, to Visual Programming I, II 0602-215,216	8
Interactive Digital Media 0602-330	4
Computer Concepts & Software Systems 0602-340	4
Algebra & Trigonometry 1016-204	4
Calculus for Technologists I, II 1019-420,421	8
Liberal Arts *	12
Lab Science Elective	4

Second Year	
Data Communications 0602-341	4
Internetworking Lab 0602-342	4
Database & Data Modeling 0602-360	4
Human Factors 0602-425	4
Data Analysis 1016-319	4
Liberal Arts *	16
Lab Science Elective	4
Professional Electives	8

Third/Fourth Years	
Cooperative Education (3 quarters required after year 2)	Co-op
Interface Design 0602-426	4
Technology Transfer 0602-460	4
Needs Assessment 0602-455	4
IT Concentration Courses †	24
Liberal Arts *	26
Professional Electives	8
General Education Electives	12
IT Senior Seminar 0602-595	1
Total Quarter Credit Hours	180

* See page 10 for liberal arts requirements.

t *Two three-course concentrations are required. Concentrations are available in interactive multimedia design, data communications and networking, system administration, database, Windows application development, learning and performance support, and special topics.*

Information technology, AAS degree

INFORMATION TECHNOLOGY	*Quarter Credit Hours*
Intro, to Multimedia: Internet & Web 0602-320	4
Intro, to Visual Programming I, II 0602-215,216	8
Interactive Digital Media 0602-330	4
Computer Concepts & Software Systems 0602-340	4
Data Communications 0602-341	4
Internetworking Lab 0602-342	4
Database & Data Modeling 0602-360	4
Technology Transfer 0602-460	4
IT Electives	8

MATHEMATICS and SCIENCE	
Algebra & Trigonometry 1016-204	4
Calculus for Technologists I, II 1019-420,421	8
Lab Science Electives	8

LIBERAL ARTS *	
Communications 0688-220 or 0502-220	4
Literature 0504-332	4
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 10 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 remaining 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.

The IT/new media student will rejoin those from the other two programs in their senior year 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.

Stephen Jacobs, assistant professor, information technology, reviews electronic products for his Gadget Boy page on the World Wide Web.

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 co-op education portions of the program.

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

First Year	*Quarter Credit Hours*
Ideation & Visualization 2010-251	4
Photography with Digital Technology 2061-251	4
New Media Perspectives 2065-251	3
Writing & Literature I 0502-225	4
Liberal Arts *	8
Freshman Seminar 0602-201	1
3D Form & Space 2009-212	3
Intro, to Programming for Digital Media 0602-230	4
New Media Publishing 2083-211	3
Elements of Graphic Design 2009-213	3
Programming for Digital Media 0602-434	4
Digital Video for Multimedia 2065-217	4
Physical Education †	0
	45

Second Year	
Typography 2083-311	3
Web Site Design & Implementation 0602-409	4
Algebra & Trigonometry 1016-204	4
Calculus for Technologist I, II1019-420,421	8
Writing & Literature II 0502-226	4
Liberal Arts *	8
Intro, to Computer Animation 2065-XXX	4
Computer Concepts & Software Systems 0602-340	4
Design of Graphical User Interface 2009-XXX	4
Programming for the World Wide Web 0602-539	4
Physical Education †	0
	47

Third/Fourth Years	
Cooperative Education (3 quarters required after year 2)	Co-op
Writing for Interactive Media 0602-528	4
Visual Basic for Programmers 0602-317	4
Interface Design 0602-426	4
Design of Interactive Media 0602-537	4
Data Communications & Computer Networks 0602-341	4
Professional Electives	7
Applied Database Management 0602-360	4
Data Analysis 1016-319	4
Lab Science Elective	8
Liberal Arts *	30
New Media Production Management 3001-201	3
Technology Transfer 0602-460	4
New Media Team Project I,IIXXXX-XXX	8
Physical Education †	0
	88

Total Quarter Credit Hours	180

* See page 10 for liberal arts requirements.
† See page 11 for physical education requirements.

Engineering Technology

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
- computer integrated 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.

Upper-division evening programs and distance learning programs

The following upper-division (junior-senior) programs are offered during the evening hours for part-time students:
- electrical engineering technology
- computer engineering technology
- computer integrated manufacturing engineering technology
- mechanical engineering technology
- telecommunications engineering technology
- electrical/mechanical engineering technology

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 distance learning.

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

Lower-division evening programs

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 distance learning. Further details on these certificates can be found in the RIT Part-time Studies Guide and *Guide to Distance Learning Programs.*

Additional part-time program information is provided in individual program descriptions on the following pages. Persons wishing further information on part-time evening studies should contact the appropriate department office.

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 bachelor's degree graduate—an engineering technologist—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

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.
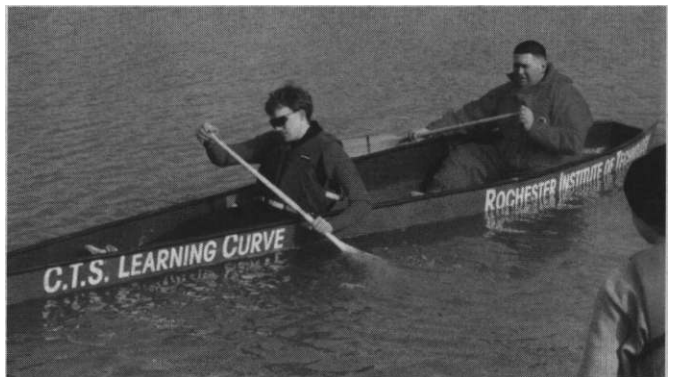
Each year, civil engineering technology students design and build a concrete canoe and travel to compete in annual regional competitions sponsored by the American Society of Civil Engineers. Regional winners go on to national competition.

Cooperative education plan—engineering technology

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	–

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 above.

Undeclared Engineering Technology Option

James F. Scudder, Program Chair

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 than 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

Fall Quarter   *Quarter Credit Hours*
    Writing & Literature I   0502-225   4
    Engineering Graphics with CAD   0608-211   4
    Electrical Fabrication Techniques   0618-220   2
    College Algebra & Trigonometry   1016-204   4
    Engineering Technology Seminar   0606-101   2

Winter Quarter
    Electrical Option Students
    Writing & Literature II   0502-226   4
    College Physics I   1017-211,271   4
    Introduction to Programming   0602-208   4
    DC Circuits   0609-201   3
    DC Circuits & Simulation 0609-221   2
    Mechanical Option Students
    Writing & Literature III   0502-226   4
    College Physics I   1017-211,271   4
    CAD for Mechanical Drafting & DES   0617-262   4
    Computer Programming Elective   4
Spring Quarter
    Electrical Students
    Introduction to Statics   0610-302   4
    AC Circuits   0609-202   3
    AC Circuits & Simulation   0609-222   2
    Digital Fundamentals   0618-301   4
    Calculus for Technologists I   1019-420   4
    Mechanical Students
    Introduction to Statics   0610-302   4
    Data Analysis   1016-319   4
    College Physics II   1017-212, 272   4
    Liberal Arts (Core) *   4
Total Quarter Credit Hours   50

* *See page 10 for liberal arts requirements.*

Civil Engineering Technology

Robert H. Easton, Chair

Background

The technologist translates the innovative concepts of the engineer into functioning systems and structures, using the language of codes, working drawings and specifications.

Students may choose one of five elective paths that meet their specific interests. Combined with a broad-based civil engineering technology core curriculum, this approach provides a good entry-level foundation in the industry. Graduates have found extensive employment opportunities.

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 and is operated as a cooperative education program.

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.

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.

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 masters' degrees, a large number have gained registration in several states as professional engineers, and several manage their own consulting firms.

Civil engineering technology students' career options include not only the construction industry and water delivery systems design, but also environmental and architectural restoration.

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	*Quarter Credit Hours*
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

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

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.

Students are encouraged to utilize the first-class computer facilities and to work with professors on additional applications of computer graphics. Evening classes and all-day college courses are open if schedules can be arranged and students have the capacity to handle additional credits.

Civil engineering technology, BS degree,
typical course sequence

First Year	*Quarter Credit Hours*
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
Survey of Computer Science 0602-200	4
Analytic Geometry 1016-228	4
College Physics I & Lab 1017-211,271	4
Writing & Literature I 0502-225	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 0502-226	4
Physical 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 Technologists I 1019-420	4
Route Surveying 0608-340	4
Elementary Structures 0608-380	4
Calculus for Technologists II 1019-421	4
Liberal Arts (Core) †	8
Physical 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
Techniques of Computer Programming 0618-231	4
Solutions to Engineering Problems 1019-422	4
Computer Applications II 0608-310	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)	Co-op

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)	Co-op

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)	Co-op
Total Quarter Credit Hours	196

* *See page 11 for policy on physical education.*
† *See page 10 for liberal arts requirements.*

Electrical Engineering Technology

Carol Richardson, Chair
Thomas J. Dingman, Program Chair

This professional program is designed to meet the growing needs for engineering technologists in a rapidly changing society.

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, 1 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.

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.

Professional elective sequences

Computer Design
Embedded Systems Design I   0618-561
Embedded Systems Design II   0618-562
Digital Processing of Signals   0609-547

Power Systems
Power Systems I   0609-550
Power Systems II   0609-552

Electronic Communications
Communications Systems I   0609-534
Communications Systems II   0609-535
Digital Processing of Signals   0609-547

Networking
Network Engineering   0614-571
Network Planning and Design   0614-574

Other Electives
Senior Project   0609-580
Statistical Quality Control   0617-424
Robots in Manufacturing   0617-485
Value Analysis   0617-437
Robust Design   0610-570
Telecommunications Fundamentals   0614-271
Voice Communications   0614-474

Evening program

The upper-division portion of this program may be taken on a part-time basis during the evening hours by those who are employed full time and desire to receive an accredited baccalaureate degree. The BS in electrical 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. The typical evening student requires approximately 13 quarters to complete the upper-division course requirements. In the early quarters the fundamentals of mathematics, circuit theory and power concepts are emphasized to provide the background for later courses in control systems, advanced electronics and professional electives.

Technical electives that are available and appropriate for the evening program are the same as those listed for the full-time program.

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

Electrical technology, associate program

This part-time evening program is designed to prepare technicians for employment in the electrical and electronics fields. It also prepares graduates for continuing their studies toward a baccalaureate degree in engineering technology. The program begins with courses in mathematics, physics and basic electricity. The latter portion of the technical program covers topics in electronics, electrical power, microprocessors and design automation. Courses in composition, communication, social science and humanities round out the program.

Electrical engineering technology, BS degree, typical course sequence

	Quarter Credit Hours
First Year	
DC Circuits 0609 201	3
Electronic Fabrication Techniques 0618-220	2
DC Circuits & Simulation 0609-221	2
College Algebra & Trigonometry 1016-204	4
First Year Orientation 0609-207	1
Liberal Arts (Core) *	12
AC Circuits 0609-202	3
AC Circuits & Simulation 0609-222	2
Technical Programming I 0618-231	4
Calculus for Technologists I, II 1019-420,421	8
Electronics I 0609-203	4
Digital Fundamentals 0618-301	4
Physical Education †	0
Second Year	
College Physics I/Lab 1017-211,271	4
College Physics n/Lab 1017-212,272	4
College Physics Hi/Lab 1017-213,273	4
Electronics H, HI 0609-361,362	8
Data Analysis 1016-319	4
Liberal Arts (Core) *	8
Machines & Transformers 0609-337	4
Effective Technical Communications 0535-403	4
Microcomputers 0618-303	4
Microcontrollers 0618-339	4
Physical 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
Solutions to Engineering Programs 1019-422	4
Liberal Arts (Core) *	4
Career Orientation 0609-407	1
Math/Science Elective	4
Liberal Arts (Concentration) *	4
Principles of Electronic Design Automation 0618-320	4
Concepts in Systems & Signals 0609-333	4
Cooperative Education (2 quarters)	Co-op

Fourth Year

General Education Elective	4
Technical Electives	8
Liberal Arts (Concentration) *	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
Engineering Economics 0617-436	4
Senior Seminar	2
Professional Electives	8
Free Elective	4
Technical Elective	4
Liberal Arts (Concentration) *	4
Cooperative Education (1 quarter)	Co-op
Total Quarter Credit Hours	192

The program shown is that which would be taken by those who start at RTT 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 10 for liberal arts requirements,
f See page 11 for policy on physical education.

Electrical engineering technology, BS degree, typical evening course sequence, upper division only

First Year	*Quarter Credit Hours*
Calculus for Technologists II 1019-421 *	4
Concepts in Signals & Systems 0609-333	4
Solution of Engineering Problems 1019-422 *	4
Analog Simulation Seminar 0609-426	2
Machines & Transformers 0609-337 †	4
Advanced Circuit Theory 0609-403	4
Principles of Electronic Design Automation 0618-320	4
Cooperative Education (1 quarter)	
Career Orientation 0609-407	

Second Year

Mechanical/Manufacturing ET Elective	
or	
Technical Elective	4
Liberal Arts (Core) ‡	4
Advanced Electronics 0609-442	4
Effective Technical Communication 0535-403 †	
or	
Technical Programming I 0618-231 †	4
Control Systems I 0609-404	4
Math/Science Elective	4
\ Cooperative Education (1 quarter)	

Third Year

Transmission Lines 0609-408	4
General Education Elective	4
Digital Systems Design I 0618-438	4
Data Analysis 1016-319 †	4
Technical Elective	4
General Education Elective	
or	
Technical Elective	4
Cooperative Education (1 quarter)	

Fourth Year

Liberal Arts (Concentration) ‡	4
Engineering Economics 0617-436	4
Liberal Arts (Concentration) ‡	4
Professional Elective	8
Technical Elective	4
Cooperative Education (1 quarter)	

Fifth Year

Liberal Arts (Concentration) ‡	4
Senior Seminar ‡	2
Cooperative Education (1 quarter)	
Total Quarter Credit Hours	102

* This sequence is based on students who have had the equivalent of 1019-420 as a part of their associate degree. If a student has not had this course, the recommended sequence for the first year for these courses is: fall, 1019-420; winter, 1019-421; spring, 1019-422.
† Lower-division course
‡ See page 10 for liberal arts requirements.

Electrical technology, AAS degree, typical evening sequence

First Year	*Quarter Credit Hours*
DC Circuits 0609-201	3
DC Circuits & Simulation 0609-221	2
Electronic Fabrication Techniques 0618-220	2
College Algebra & Trigonometry 1016-204 *	4
Calculus for Technologists I 1019-420	4
Writing & Literature I 0502-225	4
Writing & Literature II 0502-226	4

Second Year

AC Circuits 0609-202	3
AC Circuits & Simulation 0609-221	2
Electronics I 0609-203	4
College Physics I & Lab 1017-211,271	3+1
College Physics II & Lab 1017-212,272	3+1
College Physics HI & Lab 1017-213,273	3+1
Social Science Core Liberal Arts †	4

Third Year

Electronics II 0609-361	4
Electronics III 0609-362	4
Digital Fundamentals 0618-301	4
Microcomputers 0618-303	4
Technical Programming I 0618-231	4
Calculus for Technologists II 1019-421	4

Fourth Year

Program Electives	12
Humanities Core Liberal Arts †	4
Liberal Arts Core ‡	4
Effective Technical Communications 0535-403	4
Total Quarter Credit Hours	*96*

* Alternate sequence available based on pre-testing
† See page 10 for liberal arts requirements.
‡ Students who plan to obtain an AAS degree as their terminal degree may substitute a technical elective here. They should contact their academic adviser for appropriate technical electives.

Program Electives	*Quarter Credit Hours*

Computer Technology

Technical Programming II 0618-232	4
Technical Programming III 0618-233	4
Microcontrollers 0618-339	4

Electrical Technology

Machines and Transformers 0609-337	4
Electronics IV 0609-363	4
Microcontrollers 0618-339	4

Telecommunications Technology

Technical Programming II 0618-232	4
Electronics IV 0609-363	4
Telecommunications Fundamentals 0614-271	4

Computer Engineering Technology

Carol Richardson, Chair
George Zion, Program Chair

There is an increasing requirement in industry for graduates with an in-depth knowledge of both hardware and software design and development. The computer engineering technology program bridges the gap between hardware and software by providing a solid foundation in both and tying the disciplines together with a curriculum that has intensive classroom and laboratory components.

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.

Computer 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.

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 are:

Computer Science
Computer Science for Transfers   0603-263
Programming Language Concepts   0603-450
Operating Systems I 0603-440
Systems Administration
Scripting   0602-402
Systems Administration I   0602-421
Systems Administration II   0602-422
Local Area Networking
Internetworking Lab I   0602-342
Internetworking Lab II   0602-413
Internet: Network Transport   0602-515
Wide Area Networking
Telecommunications Fundamentals   0614-271
Voice Communications   0614-474
Switching Technologies   0614-475
Communication Systems
Electronics IV   0609-363
Communication Systems I   0609-534
Communication Systems II   0609-535

Computer engineering technology, BS degree,
typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 0618-101	1
Electronic Fabrication Devices 0618-220	2
Digital Fundamentals 0618-301	4
DC Circuits 0609-201	3
DC Circuits & Simulation 0609-221	2
AC Circuits 0609-202	3
AC Circuits & Simulation 0609-222	2
Technical Programming I 0618-231	4
Technical Programming II 0618-232	4
College Algebra & Trigonometry 1016- 204	4
Calculus for Technologists I, II 1019-420,421	8
Liberal Arts *	12

Second Year	
Microcomputers 0618-303	4
Electronics I, II, HI 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

Third Year	
Principles of Electronic Design Automation 0618-320	4
Digital Systems Design I 0618-438	4
Effective Technical Communication 0535-403	4
Networking Technologies 0614-477	4
Engineering Economics 0617-436	4
Solutions of Engineering Problems 1019-422	4
Data Analysis 1016-319	4
Liberal Arts *	4
Career Orientation 0609-407	1
Cooperative Education (2 quarters)	Co-op

Fourth Year	
Embedded Systems Design I, II 0618-561,562	8
Concepts in Systems & Signals 0609-333	4
Advanced Electronics 0609-442	4
Professional Concentration Electives	8
Liberal Arts*	8
Cooperative Education (2 quarters)	Co-op

Fifth Year	
Embedded Systems Design III 0618-563	4
Professional Concentration Elective	4
Electives †	16
Semiconductor Device Physics 1017-300	4
Senior Seminar 0520-501	2
Cooperative Education (1 quarter)	Co-op
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 10 for liberal arts requirements.
t The electives must include (1) math/science, (1) general education and (2) technical.

Computer engineering technology, BS degree,
typical evening course sequence/upper division only

First Year   *Quarter Credit Hours*

Networking Technologies I 0614-477	4
Concepts in Systems & Signals 0609-333	4
Digital Systems Design I 0618-438	4
Principles of Electronic Design Automation 0618-320	4
Engineering Economics 0617-436	4
Analog Simulation Seminar 0609-426 *	2
Career Orientation 0609-407	1
Co-op	

Second Year

Solutions of Engineering Problems 1019-422	4
Professional Concentration Electives	8
Data Analysis 1016-319	4
Advanced Electronics 0609-442	4
Co-op	

Third Year

Embedded Systems Design I 0618-561	4
Professional Concentration Elective	4
Effective Technical Communication 0535-403	4
Liberal Arts †	4
Elective ‡	4
Co-op	

Fourth Year

Embedded Systems Design II, III 0618-562,563	8
Elective ‡	4
Liberal Arts †	8
Co-op	

Fifth Year

Electives ‡	8
Intro, to Semiconductor Device Physics 1017-300	4
Senior Seminar 0520-501	2
Co-op	
Total Quarter Credit Hours	97

* Required only if missing computer simulation in DC & AC circuits,
f See page 10 for liberal arts requirements.
‡ The electives must include (1) math/science, (1) general education and (2) technical.

In the Center for Electronic Design Automation, students can pose a "what-if scenario and have the answer in seconds rather than spending hours in a traditional circuits laboratory.

Telecommunications Engineering Technology

Carol Richardson, Chair
William Johnson, Program Chair

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.

Two options are available to fulfill the needs of specific employers. 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, 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 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 are:

Microcontrollers   0618-339
Principles of Electronic Design Automation   0618-320
Internetworking Lab   0602-412
Windows Programming   0602-570
Control Systems   0609-404
Digital Signal Processing   0609-547
Embedded Systems Design I, II   0618-561, 562
Digital System Design I   0618-438
Electronic Imaging   0602-302
Communications II   0609-535

Evening program

The upper division of this program may be taken evenings on a part-time basis by students who have at least 45 quarter credit hours of transfer and/or program credit. A special schedule is available through the department office.

Also, courses have been identified that can be taken for the equivalent of the lower division of this program. Please contact the department for an appointment with an adviser to discuss this option.

Telecommunications engineering technology, BS degree, typical course sequence

First Year	Quarter Credit Hours
DC Circuits 0609-201	3
DC Circuits & Simulation 0609-221	2
Electronic Fabrication Techniques 0618-220	2
College Algebra & Trigonometry 1016-204	4
First Year Orientation—Telecommunications 0614-207	1
Writing & Literature I, II 0502-225,226	8
Liberal Arts (Core) *	4
AC Circuits 0609-202	3
AC Circuits & Simulation 0609-222	2
Telecommunications Fundamentals 0614-271	4
Calculus for Technologists I, II 1019-420,421	8
Electronics I 0609-203	4
Digital Fundamentals 0618-301	4
Physical Education †	0

Second Year	
College Physics I & Lab 1017-211, 271	4
College Physics II & Lab 1017-212,272	4
College Physics III & Lab 1017-213,273	4
Electronics H, HI 0609-361,362,	8
Solutions of Engineering Problems 1019-422	4
Technical Programming I, II 0618-231,232	8
Effective Technical Communication 0535-403	4
Liberal Arts (Core) *	12
Physical Education †	0
(Or completion of an appropriate associate degree or equivalent)	

Technical option, upper division

Third Year	
Voice Communications 0614-474	4
Microcomputers 0618-303	4
General Education Elective	4
Career Orientation 0609-407	1
Data Analysis 1016-319	4
Networking Technologies 0614-477	4
Technical Electives	8
Electronics IV 0609-363	4
Cooperative Education (2 quarters)	Co-op

Fourth Year	
Network Management 0614-479	4
Liberal Arts (Concentration) *	4
Transmission Systems 0614-473	4
Intro, to Database & Database Modeling 0602-360	4
Concepts in Signals & Systems 0609-333	4
Math/Science Elective	4
Switching Technologies 0614-475	4
Telecommunications Policy 0614-480	4
Cooperative Education (2 quarters)	Co-op

Fifth Year	
Network Engineering 0614-571	4
Communication Systems I 0609-534	4
Liberal Arts (Concentration) *	8
Senior Seminar	2
Technical Electives	8
Engineering Economics 0617-436	4
Network Planning & Design 0614-574	4
Cooperative Education (1 quarter)	Co-op
Total Quarter Credit Hours (includes lower division)	196

* See page 10 for liberal arts requirements,
t See page 11 for policy on physical education.

Management option, upper division

Third Year	
Voice Communications 0614-474	*4*
Financial Accounting 0101-301	*4*
Liberal Arts (Concentration) *	4
Data Analysis 1016-319	4
Career Orientation 0609-407	1
Microcomputers 0618-303	4
Networking Technologies 0614-477	4
Managerial Accounting 0101-302	4
Electronics IV 0609-363	4
Cooperative Education (2 quarters)	

Fourth Year	
Network Management 0614-479	4
Intro, to Database & Database Modeling 0602-360	4
Transmission Systems 0614-473	4
Principles of Economics I 0511-301	4
Concepts in Signals & Systems 0609-333	4
Organizational Behavior 0102-430	4
Switching Technologies 0614-475	4
Telecommunications Policy 0614-480	4
Cooperative Education (2 quarters)	

Fifth Year	
Network Engineering 0614-571	4
Communication Systems I 0609-534	4
Math/Science Elective	4
Liberal Arts (Concentration) *	8
General Education Elective	4
Senior Seminar	2
Corporate Finance 0102-441	4
Network Planning & Design 0614-574	4
Cooperative Education (1 quarter)	
Total Quarter Credit Hours (includes lower division)	196

* See page 10 for liberal arts requirements.

Telecommunications engineering technology— management option, BS degree, typical evening course sequence, upper division

First Year	Quarter Credit Hours
Microcomputers 0618-303	4
Liberal Arts (Concentration) *	4
Intro, to Database & Database Modeling 0602-360	4
Voice Communications 0614-474	4
General Education Elective	4
Cooperative Education (1 quarter)	
Career Orientation 0609-407	1

Second Year	
Networking Technologies 0614-477	4
Financial Accounting 0101-301	4
Electronics IV 0609-363	4
Managerial Accounting 0101-302	4
Principles of Economics I 0511-301	4
Cooperative Education (1 quarter)	

Third Year	
Transmission Systems 0614-473	4
Concepts in Signals & Systems 0609-333	4
Math/Sci. Elective	4
Data Analysis 1016-319	4
Switching Technologies 0614-475	4
Cooperative Education (1 quarter)	

Fourth Year	
Intro, to Telecommunications Policy 0614-480	4
Liberal Arts (Concentration) *	4
Organizational Behavior 0102-430	4
Network Management 0614-479	4
Liberal Arts (Concentration) *	4
Cooperative Education (1 quarter)	

Fifth Year	
Network Engineering 0614-571	4
Network Planning & Design 0614-574	4
Corporate Finance 0104-441	4
Communications Systems I 0609-534	4
Senior Seminar *	2
Cooperative Education (1 quarter)	
Total Quarter Credit Hours (includes lower division)	196

* See page 10 for liberal arts requirements.

Telecommunications engineering technology—technical option, BS degree, typical evening course sequence, upper division

First Year	Quarter Credit Hours
Microcomputers 0618-303	4
Technical Elective	8
Voice Communications 0614-474	4
Data Analysis 1016-319	4
Cooperative Education (1 Quarter)	
Career Orientation 0609-407	

Second Year	
Networking Technologies 0614-477	4
Electronics IV 0609-363	4
Technical Elective	4
General Education Elective	4
Liberal Arts (Concentration) *	4
Cooperative Education (1 Quarter)	

Third Year	
Concepts in Signals & Systems 0609-333	4
Intro, to Database & Database Modeling 0602-360	4
General Education Elective	4
Switching Technologies 0614-475	4
Math/Science Elective	4
Cooperative Education (1 Quarter)	

Fourth Year	
Intro, to Telecommunications Policy 0614-480	4
Liberal Arts (Concentration) *	4
Network Management 0614-472	4
Engineering Economics 0617-436	4
Transmission Systems 0614-473	4
Cooperative Education (1 Quarter)	

Fifth Year	
Network Engineering 0614-571	4
Liberal Arts (Concentration) *	4
Senior Seminar *	2
Communications Systems I 0614-534	4
Network Planning & Design 0614-574	4
Cooperative Education (1 Quarter)	
Total Quarter Credit Hours (includes lower division)	196

See page 10 for liberal arts requirements.

Manufacturing and Mechanical Engineering Technology/Packaging Science

The manufacturing and mechanical engineering technology/packaging science department offers a variety of programs focusing on the disciplines of manufacturing, mechanical, and packaging. 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 computer integrated manufacturing engineering technology, electrical /mechanical engineering technology, and mechanical engineering technology 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.

   Laboratories for each of the programs are in the new College of Applied Science and Technology building or the adjacent 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.

Objectives of the program
This program is designed to integrate the electrical, mechanical, and manufacturing disciplines in order to provide the breadth of knowledge required to integrate systems in an increasingly complex world. The graduate will be able to work effectively within a wide variety of disciplines. The program is designed so that transfer students from a wide variety of disciplines can complete the requirements and specialize in one of the many areas available through other engineering technology programs on campus.

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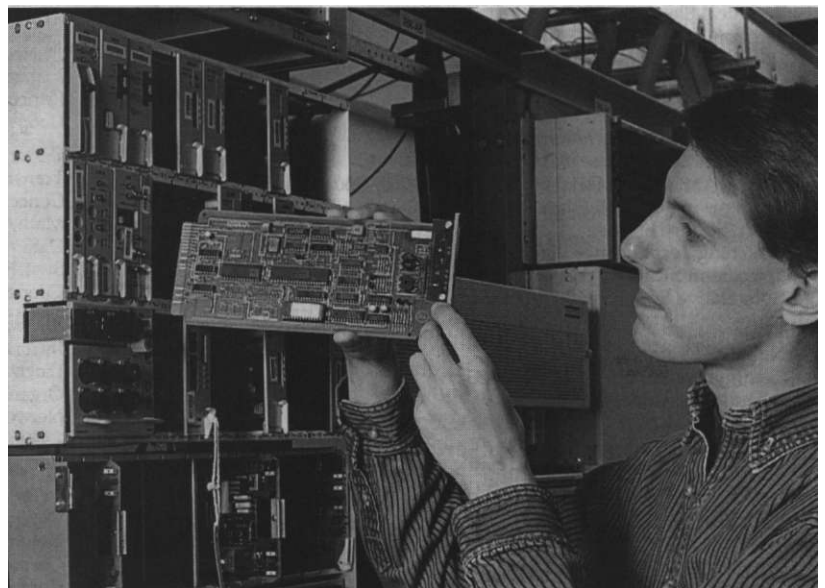
Telecommunications engineering technology majors may select from a technical option—focusing on equipment—or a management option, preparing them to work for companies that use telecommunications equipment and services.

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 distance learning program

The upper division portion of this program may be taken part time during the evening through distance 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 distance learning format only every other year.

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

	Quarter Credit Hours
College Algebra & Trigonometry	4
College Physics I with lab 1017-211,271	4
College Physics H with lab 1017-212,272	4
Introduction to Programming 0602-208	4
Liberal Arts Core Courses †	16
General Education Electives	8
Engineering Graphics with CAD 0608-211	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
Typical Transfer Total (varies with background)	80-100

* Students should complete as many of these requirements as possible before taking advanced courses. Extension students may take equivalent courses at local community colleges,
t See page 10 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
Advanced Circuit Theory
Advanced Electronics
Control Systems
Mechanical Design
Robust Design
Machine Design I
Machine Design II
Manufacturing Management
Robust Design
Productions and Operations Management II
Product Design
Telecommunications (select 3 courses)
Voice Communications
Telecommunications Policy and Issues
Data Communications and Computer Networks
Switching Technologies
Networking Technologies

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

First Year	Quarter Credit Hours
IX Circuits 0609-201	3
DC Circuits & Simulations 0609-221	2
Electronic Fabrication 0618-220	2
Engineering Technology Seminar 0606-101	2
Manufacturing Processes 0617-220	4
College Algebra & Trigonometry 1016-204	4
AC Circuits 0609-202	3
AC Circuits & Simulations 0609-222	2
Writing & Literature I, II 0502-225,226*	8
CAD for Mechanical Design 0617-262	4
Computer Tools in Engineering Technology 0610-230	4
Electronics I 0609-203	4
College Physics I/Lab 1017-211,272	4
Design, Dimensioning & Tolerancing 0610-220	4
Second Year	
Introduction to Statics 0610-302	4
College Physics II/Lab 1017-212,272	4
Liberal Arts Core Courses *	8
Pneumatics & Hydraulics 0610-305	4
Strength of Materials 0610-303	4
Data Analysis 1016-319	4
College Physics Ill/Lab 1017-213,272	4
Digital Fundamentals 0618-301	4
Calculus for Technologists I 1019-420	4
Introduction to Materials 0610-211	3
Materials Testing 0610-304	1
Effective Technical Communications 0535-403	4
Third Year	
Fundamentals of Chemistry & Lab 1011-271,205	4
Introduction to Programming 0602-208	4
Applied Dynamics 0610-405	4
Calculus for Technologists II 1019-421	4
Co-op Prep 0606-099	0
Microcomputers 0618-303	4
MET Lab I 0610-407	2
Solution of Engineering Problems 1019-422	4
Liberal Arts Core Course*	4
Introduction to Chemistry of Materials & Lab 1011-273,276	4
Cooperative Education (Spring & Summer)	0
Fourth Year	
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 n 0610-409	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
Fifth Year	
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
Total Quarter Credit Hours (including transfer credit)	194

* See page 10 for liberal arts requirements.

Electrical/mechanical engineering technology, BS degree, upper-division evening and distance learning program, typical course sequence

First Year	Quarter Credit Hours
Effective Technical Communications 0535-403	4
Data Analysis 1016-319	4
Calculus for Technologists I, II 1019-420,421 *	8
Electrical Principles for Design I 0609-411*	4
Applied Mechanics I 0610-408 *	4
Engineering Economics 0617-436	4

Second Year	
Solution of Engineering Problems 1019-422	4
Computers in MET 0610-432	2
Electrical Principles for Design II 0609-412 *	4
Applied Microprocessors 0609-413 *	4
Applied Mechanics II 0610-410	4
Electrical Machines & Transformers 0609-337	4
MET Lab I 0610-407	2

Third Year	
Fundamentals of Chemistry & Lab 1011-271,205	4
Introduction to Chemistry of Materials & Lab 1011-273,276	4
Materials Technology 0610-416	4
MET Lab II 0610-409	2
Telecommunications Fundamentals 0614-271	4
Liberal Arts Core †	4

Fourth Year	
Controls for Manufacturing Automation 0617-470	3
Production & Operations Management I 0617-440	4
Liberal Arts Core *	4
Thermodynamics & Heat Transfer 0610-441	4
Liberal Arts (Concentration) †	8

Fifth Year	
Technical Concentration	12
Liberal Arts (Concentration) †	4
Senior Seminar 0520-501 †	2
Total Quarter Credit Hours (including transfer credit)	192

*These courses cover material normally covered in associate degree programs. Students who have had equivalent courses may schedule any other required course.
† See page 10 for liberal arts requirements.

Computer Integrated Manufacturing Engineering Technology

Louis Gennaro, 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. The rate of increase of productivity in American industry is lagging behind most industrial nations.

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 computer integrated manufacturing engineering technology program is designed to meet industry demands and is operated on the cooperative education plan. The BS in computer integrated 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 objectives
The primary objective of the computer integrated 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.

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 and plastics.

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.

Evening 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. Computer integrated 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.

Computer integrated manufacturing engineering
technology, BS degree, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 0610-101	1
College Algebra & Trigonometry 1016-204	4
Computing Tools in Engineering Technology 0610-230	4
Engineering Graphics with CAD 0608-211	4
Manufacturing Processes I 0617-220	3
Machine Tool Lab	1
Writing & Literature I, II 0502-225,226	8
College Physics I & Lab 1017-211,271	4
Solid Modeling & Design 0617-262	4
Intro, to Materials Technology 0610-211	3
Materials Testing 0610-304	1
College Physics II & Lab 1017-212,272	4
Data Analysis 1016-319	4
Intro, to Statics 0610-302	4
Liberal Arts (Core)*	4

Second Year	
College Physics III & Lab 1017-213,273	4
Strength of Materials 0610-303	4
Manufacturing Processes II 0617-420	4
Math Elective	4
Physical Education	0
Sophomore Seminar 0610-102	1
Pneumatics & Hydraulics 0610-305	4
Design, Dimensioning & Tolerancing 0610-220	4
Electrical Principles for Design I 0609-411	4
Physical Education †	0
Calculus for Technologists I 1019-420	4
Principles of Mechanical Design I 0610-315	4
Liberal Arts (Core)*	4
Computer-aided Design (UG-Solids) 0617-460	4
Physical Education†	0

Third Year	
Co-op Preparation 0606-099	0
Effective Technical Communication 0535-403	4
Calculus for Technologists II 1019-421	4
Intro, to Electronics Manufacturing 0617-455	3
C++ Programming 0602-208	4
Computer Numerical Control 0617-471	4
Computers in Manufacturing 0617-410	4
Solutions to Engineering Problems 1019-422	4
Chemistry & Chemistry Lab 1011-205,271	4
Cooperative Education (2 quarters)	Co-op

Fourth Year	
Controls for Manufacturing Automation 0617-470	3
Integrated Electronics Packaging Design 0609-445	3
Production & Operations Management I 06017-440	4
Robots in Manufacturing 0617-485	4
Liberal Arts (Core)*	4
Engineering Economics 0617-436	4
Production & Operations Management II 0617-441	4
Electronics Manufacturing with SMT 0617-456	4
Liberal Arts (Concentration)*	4
Cooperative Education (2 quarters)	Co-op

Fifth Year	
Computer-aided Manufacturing 0617-475	4
Liberal Arts (Core)*	4
Technical Elective	4
Liberal Arts (Concentration)*	4
Tool Engineering 0617-472	4
Process Design 0617-510	4
Liberal Arts (Concentration)*	4
Liberal Arts (Senior Seminar) 0520-501*	2
Cooperative Education	Co-op
Total Quarter Credit Hours	193

See page 10 for liberal arts requirements.
† See page 11 for physical education policy.

Computer integrated manufacturing engineering
technology, BS degree, typical transfer sequence

Third Year	Quarter Credit Hours
Co-op Preparation 0606-099	0
Effective Technical Communication 0535-403	4
Calculus for Technologists II 1019-421	4
Intro, to Electronics Manufacturing 0617-455	3
C++ Programming 0602-208	4
Computer Numerical Control 0617-471	4
Computers in Manufacturing 0617-410	4
Solutions to Engineering Problems 1019-422	4
Chemistry & Chemistry Lab 1011-205,271	4
Cooperative Education (2 quarters)	Co-op

Fourth Year	
Controls for Manufacturing Automation 0617-470	3
Integrated Electronics Packaging Design 0609-445	3
Production & Operations Management I 0617-440	4
Robots in Manufacturing 0617-485	4
Liberal Arts (Core)*	4
Engineering Economics 0617-436	4
Production & Operations Management II 0617-441	4
Electronics Manufacturing with SMT 0617-456	4
Liberal Arts (Concentration)*	4
Cooperative Education (2 quarters)	Co-op

Fifth Year	
Computer-aided Manufacturing 0617-475	4
Liberal Arts (Core)*	4
Technical Elective	4
Liberal Arts (Concentration)*	4
Tool Engineering 0617-472	4
Process Design 0617-510	4
Liberal Arts (Concentration)*	4
Liberal Arts (Senior Seminar) 0520-501*	2
Cooperative Education (1 quarter)	Co-op
Total Quarter Credit Hours	95

See page 10 for liberal arts requirements.

Mechanical Engineering Technology

Robert Merrill, Program Chair

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 drafting, CAD, 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 objectives

The program objectives are 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.

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 prgrams 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.

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

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, mechanical drafting, computer-aided design (CAD) 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

First Year	Quarter Credit Hours
Freshman Seminar 0610-101	1
College Algebra & Trigonometry 1016-204	4
Writing & Literature I, II 0502-225,226 *	8
Computing Tools in Engineering Technology 0610-230	4
Manufacturing Processes I, II 0617-220,420	8
Math Elective	4
Solid Modeling & Design 0617-262	4
College Physics I and 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

Second Year	Quarter Credit Hours
College Physics n, ID and Labs 1017-212,213,272,273	8
Pneumatic & Hydraulic Systems 0610-305	4
Intro, to Statics 0610-302	4
Sophomore Seminar 0610-102	1
Calculus for Technologists I 1019-420	4
Strength of Materials 0610-303	4
Principles of Mechanical Design I 0610-315	4
Lower-Division Technical Electives	8
Free Elective	4
Liberal Art Core*	8
Physical Education (3 quarters) †	0

Third Year	Quarter Credit Hours
Calculus for Technologists II 1019-421	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
Solutions to Engineering Problems 1019-422	4
Applied Thermodynamics I 0610-440	4
MET Lab I 0610-407	2
Intro, to Chem. of Mat'l. and Lab 1011-273,277	4
Liberal Arts (Core) *	4
Cooperative Education (2 quarters)	Co-op

Fourth Year	Quarter Credit Hours
Materials Technology 0610-416	4
MET Lab D 0610-409	2
Applied Mechanics of Materials 0610-404	4
Applied Fluid Mechanics 0610-460	4
Liberal Arts (Core) *	4
Electrical Principles for Design I 0609-411	
or	
Lower-Division Technical Elective	4
Machine Design I 0610-506	4
Upper-Division Technical Elective	4
Liberal Arts (Concentration) *	4
Cooperative Education (2 quarters)	Co-op

Fifth Year	Quarter Credit Hours
Thermofluids Lab 0610-465	3
Electrical Elective	
or	
Lower-Division Technical 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	**195**

* See page 10 for liberal arts requirements.
t See page 11 for policy on physical education.

Mechanical engineering technology, BS degree, upper-division evening program, typical course sequence

First Year	Quarter Credit Hours
Effective Technical Communication 0535-403	4
Liberal Arts (Core)*	8
Applied Dynamics 0610-405	4
Calculus for Technologists II 1019-421	4
Solutions to Engineering Problems 1019-422	4

Second Year	Quarter Credit Hours
MET Lab I 0610-407	2
Applied Mechanics of Materials 0610-404	4
Electrical Principles for Design I 0609-411	4
Electrical Elective	4
Fundamentals of Chemistry 1011-271	3
Chemistry I Lab 1011-205	1
Liberal Arts (Concentration) *	4

Third Year	Quarter Credit Hours
Materials Technology 0610-416	4
MET Lab II 0610-409	2
Machine Design I 0610-506	4
Intro, to Chemistry of Materials 1011-273	3
Intro, to Chemistry of Materials Lab 1011-277	1
Liberal Arts (Concentration)	8

Fourth Year	Quarter Credit Hours
Applied Thermodynamics I 0610-440	4
Applied Fluid Mechanics 0610-460	4
Upper-Division Technical Electives	12
Free Elective	4

Fifth Year	Quarter Credit Hours
Thermofluids Lab 0610-465	3
Liberal Arts (Senior Seminar)	2
Total Quarter Credit Hours	**97**

* See page 10 for liberal arts requirements.

Mechanical technology, AAS degree, evening program typical course sequence

First Year	Quarter Credit Hours
Writing & Literature I, H 0502-225,226	8
Computing Tools in Engineering Technology 0610-230	4
College Algebra & Trigonometry 1016-204	4
Solid Modeling & Design	4
Math Elective	4

Second Year	Quarter Credit Hours
Data Analysis 1016-319	4
Design, Dimensioning & Tolerancing 0610-220	4
Manufacturing Processes I, II 0617-220,420	8
Liberal Arts (Core) *	8

Third Year	Quarter Credit Hours
College Physics I, II, m 1017-211,212,213	9
College Physics I, H, ffl Lab 1017-271,272,273	3
Intro, to Materials Technology 0610-211	3
Materials Testing 0610-304	1
Intro, to Statics 0610-302	4
Strength of Materials 0610-303	4

Fourth Year	Quarter Credit Hours
Principles of Mechanical Design I 0610-315	4
Lower Division Technical Electives	8
Calculus for Technologists I 1019-420	4
Pneumatics & Hydraulic Systems 0610-305	4
Free Elective	4
Total Quarter Credit Hours	**96**

* See page 10 for liberal arts requirements.

Packaging Science

Daniel L. Goodwin, 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 engineering, development, sales, purchasing, structural design, production, research and marketing.

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.

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 characteristics

The program is:
1. Career oriented—graduates are ready to enter directly into a position of responsibility
2. Interdisciplinary—students become familiar with the many facets of packaging through courses in several RIT colleges
3. Flexible—offering three options (management, technical and printing) with ample opportunity for electives according to interest
4. Representative of industry needs—content developed with the assistance of an industry advisory board, consultants from the industry and educational specialists
5. 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

First Year	*Quarter Credit Hours*
New Student Seminar 0607-200	1
Principles of Packaging 0607-201	4
Engineering Design Graphics 0607-301	4
Packaging Materials I 0607-311	4
Computer Applications 0607-341	4
College Physics & Lab 1017-211,271	4
Algebra for Management Science 1016-225	4
Calculus for Management Science 1016-226	4
Principles of Economics I, II 0511-301,302	8
Liberal Arts (Foundation) *	12
Physical Education †	0
Second Year	
Packaging Materials II 0607-312	4
Methods of Evaluation 0607-313	3
Rigid Containers 0607-321	4
Flexible Containers 0607-322	4
Survey of General Chemistry & Lab 1011-201,221	4
Survey of Organic Chemistry & Lab 1011-202,222	4
Foundations of Scientific Thinking 1017-341	2
Data Analysis 1016-319	4
Intro, to Graphic Comm. Industry 2081-254	3
Financial Accounting 0101-301	4
Liberal Arts (Foundation) *	16
Physical Education †	0
Cooperative Education 0607-499	Co-op
Third Year	
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 & Vibration 0607-485	4
Organizational Behavior 0102-430	4
Principles of Marketing 0105-363	4
Effective Speaking 0502-501	4
Liberal Arts (Concentration) *	12
Free Elective	3
Cooperative Education 0607-499	Co-op
Fourth Year	
Packaging Regulations 0607-462	3
Professional (Packaging) Electives	12
Liberal Arts (Electives & Senior Seminar) *	14
Management Electives	8
Free Electives	7
Total Quarter Credit Hours	192

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.

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

first Year   *Quarter Credit Hours*
New Student Seminar   0607-200   1
Principles of Packaging   0607-201   4
Engineering Design Graphics   0607-301   4
Packaging Materials I   0607-311   4
Modern Algebra   1016-204   4
Introduction to Calculus   1016-214,215   6
College Chemistry   1011-208,273   8
Effective Speaking   0502-501   4
Liberal Arts (Foundation) *   16
Physical Education †   0

Second Year
Packaging Materials II   0607-312   4
Methods of Evaluation   0607-313   3
Rigid Containers   0607-321   4
Flexible Containers   0607-322   4
Computer Applications   0607-341   4
Data Analysis   1016-319   4
Introduction to Organic Chemistry/Lab   1011-213/227   4
Introduction to Polymer Technology   1014-301   2
Liberal Arts (Foundation) *   12
Free Electives   8
Physical Education †   0
Cooperative Education   0607-499   Co-op

Third Year
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   1017-211,212,213   9
College Physics Lab   1017-271,272,273   3
Foundations of Scientific Thinking   1017-341   2
Intro, to Graphic Comm. Industry   2081-254   3
Liberal Arts (Concentration) *   12
Cooperative Education   0607-499   Co-op

Fourth Year
Packaging Regulations   0607-462   3
Professional (Packaging) Electives   12
Principles of Marketing   0105-363   4
Organizational Behavior   0102-430   4
Liberal Arts (Electives & Senior Seminar) *   14
Free Electives   6
Total Quarter Credit Hours   192

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.

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

First Year   *Quarter Credit Hours*
New Student Seminar   0607-200   1
Principles of Packaging   0607-201   4
Engineering Design Graphics   0607-301   4
Packaging Materials I   0607-311   4
Packaging Materials II   0607-312   4
Algebra for Management Science   1016-225   4
Calculus for Management Science   1016-226   4
Data Analysis   1016-319   4
College Physics & Lab   1017-211, 271   4
Foundations of Scientific Thinking   1017-341   2
Liberal Arts (Foundation) *   16
Physical Education †   0

Second Year
Methods of Evaluation   0607-313   3
Rigid Containers   0607-321   4
Flexible Containers   0607-322   4
Computer Applications   0607-341   4
Technical Communication   0607-420   4
Survey of General Chemistry & Lab   1011-201,221   4
Survey of Organic Chemistry & Lab   1011-202,222   4
Intro, to Graphic Comm. Indus.   2081-254   3
Principles of Copy Preparation   2081-256   3
Gravure Process   2081-386   3
Liberal Arts (Foundation) *   12
Physical Education †   0
Cooperative Education   0607-499   Co-op

Third Year
Career Seminar   0607-401   1
Packaging Production Systems   0607-431   4
Packaging for Distribution   0607-432   4
Packaging for Marketing   0607-433   4
Packaging Regulations   0607-462   3
Principles of Shock & Vibration   0607-485   4
Lithographic Process   2081-367   3
Flexographic Process   2081-364   3
Organizational Behavior   0105-430   4
Principles of Economics I, II   0511-301,302   8
Liberal Arts (Concentration) *   12
Cooperative Education   0607-499   Co-op

Fourth Year
Professional (Packaging) Electives   12
Effective Speaking   0502-501   4
Image Capture & Conversion   2081-401   3
Liberal Arts (Electives & Senior Seminar) *   14
Free Electives   11
Total Quarter Credit Hours   192~

* See page 10 for liberal arts requirements,
f See page 11 for policy on physical education.

Hospitality and Service Management

Francis Domoy, Chair

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 109th 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 Council on Hotel, Restaurant and Institution Education and by the American Dietetic Association. Over the past six years 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.

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 the fields of their expertise: travel, marketing, hospitality operations, nutrition 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 2.75 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. Hospitality and service is fortunate to have for instruction the American Airlines SABRE computerized reservation and accounting systems in the live mode. Two computer laboratories and the 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 500 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, computer science, 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.

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.

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
Orientation to Computers in Hospitality 0622-221	2
HSM Elective	4
Algebra for Management Sciences 1016-225	4
Science Electives with Lab	8
Liberal Arts (Core) *	16
Physical 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	8
Intro. Statistics Methods I, II, HI & Lab 1016-301,302,303	12
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 10 for liberal arts requirements.
† See page 11 for policy on physical education.

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
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
Orientation to Computers in Hospitality 0622-221	2
Distribution Systems 0623-206	4
Algebra for Management Science 1016-225	4
Science Electives with Lab	8
Liberal Arts (Core) *	16
Physical Education (3 quarters) †	0
Cooperative Education 0621-499	Co-op
Second Year	
Commodity Market Analysis 0621-310	4
Restaurant Operations 0621-331	6
Financial Management for Hospitality Industry 0622-355	4
Intro. Statistics Methods I, II, III & Lab 1016-301,302,303	12
Financial Accounting 0101-301	4
Managerial Accounting 0101-302	4
Principles of Economics I 0511-301	4
Liberal Arts (Core) *	12
Cooperative Education 0621-499	Co-op
Third Year	
Packaging for Distribution or Marketing 0607-432 or 433	4
Assessment of Service Quality 0619-410	4
Technology in Service Systems 0619-426	4
Food Service Marketing 0621-315	4
Product Development 0621-416	6
HSM Electives	14
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
Food Processing/Quality Assurance 0621-410	4
HSM Elective	4
Free Elective	4
Liberal Arts (Upper-division elective) *	12
Liberal Arts (Senior Seminar) *	2
Cooperative Education 0621-499	Co-op
Total Quarter Credit Hours	180

See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.

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, personnel 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
Hotel Operations 0621-200	4
Hospitality Industry Real Estate 0622-205	4
Hotel Marketing & Sales 0622-210	4
Orientation to Computers in Hospitality 0622-221	2
Algebra for Management Science 1016-225	4
Principles of Economics I 0511-301	4
Science Elective with Lab	8
Liberal Arts (Core) *	16
Physical Education (3 quarters) †	0
Cooperative Education 0621-499	Co-op
Second Year	
Resort Development & Management 0622-310	4
Financial Management for Hospitality Industry 0622-355	4
Minor Program Courses—Food or Travel (choose one)	
Food—Principles of Food 0621-225	4
Sanitation & Safety 0621-314	2
Purchasing & Inventory Control 0621-324	2
Travel—Distribution Systems 0623-206	4
Intro, to SABRE 0632-210	4
Intro. Statistics Methods I, II, III & Lab 1016-301,302,303	12
Financial Accounting 0101-301	4
Managerial Accounting 0101-302	4
Liberal Arts (Core) *	12
Cooperative Education 0621-499	Co-op

Third Year
Principles of Marketing 0105-363	4
Assessment Service Quality 0619-410	4
Minor Program Courses—Food or Travel (choose one)	
Food—Restaurant Operations 0621-331	6
Food & Labor Cost Control 0621-424	4
Travel—Meeting Management 0623-410	4
Corporate Travel Planning 0623-420	4
Negotiations & Conflict 0623-522	2
Liberal Arts (Concentration & upper-division electives) *	16
HSM Electives	12
Free Elective	4
Cooperative Education 0621-499	Co-op

Fourth Year
Technology in Service Systems 0619-426	4
Leadership Management in Service Cultures 0619-470	4
Senior Project 0619-490	4
HSM Electives	12
Liberal Arts (Upper-division electives) *	8
Liberal Arts (Senior Seminar) *	2
Cooperative Education 0621-499	Co-op
Total Quarter Credit Hours	180

* See page 10 for liberal arts requirements.
† See page 11 for polio/ on physical education.

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, foreign languages and computer science. 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. 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.

American Airlines SABRE Systems
Available to hospitality and service management students in live mode are the automated reservation and accounting systems designed by American Airlines to allow corporate travel planners and meeting managers to serve the client faster while handling the complex details of their business more efficiently. The reservation system, SABRE, enables travel professionals to give their clients immediate confirmation for flights operated by airlines worldwide.

Students work at SABRE reservation sets, with video screens and keyboards, which are linked directly to American's worldwide travel information system. This provides access to accommodations at hotels—domestic and international—major car rental firms and wholesale tour operators who design tours to such destinations as Hawaii, the Caribbean, Mexico, Canada and the U.S. mainland.

SABRE provides the student with a view of a worldwide market distribution system. The system also performs fare quotations; currency conversions; and, with the aid of the Telenet printers, prepares a printed ticket, a comprehensive invoice and a passenger itinerary.

Students are also versed in the use of communication technologies that allow them to conduct research via the Internet.

Travel and tourism management, BS degree, typical course sequence

First Year   *Quarter Credit Hours*
Service Management Careers in Hospitality 0619-220	2
Orientation to Computers in Hospitality 0622-221	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
Physical Education (3 quarters) †	0
Cooperative Education 0621-499	Co-op

Second Year
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	8
Intro. Statistics Methods I, II, III & Lab 1016-301,302,303	12
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

Third Year
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

Fourth Year
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 10 for liberal arts requirements.
† See page 11 for policy on physical education.

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.

Nutrition management program options

All nutrition management students are enrolled in the didactic program in nutrition management during the first two years. Upon completion of the necessary preprofessional (first and second year) courses, students may apply for admission into the coordinated program in nutrition management. The coordinated program is one of the supervised practice options leading to the registered dietitian (RD) credential. Applications for this program must be submitted "by. February 15 to be considered for admission into the professional phase the following September.

Didactic program option

The didactic 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 and pass the National Registration Examination for Dietitians.

Coordinated program option

This option combines the undergraduate curriculum and planned supervised practice to meet the academic and performance requirements established by the ADA for eligibility as a registered dietitian.

This option is planned to integrate formal teaching and more than 900 hours of planned, supervised practice in hospitals, long-term care facilities, school and corporate food services, and community health agencies. Academic and supervised practice phases are taught together to reinforce each other. Learning experience involves team teaching by RIT faculty and industry instructors, each contributing his or her expertise in the profession.

Co-op is required of students in the coordinated program. In addition, the supervised practice hours in the junior and senior years establish their eligibility to take the National Registration Examination for Dietitians upon graduation.

Completion of this option leads to a bachelor of science degree plus eligibility to take the national examination. Students who have earned a bachelor of science degree may elect to complete the coordinated program option along with additional course work and receive a master of science degree.

Today dietitians use hand-held "nutrition computers" to analyze a person's body composition and food-intake needs.

Nutrition management, BS degree, typical course sequence

First Year		*Quarter Credit Hours*
Service Management Careers in Hospitality Ind.	0619-220	2
Contemporary Nutrition	0620-213	4
Principles of Food Production	0621-225	4
Orientation to Computers in Hospitality	0622-221	2
Survey of General Chemistry & Lab	1011-201,205	6
Survey of Organic Chemistry & Lab	1011-202,207	5
Biochemistry I	1011-203	4
Algebra for Management Science	1016-225	4
Liberal Arts (Core)*		16
Principles of Economics I	0511-301	4
Physical Education (3 quarters) †		0
Second Year		
Menu Planning & Merchandising	0621-321	2
Sanitation & Safety	0621-314	2
Purchasing & Inventory Control	0621-324	2
Microbiology	1004-210	4
Human Biology I & Lab	1004-211,231	4
Human Biology II & Lab	1004-212,232	4
Intro. Statistics Methods I & Lab	1016-301,311	4
Financial Accounting	0101-301	4
Liberal Arts (Core) *		12
Liberal Arts (Concentration) *		4
Principles of Marketing	0105-363	4
Physical Education (3 quarters) †		0
Cooperative Education	0621-499	Co-op

Didactic program option

Third Year

Assessment of Service Quality 0619-410		4
Technology in Service Systems 0619-426		4
Product Development 0621-416		6
Food & Labor Cost Control 0621-424		4
Design & Layout of Food Operations 0621-512		2
Nutrition in Life Cycle 0621-554		5
Liberal Arts (Concentration) *		8
Cooperative Education (2 quarters) 0621-499		Co-op

Fourth Year

Techniques of Dietetics Education 0627-519		4
Leadership Management in Service Culture 0619-470		4
Senior Project 0619-490		4
Advanced Nutrition/Diet Therapy I 0620-525		5
Advanced Nutrition/Diet Therapy II 0620-526		4
Community Nutrition 0620-550		8
Free Electives		8
Liberal Arts (Upper-division elective) *		12
Liberal Arts (Senior Seminar) *		2
Total Quarter Credit Hours		181

Coordinated program option

Third Year — *Quarter Credit Hours*

Techniques of Dietetics Education 0627-519		4
Assessment of Service Quality 0619-410		4
Technology in Service Systems 0619-426		4
Dietetic Environment 0620-402		4
Design & Layout of Food Operations 0620-512		2
Food Systems Management II 0620-551		8
Nutrition in Life Cycle 0620-554		5
Product Development 0621-416		6
Food & Labor Cost Control 0621-424		4
Liberal Arts (Concentration) *		8

Fourth Year

Leadership Management in Service Cultures 0619-470		4
Community Nutrition 0620-550		8
Clinical Dietetics I 0620-560		4
Clinical Dietetics H 0620-561		4
Clinical Dietetics m 0620-562		4
Clinical Dietetics IV 0620-563		8
Liberal Arts (Upper-division elective) *		12
Liberal Arts (Senior Seminar) *		2
Total Quarter Credit Hours		192

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.

Environmental Management and Technology

John Morelli, Chair

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 lots of 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. Since the concept is so new, there is much to be done. Activities range from simple tasks like keeping contaminated wastewater separated from clean water (you'd be surprised at how many people haven't thought of doing this) 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 just 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

And you don't have to wait until graduation to begin helping the environment. 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 H/Ub 1011-212/206		4
Algebra for Management Science 1016-225		4
Calculus for Management Science 1016-226		4
Environmental Mgmt. Seminar 0630-200		1
Survey of Computer Science 0602-200		4
Intro, to Organic Chemistry/Lab 1011-213/207		4
Field Biology 1005-210		4
Environmental Communication 0688-327		4
Liberal Arts Core*		16
Physical Education †		0

Joshua Goldowitz, assistant professor of environmental management, shows his students how to install and use ground water monitoring wells on campus.

Second Year
General Biology/Lab 1001-201	4
Financial Accounting 0101-301	4
Data Analysis I 1016-319	4
Data Analysis II 1016-320	4
Principles of Environmental Management 0630-201	4
Quantitative Methods I 0630-220	4
College Physics I & Lab 1017-211,271	4
Environmental Geology/Lab 0630-370/372	4
Professional Elective	4
Liberal Arts *	12
Physical Education †	0

Third Year
Occupational Health 0630-450	4
Intro, to Hydrology/Lab 0630-380/382	4
Solid & Hazardous Waste Management 0630-350	4
Environmental Co-op Orientation	0
Teams & Team Development 0697-433	4
Air Emissions Management 0630-354	4
Environmental Monitoring & Measurement/Lab 0630-360/362	4
Liberal Arts *	8
Cooperative Education (2 quarters)	Co-op

Fourth Year
Environmental Regulatory Law I 0630-480	4
Industrial Wastewater Management 0630-352	4
Resource Reduction 0630-505	4
Remedial Investigation & Corrective Action 0630-444	4
Project Management 0630-490	4
Environmental Permitting 0630-440	4
Professional Electives	4
Liberal Arts *	4
Cooperative Education (2 quarters)	Co-op

Fifth Year
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 *	12
Cooperative Education (1 quarter)	Co-op
Total Quarter Credit Hours	191

* See page 10 for liberal arts requirements.
† See page 11 for physical education policy.

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 Management/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
Corporate Environmental Management 0630-515 (prereq. 350,352,354)	
Certificate Total	24

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 John Morelli at 716-475-7213 or an applied arts and science adviser. Students must achieve a program GPA of at least 2.5 in order to be certified.

Safety Technology

John Morelli, Chair

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.

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 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.

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.

Safety technology, BS degree, typical course sequence

Third Year
Environmental Health & Safety Seminar 0630-200		1
Occupational Health & Lab 0630-450,451		5
Manufacturing Process 0617-220		4
Principles of EHS Management 0630-201		4
Fire Protection 0633-401		4
Instructional Design Principles 0688-362		4
Elements of Building Construction 0608-442		4
Basic Electrical Principles 0609-414		4
Occupational Safety 0630-454		4
Project Management 0630-490		4
Construction Safety & Lab 0608-505,0633-506		3
Cooperative Education (Summer)		Co-op

Fourth Year
Mech. & Elec. Controls & Standards 0633-53		4
System Safety/Incident Investigation 0633-540		4
Radiation Health Safety 1025-519		2
Liberal Arts Concentration *		8
Cooperative Education (2 quarters)		Co-op

Fifth Year
Occupational Health II 0633-526		4
Human Factors 0303-516		4
Safety & Health Program Management 0633-545		4
Professional Electives		8
Liberal Arts Concentration*		4
Liberal Arts Senior Seminar 0520-501 *		2
Senior Project Planning 0630-509		1
Senior Project 0630-511		3
Cooperative Education (recommended—1 quarter)		Co-op
Total Quarter Credit Hours		89~

* See page 10 for liberal arts requirements.
†Total program with with transfer credits applied is 191 quarter credit hours.

Safety and Health Technology Certificate

Designed for accessibility and convenience, this certificate program is offered in both campus-based and distance 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, college algebra, and trigonometry. Students must achieve a program GPA of at least 2.5 in order to be certified.

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

Center for Multidisciplinary Studies

Traditional college programs and schedules are not always the answer. For the adult student juggling work, family and social obligations, for the young adult seeking to upgrade basic skills for college or the job market, for the employee who wants to learn new skills, and for the traditional college student who wants a nontraditional degree, the Center for Multidisciplinary Studies may be the answer. Students can earn degrees, diplomas, and certificates through a number of CMS programs in a variety of ways.

The Center for Multidisciplinary Studies provides courses and programs specifically designed with the adult, part-time student in mind; but in addition, the center now serves students of all ages who are interested in multidisciplinary study.

The Center for Multidisciplinary Studies specializes in offering programs that are either very flexible and able to be tailored to the diverse multidisciplinary interests of students (or their employers) or that have unique content forged from multidisciplinary roots.

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 program—a comprehensive undergraduate program with diploma, AAS and BS options that allows students to pursue unique and customized plans of study that include several areas of concentration

- Cross-disciplinary professional studies graduate degree program—a flexible master's degree program through which graduate students design individual degree programs that incorporate several different areas of study

Examples of the center's integrated multidisciplinary programs include:
- Health systems administration—master's, advanced certificate and undergraduate certificate programs delivered in distance learning format that provide students with a comprehensive understanding of health care systems
- Quality management—certificate programs that integrate information from the social sciences, management, finance and applied statistics, preparing students to design and implement quality management systems
- Technical communication and public relations communications—certificate programs that bring together knowledge of written communication, instructional design, information technology, psychology and advertising, graphic design, and research methodology, preparing students to design and produce effective messages in a variety of forms

Along with these programs, the center offers the following academic programs and courses:
- A wide variety of courses and course combinations of special interest, including some of the general education courses (liberal arts, science, mathematics, computer literacy and communication) required in all RIT undergraduate degree programs

Course requirements, AAS and BS degrees in applied arts and science

Math/Computer/Science		Qtr. Cr.	Liberal Arts		Qtr. Cr.	Concentration(s) * 1 or 2	Qtr. Cr.
Math		8				To be developed by student with adviser	38
Technical Mathematics	0692-221,222		Communication † 0688-220		4		
or			Literature 0504-332		4		
Math for Business	0692-211,212		Communication Elective		4		
or			Humanities Electives		8		
Math Thought/Processes	0692-201		Behavioral Science Electives		8		
and							
Modern Math Methods	0692-202						
or							
Statistics I, II	0692-311,312						
Computer		4					
Intro, to Computers/Prog,	0692-250						
or							
Intro, to Computer Science	0602-270						
or							
Information Resources and Network Tools	0680-341						
Science		12					
College Physics/Lab 1017-211 212,213 or 271,272,273							
Contemporary Science 0692-231,232,233,234,236,331,332,333 (3 of 8 courses)							
Math/Science		8	**Liberal Arts**			**Concentration(s) * 2 or 3**	
Math			General Education		4	To be developed by student with adviser	48
or			Liberal Arts Concentration		12		
Science Electives ‡			Liberal Arts Electives §		16		
			Senior Seminar		2		

*A concentration = 20 (or more) quarter hours in one subject area (e.g., applied computing, communication, business).
t The communication courses require pretest; call 716-475-2234 for information. Students completing BS degree must also pass a communications 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.

- Certificate programs, applicable to the applied arts and science degree or other appropriate programs, in:
  - Emergency management
  - Management development
  - Organizational development
  - Small business management
  - Computer graphics
  - Deaf studies
  - Exercise science
- Diploma programs, also applicable to the applied arts and science degree or other appropriate programs, in:
  - Management development, with concentrations in four areas
- Associate degrees:
  - AAS degrees in business administration and management (business administration, marketing, human resources administration, and logistics and transportation)

If you are interested in the center's graduate programs, contact Thomas Moran at 716-475-4936 for the advanced certificate in technical information design, 716-475-2234 for the MS in cross-disciplinary professional studies, and William Walence at 716-475-7359 for the MS in health systems administration. For more information on any of the programs offered by CMS, call 716-475-2234.

Enrollment policies

The center allows a student to take 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.

Students who wish to enroll in a CMS math or communication course are asked to take diagnostic tests that will assist in their placement in appropriate courses. Distance learning students may be tested off campus. Call 716-475-2234 to arrange to take either on- or off-campus diagnostic exams. Students in Communication 220 (0688-220) are required to take an exit examination. Those who do not pass may work out a program with their instructors for mastering needed skills and may retake the exit test later. When they pass the test, students receive the grade they earned in the course.

In support of and in compliance with RIT's policy of assuring competency in written communication, all students matriculated in a center's BS degree program must satisfy a communication 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 716-475-4936.

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

Financial aid

Specially trained financial aid counselors can provide students with information about some of the grants and loans available for part-time students. In addition to federal, state and private programs, RIT has special financial aid funds for part-time students. Many companies have 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. Call 716-475-2958 for more information on financial aid.

Academic advising

The Center for Multidisciplinary Studies provides academic advising regarding educational and career goals. This service is available at no charge to all undergraduate students who are interested in CMS degree, diploma 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. The advising process ensures that the courses will lead to a certificate, diploma or degree in the quickest, most direct manner. Call 716-475-2078 to schedule an advising session. The office is in room 2200 of the Eastman Building.

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. Call 716-475-2234 for more information.

Faculty

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

Course scheduling options

CMS courses and programs are offered during the day, at night, on Saturdays, through Weekend College and even in distance learning format so that students can take courses away from campus.

Distance learning

Courses combine videotape lectures sent to the student or aired on cable and public broadcast television with textbook readings, audio and computer conferencing, assignments, exams and a limited number of class meetings. Students have access to instructors by mail, computer, telephone or individual appointments. The center's new MS in cross-disciplinary professional studies and the popular applied arts and science program—RIT's flexible multidisciplinary programs—are now fully available nationwide through distance learning technologies. For more information about these and other distance learning programs, call 716-475-5089; for advising, call 716-475-2078.

Weekend College

Weekend College courses meet on Saturdays (leaving the rest of your weekend free), usually every other weekend, and a full course may be completed in five weekends. Students enjoy the schedule and the seminar-like environment. Through Weekend College, you can earn credits toward a degree or complete a certificate or diploma program. For more information, call 716-475-2234.

Applied Arts and Science Degrees

The Center for Multidisciplinary Studies offers students the opportunity to tailor individualized undergraduate programs of technical and professional study through its applied arts and science program. In this program, students work closely with faculty, advisers, and the program review committee to co-design unique, multidisciplinary plans of study that combine several areas of expertise. The center also will work with employers to design multidisciplinary programs that are specially suited to their employees' needs.

   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 environment that requires skills and expertise in several areas of knowledge. There are three levels:

Diploma
36 credits; 1 area of concentration

Associate of applied science (AAS) degree
52 core credits in general education plus 38 credits in 1 to 2 areas of concentration

Bachelor of science (BS) degree
90 core credits in general education plus 90 credits in 2 to 4 areas of concentration
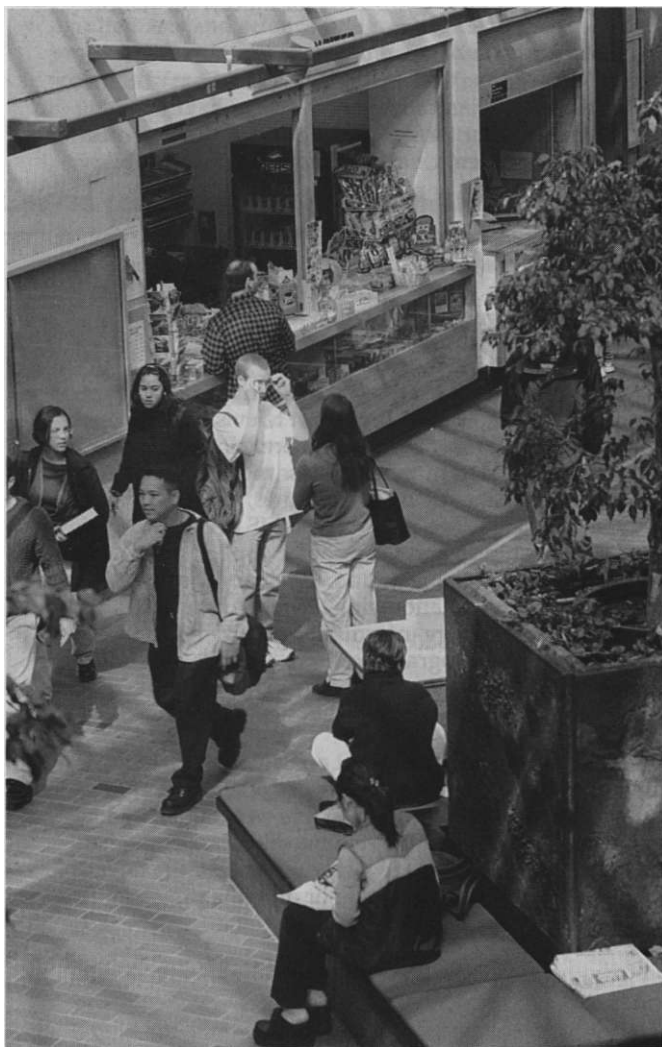
The Student Alumni Union is a hub of campus activity.

   The AAS and BS degree are available to full-time day students. The day program for full-time students is very flexible, includes physical education requirements, and contains a different set of math and science course options. (Full-time students should telephone 716-475-2234 for further information.)

Individualized concentrations

The associate and bachelor's degrees allow you to study several different professional and technical areas, selected specifically to meet your unique career and personal goals. The diploma focuses on one concentration. For your professional concentrations, you can draw on a wealth of educational resources from across RIT colleges and departments, including quality management, information technology, engineering technologies, sciences, computing, photography, printing, business and management, liberal arts, physical and social sciences, mathematics, fine arts, technical communication and public relations. Concentrations in health systems administration, business management, quality management, technical communication, applied computing, telecommunications, emergency management and environmental management technology are now available through distance delivery.

   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.

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.

Recognition for prior college-level learning

Each program begins by taking account of 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.

Organizational Development Certificates

In these days of rightsizing, reengineering, restructuring, virtual organizing and lifelong learning, knowing how to change and continually renew your organization, design new **work** patterns and structures, and enable your employees and colleagues to meet competitive challenges is more important than ever before. The center provides this knowledge through its certificate programs in three complementary areas of organizational development (OD): human resource development, training design and organizational change. The certificate in human resource development, while providing general expertise in the field of human resource management, is designed to prepare students to work in benefits and compensation administration. The certificate in training design provides the essential skills and knowledge needed to plan and implement organizational training programs. Through the certificate in organizational change, students will examine the processes and consequences of organizational change, learn how to develop contemporary organizations and teams, and study contemporary leadership theory.

Students may earn one or more of the certificates, and students not interested in taking an entire certificate program may take individual courses for which they have the proper prerequisites. Courses may be applied toward appropriate diploma and degree programs, such as the BS in applied arts and science. In each certificate program, up to four credits may be awarded by examination or for courses taken at another college. Students must achieve a program GPA of at least 2.0 in order to be certified.

Most courses in the certificate programs count as upper level, and students are expected to have had some prior college-level course work and/or experience in the field. All students should have successfully completed at least one of the following courses (or equivalent) before enrolling:

General prerequisite—
    Management Process I, II, III (0681-200,201,202) *or*
    Introduction to Psychology (0514-210) *or*
    Introduction to Sociology (0515-210)
    or obtain permission of program chair.
The OD certificate programs share a common core of two courses; with the exception of these two courses, courses (or credits) used for one OD certificate may not be used to satisfy the requirements of other OD certificates.

Core courses	*Quarter Credit Hours*
Understanding Corporate Culture 0697-431	4
The Learning Organization 0697-442	4

Certificate in Human Resource Development	
Core courses	8
Human Resources Administration 0681-239	4
Compensation Administration 0681-333	4
Benefits Administration 0681-433	4
Managing Change 0697-432	4
Certificate Total	24

Certificate in Training Design	
Core courses	8
Self-Directed Learning 0697-444	4
Training Design & Delivery 0697-428	4
Approved electives in training design and OD	10

e.g., Criterion Referenced Instruct. I   (0627-755) (3 cr.)
    Criterion Referenced Instruct. II   (0627-756) (3 cr.)
    Managing Learning & Knowledge
        (0697-448) (4 cr.)

Certificate Total	26

Certificate in Organizational Change	
Core courses	8
Psychology: Behavior in Industry 0686-331	4
Managing Change 0697-432	4
Approved electives in leadership and OD	8

e.g., Leadership Skills for Quality   (0684-330) (4 cr.)
    Project Management   (0681-410) (4 cr.)
    Empowered Leadership   (0697-462) (4 cr.)
    Teams & Team Development   (0697-433) (4 cr.)

Certificate Total	24

For more information about the certificate programs in organizational development, telephone 716-475-2234.

Business and Management Studies

Approximately 50 credit-bearing courses in business and management subjects are available through the center. Courses leading to an AAS degree and transferable to appropriate baccalaureate degree programs in RIT's College of Business and other schools are available in business administration, marketing, human resources administration, and logistics and transportation.

For those interested in a short-term concentration in one of these fields, the center also offers a management development program leading to a management certificate and management diploma and a program in small business management. Courses also may be taken individually.

General requirements for an AAS degree, diploma, or certificate in business or management are:
  • Completing the necessary quarter credits
  • Following the program outline when selecting courses
  • Achieving a program GPA of at least 2.0 in order to be certified

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 include academically qualified entrepreneurs who have managed their own small companies. Courses may count as business electives in degree programs, may serve as foundation courses for the management diploma and may be taken out of sequence. Students must achieve a program GPA of at least 2.0 in order to be certified.

Like most courses in the center, small business management courses may be taken on an audit basis (noncredit, without exams) at a reduced rate. For more information, call Daniel Smialek at 716-475-5023.

Courses	*Quarter Credit Hours*
New Venture Development 0681-221	4
Small Business Management & Finance 0681-222	4
Small Business Marketing & Planning 0681-223	4
Certificate Total	12~

Program:	Leads to:
MANAGEMENT DEVELOPMENT PROGRAMS	CERTIFICATE and/or DIPLOMA
TRANSFER CREDIT	
AAS DEGREE PROGRAM (6 Options)	AAS DEGREE
BS DEGREE PROGRAM (through the College of Business)	BS DEGREE
MBA PROGRAM (through the College of Business)	MBA DEGREE
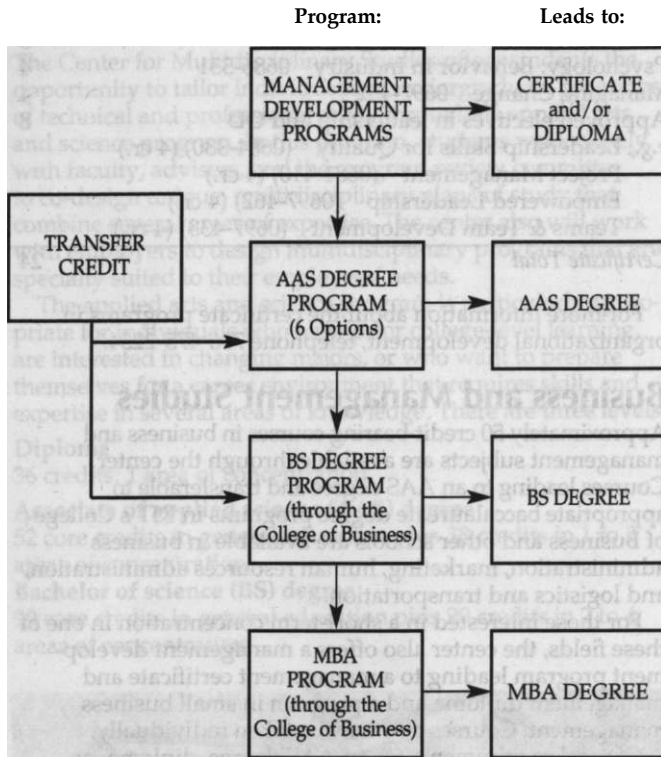
Quality Management

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 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. Students must achieve a program GPA of at least 2.0 in order to be certified. For more information, contact Daniel Smialek at 716-475-5023.

Certificate in Basic Quality	*Quarter Credit Hours*
Introduction to Quality 0684-310	4
Basic SQC Techniques 0684-320	4
Leadership Skills for Quality 0684-330	4^
Certificate Total	12

Certificate in Quality Implementation	
Statistics for Total Quality 0684-340	4
Costing for Quality 0684-410	4
Implementing Total Quality 0684-430	4
Certificate Total	12

The Management Development Program

The management development program has two components: the management certificate and the management diploma. By successfully completing The Management Process (0681-200,201,202), a 12-credit course in practical supervision, management and communication skills, students may earn the management certificate. To receive a management diploma, students must complete 16 additional credits in one of four business/management concentrations.

The program is structured to provide a broad foundation in applied general management and focused study in a specialized field. It is specifically designed for new supervisors, emerging managers, those seeking supervisory and management positions, and for new and re-entering students. *Both parts of the program are also appropriate for individuals with degrees* in the liberal arts, sciences or technologies who wish to acquire new professional skills and expand their career opportunities.

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. Management certificate courses are typically offered as part of our Weekend College and our regular schedule. Students must achieve a program GPA of at least 2.0 in order to be certified. For further information, call Daniel Smialek at 716-475-5023.

Management Certificate

The management certificate is earned by successfully completing a unique three-quarter, 12-credit course, The Management Process. The course focuses on:
- practical applications of management theory
- management problems, solutions and ideas
- personal development as an effective manager.

The Management Process 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. Instruction is usually guided by a team of management specialists, rather than by a single instructor. Students must achieve a program GPA of at least 2.0 in order to be certified. For further information, call Daniel Smialek at 716-475-5023.

Management Certificate	*Quarter Credit Hours*
Management Process I 0681-200	4
Management Process II 0681-201	4
Management Process III 0681-202	
Certificate Total	12
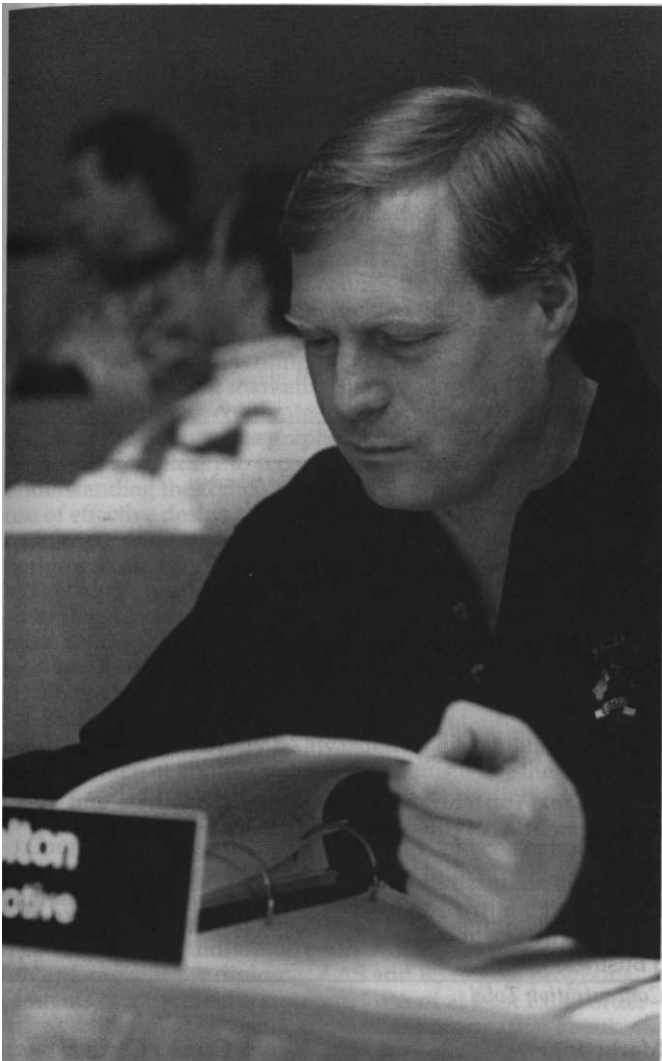
RIT's extensive evening course offerings are appreciated by working professionals.

Management Diploma

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

A management diploma is earned by completing 16 quarter credits in addition to, typically, a management certificate. However, one of the following options may be substituted for the management certificate:

- the small business management certificate
- three foundation courses (Organization and Management, 0681-205; Communication, 0688-214 or 220; and one additional business elective)
- or approved equivalents

Courses applied toward a management diploma also may 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 further information, call Daniel Smialek at 716-475-5023.

General Management	*Quarter Credit Hours*
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	4
or	
Business Elective	
Diploma Total	28"

Marketing	*Quarter Credit Hours*
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 Resources Administration	*Quarter Credit Hours*
Management Process 0681-200,201,202	
or approved alternative	12
Human Resources Administration 0681-239	4
Interviewing Techniques 0681-234	4
Business Law I 0680-311	4
Business Elective	4
Diploma Total	28~

Logistics and Transportation Management	*Quarter Credit Hours*
Management Process 0681-200,201,202	
or approved alternative	12
Intro, to Logistics & Transportation 0681-251	4
Traffic & Transportation Law, Rates, Accounting & Control 0681-253	4
International Logistics & Transportation 0681-255	4
Marketing 0681-361	4_
Diploma Total	28

Core Requirements, All Business and Management AAS Programs

Below are the core requirements for all business and management degree 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	Communication * and	0688-220		Science Electives †		8
	Managerial Accounting	0680-203	4				Math for Business	0692-211,212	8
	Organization & Mgmt. (1)	0681-205	4	Literature	0504-332	8	Statistics	0692-311,312	8
	Information Resources &			or		or			
	Network Tools	0680-341	4	Dyn. Comm. *	0688-214				
	Principles of Marketing	0681-361	4	Comm.	0688-220	8			
	Management Science	0680-353	4	Economics	0511-301,401	8			
	Professional Concentration			Psychology	0514-210	4			
	Courses (see below)		20	Sociology	0515-210	4			
		Total	44		Total	24		Total	24

In sequentially numbered courses, the lower-number course is prerequisite.
(1) The Management Process (0681-200,201, 202) may be substituted for the
following: *Qtr.Cr.*

Dynamic Communication 0688-214	*4*
Organization & Management 0681-205	*4*
1 business elective	*4*

* These communication courses require pretest; call 716-475-2234 for information.
Students who take 0688-214 should also take 0688-220. Students who take
0688-220 should also take 0504-332.

† 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   0692-331
Fitness Prescription/Programming   0692-332
Exercise Prescription   0692-333

Business and Management AAS Degree Programs

Programs leading to an AAS degree in business administration are fully transferable to baccalaureate degree programs in RIT's College of Business.

Programs leading to an AAS degree in management are offered in marketing, human resources administration, production management, logistics and transportation. Management programs are also transferable to a BS degree program in RIT's College of Business.

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, which may count in management diploma programs, as well as in AAS degrees. 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.

For more information, call Daniel Smialek at 716-475-5023.

Professional concentration requirements, business and management AAS programs

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

Marketing	*Quarter Credit Hours*
Effective Selling 0681-261	4
Advertising Principles 0681-263	4
Business Law I 0680-311	4
2 Business Electives	8
Concentration Total	20

Human Resources Administration	*Quarter Credit Hours*
Human Resources Administration 0681-239	4
Interviewing Techniques 0681-234	4
Business Law I 0680-311	4
2 Business Electives	8
Concentration Total	20

Logistics and Transportation Management	*Quarter Credit Hours*
Intro, to Logistics & Transportation 0681-251	4
Traffic & Transportation Law, Rates, Accounting & Control 0681-253	4
International Logistics & Transportation 0681-255	4
Business Law I 0680-311	4
Elective	4
Concentration Total	20

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 nonartists) 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.

Up to four credits may be awarded by examination or for courses taken at another college. 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. Courses may be applied toward appropriate diploma, AAS and BS degree programs. Students must achieve a program GPA of at least 2.0 in order to be certified. For advising and further information about these courses, transfer credit, credit for college-level learning and financial assistance, call Thomas Moran at 716-475-4936.

Core Courses		Quarter Credit Hours
Introduction to Public Relations	0688-350	2
Psychology of Persuasion	0686-333	2
Advertising Evaluation & Techniques	0681-264	4
Managing the Project	0688-348	2
Core Total		10

Professional Writing		Quarter Credit Hours
Core Courses		10
Writing for the Organization I	0688-351	2
Writing for the Organization II	0688-352	2
Promotional Writing	0688-347	2
Scripting for A/V & Video Presentations	0688-353	2
Speechwriting	0688-354	2
Certificate Total		20

Graphic Communication		Quarter Credit Hours
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
Certificate Total		21

"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.

Basic Technical Communication		Quarter Credit Hours
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
Certificate Total		12"

Up to four credits may be awarded by examination or for courses taken at another college. Prerequisite for the basic sequence is demonstration (by examination, portfolio or transcript) of a command of standard written English. Students must achieve a program GPA of at least 2.0 in order to be certified.

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.

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

Up to four credits may be awarded by examination or for courses taken at another college. Research Techniques (0688-361) or Instructional Design Principles (0688-362) may be substituted for one of the required advanced courses with the 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 in order to be certified.

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 these courses, transfer credit and financial assistance, call 716-475-4936.

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 and the World Wide Web, 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.

Courses	Quarter Credit Hours
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
Certificate Total	20

Up to four credits may be awarded by examination or for courses taken at another college. Special topic courses offered through the program, such as Designing with Quark and Basic Computer Graphics II, also may be substituted with the permission of the program chair. For advising or further information about this program, call Tom Moran at 716-475-4936.

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 center's 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 distance learning format.

Health systems administration certificate

This is an upper-level concentration generally requiring previous course work or experience and permission of the chair for enrollment. Students may earn the certificate and/or apply the courses to the professional concentration requirements for the degree in applied arts and science. The program has been developed with the assistance of Rochester-area health care administrators and subject matter experts, and courses are taught by experienced professionals. Students must achieve a program GPA of at least 2.0 in order to be certified. For further information regarding course content and admissions requirements, contact William Walence at 716-475-7359 or e-mail at wwwcad@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
Certificate Total	24~

Exercise Science

The field of exercise science provides additional and expanded employment opportunities for individuals working in many different occupations. In addition, exercise science is emerging as a primary professional career domain in its own right. **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—nurses, physical therapists, nutritionists and others who wish to augment their care or practice with the ability to prescribe exercise programs that address special medical needs. Those interested in sports equipment design and technology or outdoor, recreation and resort programming or just their own personal fitness also will find that an understanding of sports physiology and exercise fitness will complement and enhance their work or personal growth.

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 (Health/Fitness Instructor Certification and Exercise Specialist Certification), American Council on Exercise (Personal Trainer Certification), and the American Academy of Health and Fitness Professionals (Medical Exercise Specialist Certification), 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.

Courses in the program were developed by scientists and exercise physiologists and are taught by such professionals. Students must achieve a program GPA of at least 2.0 in order to receive the certificate in exercise science. Up to four credits may be transferred into the certificate program from other colleges. Courses also may be taken individually, assuming prerequisites are met, and all three courses may be applied to the flexible BS in applied arts and science as part of a professional area of study (a professional concentration in allied health science, for example), as contemporary science courses satisfying part of the degree's science requirement or as free electives. For further information, call Joe Pow at 716-475-4953.

Exercise Science	*Quarter Credit Hours*
Sports Physiology & Life Fitness 0692-331	4
Fitness Prescription & Programming 0692-332	4
Exercise Prescription 0692-333	4
Certificate Total	12~

Deaf Studies

The deaf studies certificate is intended primarily to achieve two purposes: first, to permit employees and volunteers in the private and public sectors to prepare themselves to communicate more effectively with deaf clientele, students, fellow professionals or employees in business, industries, schools, colleges and hospitals; and, second, to provide a stimulating foundation for those who wish to pursue further education in the fields of interpreting for the deaf or deaf education.

Rochester has the second-highest population per capita of deaf and hard-of-hearing individuals in the United States,
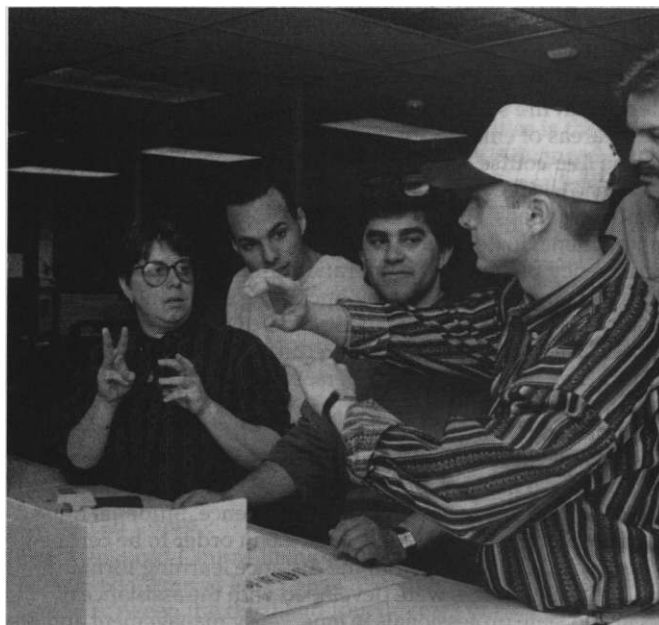
The deaf studies certificate can assist graduates in communicating with deaf persons and understanding deaf culture.

a fact that has led to extensive community and educational resources for them.

The 16-credit curriculum is composed of the seven courses listed below. Although a primary emphasis in the curriculum is learning both Basic Sign Language and American Sign Language, students also deepen their understanding of the phenomenon of deafness through courses related to the physical, psychological, social and linguistic aspects of deafness.

Although substitution of one course for another generally is not permitted, students are able to challenge course content in any of the courses listed. Students must achieve a program GPA of at least 2.0 in order to be certified.

The courses have been designed and are largely taught by the faculty of the National Technical Institute for the Deaf at RIT.

Courses	*Quarter Credit Hours*
American Sign Language I, II, III 0690-211,212,213	6
American Sign Language IV, V 0690-311,312	4
Aspects & Issues of Deafness I, II 0690-241,242	6
Certificate Total	16

For advising or further information about this program, call William Walence at 716-475-4986 (v/TTY) or e-mail at wwwcad@rit.edu.

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 distance 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 716-475-2078.

Emergency management	*Quarter Credit Hours*
Earth Science 0694-311	4
Manmade Hazards 0694-321	4
Emergency Preparedness Laws & Regulations 0694-401	4
Emergency Planning & Methodology 0694-471	4
Emergency Operations 0694-481	4
Terrorism 0694-475	4
Certificate Total	24~

Department of Military Science-Army Reserve Officers' Training Corps (ROTC)

LTC Daniel Stafford, Professor of Military Science

The Army Reserve Officers' 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 $64,000. Students who have two or three years of college remaining are encouraged to compete for campus-based scholarships, which are worth $16,000 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 $96,000. Check with the Financial Office Office for the latest incentive. In addition to the tuition award, the Army provides $450 annually for books and a monthly cash stipend of $200 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 nonenrolled students may compete for a scholarship. Students preparing to enter

graduate studies also may be eligible to apply for a scholar-**ship-** 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** on-line 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 $200 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 $3,000 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 qual-**ify** for these incentives, file a Free Application for Federal Student Aid form by March 15 of each year (see pages 338, 343). For additional information, please contact the Office of Financial Aid at 716-475-2186.

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, *nonscholarship 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.

Basic Camp program

Basic Camp 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 six-week summer camp, students obtain the necessary skills and training to qualify for entry into the last two years of the Army ROTC program. Basic Camp teaches basic military skills while emphasizing leadership development. Basic Camp is voluntary, and participants do not incur any military obligation for attending. 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. Successful graduates of the Basic Camp also may receive two-year scholarships valued at $32,000.

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.

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.

Advanced Camp

The Advanced Course includes attendance at the ROTC Advanced Camp at Fort Lewis, Washington, which normally occurs between the third and fourth years of college. At Advanced Camp, 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.

Professional military education (PME)

In addition to the military science curriculum and Advanced Camp participation, each cadet must complete a credit-bearing course in the following fields of study at RIT:

- communication skills
- military history
- computer literacy

A list of the courses accredited by RIT and ROTC to fulfill these PME requirements is available at the department of military science office.

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 716-475-2881. Visit our Web site at www.rit.edu/~armyrotc/Home/Home.html.

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 [4]	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. Thomas J. Burgie, Professor of Aerospace Studies

Background

Air Force Reserve Officer Training Corps (AFROTC) opened at RIT in September 1985. Since 1947 AFROTC has afforded graduating college students an appointment as commissioned officers in the United States Air Force. There are three methods to obtain a commission: through the Air Force Academy, the Air Force Officer Training School and our Air Force ROTC program. 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, physical fitness and more.

Characteristics

The department of aerospace studies at RIT has designed an approach to its curriculum totally compatible with the normal four-year curriculum in some RIT colleges and with the five-year cooperative education program in a larger number of colleges within the Institute. RIT and the department of aerospace studies believe the program will develop very 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 the Summer Field Training.

Cadets normally enter the four-year program directly from high school. The GMC is taken by freshmen and sophomores. Air Doctrine, Air Force Mission Structure, Organization, the Nature of Conflict, Air Power Development, National Security, the Evolution of Air Power and more are studied. Successful completion of the GMC requirements and the four-week field training exercise qualifies a student to apply for entry into the POC.

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 commissioned second lieutenants. Fundamentals of leadership and management, ethics, staffing, planning, coordinating, the need for national security, policy direction and implementation, and actual leadership case studies are examined.

Additionally, in both the GMC and POC curricula, several instructional blocks on written and oral communication skills are taught. 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, physical training and more.

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.

The four-year program is very comprehensive. Spirited and well-rounded Air Force officers are the result.

Two-year program

This program allows students to join the cadet corps with as little as two years remaining at college. The GMC material and leadership laboratories are obviously not taught, but instead cadets receive all GMC curriculum and laboratory experience in a five-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"). Cadets then complete their remaining AFROTC requirements as members of the Professional Officer Corps.

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 activity 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.

Rappell training is held on the RIT campus.

Qualifications and selection procedure

To become a member of the Air Force ROTC requires many different and varied qualifications. Some are very simply met; others are more complex, involving Air Force Officer Qualifying Testing, physicals, interviews and selection boards. Please contact the Air Force ROTC office for complete details and learn how you may qualify. The phone number is 716-475-5196.

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, non-technical, pilot, navigator and missile career 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 the senior year. Any student awarded a scholarship is entitled to numerous benefits. Most scholarships pay the majority of tuition and textbook expenses. Also, contract cadets receive a nontaxable allowance of $200 per month during the school year.

Air Force ROTC specialized programs

The AFROTC also has several specialized career programs, pre-health being the most widely known. In addition, a number of graduate study programs are available. Certain specialties may be paid in full; the requirements are extremely varied, and contact with the AFROTC detachment at RIT is imperative.

Financial assistance

Every scholarship cadet and all POC cadets receive a $200 monthly allowance. RIT augments three- and four-year ROTC scholarships with either free room and board or $5,000 per year, depending on scholarship type. 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 331,336).** Contact the Office of Financial Aid for further information. In addition, during field training, transportation and room and board are paid, and a salary is provided. Other student loan programs are available to cadets from both the Air Force and RIT.

Commissioning

The commissioning of cadets as second lieutenants takes place close to graduation day ceremonies. Prior to commissioning, each cadet must perform the following:

1. Complete all degree requirements
2. Complete the aerospace studies curriculum
3. Complete the applicable summer training
4. Complete one quarter of English composition (scholarship recipients only)
5. Complete one quarter of college mathematics

For more AFROTC information

Call the department at 716-475-5196 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:
1. This is a typical flow. Certain degree programs may desire the Air Force junior- and senior-level courses to be taken in any one of the following combinations: years 3 and 5, years 4 and 5, or as printed in years 3 and 4.
2. While students are enrolled at RIT but not taking Air Force junior- or senior-level courses, they must be enrolled in a Leadership Lab.
3. Although the number of credit hours seem less than required, the contact hours actually meet or exceed those required by AFROTC/Hdqtrs.

College of Business

Thomas D. Hopkins, *Dean*

Success in the 21st century business environment will require leadership and management attuned to rapid changes in technology and increasingly vigorous and 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.

Flan of education

To achieve the educational aims described above, the college has prepared a program that has four components: the liberal arts, the business core, the major and the 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
Photographic marketing management
(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 choose an additional business focus area by completing three to five courses in any of the seven 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.

Typical cooperative education plan—College of Business *

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

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

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.

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 in their major area of study once the major is declared. 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.

Interpreting and notetaking are just two of the support services available to deaf students who take classes in all seven of RIT's colleges.

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 photographic marketing management.

Certificate programs

The College of Business now offers four certificate programs in management information systems. Varying in length from three to ten courses, these programs are designed for students pursuing a new career or a secondary area of expertise. Classes for the certificate programs are offered both in the day and evening.

Additionally offered is a six-course certificate in e-business, which combines the disciplines of marketing, technology and business. The courses are available in the evening and in a distance learning format.

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.

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 International Association for Management Education (AACSB), 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 and the master of science degree in finance. The College of Business and the College of Engineering offer a joint master of science degree in manufacturing management and leadership and a master of science degree in product development. An executive master of business administration is also offered. Most 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 Graduate Enrollment Services Office.

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 at 716-475-6221.

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 *

Effective Communications
Quality Concepts
Quality Applications I, II
Algebra for Management Science
Calculus for Management Science
Business Computer Applications
Economics I (Macro)
Economics II (Micro)
Financial Accounting
Managerial Accounting
Data Analysis
Management Science
Survey of International Business
Principles of Marketing
Organizational Behavior
Corporate Finance
Operations Management
Strategy and Policy

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

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*
Freshman Seminar 0102-011	0
Effective Communications 0102-225	2
Quality Concepts 0102-231	2
Quality Applications I 0102-232	2
Principles of Economics I & II 0511-301,401	8
Calculus for Management Science 1016-226	4
Data Analysis I 1016-319	4
Business Computer Applications 0112-300	4
Liberal Arts (lower-level core) *	16
Laboratory Science	8
Physical Education †	0

Second Year	
Quality Applications II 0102-233	2
Data Analysis II 1016-320	4
Data Analysis II Lab 1016-380	2
Financial Accounting 0101-301	4
Business Law 0101-320	4
Legal Environment of Business 0101-319	4
Survey of International Business 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) *	4
Completion of College Writing Competency Requirement	

Third Year	
Organizational Behavior 0102-430	4
Financial Reporting & Analysis I, II 0101-408,409	8
Cost and Managerial Accounting 0101-431	4
Tax Accounting I, II 0101-522,523	8
Corporate Finance 0104-441	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)	Co-op

Fourth Year	
Strategy & Policy 0102-551	4
Auditing 0101-530	4
Advanced Accounting 0101-540	4
Analytical Skills in Accounting 0101-541	2
Financial Accounting & Reporting Issues 0101-550	4
Free Elective	2
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 10 for liberal arts requirements,
ƒ *See page 11 for policy on physical education.*

Accounting Core

Financial Reporting and Analysis I and II
Cost and Managerial Accounting
Business Law
Advanced Accounting
Analytical Skills in Accounting
Financial Accounting and Reporting Issues
Managing Corporate Assets and Liabilities
Tax Accounting I

Management Accounting Option

Free Electives, 10 credits
Liberal Arts/Science Elective, 4 credits

Public Accounting Option

Tax Accounting II
Auditing
Free Electives, 2 credits
Liberal Arts/Science Elective, 4 credits
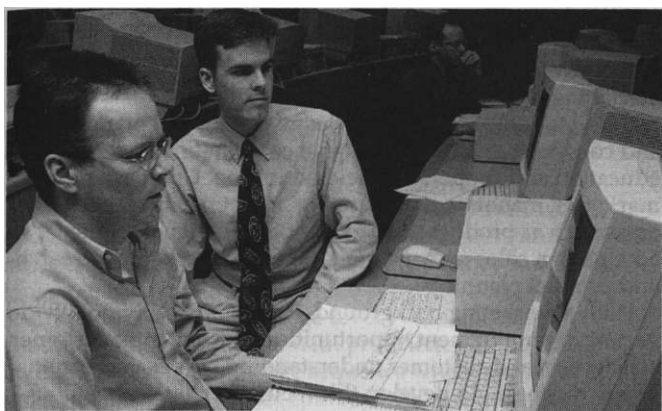
The computer lab in the College of Business gives students an opportunity to experiment with new technology.

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*
Freshman Seminar 0102-011	0
Effective Communications 0102-225	2
Quality Concepts 0102-231	2
Quality Applications I 0102-232	2
Principles of Economics I & II 0511-301,401	8
Calculus for Management Science 1016-226	4
Data Analysis I 1016-319	4
Business Computer Applications 0112-300	4
Liberal Arts (lower-level core) *	16
Laboratory Science	8
Physical Education †	0

Second Year	
Quality Applications II 0102-233	2
Data Analysis II 1016-320	4
Data Analysis II Lab 1016-380	2
Financial & Managerial Accounting 0101-301,302	8
Legal Environment of Business 0101-319	4
Survey of International Business 0102-360	4
Principles of Marketing 0105-363	4
Liberal Arts (lower-division core) *	12
Liberal Arts (upper-division concentration, elective or minor) *	8
Completion of College Writing Competency Requirement	

Third Year	
Organizational Behavior 0102-430	4
Corporate Finance 0104-441	4
Managing Corporate Assets & Liabilities 0104-452	4
Intermediate Investments 0104-453	4
Finance Electives	8
Operations Management 0106-401	4
Liberal Arts (upper-division concentration, elective or minor) *	8
Free Electives	12
Cooperative Education (2 quarters required; must complete within third and fourth years)	Co-op

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 10 for liberal arts requirements,
† See page 11 for policy on physical education.

Finance Electives (minimum 3 of 4 must be 0104 courses)
International Finance   0104-504
Advanced Corporate Financial Planning and
    Analysis   0104-505
Management of Financial Institutions   0104-510
Seminar in Finance and Analysis I   0101-408
Cost and Managerial Accounting   0101-431

Management

The management major is an ideal choice for students with a variety of interests and career choices in industrial, commercial, service and nonprofit enterprises. Management majors gain an understanding of the dynamics of work organizations, especially as they relate to the concepts, theories, analytical tools and skills that enhance workplace interactions. Students examine issues of motivation, leadership, job design, group dynamics and organization structure.

Management majors have a wide choice of careers in both line and staff roles. In addition, they acquire skills in supervision, liaison support and the foundations of management consulting. Many management majors are budding entrepreneurs with plans to start their own businesses.

Management majors are able to concentrate in the areas of human resource management, entrepreneurship and small business management and in managing for quality and performance.

Management, BS degree, typical course sequence

First Year	*Quarter Credit Hours*
Freshman Seminar 0102-011	0
Effective Communications 0102-225	2
Quality Concepts 0102-231	2
Quality Applications I 0102-232	2
Principles of Economics I & II 0511-301,401	8
Algebra, Calculus for Management Science 1016-225,226	8
Business Computer Applications 0112-300	4
Liberal Arts (lower-division core) *	16
Laboratory Science	8
Physical Education †	0

Second Year	
Quality Applications II 0102-233	2
Financial & Managerial Accounting 0101-301,302	8
Data Analysis I 1016-319	4
Data Analysis I Lab 1016-379	2
Survey of International Business 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	

Third Year	
Organizational Behavior 0102-430	4
Human Resources Management 0102-455	4
Operations Management 0106-401	4
Corporate Finance 0104-441	4
Management & Leadership 0102-460	4
Seminar in Quality Management 0102-520	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)	Co-op

Fourth Year	
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 10 for liberal arts requirements.
† See page 11 for policy on physical education.

Management Information Systems

The management information systems major prepares students for careers involving the development and management of computer-based information systems that support business activities. The curriculum provides students with a thorough understanding of the fundamentals of business, networks and computer technology. Students learn to design business processes and information processing systems that support the activities of organizations. They are introduced to the tools available for the analysis, design and implementation of computer-based and manual information systems. As a result, they are able to design practical, cost-effective systems that help meet an organization's need for information. Major career directions for graduates of this program include network design and administration, applications programming, systems analysis and design, World Wide Web site development and administration, and the management of information systems design projects.

Management information systems, BS degree, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 0102-011	0
Effective Communications 0102-225	2
Quality Concepts 0102-231	2
Quality Applications I 0102-232	2
Principles of Economics I & II 0511-301,401	8
Business Computer Applications 0112-300	4
Algebra, Calculus for Management Science 1016-225,226	8
Business Programming in Visual Basic 0112-330	4
Liberal Arts (lower-level core) *	12
Laboratory Science	8
Physical Education †	0

Second Year	
Quality Applications II 0102-233	2
Business Applications Using COBOL 0602-300	4
Visual Basic with Graphical User Interface Design 0112-335	4
Financial Accounting 0101-301	4
MIS Hardware & Operating Systems 0112-360	4
Survey of International Business 0102-360	4
Systems Analysis & Design I 0112-370	4
Data Analysis I 1016-319	4
Data Analysis I Lab 1016-379	2
Liberal Arts (lower-division core) *	16
Completion of College Writing Competency Requirement	

Third Year	
Professional Elective	4
Database Management Systems 0112-340	4
Network Technology 0112-380	4
Network Applications Development 0112-430	4
Organizational Behavior 0102-430	4
Principles of Marketing 0105-363	4
Corporate Finance 0104-441	4
Operations Management 0106-401	4
Liberal Arts (upper-division concentration, elective or minor) *	8
Free Electives	8
Cooperative Education (2 quarters required; must complete within third and fourth years)	Co-op

Fourth Year	
Systems Analysis & Design II 0112-410	4
Project Management & Practice 0106-553	4
Business, Government & Society 0102-507	4
Strategy & Policy 0102-551	4
Liberal Arts (upper-division concentration, elective or minor) *	16
Senior Seminar 0520-501*	2
Total Quarter Credit Hours	180

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.

Marketing

The marketing major prepares students for entry-level marketing management and sales positions. As marketing majors, students acquire knowledge of markets, marketing and consumer behavior through a combination of academic education and cooperative field education. Upon graduation, marketing manors are prepared to accept positions in career areas such as product management, professional selling, advertising, sales management, retailing, marketing research and product planning.

With a marketing background, the student will find a wide variety of employment opportunities that center on customer satisfaction and customer understanding, the major focus of any business. To develop this focus, the marketing curriculum provides an understanding of business in general and specific marketing operations with emphasis on customer motivation, quality management and business problem solving.

Marketing, BS degree, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 0102-011	0
Effective Communications 0102-225	2
Quality Concepts 0102-231	2
Quality Applications I 0102-232	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 I Lab 1016-379	2
Liberal Arts (lower-division core) *	16
Laboratory Science	8
Physical Education †	0

Second Year	
Quality Applications II 0102-233	2
Financial & Managerial Accounting 0101-301,302	8
Business Computer Applications 0112-300	4
Survey of International Business 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 & Satisfaction 0105-505	4
Operations Management 0106-401	4
Corporate Finance 0104-441	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 Problems 0105-550	4
Free Electives	12
Senior Seminar 0502-501*	2
Total Quarter Credit Hours	180

* See page 10 for liberal arts requirements,
f See page 11 for policy on physical education.

International Business

Designed to meet the growing interest of American businesses in global markets, the international business major has a **co**-major in one of the following functional areas: accounting, finance, management, management information systems or marketing.

Students in international business 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. Students are required to complete a college-level I-VI sequence of one chosen language. Students with proficiency at the college level may start the language sequence where appropriate. In most cases, three of the six courses will be used to fulfill part of the upper-level liberal arts requirement. In some cases, program credits will exceed the minimum required amount. The cooperative education requirement for the international business student may be satisfied through foreign work experience, international experience within a domestic corporation or study abroad.

The College of Business has a well-established study-abroad arrangement with Sheffield Hallam University in Sheffield, England. Qualified students can participate in this program in the fall of their junior or senior year.

Upon graduation, international business students are prepared to step into positions in several aspects of international trade. They can assume positions such as international product managers, export-import managers, international financial analysts, sales representatives or regional analysts.

International business, BS degree, typical course sequence*

First Year	Quarter Credit Hours
Freshman Seminar 0102-011	0
Effective Communications 0102-225	2
Quality Concepts 0102-231	2
Quality Applications I 0102-232	2
Principles of Economics I & II 0511-301,401	8
Algebra, Calculus for Management Science 1016-225,226	8
Business Computer Applications 0112-300	4
Liberal Arts (lower-division core) *	4
Laboratory Science	8
Language Levels I, II, III †	12
Physical Education ‡	0

Second Year	
Quality Applications II 0102-233	2
Financial & Managerial Accounting 0101-301,302	8
Data Analysis I 1016-319	4
Data Analysis I Lab 1016-379	2
Survey of International Business 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 0104-441	4
International Business Co-major course	8
Co-major course	8
Liberal Arts (lower-division core) *	16
Cooperative Education (2 quarters required; must fall within third and fourth years)	Co-op

Fourth Year	
Strategy & Policy 0102-551	4
International Business Co-Major course	8
Co-Major course	8
Liberal Arts (upper-division concentration or elective) *	12
Senior Seminar 0520-501*	2
Total Quarter Credit Hours	**180**

See page 10 for liberal arts requirements,
† Language credit may be used as liberal arts upper-division credit.
‡ See page 11 for policy on physical education.

International business co-major
 (Choose 4)
International Marketing
International Finance
International Management
Multinational Business Operations and Strategy
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

Photographic Marketing Management

The imaging industry is one of the most innovative and diverse global industries with applications of its technologies in business, science, the arts and medicine. RIT is the world leader in imaging education. The RIT program in imaging systems management is an interdisciplinary major with requirements in photographic, printing, imaging and information technologies and management. It is designed to meet the
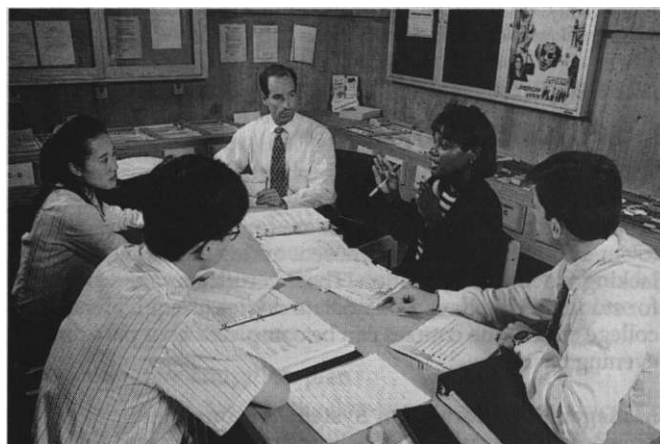
Classmates put the finishing touches on preparation for a class presentation.

imaging industry need for broadly educated, well-qualified people to take on the challenge of a variety of careers in the industry of the future in technical operations management, marketing and entrepreneurial venturing. This joint degree program between the College of Business and the College of Imaging Arts and Sciences is unique to RIT. Students wishing to enroll in this program as freshmen should contact the chairperson of the imaging systems management program.

Photographic marketing management, BS degree, typical course sequence

First Year	Quarter Credit Hours
Freshman Seminar 0102-011	0
Effective Communications 0102-225	2
Quality Concepts 0102-231	2
Quality Applications I 0102-232	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 I 1016-379	2
Liberal Arts (lower-division core) *	16
Laboratory Science	8
Physical Education †	0

Second Year

Quality Applications II 0102-233	2
Financial & Managerial Accounting 0101-301,302	8
Business Computer Applications 0112-300	4
Survey of International Business 0102-360	4
Principles of Marketing 0105-363	4
Management Science 0106-334	4
Photo Image Production Systems 2068-401	4
Digital Image Production Systems 2068-402	4
Custom Image Services 2068-403	4
Liberal Arts (lower-division core) *	12
Completion of College Writing Competency Requirement	

Third Year

Materials & Processes of Photography 2076-211,212,213	9
Organizational Behavior 0102-430	4
Buyer Behavior & Satisfaction 0105-505	4
Professional Selling 0105-559	4
Operations Management 0106-401	4
Corporate Finance 0104-441	4
Liberal Arts (upper-division concentration, elective or minor) *	20
Technical Electives	3
Cooperative Education (2 quarters required; must fall within third and fourth years)	Co-op

Fourth Year

Business, Government & Society 0102-507	4
Strategy & Policy 0102-551	4
Marketing Research 0105-551	4
Marketing Management Problems 0105-550	4
Marketing/Management Elective	4
Liberal Arts (upper-division concentration, elective or minor) *	4
Senior Seminar 0520-501*	2
Total Quarter Credit Hours	**180**

* See page 10 for liberal arts requirements,
t See page 11 for policy on physical education.

Management Information Systems Certificate Programs

The College of Business offers four certificate programs in separate, interrelated areas of management information systems (MIS). These certificates are for individuals seeking to enter the MIS field or for those working in the field but lacking the formal education. These certificates are designed for students who have an associate degree or equivalent college credit. The courses can be completed on a part-time, evening basis.

Management Information Systems Technology
This program focuses on machine organization and data communications and acquaints students with the architectural components of today's computers, operating systems and networks.

	Quarter Credit Hours
Business Computer Applications 0112-300	4
MIS Hardware & Operating Systems 0112-360	4
Network Technology 0112-380	4
Certificate Total	12

Business Systems Analysis
Designed for students interested in systems analysis, process reengineering and database design. Career paths in this program include systems analyst, reengineering specialist or process manager.

	Quarter Credit Hours
Database Management Systems 0112-340	4
Programming Language	4
Systems Analysis & Design I 0112-370	4
Systems Analysis & Design II 0112-410	4
Project Management & Practice 0112-520	4
Certificate Total	20~

Web Site Client/Server Systems Development
Students develop skills and knowledge required to design client/server, Intranet and Internet applications. Job possibilities include Web site manager/developer, network application developer/programmer and network applications specialist.

	Quarter Credit How
Business Computer Applications 0112-300	4
Visual Basic with Graphical User Interface Design 0112-335	4
or	
Business Programming in Visual Basic 0112-330	4
MIS Hardware & Operating Systems 0112-360	4
Network Technology 0112-380	4
Database Management Systems 0112-340	4
Network Applications Development 0112-430	4
Certificate Total	24

Management Information Systems
This comprehensive program was designed to provide students with the knowledge and skills necessary for high perfoi mance work in MIS departments and MIS focused fields. Career tracks options include systems analyst, business applications programmer, programmer/analyst, network administrator and network applications developer.

	Quarter Credit Hout
MIS Hardware & Operating Systems 0112-360	4
Network Technology 0112-380	4
Visual Basic with Graphical User Interface Design 0112-335	4
Business Applications Using COBOL 0602-300	4
Database Management Systems 0112-340	4
Systems Analysis & Design I 0112-370	4
Systems Analysis & Design II 0112-410	4
Network Applications Development 0112-430	4
Project Management & Practice 01112-520	4
Certificate Total	40

E-Business Certificate

This certificate program was designed to meet the critical demand for professionals who understand how to do busi-ness using the World Wide Web. Students will learn e-business design, implementation and management. The focus of this certificate will be on the business-to-business sector, which today represents 74 percent of the total e-commerce transactions conducted.

This certificate is designed for students who have an associate degree or equivalent college credit and have completed a principles of marketing course or equivalent. The courses can be completed on a part-time basis in the evening or through distance learning.

	Quarter Credit Hour
Introduction to E-Business Technologies 0112-310	4
Marketing on the Internet 0105-440	4
Business-to-Business E-commerce 0105-445	4
Designing the E-Business Organization 0112-500	4
Two Electives (Must be approved by adviser)	8
Certificate Total	24

Kate Gleason College of Engineering

Harvey /. 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. To help ready students for life in the larger community, a balance among humanistic-social subjects, the physical sciences and professional studies is maintained.

Goals

The overarching goals of the engineering program are
• to prepare graduates to join the work force as sought-after engineering professionals,
• to provide graduates with the educational foundation to assist in entering select graduate programs.
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 works to establish in all students an appreciation and desire for lifelong learning.

Resources

The departments of computer, electrical, mechanical, microelectronic and software engineering occupy the James E. Gleason Building and the Center for Microelectronic and Computer Engineering, an adjoining building that has more than 10,000 square feet of laboratory space for the fabrication of integrated circuits plus an integrated circuit design center. The industrial and manufacturing engineering program is housed 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 six five-year cooperative education programs leading to the bachelor of science degree with majors in electrical, computer, industrial and manufacturing, mechanical, microelectronic and software engineering. These programs include four years of academic study and five quarters of cooperative work experience.

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 six 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 on the basis of 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.

The cooperative education plan

All students participate in the five-year cooperative education programs and attend classes during the fall, winter and spring quarters of their first and second years. Before beginning the third year, students are assigned to co-op block A or B. 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.

Cooperative education plan—College of Engineering

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
3	A	RIT	Co-op	RIT	–
	B	Co-op	RIT	RIT	–

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.

Women and Minorities in Engineering Programs

Special programs led by the assistant dean for student services are in place to support female and minority engineering students.

Orientation

The 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.

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 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) with the exception of the new software engineering program, which was developed using ABET guidelines and will be eligible for accreditation upon the graduation of its first class. 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.

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.

A team of 32 mechanical engineering students designed and built this award-winning formula race car to compete against teams from across the United States and the United Kingdom.

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.

It also offers jointly with the College of Business a program leading to the master of science degree in manufacturing management and leadership.

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 additional preparation through the Center for Multidisciplinary Studies. 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 Students Services at 716-475-7994.

Engineering science, AS degree, typical course work *

Liberal Arts	*Quarter Credit Hours*
Writing and Literature I 0502-225	4
Writing and 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;	4
or Science, Technology & Values	

Math and Science, Electrical Option	
Calculus I, II, m 1016-251,252,253	12
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Matrix Algebra 1016-331	4
Chemical Principles I 1011-211	3
Chemical Principles I Lab 1011-205	1

Math and Science, Mechanical Option	
Calculus I, n , m 1016-251,252,253	12
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Matrices & Boundary Value Problems 1016-318	4
Chemical Principles I 1011-211	3
Chemistry I Lab 1011-205	1
Chemistry of Materials 1011-273	3
Chemistry of Materials Lab 1011-277	1

Physics, Electrical Option	
University Physics I, II, HI 1017-311,312,313	12
University Physics Lab I, II, III 1017-375,376,377	3
Introduction to Modern Physics 1017-314	4

Physics, Mechanical Option	
University Physics I, H, III 1017-311,312,313	12
University Physics Lab I, II, m 1017-375,376,377	3
Science Elective	4

Professional, Electrical Option	
Statics 0304-336	4
Dynamics 0304-359	5
Introduction to Digital Systems 0301-240	4
Advanced Programming for Engineers 0301-346	4
Introduction to C Programming 0301-345	4
Introduction to Microcomputers 0301-365	4
Circuit Analysis I with Lab 0301-381	5

Professional, Mechanical Option	
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
Circuit Analysis I with Lab 0301-381	5
Total Quarter Credit Hours	97

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

Undeclared Engineering

The undeclared engineering 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 undeclared engineering student will transfer into all engineering programs without any loss of credits toward graduation.

During the fall quarter undeclared engineering students take a one-credit course, Introduction to Engineering, that provides an overview of all six 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.

Undeclared engineering program, typical first-year schedule *

Fall	*Quarter Credit Hours*
Calculus I 1016-251	4
Chemical Principles I 1011-211	3
Chemical Principles Lab I 1011-205	1
Computing for Engineers 0302-215	4
Introduction to Engineering 0302-210	1
Liberal Arts †	4
Physical Education ‡	0

Winter	
Calculus II 1016-252	4
Chemical Principles II 1011-212	3
Chemical Principles Lab II 1011-206	1
University Physics I 1017-311	4
University Physics Lab I 1017-375	1
Liberal Arts †	4
Physical Education ‡	0

Spring	
Calculus III 1016-253	4
Calculus IV 1016-305	4
University Physics II 1017-312	4
University Physics Lab II 1017-376	1
Liberal Arts †	4
Physical Education ‡	0^
Total Quarter Credit Hours	51

* For suggested quarterly schedule, consult with your academic adviser.
† See page 10 for liberal arts requirements.
‡ See page 11 for policy on physical education.

Computer Engineering

Mary M. Eshaghian, Head

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. The objective of the computer engineer is to 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.

Fifth-year computer engineering students work in teams to complete the required senior design project. Here Joshua Freier and Erin Cohen demonstrate a controlled vehicle that uses a bar code reader and photosensor to identify an object. The device could be used in warehouse inventory retrieval and storage or in mail distribution systems.

The goals of the program are enumerated in the introduction to the Kate Gleason College of Engineering in this bulletin. In addition, the BS degree program in computer engineering is designed to prepare its graduates to be effective integrators of hardware and software in the design and development of digital systems; to be able to design and implement computer systems architecture and networking; with the proper choice of electives, to specialize in areas such as software development (especially for real-time and embedded computer applications) and computer-aided design of very large scale integrated circuits; to facilitate lifelong career development by providing the proper educational foundation for appropriate graduate study and the skills and insight necessary for independent learning; and to produce graduates with an awareness and appreciation of the responsibilities required of a professional engineer.

As an engineering discipline, this program 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 in computer engineering

The department of computer engineering also offers a combined bachelor of science and master of science degree course sequence over five calendar years. This accelerated 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 targets the graduate to develop complex software systems, especially embedded systems, where at least one control processor is designed into a product. 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 within 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 information technology. Matriculated students not maintaining a 2.0 cumulative grade point average in their principal field of study are subject to academic probation and suspension according to Institute policy.

Computer engineering, BS degree, typical course sequence *

first Year   *Quarter Credit Hours*
Introduction to Computer Engineering   0306-200   1
Computer Science I   0603-231   4
Computer Science II   0603-232   4
Computer Science IV   0603-334   4
College Chemistry I   1011-208   4
Calculus I, II, III   1016-251,252,253   12
University Physics I, II   1017-311,312   8
University Physics Lab I, II   1017-375,376   2
Liberal Arts †   12
Physical Education ‡   0

Second Year
Assembly Language for Computer Engineering   0306-250   4
Intro, to Digital Systems for Computer Engineers   0306-341   4
Modeling of Linear Systems   0306-361   4
Circuits I with Lab   0301-381   5
Statics & Dynamics   0304-330   5
Scientific Applications Programming   0601-319   4
Software Engineering   3010-361   4
Foundations of Discrete Math   1016-265   4
Calculus IV   1016-305   4
Differential Equations   1016-306   4
University Physics III   1017-313   4
University Physics Lab III   1017-377   1
Modern Physics   1017-314   4
Physical Education ‡   0

Third Year
Computer Organization   0306-550   4
Digital Systems Design for Computer Engineers   0306-561   4
Circuit Analysis II   0301-382   3
Electronics I, II with Labs   0301-481,482   8
Operating Systems   0603-440   4
Liberal Arts †   8
Cooperative Education (2 quarters)   Co-op

Fourth Year
Linear Control Systems   0306-452   4
Digital Control Systems Design   0306-553   4
Interface & Digital Electronics   0306-560   4
Introduction to VLSI Design   0306-630   4
Programming Language Concepts   0601-450   4
Probability & Statistics I   1016-351   4
Computer Engineering Design Projects I   0306-654   1
Liberal Arts †   8
Cooperative Education (2 quarters)   Co-op

Fifth Year
Computer Architecture   0306-551   4
Computer Engineering Design Projects II   0306-657   3
Data & Computer Communications   0306-694   4
Professional Electives §   8
Free Elective   4
Liberal Arts †   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,*
t *See page 10 for liberal arts requirements.*
‡ *See page 11 for policy on physical education.*
§ *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	0306-661
Concurrent and Embedded	
Software Design	0306-662
Digital Filters and Signal Processing	0301-677
Independent Study	0306-699
Systems Specification, Design	
and Implementation	0603-435
Artificial Intelligence	0603-455
Database Concepts	0603-485
Analysis of Algorithms	0603-515
Operating Systems Laboratory	0603-540
Compiler Construction Laboratory	0603-560
Introduction to Computer Graphics	0603-570

Electrical Engineering

R. Unnikrishnan, Head

Every time you turn on a TV, open a refrigerator, make a phone call, play a computer game or gaze at the images of Venus and Jupiter sent by space probes, you are witnessing electrical engineering at work. From the mundane to the esoteric, electrical engineering has tremendously affected modern living.

RIT has one of the finest electrical engineering programs around, combining the rigor of theory with the flexibility of engineering practice. Electrical engineering is a very comprehensive engineering program—an electrical engineer synthesizes science, technology and common-sense design into things such as consumer products, electronic components, microchips, computers, signal processing, power systems, microwaves, telecommunications, robotics and transportation, to name a few. Graduates carry the passport to technical and management positions in industry, admission to prestigious graduate schools and opportunities for entrepreneurship. Electrical engineering provides the foundation for a challenging and most fulfilling career in the coming century.

The electrical engineering program has three primary goals. Every electrical engineering graduate is expected to possess adequate knowledge of the profession so that he or she can commence a productive engineering career in one of a variety of industries. The graduate is also expected to be able to pursue a graduate program in electrical engineering or a related field consistent with the professional goals and aspirations of most engineers. Furthermore, every graduate is expected to possess the knowledge and skills that will enable him or her to adapt to change in this singularly dynamic field via self-study or continuing education.

The basic strategies towards achieving these goals are discussed in the introduction to the Kate Gleason College of Engineering in this bulletin. The electrical engineering curriculum is very carefully designed to accomplish the goals of state-of-the-art knowledge consistent with the expectations of industry and the ability to pursue graduate education for those who want it. Superior computing skills, the knowledge of the latest programming and computer-aided design (CAD) tools, and state-of-the-art laboratories also help prepare graduates for electrical engineering practice and graduate school. The solid fundamentals and analytical rigor of the courses help the graduate maintain cutting-edge skills via self-study. Finally, the mandatory co-op experience bestows an "edge of excellence" on these graduates by giving them a formal opportunity to experience engineering practice before graduation.

The faculty stresses laboratory use to strengthen students' knowledge of electrical engineering, and the laboratory is an integral part of a large number of courses. There is continual effort by the faculty to keep the laboratory equipment and experience up-to-date.

Since the ability to design is an important part of engineering, the student also is presented with challenging problems of design in a number of courses.

The co-op requirement enhances knowledge acquired in the classroom and the laboratory. The exposure and experience gained in industry make the student keenly aware of the constraints imposed by the industrial environment on the solution of engineering problems. The co-op experience also helps the student decide which career path would be most challenging and rewarding. Co-op experience results in the production of a mature graduate with well-developed academic and industrial perspectives.
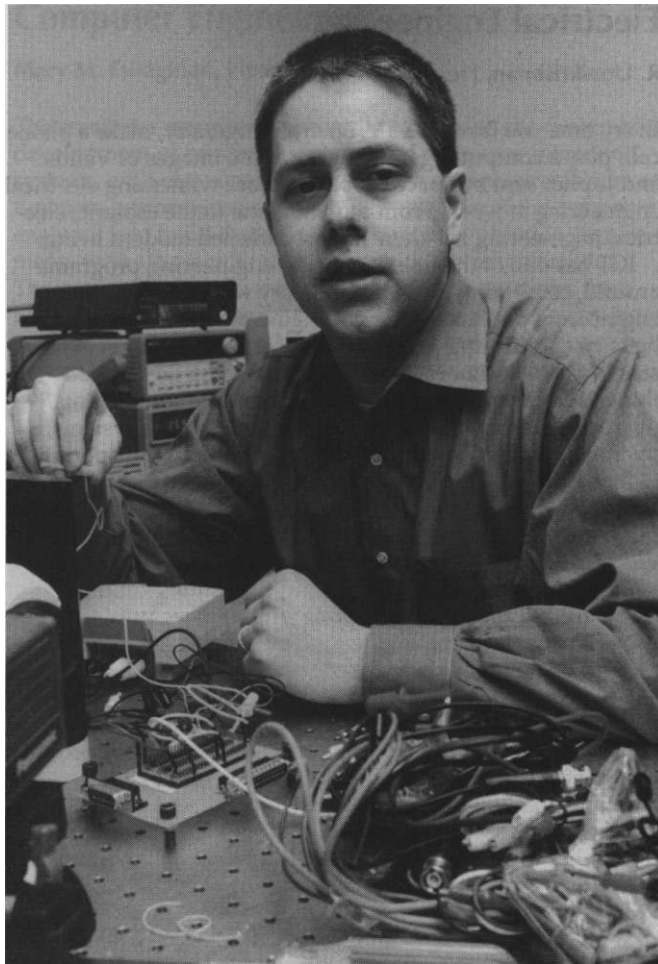
Albert Titus, assistant professor of electrical engineering, was recently honored with a prestigious teaching award from the National Science Foundation. His award will support research of compact artificial visual systems based on biological visual processing.

In modern society, engineering decisions are rarely made without considering the ethical and socio-economic impact. The ability to communicate clearly and effectively with others is also an indispensable tool for 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 making students more sensitive to the factors that normally surround any decision-making situation, improving their ability to communicate with others and making their professional life more meaningful and rewarding.

The first two years of the curriculum are devoted to the mastery of laws of mathematics and principles of science essential to the study of electrical engineering. Some technical courses directly involving electrical engineering principles are also offered. The third and fourth years build on the foundation laid in the first two years by focusing 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. The fifth and final year allows the student to specialize in an area of his or her professional interest. Professional elective courses are generally taken from the electrical engineering department, while the free elective does not have that restriction. Students are also expected to complete a senior design project as part of the graduation requirements.

Electrical engineering, BS degree, typical course sequence *

First Year	Quarter Credit Hours
EE Freshman Seminar 0301-203	1
Introduction to Matlab 0301-204	1
Introduction to Digital Systems 0301-240	4
C Programming for Engineers 0301-345	4
College Chemistry I 1011-208	4
Calculus I, II, HI 1016-251,252,253	12
University Physics I 1017-311	4
University Physics Lab I 1017-375	1
Liberal Arts (Core) †	20
Physical Education ‡	0

Second Year	
Adv. Programming for Engineers 0301-346	4
Introduction to Microcomputers 0301-365	4
Circuit Analysis I with Lab 0301-381	5
Statics & Dynamics 0304-330	5
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Engineering Mathematics 1016-328	4
University Physics II, III 1017-312,313	8
University Physics Lab II, III 1017-376,377	2
Modem Physics I 1017-314	4
Liberal Arts (Core) †	8
Physical Education ‡	0
Optional Free Elective	4

Third Year	
Computer Architecture & Data Structures 0301-347	4
Circuit Analysis II 0301-382	3
Linear Systems I 0301-453	4
Electromagnetic Fields I 0301-473	4
Electronics I, II with Labs 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
Introduction to Automatic Control 0301-514	5
Electrical Machines 0301-531	4
Introduction to Communication Systems 0301-534	4
Digital Electronics 0301-545	4
Linear Systems II 0301-554	4
Liberal Arts (Concentration) †	4
Cooperative Education (2 quarters)	Co-op

Fifth Year	
Semiconductor Electronics 0301-544	4
Professional Electives	12
Senior Design Project Part I 0301-697	2
Senior Design Project Part II 0301-698	4
Free Elective	4
Liberal Arts (Concentration) †	8
Liberal Arts (Senior Seminar) †	2
Cooperative Education (1 quarter)	Co-op
Total Quarter Credit Hours	196

* For suggested quarterly schedule, consult with your academic adviser.
† See page 10 for liberal arts requirements.
‡ See page 11 for policy on physical education.

Each of the listed professional electives includes significant design emphasis. For convenience they 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
Optical Devices and Systems	0301-672
Fiber Optics: Theory and Applications	0301-674
Electro-Optics	0301-776

Control Systems

Robotic Vision	0301-605
Design of Digital Control Systems	0301-614
Power Electronics	0301-646
Design of Digital Systems	0301-650
Embedded Microcontroller System Design	0301-664

Communications

Design of Digital Systems	0301-650
Communication Networks	0301-692
Digital Data Communications	0301-693
Information Theory and Coding	0301-694

Signal Processing

Robotic Vision	0301-605
Digital Filters and Signal Processing	0301-677
Analog Filter Design	0301-679
Digital Image Processing	0301-779

Computers

Design of Digital Systems	0301-650
ASIC Design	0301-651
Object-Oriented Programming with C++	0301-655
Embedded Microcontroller System Design	0301-664
32-Bit Microcomputers	0301-666

Microelectronics

Analog Electronic Design	0301-610
Design of Digital Systems	0301-650
Introduction to Microelectronics	0301-670
Physics of Bipolar Devices	0301-711
Physics and Scaling of CMOS Devices	0301-712
Solid State Physics	0301-713
Analog IC Circuits	0301-726
Senior Design Project	0301-697, 698

BSEE with computer engineering option

The department of electrical engineering offers a BSEE degree with a computer engineering specialization also. This is ideal for those who want to be educated within the framework of the professional breadth that is offered by the traditional electrical engineering program but would like to incorporate the highly sought-after skills surrounding and within computing. 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. This is accomplished by a judicious selection of professional and free electives.

Students pursuing a BSEE program with computer engineering option must meet all the requirements of the BSEE degree with certain specifications.

The BSEE program includes the following computer-specific courses:
- 0301-240 Intro. to Digital Systems
- 0301-365 Intro. to Microcomputers
- 0301-345 Intro. to C Programming for Engineers
- 0301-346 Advanced Programming for Engineers
- 0301-347 Computer Architecture & Data Structures

0603-713 Operating Systems (or equivalent) is required in place of the Free Elective

Two of the three required Professional Electives must be chosen from the following:
- 0301-650 Design of Digital Systems
- 0301-665 Embedded Systems
- 0301-666 32-Bit Microcomputer Systems
- 0301-651 ASIC Design
- 0301-773 Applied Web Techniques for Engineers

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.

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 work period between the second and third years is used to earn co-op credit.

The first three years of the program are identical for the BSEE and the combined BS/MS program. Further information can be obtained from the department of electrical engineering at 716-475-2165. A typical fourth- and fifth-year program sequence follows.

Electrical engineering, combined BS/MS degree, typical course sequence *

	Quarter Credit Hours
First Year	
Same as BSEE	51
Second Year	
Same as BSEE	48
Third Year	
Same as BSEE	31
Fourth Year	
Semiconductor Electronics 0301-544	4
Electrical Machines 0301-531	4
Electromagnetic Fields II 0301-474	5
Liberal Arts †	8
Introduction to Communication Systems 0301-534	4
Matrix Methods in Electrical Engineering 0301-703	4
Linear Systems II 0301-554	4
Introduction to Automatic Control 0301-514	5
Digital Electronics 0301-545	4
Random Signals & Noise 0301-702	4
Graduate Course	4
Thesis	5
Fifth Year	
Graduate Courses	16-20
Professional Electives	12
Design Project	6
Liberal Arts †	4
Thesis	4
Senior Seminar	2
Total Quarter Credit Hours	229

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 10 for liberal arts requirements.

Industrial and Manufacturing Engineering

Jacqueline R. Mozrall, Head

Industrial engineering differs from other branches of the engineering program in at least two ways. First, industrial engineering education is relevant to most types of industry and commercial activity. Second, it is that 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 manufacturing student can build a strong concentration in any area of industrial engineering — robotics, automation, design for manufacturing, NC programming, safety, etc. Students may choose one free and four professional electives for this purpose.

In addition, there are two degree options within the department — one in manufacturing, the other in ergonomics. These options are based on selected professional electives, co-op assignments and senior design projects in the concentration areas.

Combined five-year BS/master's degree program

The IME department offers honors-accelerated BS/MS and BS/ME degree programs within the department where select students may complete a BS and an MS or ME in industrial engineering in five years plus one additional quarter.

A joint program exists between the IME department and the Center for Quality and Applied Statistics that also allows for a combined BSIE/MS degree in reliability in five years plus one additional academic quarter. A similar arrangement with the College of Business allows for an accelerated BS/MBA option. For more information, contact the IME department at 716-475-2598.

The industrial engineering curriculum covers the principal concepts of human performance, mathematical modeling, management systems and contemporary manufacturing processes along with the traditional industrial engineering topics. 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 uses computers to design Web-based data systems and to control flexible manufacturing systems involving robots, machines and conveyors.

3. The industrial engineering student uses the computer in conjunction with cognitive, physiological, biomechanical and anthropometric modeling of human performance in the analysis and design of man/machine systems.

Martin Haas (right), facilities manager for the industrial and manufacturing engineering department, and John Bausch, director of the Brinkman Machine Tool Laboratory in the Center for Integrated Manufacturing Studies, work on the new Hardinge computer-controlled milling machine.

Facilities

The IME department is located in the Center for Integrated Manufacturing Studies, which is a collaborative effort of the Institute, government and private industry and home to 50,000 square feet of high-tech research and development laboratories, 40,000 square feet of world-class manufacturing bays and 30,000 square feet of industrial training space. IME students and faculty actively participate in related research and training programs and operate more than a half dozen labs within CIMS.

The industrial and manufacturing 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.

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.

Balance, rather than 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:

a. perform product life studies
b. lay out optimum new and improve existing work areas
c. design and implement an information system
d. investigate production processes involved in cleaning carbide dies
e. investigate and analyze the costs of purchasing new vs. repairing existing equipment
f. investigate waiting lines in connection with a product line
g. investigate delivery service, including scheduling, route modification and material handling
h. assist in setting up a production control monitoring board
i. create computer programs for pricing policies, blending problems and truck scheduling
j. perform downtime studies of various operations using time study and work sampling
k. develop and computerize a forecasting model
l. perform ergonomic studies and evaluations of workstations and product designs
m. participate in design process of new products and processes to ensure ease of manufacture and maintenance to maximize productivity while minimizing the human toll in terms of fatigue and workplace disorders

In service industries:

a. evaluate the ergonomics of workstation designs
b. design information systems
c. monitor safety and health programs
d. manage hazardous and toxic materials storage and disposal programs
e. do cost analyses of procedures
f. schedule operations, information flow
g. design supply-ordering systems
h. manage operations services at hospitals

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, n, III 1016-251,252,253	12
University Physics I 1017-311	8
University Physics Lab I 1017-375	2
Materials Processing 0304-343	4
Materials Science 0304-344	4
Liberal Arts (Core) †	12
Physical 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, m 1017-312,313	4
University Physics Lab II, III 1017-376,377	1
Science Elective	4
Liberal Arts (Core) †	12
Physical Education ‡	0
Third Year	
Work Measurement & Analysis I 0303-420	4
Engineering Economics 0303-520	4
Introduction to Operations Research I 0303-401	4
Probability & Statistics I, H 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
Introduction to Operations Research II 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	
Project Design 0303-560	4
Professional Electives (see list below)	16
Liberal Arts (Concentration)	8
Free Elective	3
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 10 for liberal arts requirements.
‡ See page 11 for policy on physical education.

Professional electives (partial list)

Reliability Engineering	0303-512
Safety Engineering	0303-550
Value Analysis	0303-601
Concepts in Manufacturing	0303-625
Seminar in Computer-Integrated Manufacturing	0303-690

Selected courses from the IME 700-level courses may also be used for professional electives with permission from adviser and course instructor. (See Graduate Bulletin for descriptions.)

Mechanical Engineering

Satish G. Kandlikar, Head

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.

Mechanical engineering student Matt Williams visits a local elementary school, where he and another student help teach design, construction and programming using Lego's RoboLab. The project is funded by Toyota through a grant from the National Science Teachers Association.

The mechanical engineering department is staffed to offer 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 laser doppler anemometer for measuring fluid velocities and particle size, a sting balance for measuring drag and lift in a wind tunnel, dynamic system simulators, a spectrum analyzer, a modal analysis system and a CNC machine.

Students have an opportunity to participate in regional and national design competitions such as the Formula SAE car and the SAE Aerodesign. They are also encouraged to participate in the student chapters of professional societies such as ASME, SWE and SAE.

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 quality engineering education. The goals of this program are stated in the introduction to the Kate Gleason College of Engineering in this bulletin.

The 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 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 mechanical engineering student. A student enrolled in this program is required to successfully complete at least 230 quarter credit hours, after which he or she is awarded the BS and MS 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 3.0; three letters of recommendation from the faculty; and a personal interview with the program coordinator. All students in the program are required to maintain a cumulative grade point average of at least 3.0.

Mechanical engineering, BS degree, typical course sequence *

First Year	*Quarter Credit Hours*
Freshman Seminar 0304-203	2
Calculus I, H, HI 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	4
University Physics Lab I 1017-375	1
Problem Solving with Computers 0304-342	3
Liberal Arts (Core) 1,2,3 †	12
Physical Education ‡	0

Second Year	
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Matrices & Boundary Value Problems 1016-318	4
University Physics II, III 1017-312,313	8
University Physics Lab II, III 1017-376,377	2
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
Physical Education ‡	0

Third Year	
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

Fourth Year	
Heat Transfer 0304-514	4
Systems Dynamics 0304-543	5
Transport Phenomena 0304-550	4
Liberal Arts (Core) 6 †	4
Thermal Fluids Lab H 0304-551	1
Technical Elective 1,2	8
Design for Manufacture 0304-464	4
Liberal Arts (Concentration) 1	4
Cooperative Education (2 quarters)	Co-op

Fifth Year	
Senior Design I & II 0304-630,631	8
Technical Elective 3	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

* For suggested quarterly schedule, consult with your academic adviser,
t See page 10 for liberal arts requirements.
‡ See page 11 for policy on physical education.

Technical elective courses

Solid Body Mechanics Courses

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
Engineering Vibrations	0304-758

Thermal Fluid Science Courses

Heat Transfer II	0304-635
Air Pollution Dispersion Modeling	0304-642
Turbomachinery	0304-652
Refrigeration and Air Conditioning	0304-660

Aerospace Courses

Aerospace Structures	0304-671
Aerodynamics	0304-675
Propulsion	0304-678
Flight Dynamics	0304-682

Automotive Courses

Vehicle Dynamics	0304-624
Automotive Control Applications	0304-626
Internal Combustion Engines	0304-640

Free Elective Courses

Engineering Economy	0303-520
Introduction to Automotive Design and Manufacturing	0304-540
Introduction to Aerospace Engineering	0304-560

Microelectronic Engineering

Lynn F. Fuller, Head

The College of Engineering is proud to offer an undergraduate degree program in microelectronic engineering. This is the only program of its type in the United States that leads to the bachelor of science degree. Offered in conjunction with RIT's College of Imaging Arts and Sciences and College of Science, the ABET-accredited, five-year program provides the broad interdisciplinary background in optics, chemistry, device physics, computer science, electrical engineering, photographic science and statistics necessary for entry into the semiconductor industry.

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 all 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.

Students have hands-on experience in the design and manufacture of integrated circuits, the vital component in almost every advanced electronic product manufactured today. The undergraduate microelectronic engineering laboratories at RIT are the best in the nation.

As the worldwide semiconductor industry continues to grow 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 areas of engineering of our time.

The faculty in the microelectronic engineering department are committed to quality engineering education. The goals of this program are defined in the introduction to the Kate Gleason College of Engineering in this bulletin.

Microelectronic engineering, BS degree, typical course sequence *

First Year   *Quarter Credit Hours*
Introduction to Microelectronics 0305-201	4
Introduction to Microlithography 0305-221	4
Chemical Principles I, II 1011-211,212	6
Chemical Principles I, H Lab 1011-205,206	2
Calculus I, D, DI 1016-251,252,253	12
University Physics I, II 1017-311,312	8
Physics Lab I 1017-375,376	2
Liberal Arts (Core) †	12
Physical Education ‡	0

Second Year
Circuit Analysis I with Lab 0301-381	5
Introduction to Digital Systems 0301-240	4
I.C. Technology 0305-350	4
C Language Programming 0602-207	4
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Engineering Mathematics 1016-328	4
Engineering Statistics 1016-314	4

Students discuss how to use the i-line stepper to etch barely visible images on wafers in the photolithography bay.

University Physics III 1017-313	4
Physics Lab m 1017-377	1
Modern Physics 1017-314	4
Liberal Arts (Core) †	8
Physical Education ‡	0

Third Year
Circuit Analysis II 0301-382	3
Electronics I, n with Labs 0301-481,482	8
Linear Systems 0301-455	4
Semiconductor Devices I 0305-460	4
Electromagnetic Fields I, II 0305-530,540	8
Liberal Arts (Core) †	4
Cooperative Education (2 quarters)	Co-op

Fourth Year
Design of Experiments 0305-514	4
VLSI Design 0305-520	4
Semiconductor Devices II 0305-560	4
Microlithography I 0305-563	3
Microlithography I Lab 0305-573	1
Silicon Processes 0305-632	4
Thin Film Processes 0305-643	4
Optics for Microelectronics 0305-525	4
Liberal Arts (Concentration) †	4
Cooperative Education (2 quarters)	Co-op

Fifth Year
Advanced Microelectronics 0305-645	4
I.C. Processing Lab 0305-650	4
Seminar/Research 0305-660	4
Microlithography II 0305-665	3
Advanced Microlithography 0305-670	4
Microlithography II Lab 0305-675	1
Liberal Arts (Concentration) †	8
Liberal Arts (Senior Seminar) †	2
Professional Elective	4
Cooperative Education (1 quarter)	Co-op
Total Quarter Credit Hours	197

* For suggested quarterly schedule, consult with your academic adviser.
† See page 10 for liberal arts requirements.
‡ See page 11 for policy on physical education.

Software Engineering

Michael J. Lutz, Head

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. In response to this demand, 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 human/computer interactions. Finally, a three-course sequence in an application domain helps connect software engineering principles to an area where they are applied.

The faculty in the software engineering department are committed to quality engineering education. The goals of this program are defined in the introduction to the Kate Gleason College of Engineering in this bulletin.

Laboratories

Students in software engineering have access to general campus-wide computing facilities, as well as the specialized laboratories supporting both computer science and computer engineering. These laboratories house state-of-the-art equipment for small-group instruction and experimentation.

All of these laboratories are connected to the campus-wide network, and from there to the Internet. Students can use their accounts to access Internet resources such as electronic mail, file transfer and the World Wide Web. Indeed, many departments on campus use the Internet as a means of dissemination and communication.

Cooperative education

All students in the software engineering program must complete five 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 their last academic quarter.

Software engineering, BS degree, typical course sequence

First Year	*Quarter Credit Hours*
Freshman Seminar 3010-101	1
Computer Science 1,2,3 0603-231,232,233	12
Calculus I, II, m 1016-251,252,253	12
College Chemistry I 1011-208	4
University Physics I, II & Lab 1011-311,312,375,376	10
English Composition 0502-220	4
Liberal Arts *	8
Physical Education Electives †	0
Second Year	
Engineering of Software Subsystems 3010-362	4
Computer Science 4 0603-334	4
Professional Communications 0603-341	4
Software Engineering 3010-361	4
Assembly Language Programming 0306-250	4
Introduction to Digital Systems 0306-341	4
Differential Equations 1016-306	4
Discrete Mathematics I, II 1016-365,366	8
University Physics III & Lab 1017-313,377	5
Liberal Arts *	8
Physical Education Electives †	0
Third, Fourth, Fifth Years	
Principles of Software Architecture 3010-440	4
Formal Methods of Specification & Design 3010-420	4
Software Requirements & Specification 3010-455	4
Software Engineering Project 1,2 3010-561,562	8
Software Engineering Electives ‡	20
Scientific Applications Programming 0603-319	4
Programming Language Concepts 0603-450	4
Computer Architecture 0306-522	4
Human Factors 0303-516	4
Probability & Statistics 1016-351	4
Application Domain Electives §	12
Free Elective	4
Liberal Arts *	18
Cooperative Education (5 quarters required)	Co-op
Total Quarter Credit Hours	194

* See page 10 for liberal arts requirements,
f See page 11 for physical education policy.
‡ Students must choose five of the following six courses:
   Principles of Concurrent Software Systems 3010-441
   Principles of Distributed Software Systems 3010-442
   Principles of Information Systems Design 3010-443
   Software Process & Product Metrics 3010-450
   Software Verification & Validation 3010-452
   Software Engineering Process 3010-456
§ Each student must complete a three-course sequence in an application domain related to software engineering. Current domains include electrical engineering, industrial engineering, mechanical engineering, communications and networks, embedded systems, commercial applications, imaging and publishing technology.

College of Imaging Arts and Sciences

Ioan 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 Printing Management and Sciences. Students from nearly every state and many foreign countries are enrolled in the five schools.

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 Admissions Office.

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 (painting, printmaking, sculpture)

Bachelor of fine arts (BFA): illustration, medical illustration and fine arts studio (painting, printmaking, sculpture)

Master of science for teachers (MST): art education and fine arts studio (painting, printmaking, sculpture)

Master of fine arts (MFA): medical illustration and fine arts studio (painting, printmaking, sculpture)

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): graphic design and 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 and ceramic sculpture, glass and glass sculpture, metals and jewelry design, woodworking and furniture design

Associate in occupational studies (AOS): woodworking and furniture design

Bachelor of fine arts (BFA): ceramics and ceramic sculpture, glass and glass sculpture, metals and jewelry design, woodworking and furniture design

Master of science for teachers (MST): ceramics and ceramic sculpture, glass and glass sculpture, metals and jewelry design, woodworking and furniture design

Master of fine arts (MFA): ceramics and ceramic sculpture, glass and glass sculpture, metals and jewelry design, woodworking and furniture design

The School of Film and Animation

Approximately 250 undergraduate students are enrolled in this school's programs.

Bachelor of fine arts (BFA): film/video/animation

Master of fine arts (MFA): imaging arts with concentrations in computer animation and live-action production

The School of Photographic Arts and Sciences

More than 900 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): applied photography with major options in advertising photography, photojournalism and fine art photography

Master of fine arts (MFA): imaging arts with concentrations in photography and museum studies

The School of Printing Management and Sciences

The School of Printing Management and Sciences has approximately 300 students enrolled in the following degree programs.

Bachelor of science (BS): graphic communications, newspaper operations management, printing and applied computer science, new media publishing

Master of science (MS): printing technology, graphic arts systems, graphic arts publishing, electronic publishing

Illustration students did their civic duty when painting Jury Service, *a 15' x5' mural that now graces the walls of Rochester's Civic Center garage. The design was created by Tom Barg (center, back row), whose work was judged best by none other than three City Court judges.*

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:
- 160 fully ventilated darkrooms
- 50 studios
- More than $33 million worth of printing and publishing equipment in 12 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 on-line 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, papermaking, binding and other aspects of the graphic arts
- Bevier Gallery
- Gallery r, RIT's student managed metro showcase
- Free student membership at the Rochester Memorial Art Gallery
- 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 Printing Management and Sciences 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 Photography. 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 and 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 of 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 and 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 is normally submitted as 35 mm slides. Original work can also be reviewed at Open Houses and select Portfolio Days. If you plan to visit campus or need Open House information, please call the Office of Undergraduate Admissions at 716-475-6631.
2. 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, sculpture, models, mechanical drawings and marker renderings.
3. All slides and documents submitted should be clearly labeled. Each slide should be numbered in order in the slide page, and correspondingly numbered, clear, typed description of them on a separate sheet of paper should accompany the slide page. Include information such as title, size, media, assignment or theme, if any, and any exhibition or awards received.
4. 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.
5. *Medical illustration* applicants should include at least six samples of natural forms, such as shells, figures or animals rendered in a single medium.
6. *School for American Crafts* applicants are encouraged, where possible, to include samples of work done in the medium of their intended major.
7. *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.
8. Slide portfolios can be returned only if proper postage is included with the application. A padded, self-addressed, stamped envelope is recommended.
9. While every precaution is taken to ensure proper handling, the Institute assumes no responsibility for loss of or damage to slides.
10. We recommend that you attend an RIT Open House. Portfolio reviews are also available during these sessions.

Send your slide portfolio and completed application to:

Rochester Institute of Technology
Office of Admissions
60 Lomb Memorial Drive
Rochester, N.Y. 14623-5604
716-475-6631

General information regarding the Institute and its offerings can also be obtained from the Office of Undergraduate Admissions.

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.

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.
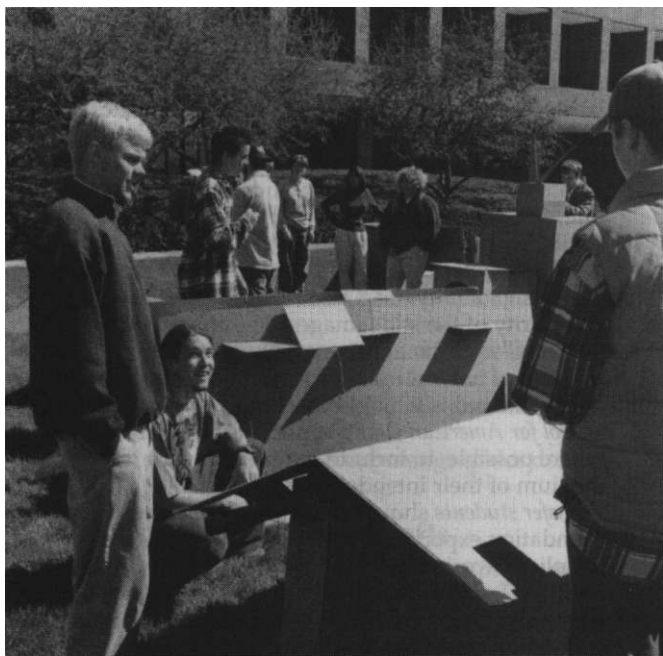
Students in the foundation class 3-D Design made the most of two sheets of 4-by-7-foot cardboard last spring. Working in pairs, 60 students created portable shelters to house the human body. They first researched "tight fit" spaces like coffins, cockpits, even papoose-type enclosures, as well as nomadic lifestyles. Next they drew designs, made functioning scale models and, lastly, built the light, movable shelters, which they demonstrated in the Gannett Building's grassy quad.

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. Painting, printmaking and sculpture are the areas of greatest emphasis.

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 91).

Credit requirements

The credit requirements for students admitted in the School of Art (medical illustration, illustration and fine arts studio) programs are as follows:

	Quarter Credit Hours
Required Major	93-94
Professional Electives	18
Open Electives	9
Liberal Arts	50
Art History	18
Total Quarter Credit Hours	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.

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
Philosophy in Art	2039-330
Symbols and Symbol Making	2039-340
Asian Art	2039-350
18th and 19th Century Art	2039-360
20th Century Art	2039-370
American Art	2039-420
Dada and Surrealism	2039-430
Conceptual Art	2039-440
Pop Art and Pop Culture	2039-450
Media, Advertising and Consciousness	2039-460

* 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

First Year	Quarter Credit Hours
Freshman Elective	6
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
Physical Education Elective †	0

Second Year ‡
Art & Civilization 2039-225,226, 227	9
Liberal Arts *	12
Physical Education Elective †	0
Major (one) §	

Fine arts studio majors must take the following courses to complete sophomore year (prerequisite: completion of foundation studies):
5 sophomore-level courses from major concentration	15
and 3 studio electives	9

Illustration majors must take the following courses (prerequisite: completion of foundation studies):
Anatomical Figure Drawing; Illustrating the Figure	15
Introduction to Computer Illustration; Introduction to Illustration	
Computer Illustration Portrait	
and 3 studio electives	9

Medical Illustration majors must take the following courses to complete sophomore year (prerequisite: completion of foundation studies):
Anatomical Figure Drawing; Introduction to Illustration	15
Introduction to Sculpture Figure; Introduction to	
Zoological and Botanical Illustration	
Computer Illustration Portrait	
2 studio electives	6
2 human biology	8
1 general biology	4

Third Year
Contemporary Art 2039-380 (one quarter required)	3
Art History Electives #	6
Liberal Arts *	12
Major (one)	

Illustration majors must take eight junior-level courses: 24
6 from major concentration	
2 courses related to major (with advisement)	
and 3 studio electives	9

Fine Arts Studio majors must take eight junior-level studio courses: 18
6 from major concentration	
2 courses related to major (with advisement)	
and 3 studio electives	9

Medical Illustration majors must take six junior-level studio
courses	18
and Human Gross Anatomy 2020-431,432	8
and 2 studio electives	6

Fourth Year
Open Electives (one per quarter) §	9
Liberal Arts *	14
Major (one)	

Illustration majors must take six senior-level courses: 18
4 from major concentration	
2 courses related to major (with advisement)	
and 3 open electives	9

Fine Arts Studio majors must take six senior studio courses: 18
4 from major concentration 2021-501,502,503	
2 courses related to major (with advisement)	
and 3 open electives	9

Medical Illustration majors must take six senior-level courses: 18
4 from major concentration	
2 courses related to major (with advisement)	
2 required courses:	
Surgical Drawing & Illustration I 2020-504	3
Surgical Drawing & Illustration II 2020-505	3
and 3 open electives	9

Total Quarter Credit Hours	185-191

* See page 10 for liberal arts requirements.
t See page 11 for policy on physical education.
‡ 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 82.

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

Major studies are offered in graphic design, industrial design and interior design. The first year offers studies in the foundation core consisting of required courses in drawing, two- and three-dimensional design, creative sources and computer skills. Introductory courses related to a variety of disciplines are also available. In subsequent years, electives may be taken in allied areas of industrial design, interior design, printing, photography, fine arts, illustration and the crafts.

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.
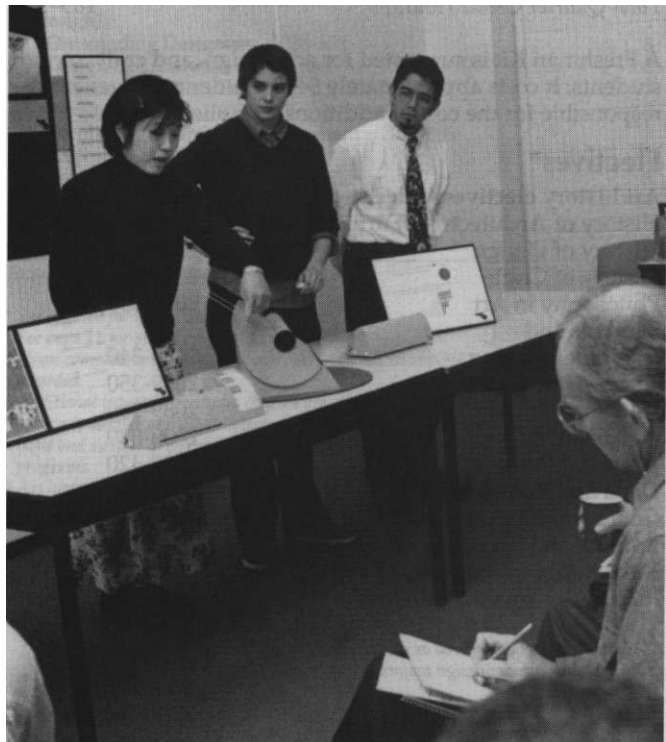
Industrial design seniors presented their futuristic concept of a combination printing, scanning, copying device for an office during final critiques. The class of 34 collaborated with Xerox Corporation designers to plan new-millennium office machines. Explaining and presenting complete models in a professional manner to professors, classmates and industry mentors plays a crucial role in the ID program.

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 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)*

Credit requirements

The credit requirements for students admitted to the School of Design programs (graphic design, interior design and industrial design) are as follows:

	Quarter Credit Hours
Required Major	82-87
Required Professional Electives	20
Open Electives	9
Liberal Arts	50
Art and Design History	18
Creative Sources	1
Total Quarter Credit Hours	183-188

Credit requirements for new media design and imaging:

	Quarter Credit Hours
Major	105-106
Professional/Open Electives	12-15
Liberal Arts	50
Art, Design, or Photo History	18
Total Quarter Credit Hours	185-189

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.

Electives*

Art history electives (select two)*

History of Architecture, Furniture and Interiorst

History of Design	2039-300
History of Crafts	2039-310
Philosophy in Art	2039-330
Symbols and Symbol Making	2039-340
Asian Art	2039-350
18th and 19th Century Art	2039-360
20th Century Art	2039-370
American Art	2039-420
Dada and Surrealism	2039-430
Conceptual Art	2039-440
Pop Art and Pop Culture	2039-450
Media, Advertising and Consciousness	2039-460

Additional selections offered as special topics
t Required for interior design majors, 3 qtrs. replaces history elective and Contemporary Art.

Graphic design, BFA degree, typical course sequence

First Year — *Quarter Credit Hours*

Freshman Electives	8

Freshman offerings of Design Survey, Computer Skills: Vector Imaging, and Computer Skills: Raster Imaging are required for graphic design freshmen; 2 credits each

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
Physical Education Elective †	0

Second Year ‡

Art & Civilization 2039-225,226,227	9
Liberal Arts *	12
Physical 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
Principles of Time Based Design 2010-XXX	3
Studio electives (one each quarter) §	9-12

Third Year

Graphic Design Pioneers 2010-XXX	3
Art 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 H 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 2010-105	3
Studio electives (average of one per quarter) §	9

Fourth Year

Liberal Arts *	14

Major 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
Interactive Media Design 2010-512	3
Editorial Design 2010-514	
Illustration for Designers 2010-XXX	3
Public & Social Service Design 2010-518	3
Open electives (one per quarter) §	
Total Quarter Credit Hours	188-191

* See page 10 for liberal arts requirements.
t See page 11 for policy on physical education.
‡ 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 this page, left column.

Interior design, BFA degree, typical course sequence

First Year	Quarter Credit Hours
Freshman Electives	8
(Elective offerings of Design Survey and one of the Computer Skills courses at 2 credits each are required for interior design freshmen)	
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
Physical Education Elective †	0

Second Year ‡	
Art & Civilization 2039-225,226,227	9
Liberal Arts *	12
Physical 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

Third Year	
Art History 2039-XXX	9
(History of Architecture, Furniture & Interiors I, II, III)	
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

Fourth Year	
Liberal Arts*	14
Majors must take each of these courses to complete senior year (prerequisite: senior standing in interior design):	
Multipurpose, Multistory Design I 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 10 for liberal arts requirements,
t See page 11 for policy on physical education.
‡ 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

First Year	Quarter Credit Hours
Freshman Electives	8
(Elective offerings of Design Survey and one of the Computer Skills courses at 2 credits each are required for industrial design freshmen)	
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
Physical Education Elective †	0

Second Year ‡	
Art & Civilization 2039-225,226,227	9
Liberal Arts *	12
Physical 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 Application 2035-310	3
Model Making 2035-311	3
Concept Design Sketching 2035-312	3
Studio electives (one each quarter) §	9-12

Third Year	
Contemporary Art 2039-380 (one quarter required)	3
Art History Electives #	6
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
Product Style 2035-409	3
Consumer Product Design II 2035-410	3
Studio electives (one each quarter) §	9

Fourth Year	
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):	
Outstanding Designers 2035-505	3
Design Collaborative 2035-506	3
Advanced Product Design 1 2035-507	3
Furniture Design 2035-508	3
Furniture Research & Development 2035-509	3
Professional Practice 2035-510	3
Product Development 1 2035-511	3
Advanced Product Design 1 2035-512	3
Career Planning 2035-513	3
Open electives (one each quarter) §	9
Total Quarter Credit Hours	185

* See page 10 for liberal arts requirements.
t See page 11 for policy on physical education.
‡ 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 84.
J Required for class of '01 only.

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 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 a truly dynamic interdisciplinary curriculum.

New media design and imaging, BFA degree, typical course sequence

First Year
Ideation & Visualization 2009-211	4
Traditional Photography with Digital Technology 2061-221	4
New Media Perspectives 2065-211	3
Freshman Seminar 2083-202	1
3-D Form & Space 2009-212	3
New Media Publishing 2083-211	3
Intro, to Programming for Digital Media 0620-230	4
Elements of Graphic Design for New Media 2009-213	3
Digital Video for Multimedia 2065-217	4
Programming for Digital Media 0602-434	4
Liberal Arts *	4
Physical Education Elective †	12

Second Year
Art & Civilization 2039-225,226,227	9
Typography 2083-311	4
Web Site Design & Implementation 0602-409	4
Intro, to Digital Animation 2065-382	4
Information Design 2010-405	
Distribution Systems OR Data Communications 2081-231 or 0602-411	3/4
Design of Graphic User Interface 2065-383	4
Web Programming 0602-539	4
Intro, to Computer Imaging 2009-313	3
Liberal Arts *	3
Physical Education Elective †	12

Third Year
Design/Photography/or Art History elective	6/8
Advanced Design for Networking 2009-401	3
Time Based Imaging 2009-411	3
Writing Elective ‡	3
History of Computer Graphics 2009-422	3
Emerging Multimedia Design & Imaging Tools 2009-402	3
Dynamic Typography 2009-112	3
Dynamic Information Design 2009-403	3
Advanced 3-D Techniques 2009-413	3
Open Elective	3/4
Liberal Arts *	12

Fourth Year
Dynamic Persuasion Design 2009-501	3
Career Skills 2010-501	3
QTVR & Multimedia Design 2009-511	3
New Media Team Project 1 § 2065-582	0-8
New Media Team Project 2 § 2065-583	0-8
Interactive Graphics 2009-512	3
Virtual Entertainment 2009-502	3
Open Elective	3/4
Liberal Arts	12
Senior Seminar (Liberal Arts)	2
Total Quarter Credit Hours	192-197

* See page 10 for liberal arts requirements,
f See page 11 for policy on physical education.
‡ 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.
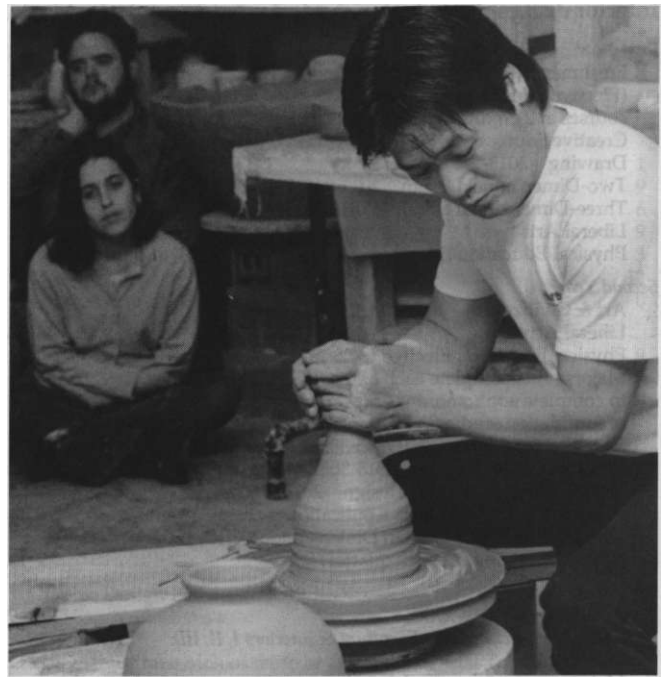
Students lined the ceramics studio to watch Tomio Fujita create vessels in the Echizen tradition of Japan.

School for American Crafts

As an internationally recognized school that merges art with craft, the mission of the School for American Crafts is to be a recognized leader in the education of craft professionals. 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.

In order to achieve the desired occupational goals, the 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 10 for liberal arts requirement

A two-year associate in occupational studies also is offered in woodworking and furniture design. The credit requirements are:

	Quarter Credit Hours
Required Wood Major	36
Creative Sources	3
Drawing	9
Two-Dimensional Design	9
Three-Dimensional Design	9
Advanced Drawing	9
Art History Elective †	9
Professional Business Practices	9
Total Quarter Credit Hours	93

• *See page 10 for liberal arts requirement*
† *Art electives listed on pages 82, 84.*

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, School of Design and School for American Crafts

Fine and Applied Arts and Crafts

Zerbe Sodervick, Director

Fine and applied arts and crafts courses are designed to contribute to the student's personal growth and cultural enrichment. Individual courses are offered, or a diploma may be earned by following a program of study in crafts, fine and applied arts, advertising design or interior design.

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 by completing the requirements in any of four areas. Some courses are offered only in alternate years.

Students should consult with an adviser to plan their course of study and to clarify goals. The director can be consulted regarding course substitution.

Students must achieve a program GPA of at least 2.0 in order to be certified.

For more information, call the director at 716-475-4977.

Core requirements	*Quarter Credit Hours*
Basic Drawing & Media 2012-211,212,213	6
Basic Design 2012-201,202,203	6
Fine Arts: Visual Arts 0505-213	4
Core Total	16

Program requirements:	
Craft	*Quarter Credit Hours*
Core requirements *	16
Major craft courses	18
Minor craft courses	6
Third craft choice	2
Electives with adviser's approval	6
Diploma Total	48

In addition to the core requirements, each student must become familiar with three of four areas.

Fine arts	
Core requirements *	16
Advanced Drawing (3 quarters) 2012-221	6
Basic Figure Drawing 2012-215	2
Figure Drawing (2 quarters) 2012-225	4
Electives with adviser's approval	20
Diploma Total	48

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
Diploma Total	48

Interior design	
Core requirements *	16
Display Design 2012-256,257,258	6
Marketing 0681-361	4
Interior Design 2012-251,252,253	6
History of Interior Design 2012-254	2
Environmental Design, 2012-261,262,263	6
Electives with adviser's approval	10
Diploma Total	50

* Core requirements are prerequisite for all diploma programs.

Sarah Struckus and Lori Moyer review work submitted by School of Art students for a juried exhibition. This is the third year that Xerox Corp. has hosted an RIT art show on premises. Company employees are able to purchase pieces on display.

School of Film and Animation

Howard Lester, Chair

The degree program in film, video 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 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 is also an active foreign-exchange program with colleges in Salisbury, England, and Rotterdam, Holland.

Students produce several short films and videos, 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: production and computer 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 department of the school.

Internet address

Additional information can be requested through the Internet: www.rit.edu/INSOFA or e-mail to helpph@rit.edu

Memberships

The school maintains memberships in a number of professional organizations: American Management Association, American Society of Training and Development, College Art Association, Professional Photographers of America, Society of Motion Picture and Television Engineers, Society for Photographic Education, University Film Video Association.

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. (Portfolio guidelines are available from the Office of Undergraduate Admissions.)

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

First Year

Film/Video Production I, II, III 2065-201,202,203	15
Materials & Processes of the Moving Image 2065-221	2
Film Language 2065-222	4
Creative Processes 2065-223	2
Writing for Film/Video I 2065-342	3
Liberal Arts (Core) *	16
Physical Education †	0
Foundations: Computer Imaging 2076-XXX	3
Animation Emphasis	
Introduction to Animation 2065-331	4

Second Year

Production Emphasis	
Video Tools & Technology 2065-311	5
Intro, to 16mm Sync. Sound 2065-431	5
Film/Video History & Aesthetics	12
Introduction to Animation 2065-311	4
Film/Video Production Workshop	4
Writing for Film/Video II 2065-343	3
Film/Video Electives	6-8
Animation Emphasis	
Video Tools & Technology 2065-311	5
or	
Introduction to 16mm Sync. Sound 2065-431	5
Advanced Animation Tools 2065-332	4
or	
Introduction to 2D Computer Animation 2065-427	4
Introduction to Drawing for Animation 2065-XXX	3
or	
Sculpture 2021-XXX	3
Color Theory 2065-313	3
Liberal Arts Core *	12
Physical 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	
3D Computer Animation 2065-361 or 2065-311	5
Advanced Animation Workshop I 2065-437	
or	
Experimental Animation Workshop 2065-447	4
Advanced Animation Workshop II 2065-438	4
Writing for Film/Video II 2065-343	3
Liberal Arts (Concentration) *	12
Film/Video Electives	6-8

Fourth Year

Senior Project I, II 2065-507,508	12
Senior Forum I, II, III 2065-511,512,513	6
Film/Video Electives	12
Film/Video History & Aesthetics	6-8
Liberal Arts (Electives) *	12
Liberal Arts Seminar *	2
Total Quarter Credit Hours	181-191

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.

School of Photographic Arts and Sciences

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 our students to take advantage of our school's location. Reflecting 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 every year.

Degrees offered

BFA degree in professional photographic illustration (advertising photography and photojournalism)—William DuBois, administrative chair; fine art photography option—Willie Osterman, 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—Milton Cofield, 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 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, Biological Photographic Association, National Microfilm Association, Ophthalmic Photographic Society, Society for Imaging Science and Technology, Society for Photographic Education, International Society for Optical Engineering, and International Panoramic Photographers Association.

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 department chair. (Portfolio guidelines are available from the Office of Undergraduate Admissions.)

Oct. 28,1999, New York City: Eleven years after it was first suggested by a then-student, and 10 months after intense planning began, 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 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, a requirement in the Summer Transfer Program. 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 should complete a Summer Transfer Program and/or have previously completed the following college-level course work: 12 credit hours of liberal arts, 8 of science and 6 of photography. Students also must complete the 10-week intensive summer courses Photography I and Materials and Processes 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 or photojournalism—Normally a minimum of 30 quarter credits, of which there are 9 credits in design; 12 in liberal arts; and 15 in photography, photography and studio art, or an accepted equivalent. The student may be required to complete the 10-week intensive summer courses Photography I and Introduction to Color Photography.

Fine art photography—After successfully completing one year in RIT's BFA photography program or at an accredited college with an acceptable portfolio (RIT summer transfer courses may be required), the student may major in fine art photography in the second, third and fourth years if a strong portfolio of photography work is submitted along with evidence, in transcript, of good scholarship. Make-up courses may be required, and an interview with the department chairperson is highly recommended.

Third-year transfer credit requirements
Advertising 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 and must make up the courses Materials and Processes of Photography and History and Aesthetics of Photography. Portfolio required.

Entry into advertising 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 Office of Undergraduate Admissions, Bausch & Lomb Center, 60 Lomb Memorial Drive, Rochester, N.Y. 14623-5604.

Biomedical Photographic Communications

Michael Peres, Program Chair

The program prepares students for a photographic career in forensic sciences, research, hospitals, and other medical settings, such as ophthalmic clinics and veterinary centers, or other life science situations. The biomedical photographer is involved in all areas of imagery—electronic, silver, and video.

The first-year courses introduce basic principles and theories plus practical experience with photographic equipment and processes. Biological subject matter is included in these first-year practical experiences.

The second year continues to prepare the student with courses in photomacrography, photomicrography, ophthalmic photography and other studies required for this diverse career. In addition to the traditional film-based activities, second-year students explore computers—their applications in electronic imaging, desktop publishing and graphics. The courses prepare the student for a summer co-op in an approved scientific facility. Completion of the co-op is required for the associate degree in biomedical photography.

The junior and senior years may include electives in advanced photomacrography, ophthalmic photography, S.E.M. photomicrography, computer graphics, television, advanced color printing and many others selected in consultation with the adviser. Flexibility is provided to allow students to explore many career-oriented areas of photography. The professional concentration courses in the senior year also encourage students to research a photographic area specific to their career direction.

The Biocommunications Association, one of the certifying and registering professional organizations in the field, has cooperated in the preparation of criteria and in program development. Thus the RIT program can provide the educational background to start work to become a registered biomedical photographer (RBP) after the student enters the profession. The curriculum is also organized to assist students in preparing for the certified retinal angiographer (CRA) exam, given by the Ophthalmic Photographers' Society.

For more information, visit the department Web page at www.rit.edu/-biomed.

Biomedical photographic communications, BS degree, typical course sequence

pi_{rst} Year — *Quarter Credit Hours*

Biomedical Freshman Seminar 2061-001	0
Biomedical Photography I 2061-201,202,203	12
Materials & Processes of Photography 2076-211,212,213	9
Survey of Biomedical Photography 2061-213	1
Preparation of Biomedical Visuals I, II 2061-311,312	5
Human Biology I, II 1004-211,212	6
Human Biology Lab I, II 1004-231,232	2
Liberal Arts (Core) *	12
Physical Education †	0

Second Year

Biomedical Photography II 2061-301,302,303	15
Color Printing/Theory 2076-312	4
Preparation of Biomedical Visuals III 2061-313	3-4
Digital Photography I, II 2061-316,318	8
Medical Terminology 1026-301	3
Liberal Arts (Core) *	16
Physical 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 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ 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

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 716-475-2592 or contact by e-mail at andpph@rit.edu.

For additional information, visit the departmental home page at: http://www.rit.edu/~andpph/ipt.html on the World Wide Web.

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 nonpicture-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 ii black-and-white photography through color

Heidi Powers' photograph was among 13 full-color images by RIT students and alumni that illustrate Rochester Gas & Electric''s calendar.

Imaging and photographic technology, BS degree, typical course sequence

First Year	*Quarter Credit Hours*
Photographic Technology I	
Photography I 2076-201,202,203	12
Materials & Processes of Photography 2076-211,212,213	9
Intro, to Programming * 0602-208	4
Program Design & Validation 0602-210	4
System Design/Graphic Presentations 2076-401	3
Introductory Calculus 1016-214,215 †	6
Liberal Arts (Core) ‡	12
Physical Education §	0
Second Year	
Photographic Technology II	
Photographic Sensitometry 2076-301	4
Technical Photographic Chemistry 2076-302	4
Photographic Optics 2076-303	4
Color Photographic Systems	
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
Physical Education ‡	0
Cooperative Education (Summer) f	Co-op
Third Year	
Concentration Electives 1	12
Photographic Technology III	
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) 1	Co-op
Fourth Year	
Concentration Electives 1	12
Photographic Technology IV	
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) t	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 10 for liberal arts requirements.*
§ *See page 11 for policy on physical education.*
‡ *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

Milton L. Cofield, Program Chair & James E. McGhee Professor

The imaging systems management major at RIT is interdisciplinary with photographic technology, printing technology, information technology and operations management requirements. This curriculum prepares students for management careers in imaging services businesses, imaging technology marketing in equipment and materials manufacturing companies, technical imaging systems specialists or to become imaging industry entrepreneurs.

Students may enroll in the program as freshmen or transfers from programs in the liberal arts, business (marketing, international business), photography, computer science, information technology and telecommunications technology.

Our curriculum intends to produce the imaging leaders of the future. Exceptionally well qualified and highly motivated students will best be able to take advantage of the unique interdisciplinary strengths of the curriculum. The imaging industry is among the most important global businesses. Opportunities for international students and students with international business interests are strong. Freshman applicants should contact the program chair, Dr. Milton Cofield, mlcpph@rit.edu, about application procedures.

The core curriculum stresses knowledge and skill development in photographic and digital image production systems and quality control, management for quality, and information technology and imaging.

Imaging systems management, BS degree, typical course sequence

Third Year	
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 10 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.
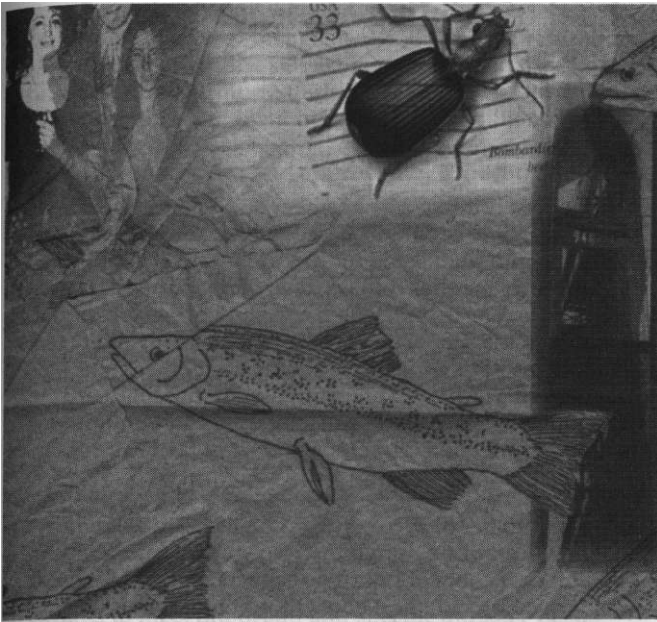
Untitled by fine art photography student Harper Shore is among work being exhibited "in" her brainchild gallery. Shore envisioned a transient art-access concept, which translated into the Next Door Gallery, a sort of traveling exhibition of student work that will change venues throughout Rochester.

Applied Photography

William DuBois, Administrative Chair

Advertising Photography

Denis Defibaugh, Program Chair

RIT's program in advertising photography prepares students to express their creativity in the challenging world of a commercial studio, an advertising agency or a corporate setting. Whether the subject is a fashion model or a new automobile, students have both the technical and artistic background to create the desired picture. Graduates receive a bachelor of fine arts degree in professional photographic illustration.

The advertising photography program is flexible enough to provide for each student's particular needs. After the second year, advertising students plan programs that will fulfill their career objectives. With an adviser, a tentative two-year program is planned for available courses that will meet the professional BFA requirements.

By the end of the second year, the student must meet or surpass the department requirements to proceed to the third year.

Professional photographic illustration, advertising photography option, BFA degree, typical course sequence

First Year	*Quarter Credit Hours*
Applied Photo I 2067-201,202	12
Art & Civilization 2039-225,226	6
Introduction to Color 2067-208	5
Introduction to Electronic Imaging 2067-325	4
2-D Design 2013-231,232	6
Drawing 2013-211	3
Liberal Arts (Core) *	12
Physical Education †	0

Second Year	
Applied Photo II 2067-301,302	10
History & Aesthetics 19th Century 2060-301,302,303	9
Materials & Processes of Photography 2076-211,212,213	9
Art & Civilization 2039-225,226	6
Career Seminar 2067-XXX	1
Photo Elective	4
Liberal Arts (Core) *	12
Physical Education †	0

Third Year	
Advertising Photography I, H 2067-411,412	10
Advertising Core	5
Art History Elective	3
Electives	6-8
Photo Electives ‡	5
Liberal Arts (Concentration) *	12

Fourth Year	
Advertising Core	10
Electives	15-17
Liberal Arts (Electives) *	12
Photo Electives (minimum) ‡	10
Liberal Arts (Senior Seminar) *	2
Total Quarter Credit Hours	182-186

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ 20 total elective credits required; may be any CIAS course (photo, art, printing, etc.)

Photojournalism

Gunther Cartwright, 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 nine Pulitzer Prizes in visual journalism since 1979. Students have the opportunity to explore related disciplines, such as electronic printing, 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
Art & Civilization 2039-225,226	6
Introduction to Color 2067-208	5
Introduction to Electronic Imaging 2067-325	4
2-D Design 2013-231,232,	6
Drawing 2013-211	3
Liberal Arts (Core) *	12
Physical Education †	0

Second Year	
Applied Photo II 2067-301,302	10
History & Aesthetics 19th Century 2060-301,302,303	9
Career Seminar 2067-XXX	1
Photo Elective	4
Materials & Processes of Photography 2076-211,212,213	9
Liberal Arts (Core) *	12
Physical Education †	0

Third Year	
Visual Journalism I 2067-XXX	15
Intro, to Electronic VJ 2067-XXX	3
Photo Electives ‡	7-8
Art History Elective	3
Liberal Arts (Concentration) *	12
Professional Writing 0535-532	4
Newspaper Production 2081-307	3

Fourth Year	
Visual Journalism II 2067-XXX	15
Advanced Electronic Visual Journalism 2067-XXX	6
Visual Journalism Core	9-12
Liberal Arts (Electives) *	12
Liberal Arts (Senior Seminar) *	2
Total Quarter Credit Hours	184-188

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ Minimum of 18 total elective credits required; may be any CIAS course (photo, art, printing, etc.)

Fine Art Photography

Willie Osterman, Program Chair

If your interests are in art and photography, you should consider fine art photography as your major. This program is designed to encourage and facilitate your artistic development, sensitivity and uniqueness as a visual artist. The department's objective is not to train you for a specific job in photography, but rather to provide you 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 color printers, and film/video artists or animators. Some 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 and television.

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 program chairperson at 716-475-2616.

Professional photographic illustration, BFA degree, fine art photography option, typical course sequence

First Year	*Quarter Credit Hours*
Applied Photo I 2067-201,202	12
Art & Civilization 2039-225,226	6
Introduction to Color 2067-208	5
Introduction to Electronic Imaging 2067-325	4
2-D Design 2013-231,232,	6
Drawing 2013-211	3
Liberal Arts (Core) *	12
Physical Education †	0

Second Year	
Applied Photo II 2067-301,302	10
History & Aesthetics 19th Century 2060-301,302,303	9
Career Seminar 2067-XXX	1
Photo Elective	4
Materials & Processes of Photography 2076-211,212,213	9
Liberal Arts (Core) *	12
Physical Education †	0

Third Year	
Photography as a Fine Art I 2060-401,402,403	12
Contemporary Issues 2060-411,412,413	12
Contemporary Art 2039-380	3
Studio Elective	8
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 ‡	8
Art History/Criticism ‡	8
Portfolio Seminar 2060-XXX	4
Liberal Arts (Electives) *	12
Liberal Arts (Senior Seminar) *	2
Total Quarter Credit Hours	187-193

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ Visual imaging electives may be any CIAS course (photo, art, printing, etc.)

School of Printing Management and Sciences

C. **Harold Gaffin**, Director

Frank J. Romano, Administrative Chair

The School of Printing Management and Sciences offers a complete array of programs based on the concepts needed in all printing and publishing industry jobs and encourages customized study in other courses to develop individual talents and interests. The completeness of a student's professional education in the School of Printing Management and Sciences differentiates RIT's programs from those at other colleges.

The school's facilities are unsurpassed: students learn with more than $33 million worth of up-to-date equipment in 12 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 printing programs. No student interested in attending the School of Printing Management and Sciences 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 Printing Management and Sciences 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

Students who have completed high school also should contact the council. Many types of scholarships are available for students pursuing an education in graphic arts.

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 Technical and Education Center of the Graphic Arts and the RIT Research Corporation. Finally, in addition to its educational benefits, cooperative education gives some 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 for at least two quarters. 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 is available. Students have been employed by 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 the graphic arts area and approved by the school. Students have been employed all over the United States and in foreign countries. Three students each quarter co-op as printing specialists on the *Queen Elizabeth II* cruise ship.

Transfer credits

RIT encourages transfer students from other colleges and programs by granting the maximum possible transfer credit. Call the school at 716-475-6026 for up-to-date information, transfer recommendations and other details about transfer credit.

Graphic Communications

William H. Birkett, Program Chair

Prospective students should look at all of the school's degree programs before making a choice. The school offers other programs to meet important and specific industry needs (described on succeeding pages), but the graphic communications program attracts 40 percent or more of students enrolled in the School of Printing Management and Sciences. It allows students the greatest flexibility in customizing their programs for the careers they seek.

This program is based on a solid foundation in technical areas important to the printing industry as well as course work in relevant management disciplines. In addition, it makes available many electives from the management or technical subject areas, which can be chosen according to the individual's career goals.
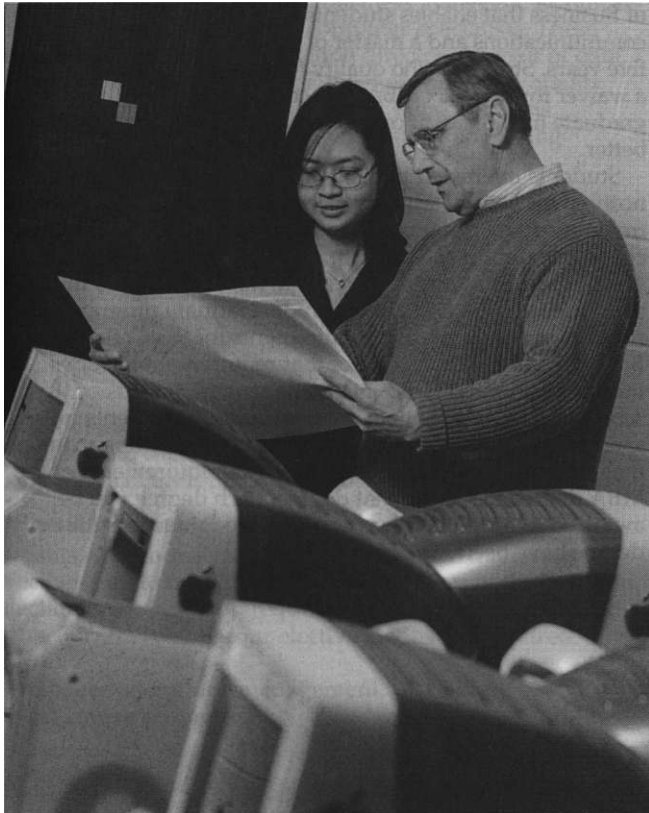
The field of graphic communications encompasses almost everything people see or read—from books to billboards to packaging and more. Students in this program learn how to create, design, produce, and manage the people and technology to get it done.

Program of study

The curriculum includes a broad base of 13 core printing courses in the first two years followed by maximum flexibility through the choice of major and minor professional electives in the last two years.

First-year printing courses include an introduction to the graphic communications industry, information formatting, the lithographic process and two classes devoted to graphic arts software tools. These are supplemented by four mathematics courses that cover material needed in later management and technology courses, a two-course laboratory science sequence and four in liberal arts. The math and science courses specified in the curriculum are minimum requirements. Students with good backgrounds in these subjects are encouraged to take higher-level courses to enhance their overall education. The liberal arts program is described in greater detail on page 10.

In the sophomore year, the technology base begun in the first year is extended by courses in imaging technology, electronic communications, distribution systems, ink and substrates, a third class in graphic arts software tools and one additional process course chosen from flexography, gravure, screen or digital printing. The student is introduced to the business side of the industry through a management overview course that lays the foundation for a minimum of four managerial courses taken in the third and fourth years. Technical writing rounds out the required professional core. In addition, all students are required to take three courses in liberal arts. They will also be able to choose two professional elective courses during the year.

Professional major and minor

The third and fourth years involve many professional elective courses plus seven liberal arts courses. Prior to the beginning of the junior year, each student is required to declare a major and a minor. The student may choose a major in either printing management or printing technology. If the student selects the graphic communications major, then he or she is required to complete a minor in printing technology. Conversely, if the student selects a printing technology major, he or she is required to complete a printing management minor.

A major consists of a minimum of 33 quarter credit hours (nine to 11 courses). A minor consists of a minimum of 16 quarter credit hours (four to six courses). In addition to meeting the major and minor requirements, students must complete at least 12 additional quarter credit hours of professional electives to meet the minimum of 181 quarter credit hours required for the degree. These latter electives may be used to expand a student's area of interest or sample courses from other RIT colleges. The School of Printing Management and Sciences, however, offers more than 60 elective courses.

A printing technology major must take the 33 quarter credit hours from School of Printing Management and Science technical courses. A graphic communications major must take the 33 quarter credit hours from either School of Printing Management and Sciences management courses or appropriate College of Business courses, including one course from each of the following four areas:

2080-301 Financial Controls (3 cr.) or
0101-301 Financial Accounting (4 cr.)
2080-302 Print Planning Concepts (3 cr.) or
0105-363 Principles of Marketing (4 cr.)
0102-350 Principles of Managerial Leadership (4 cr.)
2080-383 Economics of Production Management (4 cr.)

A printing technology minor must take the minimum 16 quarter credit hours from the School of Printing Management and Sciences technical course list. A graphic communications minor must take the minimum 16 quarter credit hours from either School of Printing Management and Sciences management courses or appropriate College of Business courses, including one course from each of the same four areas listed above for the printing management major. Students work closely with faculty advisers to put together a sequence of courses for both the major and minor that best supports their career objectives and interests.

Graphic communications, BS degree, typical course sequence

First Year — *Quarter Credit Hours*

Student Seminar 2080-001	0
Intro, to Graphic Communication Industry 2081-254	3
Information Formatting 2081-255	3
Lithographic Process 2081-367	3
Graphic Software Tools I 2081-216	1
Graphic Software Tools II 2081-217	1
Algebra for Management Sciences 1016-225	4
Calculus for Management Sciences 1016-226	4
Data Analysis I 1016-319	4
Data Analysis Lab 1016-379	2
Lab Science I and II	8
Liberal Arts (Core) *	16
Physical Education †	0

Second Year

Elect. Comm. in Print & Publ. 2080-319	3
Imaging Technology 2081-321	3
Graphic Software Tools III 2081-218	1
Graphic Comm. Distribution Systems 2081-231	3
Printing Process Course—Choice	3
Management Overview of G.A. Industry 2080-323	3
Ink & Substrates 2081-316 ‡	3
Professional & Technical Writing 2080-317 §	3
Principles of Economics I or II 0511-301 or 401	4
Professional Electives	6
Liberal Arts (Core) *	12
Physical Education †	0

Third Year

Printing Major	17
Printing Minor	9
Professional Elective	4
Liberal Arts (Upper level) *	12
Cooperative Education	Co-op

Fourth Year

Printing Major	16
Printing Minor	7
Professional Electives	8
Liberal Arts (Upper level) *	12
Liberal Arts (Senior Seminar) *	2
Total Quarter Credit Hours	181~

* See page 10 for liberal arts requirements,
t See page 11 for policy on physical education.
‡ Students choose one from flexography, gravure, screen or digital printing courses.
§ 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 communications—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 Printing Management and Sciences 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.

Graphic communications, AAS transfer option, BS degree, typical course sequence

Third Year — *Quarter Credit Hours*

Student Seminar 2080-001	0
Intro, to Graphic Communication Industry 2081-254	
Graphic Software Tools II, III 2081-217,218	
Printing Financial Controls 2080-301	3
or	
Financial Accounting 0101-301	4
Information Formatting 2081-255	3
Print Planning Concepts 2081-302	3
or	
Principles of Marketing 0105-363	4
Professional & Technical Writing 2080-317	3
Principles of Managerial Leadership 0102-350	4
Lithographic Process 2081-367	3
Printing Technology Electives	6
Liberal Arts (Upper level) *	12

Fourth Year

Imaging Technology 2081-321	3
Electronic Communication in the Graphic Arts 2080-319	3
Graphic Comm. Distribution Systems 2081-231	3
Economics of Production Management 2080-383	4
Elective Printing Process course 2081-xxx	3
Ink & Substrates 2081-316 ‡	3
Printing Technology Electives	16
Liberal Arts (Upper level) *	12
Liberal Arts Senior Seminar *	2
Total Quarter Credit Hours	181

* See page 10 for liberal arts requirements.

Accelerated BS/MBA in Graphic Communications Dual Degree Program

Len Leger, Coordinator

This is a joint program made available by the faculties of the School of Printing Management and Sciences and the College of Business that enables students to receive a BS in graphic communications 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 scores and undergraduate grade standards. Students must satisfy all of the requirements for the BS in printing management 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.

Newspaper Operations Management

Ovven Smith, Coordinator

The printing and publishing industries are undergoing dynamic technological changes. Within the newspaper industry, changes are particularly drastic, completely altering how things are **accomplished**. In addition, advances in technology **and** market penetration of related information-handling systems result in greater competition in the areas of reader interest and advertising appeal. These advances have made it imperative to alter not only the way **in** which a newspaper is printed and distributed but also the very method by which the information is prepared and processed—perhaps even what will **be** produced. The earlier distinctions among editorial, advertising and production blur as production becomes a function of advertising and editorial preparation, a direction enveloping previously distinct functions as well. These trends will result in the integration of these departments into a single entity utilizing a computer system to handle, transmit and process information and then to control production and delivery.

This new approach requires new abilities and expertise of the people who would guide this changing industry. Graduates of the newspaper operations management program will be well prepared to compete with the existing pools of talent and expertise as the functions of production merge with those of other departments.

The graduate with a BS degree in newspaper operations management has numerous career choices within the newspaper industry. Many young people find entry positions as production assistants, assistant business managers, technical specialists with suppliers and computer specialists. These can lead to positions of production director, director of data processing, operations director, business manager, quality control manager and publisher. All of these positions present a distinct challenge in an industry undergoing vast technological change.

Program of study

The newspaper operations management program is a four-year course of study leading to a bachelor of science degree. The program stresses management, engineering, sciences, and computer printing technology, as well as liberal arts.

Each student must take mathematics and a two-course lab science sequence. Placement is determined through testing and a review of the student's academic background. Preparatory math courses are available if needed. Students with strong science and math backgrounds are encouraged to complete high-level courses in these areas to enhance their overall education.

Professional electives

Students elect courses to suit their individual interests and objectives and to meet the credit requirements of the program. Selection is subject to prerequisite requirements and availability of courses. Twenty-four elective credits are required.

Newspaper operations management, BS degree, typical course sequence

First Year	Quarter Credit Hours
Student Seminar 2080-001	0
Intro, to Graphic Communication Industry 2081-254	3
Information Formatting 2081-255	3
Newspaper Seminar I, II, III 2080-211,212,213	3
Algebra for Management Science 1016-225	4
Calculus for Management Science 1016-226	4
Data Analysis I 1016-319	4

In addition to learning management and marketing practices, students in the newspaper operations management program learn by doing—they gather the day's news from national wire services, scan and electronically capture images, design pages using the latest software, prepare printing plates, and produce and distribute the finished publications.

Data Analysis Lab I 1016-379	2
Laboratory Science I, II	8
Liberal Arts (Core) *	16
Physical Education †	0
Second Year	
Imaging Technology 2081-321	3
Printing Financial Controls 2080-301	3
or	
Financial Accounting 0101-301	4
Printing Planning Concepts 2080-302	3
or	
Principles of Marketing 0105-363	4
Lithographic Process 2081-367	3
Graphic Software Tools I, II, III 2081-216,217,218	3
Newsroom Operations Management 2081-321	2
Professional & Technical Writing 2080-317 ‡	3
Newspaper Production I 2081-307	3
Adv. Concepts of Newspaper Prod. Systems 2081-308	3
Professional Electives	6
Principles of Economics I or II 0511-301 or 302	4
Liberal Arts (Core) *	12
Physical Education †	0
Third Year	
Ink & Substrates 2081-316	3
Circulation & Packaging 2081-411	3
Dynamics of Personal Leadership 2080-404	3
Elect. Comm. in Printing & Publ. 2080-319	3
Image Capture & Analysis 2081-401	3
Color Separation Systems 2081-409	3
Labor Relations 2080-421	4
Newspaper Presses 2081-408	3
Professional Electives	13
Liberal Arts (Concentration) *	12
Cooperative Education	Co-op
Fourth Year	
Legal Problems in Printing & Publishing 2080-501	4
Systems Planning 2080-502	4
Newspaper Management 2080-503	4
Professional Electives	14
Liberal Arts (Electives) *	12
Liberal Arts (Senior Seminar) *	2
Total Quarter Credit Hours	188-190

* See page 10 for liberal arts requirements.
† See page 11 for polio/ on physical education.
‡ 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.

New Media Publishing

This BS degree was created in response to the demand for college-educated specialists in cross-media publishing. Publishing takes many forms and may be print or electronic, disk-based or Web-based—paper or pixels. Students explore all forms of publishing as they complete projects using cutting-edge software programs to produce Acrobat, PDF, and HTML documents. One project involves each student producing a 100-page digitally printed book. This cross-disciplinary program shares courses with the BFA in new media design and imaging and the BS new media option in information technology.

New media publishing BS degree, typical course sequence

First Year Quarter Credit Hours
Student Seminar 2083-202	1
Ideation & Visualization 2009-211	4
Traditional Photographer with Digital Techniques 2061-221	4
New Media Perspectives 2065-211	3
Writing & Literature I 0502-225	4
3D Form & Space 2009-212	3
Intro, to Programming for Digital Media 0602-230	4
New Media Publishing 2083-211	3
Writing & Literature II 0502-226	4
Elements of Graphic Design 2009-213	3
Programming for Digital Media 0602-434	4
Digital Video for Multimedia 2065-217	4
Liberal Arts Core 05 - *	4
Physical Education (1 each quarter) †	0

Second Year
Typography 2083-311	3
Web Site Design & Implementation 0602-409	4
Algebra for Management Sciences 1016-225	4
Liberal Arts Core 05 - *	11
Publishing Segment 208 - ‡	3
Graphic Communication Distribution Systems 2081-231	3
Calculus for Management Science 1016-226	4
Professional & Technical Writing 2080-317	3
Financial Accounting 0101-301	4
Laboratory Science I 10 -	4
Sociology or Anthropology 0515-_____	4

‡ Publishing Segments
Newspaper Production I 2081-307	3
Introduction to Book Publishing 2081-361	3
Introduction to Magazine Publishing 2080-376	3

Third Year
Electronic Comm. in Printing & Publishing 2080-319	3
Theory & App. of Basic Financial Concepts 0104-420	4
Principles of Marketing 0105-363	
or	
Marketing for Total Customer Satisfaction 0105-415	4
Law & Reg. of Multimedia Comm. Systems 2083-402	3
Organizational Behavior 0102-430	4
Data Analysis 1 Lab 1016-379	2
Data Analysis 1 1016-319	4
Liberal Arts *	4
Publishing Concentration (see below)	9-12

Publishing Concentration (choose one of the following tracks)

Print Media
Imaging Technology 2081-321	3
Color Separation Systems 2081-409	
or	
Color Perception & Measurement 2081-562	3
Desktop Publishing Systems 2081-561	3
Lithographic Process 2081-367	3
or	
Gravure Process 2081-386	
or	
Flexography Process 2081-364	
or	
Digital Printing & Publishing 2081-576	

Management
Management Overview of Graphic Comm. 2080-323	3
Economics of Production Management 2080-383	3
Marketing in the Graphic Arts 2080-592	4
Seminar in Marketing 0105-554	4
Entrepreneurship 0102-490	4

News Media Management
News Production Management 2065-581	3
Digital News Systems Management 2083-412	4
Systems Planning 2080-502	4
Intro, to Electronic Visual Journalism 2067-XXX	
Entrepreneurship 0102-490	4

Digital Media
Electronic Publishing 2081-574	3
Intro, to Interface Design 2065-383	4
Applied Database Management 0602-483	4
Multimedia & the Net	4
Digital Printing & Publishing 2081-576	3

Fourth Year
Publishing Track choice continues from third year	9-12
Professional Electives	9-12
New Media Production Management 2065-581	3
Liberal Arts *	16
Liberal Arts Senior Seminar *	2
New Media Team Project I 2065-582	4
New Media Team Project II 2065-583	4

* See page 10 for liberal arts requirements.
† See page 11 for polio/ on physical education

Printing and Applied Computer Science

Len Leger, Coordinator

In recent years computers have become widely used in most areas of the graphic arts industry. From typesetting to management information and from inking systems to automated bindery operations, computers in the graphic arts have created a need for personnel with an in-depth knowledge of both printing and computer science. Recognizing this need, the School of Printing Management and Sciences, in cooperation with the department of computer science, established the printing and applied computer science program for students who want to combine both fields.

A survey of employers in the graphic arts industry indicates the strong need for trained printing/computer specialists. As more and more graphic firms adopt computer technology, the need will grow for personnel who can develop and utilize equipment, interpret the graphic arts industry to the computer industry, apply computers to printing processes, manage computer systems and work with vendors.

Many career opportunities are open to graduates with a BS degree in printing and applied computer science. These include data processing supervisor; computer systems analyst; customer training, marketing support and sales for computer-based printing equipment manufacturers; and custom software design and development. These positions can lead to management responsibilities as production manager, director of computer technology and operations manager—all stepping stones to top management opportunities.

Two quarters of cooperative education are required to fulfill school requirements, but most students in this program find it feasible and desirable to take four or more quarters. Therefore, the accompanying chart illustrates completion of the program in five years.

Requirements for admission are given in the general information section of this bulletin. Students must meet the requirements of RIT's departments of computer science and information technology.

Students may transfer into this program from two-year college computer science, computer science transfer, math/science transfer programs or other comparable programs. Transfer students find that many of their two-year college credits are applicable toward the four-year degree.

Program of study

The School of Printing Management and Sciences offers a **four**-year course leading to a bachelor of science degree in **printing** and applied computer science.

Approximately 20 percent of the course work is in **computer** science, 30 percent in printing technology and **management**, 25 percent in math and science, and 25 percent in liberal arts.

professional electives

Students may elect professional courses in printing, **computer** science or information technology to complete their elective course requirement.

printing and applied computer science, BS degree, typical course sequence

First Year	Quarter Credit Hours
Student Seminar 2080-001	0
Intro, to Graphic Communication Industry 2081-254	3
Information Formatting 2081-255	3
Lithographic Process 2081-367	3
Imaging Technology 2081-321	3
Computer Science I, n, III 0603-231,232,233	12
Calculus I, II, HI 1016-251,252,253	12
Liberal Arts (Core) *	12
Physical Education †	0

Second Year	
Printing Financial Control 2080-301	3
Printing Planning Concepts 2080-302	3
Principles of Managerial Leadership 0102-350	4
Software Engineering 0603-361	4
Calculus IV 1016-305	4
Probability & Statistics 1016-351	4
University Physics I, II & Lab 1017-311/375,1017-312/376	10
Liberal Arts (Core) *	8
Physical Education †	0

Third-Fifth Years	
Professional & Technical Writing 2080-317 ‡	3
Data Communications & Networks I 0603-420	4
Digital Computer Organization 0603-351	4
Probability & Statistics 1016-352	4
Ink & Substrates 2081-316	3
Applied Database Management 0602-483	4
Graphic Communication Distribution Systems 2081-231	3
Electronic Communications in Printing/Publishing 2080-319	3
Quality Control in Graphic Arts 2081-416	3
Human Factors in Information Processing 0602-425	4
Intro, to Computer Graphics 0603-570	4
Web Offset 2081-414	3
Professional Electives	25
Liberal Arts (Core) *	8
Liberal Arts (Senior Seminar) *	2
Liberal Arts (Concentration) *	12
Liberal Arts (Elective) *	12
Cooperative Education (2 quarters required)	Co-op
Total Quarter Credit Hours	193

* See page 10 for liberal arts requirements,
t See page 11 for policy on physical education.
‡ 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.

Distance Learning Certificate Programs

The School of Printing Management and Sciences offers a distance learning certificate program for non-traditional students. Designed to provide course work in specific areas for those with a graphic arts interest, this certificate program can be completed in two to two-and-a-half years of study. The certificate can stand alone or be used as an area of concentration in the applied arts and sciences associate and bachelor's degree programs in the Center for Multidisciplinary Studies within the College of Applied Science and Technology.

In addition, full-time undergraduate students in nonprinting programs at RIT are encouraged to investigate the ways these courses could complement their degree program.

Whether you are a full- or part-time student, graphic arts courses provide unique tracks that combine well with graphic design, liberal arts and communications, computer science, packaging and photography.

For additional information and advising, contact the Office of Distance Learning at 1-800-callRIT or visit our Web site: www.distancelearning@rit.edu.

Digital Imaging and Publishing Certificate

Students successfully completing the digital imaging and publishing certificate will improve their marketability and promotability in the graphic communication industry. Due to rapid technological advances, employers have a chronic need for employees who are well versed in the new digital technologies and workflows taught in this certificate.

	Quarter Credit Hours
Intro, to Graphic Communications Industry 2081-254	3
Imaging Technology 2081-321	3
Image Capture & Analysis 2081-401	3
Foundations of Desktop Prepress Technology 2081-561	3
Digital Printing & Publishing 2081-576	3
Electives: (choose one)	
Color Perception & Measurement 2081-562	3
Economics of Production Management 2081-576	4
Certificate Total	18-19

Students majoring in printing and applied computer science take courses in computer science, information technology, and higher-level science and mathematics as well as becoming familiar with state-of the-art printing equipment.

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 five undergraduate degree programs and one graduate degree program, 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, social sciences 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 10 for details). Departments offering advanced work include communication; criminal justice; economics; fine arts; foreign language; history; language and literature; philosophy; political science; psychology; 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 of 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 of 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 of human development and behavior;
- Critical awareness of the interactions between society and the environment;
- The ability to create, interpret and evaluate artistic expression and to understand the aesthetic dimension of other forms of expression and experience;
- Understanding of the nature and implications of work and career;
- The ability to reason critically and creatively;
- The ability to reason about ethical and value issues and to relate that reasoning to the student's judgments and practice;
- Understanding of and proficiency in written, oral, visual and nonverbal forms of communication;
- Proficiency in the analysis and interpretation of quantitative and qualitative data.
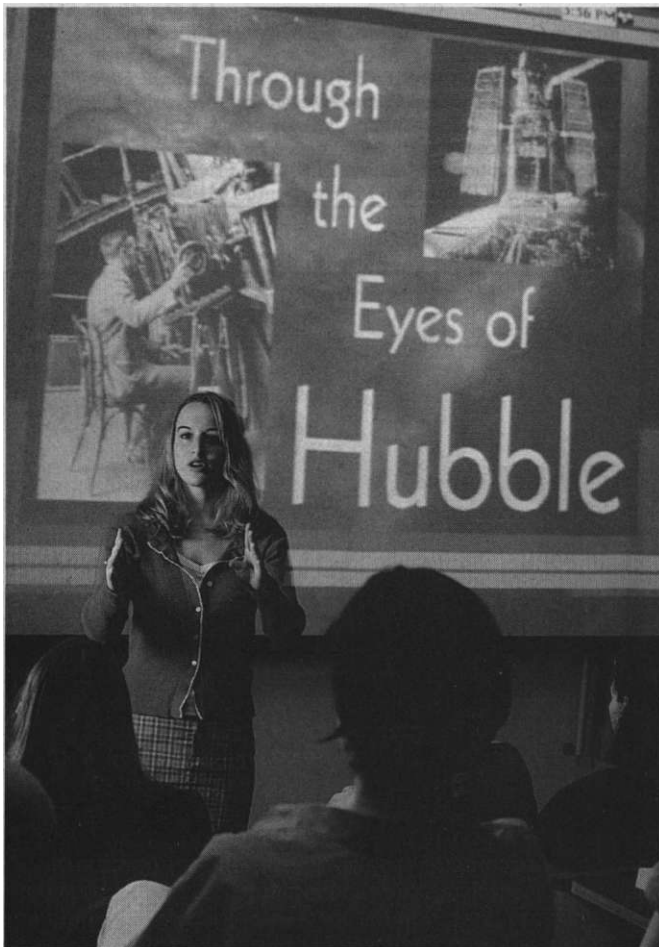
The professional and technical communication program gives students both concepts and practical skills.

The College of Liberal Arts offers undergraduate degree ^ograms in criminal justice, economics, professional and technical communication, psychology, and social work and a **master** of science degree in school psychology. The degree programs are described in the following pages. The college also houses a one-year career decision program for students ᵥho are undecided about their career choice 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 study in the social sciences and humanities. These men and women are dedicated teachers who have chosen as their professional goals the provision of rich and meaningful teaching and learning experiences for students and continuing growth in their scholarly fields.

Liberal arts degree program advising

The College of Liberal Arts is committed to providing faculty academic advisers for students in criminal justice, professional and technical communication, psychology, social work, economics, and the career decision program 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 Office of Academic Advising 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 office, located in room 2102 in the Liberal Arts Building, provides advising that is consistent with the general education policies of the College of Liberal Arts (see page 10). Students are served on a walk-in basis during open advising hours, which are posted on the office door and on bulletin boards in all academic departments. The office also evaluates liberal arts courses for transfer credits for all RIT students.

Part-time students and evening programs and courses

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 either the Liberal Arts Academic Advising Office (716-475-6987) or Scheduling Office (716-475-5267) for assistance in selecting and registering for courses. Both offices are located on the second floor of the College of Liberal Arts.

Summer

The College of Liberal Arts offers a number of courses each summer in language and literature, science and humanities, and social science, as well as degree program courses in criminal justice, psychology, social work, economics and communication.

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 (716-475-2229), located in the Bausch & Lomb Center on campus.

Criminal Justice

John M. Klofas, 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 six 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.

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.

If you take the Small Group Communication class, you may find yourself at the Red Barn on the edge of campus, involved in a teamwork exercise that demonstrates creative problem solving.

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

First Year	Quarter Credit Hours
Criminology 0501-400	4
Writing & Literature I 0502-225	4
Seminar in Criminal Justice 0501-201	4
Liberal Arts Core *	12
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
Physical Education ‡	0
Cooperative Education (Optional)	Co-op

Second Year	
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 *	16
Mathematics/Science †	12
Current Issues in Criminal Justice 0501-460	2
Physical Education ‡	0
Cooperative Education (Optional)	Co-op

Third Year	
Etiology of Crime 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/Concentrations *	12
Mathematics/Science †	4
Cooperative Education (Optional)	Co-op

Fourth Year	
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
Liberal Arts Electives/Concentrations *	8
Total Quarter Credit Hours	186

See page 10 for liberal arts requirements,
† See page 11 for mathematics/science requirements.
‡ See page 11 for policy on physical education.

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 pro- fessional strengths necessary for social work practice.

Social work classes are held between 8 a.m. and 10 p.m., which allows adult learners—some of whom are currently employed in social service agencies—as well as traditional undergraduate students to enroll in the program.

Curriculum

The social work curriculum aims to develop an understand- ing 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 a sequence of courses that introduces them to the concepts of social work practice and teaches 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.

Classes are held between 8 a.m. and 10 p.m., and students are able to enter the program in the fall, winter, or spring quarter. "Classes that fit" accommodate adults whose work and family requirements restrict their daytime schedules. Our flexible program lets them match their classes to other demands on their time.

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 edu- cation 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 experi- ences 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

First Year	*Quarter Credit Hours*
Self-Awareness in the Helping Role 0516-212	4
The Professional Social Work Role 0516-210	4
Computer Literacy for Social Work 0516-218	2
History of Social Welfare 0516-302	4
7 Liberal Arts Core *	24
History of Social Discrimination 0507-493	4
Liberal Arts Core: Writing & Literature I 0502-225 *	4
One Liberal Arts Elective *	4
Physical Education †	0
Second Year	
Structure & Function of Social Welfare 0516-305	4
One Professional Elective	4
Cultural Diversity 0510-505	4
Two Science Requirements	8
Human Behavior & the Social Environment I 0516-354	4
Human Behavior & the Social Environment II 0516-355	4
Mental Health & Mental Illness 0516-357	4
College Mathematics	4
Two Liberal Arts Electives *	8
One Liberal Arts Concentration Course *	4
Physical Education †	0
Third Year	
The Family from a Social Work Perspective 0516-405	4
Exploratory & Descriptive Research 0516-435	4
Group Theory in Social Work 0516-456	4
Assessing Community Needs 0516-465	4
Interviewing & the Helping Relationship 0516-475	4
Two Professional Electives	4
Three Statistical Methods courses	12
Two Liberal Arts Concentration Courses *	8
Fourth Year	
Assessment & Problem Solving 0516-505	4
Field Instruction I 0516-506	4
Field Seminar I 0516-524	3
Introduction to Practice Evaluation 0516-535	2
Social Intervention 0516-550	4
Field Instruction II 0516-551	4
Field Seminar II 0516-560	3
Evaluation of Practice & Programs 0516-540	2
Professional Seminar 0516-598	4
Policy & Planning Processes 0516-595	4
One Professional Elective	8
Liberal Arts Senior Seminar 0520-501 *	2
Total Quarter Credit Hours	186

* See page 10 for liberal arts requirements,
t Seepage 11 for policy on physical education.

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. Required communication courses enhance the student's oral and written communication skills. Business courses include accounting, finance and management science. 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.

Study environment

The economics faculty serve as mentors and are readily available to enhance students' personal and professional growth. Students have the opportunity to work as research assistants for the faculty, learning about research techniques using a hands-on approach and receiving a stipend for their work.

Professional option

The economics program allows the student to develop a professional option consisting of six courses. This option may be in mathematics, prelaw, or business or can be specially designed by the student. The faculty adviser helps the student develop professional options that will assist him or her in attaining career goals.

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.

Economics, BS degree, typical course sequence

First Year	Quarter Credit Hours
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, n 1016-251,252	8
Financial & Managerial Accounting 0101-301,302	8
Survey of Computer Science 0602-200	4
Liberal Arts (Core) *	16
Physical Education †	0

Second Year	
Monetary Analysis & Policy 0511-452	4
Applied Econometrics I 0511-457	4
Applied Econometrics II 0511-458	4
Introduction to Data Analysis 0106-330	4
Free Elective	4
Professional Option	4
Liberal Arts (Core) *	12
Science Requirement	8
Physical Education †	0

Third Year	
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 Option	8
Free Electives	12
Liberal Arts (Concentration) *	12

Fourth Year	
International Trade & Finance 0511-454	4
Industrial Organization 0511-456	4
Seminar in Applied Economics 0511-461	8
Professional Option	8
Free Elective	4
Liberal Arts (Electives & Senior Seminar) *	
Total Quarter Credit Hours	182

See page 10 for liberal arts requirements,
† See page 11 for policy on physical education.
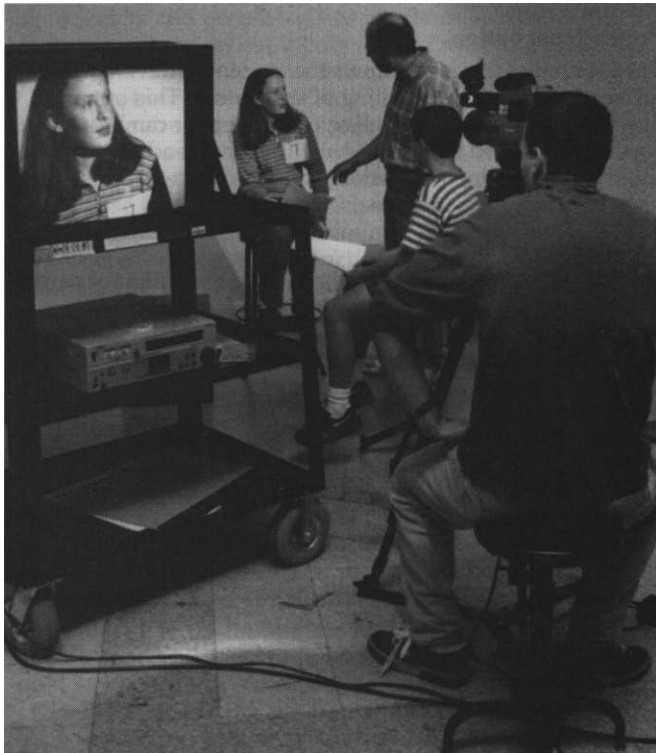
Professional and technical communication students prepare for challenging careers in a field that connects employers to employees, businesses to the public, products to consumers, mass media to audiences, and government to its citizens.

Professional and Technical Communication

Bruce A. Austin, Department Chairperson

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. Also, it prepares 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. Today employees use communication skills more than any others in their jobs, and use of these skills becomes more frequent and more important with increasingly responsible positions. 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 and related academic disciplines.

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 **or** Critical Research Methods
Quantitative Research Methods
Senior Thesis in Communication

Communication electives   **20**

Other required courses

	Credit Hours
professional Core	24
Science	8
Math	8
Computer Science	4
Statistics or Math or Science	4
Liberal Arts Courses	48

Communication electives

Students are required to take five communication electives. Of these, at least one must be a writing elective. Communication electives include:

Newswriting	0502-517
Creative Writing—Poetry	0502-451
Creative Writing—Prose Fiction	0502-452
Advanced Creative Writing	0502-453
Organizational Communication	0535-415
Advanced Public Speaking	0535-420
The Evolving English Language	0502-445
Public Relations	0535-421
Uses and Effects of Mass Media	0535-452
Communication and	
Documentary Film	0502-524
Persuasion and Social Change	0535-490
Intercultural Communication	0535-520
Special Topics in Communication	
(e.g., political communication, mediation, archival research, argumentation, propaganda, international media,	
crisis management)	0535-525
Writing Technical Manuals	0502-446
Film and Society	0535-550
Small Group Communication	0535-483
Speechwriting	0535-502
Public Relations	0535-421

Professional and technical communication, BS degree, typical course sequence

First Year	Quarter Credit Hours
Foundations of Communication 0535-200	4
Writing & Literature I 0502-225	4
Computer Science Requirement 0602-220 or 320	4
Math Requirement 1016-XXX	4
Interpersonal Communication 0535-210	4
Writing & Literature II 0535-226	4
Math Requirement 1016-XXX	4
Liberal Arts Humanities Requirement *	4
Written Argument 0535-230	4
Rhetoric & Public Discourse 0535-311	4
Liberal Arts Social Science Requirement *	4
Liberal Arts Humanities Requirement *	4

Second Year	
Persuasion 0535-481	4
Technical Writing 0502-444	4
Science Requirement 1004	4
Professional Core	4
Effective Speaking 0535-501	4
Computer Applications in Communication	4
Science Requirement 1004	4
Liberal Arts Humanities Requirement *	4
Visual Communication 0535-450	4
Mass Communications 0535-482	4
Math or Science Requirement	4
Liberal Arts Social Science Requirement *	4

Third Year	
Liberal Arts Concentration or Minor *	4
Theories of Communication 0535-312	4
Liberal Arts: Concentration or Minor *	4
Professional Core (2)	8
Qualitative or Critical Research Methods	4
Professional Writing 0535-532	4
PTC Elective 0535-0502-XXX	4
Liberal Arts: Concentration or Minor *	4
Cooperative Education (2 quarters)	Co-op

Fourth Year	
Quantitative Research Methods 0535-315	4
Liberal Arts: Concentration or Minor *	4
PTC Elective	4
Professional Core	4
PTC Electives)2)	8
Liberal Arts *	4
Professional Core	4
Liberal Arts: Senior Seminar *	2
Senior Thesis in Communication 0535-595	4
Liberal Arts *	4
PTC Writing Elective	4
Professional Core	4
Total Quarter Credit Hours	182

* See page 10 for liberal arts requirements.

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 departments of computer science and information technology, the School of Photographic 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.

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 and weekly magazine. 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, eight 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 such other professional programs 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, governments 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 attended graduate school. PTC prepares students for graduate study in law, public relations, communication, health services and management.

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 concentration requirement, 2) a choice of two interdisciplinary tracks and 3) a cooperative education/internship requirement.

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 or 5) an individualized concentration developed with the assistance of the adviser.
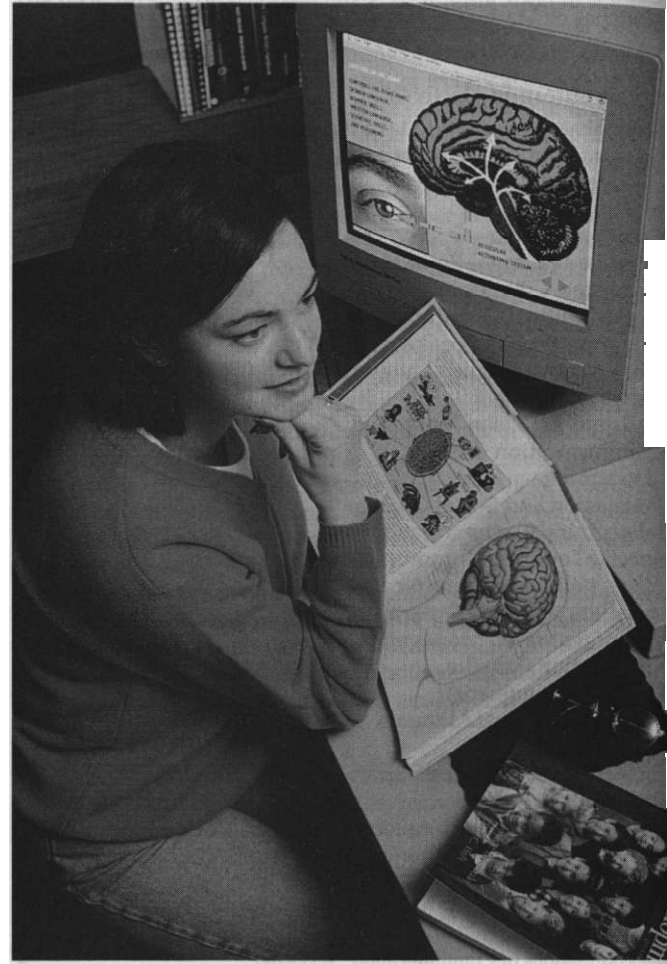
RIT's psychology program integrates the traditional curriculum with a science and technology focus.

Two interdisciplinary tracks

Students are asked to choose one of the following interdisciplinary tracks: 1) visual perception or 2) information processing. Technology is integrated with psychology in these two tracks to produce a nontraditional and career-oriented psychology major.

The visual perception track focuses on the human perceptual system and emphasizes adaptation to changes in environment. Studies include psychological principles and psychological processes related to human visual perception. Students conduct experimental laboratory research that bridges physiological and psychological processes and possesses an applied emphasis.

The information processing track focuses on human factors psychology and human factors and technological interactions. Learning, memory, cognitive processes, judgment and decision making, and learning theories are explored.

Co-op requirement

The program requires that students complete a cooperative education experience or internship between the sophomore and senior years of course work. The co-op experience is in a psychology-related field and does not carry academic credits.

Transferability

fjie psychology program provides excellent transfer opportunities for students from other institutions since it requires a core of psychology courses for which transfer students could receive credit.

The point of entry into the program is highly flexible since there are only two fixed sequences: 1) a three-course sequence **of Introduction** to Psychology, Statistics and Experimental Psychology and 2) a prerequisite of Psychology of Perception **in the** visual perception track. The technical concentration **component** increases the number of common courses shared **with** other programs and provides internal flexibility for **students** to move from other RIT programs and retain credits from some of the technical courses they may have completed previously.

Career opportunities

The unique requirements of this program ensure that upon completion of the program, 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

First Year	Quarter Credit Hours
Freshman Seminar 0514-201	1
Introduction to Psychology 0514-210	4
Writing & Literature I 0502-225	4
Liberal Arts: Humanities *	8
Liberal Arts: Social Science *	4
Liberal Arts: Writing & Literature II *	4
Mathematics Requirement †	8
Survey of Computer Science 0602-200	4
Tech./Professional Concentration ‡	4
Statistics	4
Childhood & Adolescence 0514-440	4
Freshman Seminar	2

Second Year	
Experimental Psychology 0514-310	4
Liberal Arts: Humanities *	4
Liberal Arts: Social Science *	4
Tech./Professional Concentration ‡	12
Science Sequence Requirement	8
Math/Science/Statistics †	4
Interdisciplinary Course §	4
Technical Writing 0502-444	4
Social Psychology 0514-444	4

Third Year	
Abnormal Psychology 0514-447	4
Liberal Arts Electives *	8
Ind./Organizational Psych. 0514-448	4
Liberal Arts Concentration *	12
Tech./Professional Concentration ‡	8
Interdisciplinary Course §	4
Psychology of Personality 0514-446	4

Fourth Year	
Interdisciplinary course §	8
Liberal Arts Elective *	4
Tech./Professional Concentration ‡	4
Senior Seminar *	2
Seminar in Psychology 0514-597	4
Institute Electives	20
Total Quarter Credit Hours	185

Students are expected to fulfill the co-op requirement between their second and fourth year.
* See page 10 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) individualized
§ Students are required to take 16 credit hours within one of the following tracks:
 1) visual perception
 2) information processing

Career Decision 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 beginning with their first year of college. Many freshmen and transfer students have chosen a career area by the time they have been accepted for admission. Others, however, want an opportunity to explore different fields before making a decision. The career decision program gives this group of students a chance to formulate an educational and career plan during their first year at RIT.

In addition to sampling introductory and foundation courses in one or more of RIT's departments, career decision program students enroll for liberal arts courses in the humanities and social sciences and in mathematics, science and computer science courses. They also take a one-credit seminar, Career Exploration, in which they explore both 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 may also take introductory courses in that area to ensure that the major is appropriate for them. They may take courses in any major area represented by RIT departments. Upon definitely identifying a major (sometime during their first year), career decision program students apply for a transfer to the new department.

Students who select the career decision program must, of course, 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 career decision program student has spent time in preliminary exploration.

Each student is assisted by a faculty academic adviser in choosing courses and in selecting a career path and degree program.

After one to four quarters in the career decision program, each student may reasonably anticipate:
- A clearer basis for making a decision regarding long-range career plans
- Credit for courses that would most likely 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.

By special permission, a student may enroll for portions of this program on a part-time basis.

College of Science

Robert A. Clark, *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 allied health 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 nearly 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 new 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 photographic chemistry, digital imaging, holography, microdensitometry, optics, remote sensing and color science. 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 any 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

^ginning 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/RIT	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., fall and winter).

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.

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.

The transfer plan

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 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, 80 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 below). To enroll in the program, students must visit the premedical studies office, room 2102, in the College of Science or call 716-475-7105 for an appointment.

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" (see next page). 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. 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

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	

Note: In addition to these 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.

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
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	†
Medical technology	One quarter organic chemistry lab
Nuclear medicine technology	Elect one year of organic chemistry
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.
f 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 http://www.rit.edu/-premdwww/.

Undeclared Science

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 allied health careers.

A student may apply to the college as an undeclared science major without designating a specific major. The undeclared science option allows a student to postpone a commitment to a particular major in science, mathematics or allied health without any loss of time toward a degree. This option is often attractive to first-year students.

On the next page is a typical distribution of courses for the undeclared science option. A customized schedule of introductory college-level courses in science and mathematics is developed for each student based on the student's ability, needs and goals. An academic team of advisers assist the student in selecting courses and identifying a major field of interest in which to enroll. In addition to the traditional science options of biology, chemistry, physics, and math, a student may select environmental science, imaging science, or an allied health career.

Before the end of the first year, most students are able to choose a specific major. Most students find the decision is easily made after only a quarter or two of course work.
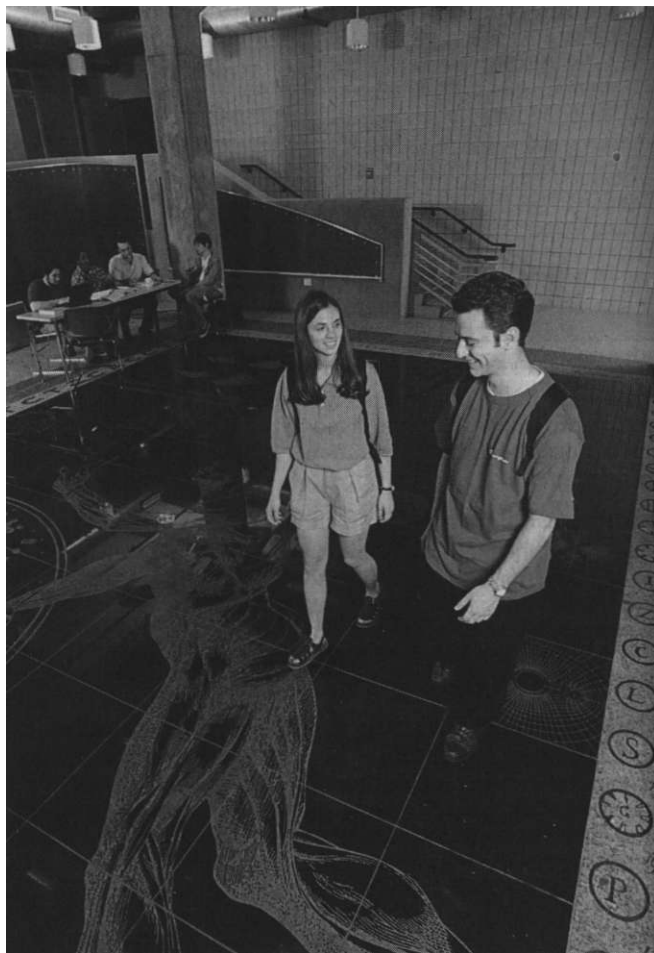
The four-story Bruce and Norm James Atrium is the focal point of the Center for Excellence in Mathematics, Science and Technology, which houses state-of-the-art laboratories and classrooms. The center is a recent addition to the College of Science's Gosnell Building.

Undeclared science option, typical course sequence

c rst Year	Quarter Credit Hours
General Biology Lecture *	9
general Biology Lab	3
General Chemistry Lecture I, II *	8
General Chemistry I Lab	1
Quantitative Analysis Lecture	4
Quantitative Analysis Lab I, II	3
Calculus I, II, III	12
physics Lecture I, II *	8
physics Lab I, II	2
Freshman Seminar for Undeclared Science	1
Liberal Arts (Core) †	12
Physical Education Electives ‡	0

Approximately 16-18 credits per quarter

' *Any two of these in a given quarter*
† *See page 10 for liberal arts requirements.*
‡ *See page H for policy on physical education.*

Biological Sciences

Douglas P. Merrill, Head

Biology

The department of biological sciences offers programs lead-**ing** 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 (e.g., human genetics, new vaccines and therapeutic drugs, diagnosis and treatment of cancer, transplantation)
ecology and environmental science
marine biology
pharmaceuticals
management positions in major science companies
agriculture

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.
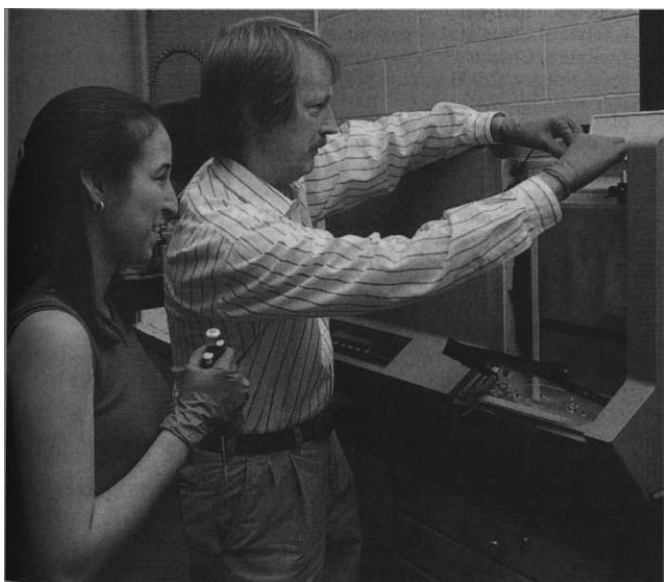
Biotechnology student Zully Gieseken works on a DNA Sequencer with Assistant Professor David Lawlor, an expert in genomics—the study of genes (human and otherwise).

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 of the BS degree in biology

The student must meet the minimum graduation requirements of the Institute as described on pages 9 to 11 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

First Year	Quarter Credit Hours
Biology Symposium 1001-200	1
Introductory Cell Biology 1001-251	4
Introductory Developmental Biology 1001-252	4
General Physiology 1001-253	4
General & Analytical Chemistry 1011-215,216,217	10
Chemical Principles Lab 1011-205,206	2
General & Analytical Chemistry Lab 1011-227	2
Elementary Calculus I & II 1016-214, 215	6
Liberal Arts (Core) *	12
Physical Education Courses †	0

Second Year	
Invertebrate Zoology 1001-301	4
Vertebrate Zoology 1001-302	4
Botany 1001-304	4
Organic Chemistry 1013-231, 232,233	9
Organic Chemistry Lab 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
Molecular Biology 1001-350	4
Introductory Microbiology 1001-404	5
Genetics 1001-421	4
Biology Seminar 1001-550	2
College Physics 1017-211,212,213	9
College Physics Lab 1017-271,272,273	3
Biology Electives	12
Technical Writing 0502-444	4
Liberal Arts (Concentration) *	12
Liberal Arts (Advanced Electives) *	12
Liberal Arts (Senior Seminar) * 0520-501	2
Free Electives	14
Cooperative Education 1001-499 (Optional)	Co-op
Total Quarter Credit Hours	180

* *See page 10 for liberal arts requirements,*
ƒ *See page 11 for policy on physical education.*
‡ *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:

> human genetics
> human gene therapy
> cancer research
> autoimmune diseases
> vaccine development
> agriculture
> food products
> pharmaceuticals
> environment and energy

Laboratory-intensive programs emphasizing hands-on applications give College of Science students a competitive edge in the work place.

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 biology. 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 9 to 11 of this bulletin. In addition, the program requires successful completion of all of the courses listed in the typical course schedule below.

Co-op program

The biotechnology degree 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.

Biotechnology, BS degree, typical course sequence

First Year	*Quarter Credit Hours*
Biology Symposium 1001-200	1
Introductory Cell Biology 1001-251	4
Introductory Developmental Biology 1001-252	4
General Physiology 1001-253	4
General & Analytical Chemistry 1011-215,216,217	10
Chemical Principles Lab 1011-205,206	2
General & Analytical Chemistry Lab 1011-227	2
Elementary Calculus I & II 1016-214,215	6
Liberal Arts (Core) *	12
Physical Education Courses †	0

Second Year	
Cell Biology 1001-311	4
Immunology 1001^02	3
Tissue Culture 1001-445	4
Molecular Biology 1001-350	4
Organic Chemistry 1013-231,232,233	9
Organic Chemistry Lab 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
Technical Writing 0502-444	4
Liberal Arts (Concentration) *	12
Liberal Arts (Advanced Electives) *	12
Liberal Arts (Senior Seminar) * 0520-501	2
Free Electives	15
Cooperative Education 1001-499 (Optional) ‡	Co-op

Total Quarter Credit Hours	180

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ 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)

Cell Physiology 1001-403	*4*
Microbial & Viral Genetics 1001-407	*4*
Plant Biotechnology 1001-416	*5*
Industrial Microbiology 1001-417	*4*
Hybridoma Techniques 1001-442	*2*
Genetic Engineering 1001-450	*5*
Microbial Pathogenesis 1001-451	*4*
Advanced Fermentation 1001-467	*4*
Advanced Immunology 1001-XXX	*4*
Genomics 1001-XXX	*4*
Biology Research 1001-54X	*1-6*

Chemistry

Gerald **A. Takacs,** Head

The department of chemistry offers programs leading to the 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, and BS polymer chemistry/MS chemistry programs.
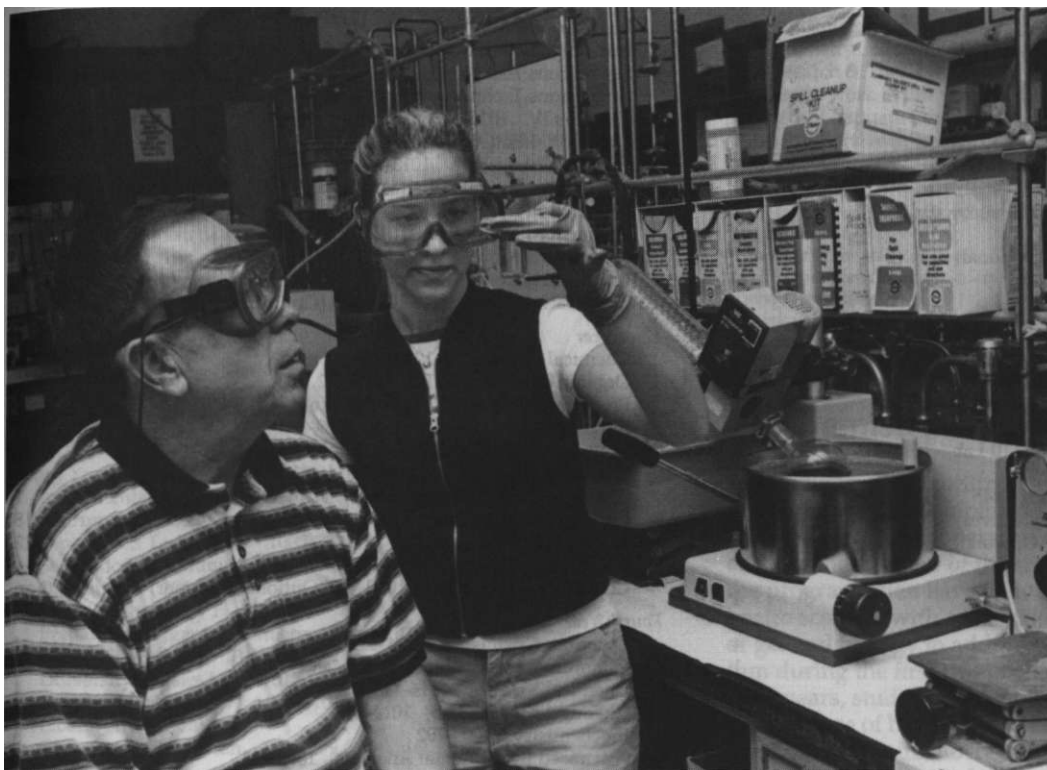
Fourth-year student Michelle Lavallee spent last summer with Professor James Worman learning how to make compounds that might have medical use and how to test them using the nuclear magnetic resonance spectrometer in order to formulate experiments for use in undergraduate chemistry classes.

Requirements for the BS degree

The student must meet the minimum graduation requirements of the Institute as described on pages 9 to 11 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.

This option is especially designed for transfer students who work full time, but it is flexible enough to meet the needs of any part-time student.

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 towards 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, 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, n, m 1016-251,252,253	12
Computer Programming Language 0602-205/207	3
Liberal Arts (Core)•	16
Physical 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 1017-311,312	8
University Physics Lab 1017-375,376	2
Liberal Arts (Core) *	8
Cooperative Education 1010-499 (Optional)	Co-op

Third Year	
Differential Equations 1016-306	4
University Physics 1017-313	4
University Physics Lab 1017-377	1
Organic Chemistry II, HI 1013-432,433	6
Preparative Organic Chemistry II Lab 1013-436	1
Introduction to Biochemistry 1009-300	1
Systematic ID of Organic Compounds IH 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 1012-765	2
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	**180**

* See page 10 for liberal arts requirements.
t See page 11 for policy on physical education.
‡ 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).

Chemistry, combined BS/MS degree, typical course sequence (BS is ACS certified)

First Year	Quarter Credit Hours
Chemical Safety 1010-200	\
New Student Seminar 1010-230	i
General Chemistry I, II 1010-251,252	7
General Chemistry I Lab 1010-255	i
Quantitative Analysis I, n 1008-261,262	7
Quantitative Analysis Lab I, II 1008-265,266	3
Calculus I, n, m 1016-251,252,253	12
Computer Programming Language 0602-205/207	3
Liberal Arts (Core) *	20
Physical 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
Differential Equations 1016-306	4
Organic Chemistry I 1013-431	3
Preparative Organic Chemistry I Lab 1013-435	1
University Physics 1017-311,312,313	12
University Physics Lab 1017-375,376,377	3
Liberal Arts (Core) *	12
Liberal Arts Concentration *‡	8
Cooperative Education 1010-499 (Optional, summer)	Co-op

Third Year	
Chemical Literature 1010-401	2
Organic Chemistry II, m 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

Fourth Year	
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	2
Liberal Arts (Senior Seminar) * 0520-501	2
Liberal Arts (Concentration) *	12
Chemistry Electives §	§
Research & Thesis Guidance 1010-879 1	3

Fifth Year	
Chemistry Seminar 1012-870	2
Research & Thesis Guidance 1010-879 1	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	**225**

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ 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.
J 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 **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 (BS is 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 0602-205/207	3
Liberal Arts (Core) *	12
Physical Education Electives †	0
General Biology 1001-201	3
General Biology Lab 1001-205	1
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 1017-311,312	8
University Physics Lab 1017-375,376	2
Applied Microbiology 1004-210	4
Liberal Arts (Core) *	12
Cooperative Education 1010-499 (Optional, summer)	Co-op

Third Year

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]	4
Differential Equations 1016-306	4
Advanced Instrumental Analysis 1008-511	3
Advanced Instrumental Analysis Lab 1008-621	2
University Physics III 1017-313	4
University Physics III Lab 1017-377	1
Aquatic Toxicology & Chemistry 1015-522	3
Cooperative Education 1010-499 (Optional, summer)	Co-op

Fourth Year

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 1012-765	2
Liberal Arts (Senior Seminar) * 0520-501	2
Liberal Arts (Electives) *	12
Chemistry Electives §	‡
Research & Thesis Guidance 1010-879 1	3
Chemical Literature 1010-401	2

Fifth Year

Atmospheric Chemistry 1015-721	3
Chemistry Seminar 1010-870	2
Research & Thesis Guidance 1010-8791	&-13
Course work in this year will be determined by the Graduate Committee and will need to fulfill the requirement of 225 credit bom's §	

Total Quarter Credit Hours	225

* See page 10 for liberal arts requirements. Environmental Studies concentration is recommended.
+ See page 11 for policy on physical education.
‡ 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,
f A student will be required to have 9-16 credit hours of Research b Thesis Guidance.

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, n 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 0602-205/207	3
Liberal Arts (Core)*	4
Physical 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
Physics 1017-311,312 (or 1017-211,212)	8(6)
Physics Lab 1017-375,376 (or 1017-271,272)	2
Liberal Arts (Core) *	8
Institute-wide Electives ‡	‡
Cooperative Education 1010-499 (Optional)	Co-op

Third Year	
Introduction to Biochemistry 1009-300	1
Differential Equations 1016-306	4
Physics 1017-313 (or 1017-213)	4 (3)
Physics Lab 1017-377 (or 1017-273)	1
Organic Chemistry H, HI 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 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ 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	
New Student Seminar 1010-230	
General Chemistry I, II 1010-251,252	y
General Chemistry I Lab 1010-255	]
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	i₂
General Biology 1001-201,202,203	9
General Biology Lab 1001-205,206,207	3
Computer Programming Language 0602-205/207	3
Liberal Arts (Core)*	4
Physical 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
Physics 1017-311,312	8
Physics Lab 1017-375,376	2
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
Physics 1017-313	4
Physics Lab 1017-377	1
Organic Chemistry II, m 1013-432,433	6
Preparative Organic Chemistry II Lab 1013-436	1
Systematic ID of Organic Compounds HI 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 1014447	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 1011-765	2
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	**182**

See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ 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 (BS degree is 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
•v 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 0602-205/207	3
Liberal Arts (Core) *	4
Physical 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
Physics 1017-311,312,313	12
Physics Lab 1017-375,376,377	3
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 HI 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	2
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 1010-8791	1

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 §	§
Research & Thesis Guidance 1010-8791	1
Total Quarter Credit Hours	227

* See page 10 for liberal arts requirements. ACS certification recommends a foreign language (preferably German).
† See page 11 for policy on physical education.
‡ 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.
1 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, D 1010-251,252	7
General Chemistry I Lab 1010-255	1
Quantitative Analysis I, D 1008-261,262	7
Quantitative Analysis Lab I, H 1008-265,266	3
Calculus I, n, m 1016-251,252,253	12
Computer Programming Language 0602-205/207	3
Liberal Arts (Core) *	20
Physical 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 1017-311,312	8
University Physics Lab 1017-375,376	2
Liberal Arts (Core) *	8
Cooperative Education 1010-499 (Optional)	Co-op

Third Year	
Introduction to Polymer Technology 1029-301	2
Differential Equations 1016-306	4
University Physics 1017-313	4
University Physics Lab 1017-377	1
Organic Chemistry II, ID 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

Polymer Chemistry: Properties of Bulk Materials 1029-503		4
Polymer Characterization Lab 1029-504		2
Preparative Inorganic Chemistry Lab 1012-765		2
Chemistry Electives 1		4
Liberal Arts (Electives) *‡		12
Liberal Arts (Senior Seminar) * 0520-501		2
Institute-wide Electives #		
Cooperative Education 1010-499 (Optional) §		Co-op
Total Quarter Credit Hours		180

* *See page 10 for liberal arts requirements.*
† *See page 11 for policy on physical education.*
‡ *ACS requirements highly recommend a foreign langmge (preferably German).*
§ *Students must take A-block co-op.*
# *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 ISO for graduation. Twelve credits are necessary for full-time status.*
} *ACS certification requires Preparative Inorganic Chemistry 1Mb 1012-765*

Polymer chemistry, combined BS/MS degree, typical course sequence (BS degree is 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, m 1016-251,252,253	12
Computer Programming Language 0602-205/207	3
Liberal Arts (Core) *	20
Physical 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
Differential Equations 1016-306	4
Organic Chemistry 11013-431	3
Preparative Organic Chemistry I Lab 1013-435	1
University Physics 1017-311,312,313	12
University Physics Lab 1017-375,376, 377	3
Liberal Arts (Core) *	12
Liberal Arts (Concentration) *‡	8
Cooperative Education 1010-499 (Optional)	Co-op

Third Year	
Introduction to Polymer Technology 1029-301	1
Chemical Literature 1010-401	2
Organic Chemistry H, 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 §	§
Cooperative Education 1010-499 (Optional)	Co-op

Fourth Year	
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	2
Chemistry Electives §	§
Research & Thesis Guidance 1010-879 #	3

Fifth Year

Polymer Chemistry: Properties of Bulk Materials 1029-703		4
Chemistry Seminar 1010-870		
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. §		r
Total Quarter Credit Hours		225

* *See page 10 for liberal arts requirements.*
t *See page 11 for policy on physical education.*
‡ *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.*
# *A student will normally have 9-16 credit hours of Research and Thesis Guidance.*

Environmental Science

John M. Waud, Program Director

The twenty-first 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 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.

\Ve 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.

Field exercises offer students in the environmental science program hands-on experience such as "hawk banding" of American Kestrels at Braddock's Bay with Professor John Waud.

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, and students enrolled in the BS/MS program are required to take a minimum of 28 quarter credit hours in a specified concentration. The available concentrations are:

environmental chemistry
remote sensing
civil engineering technology
environmental management and technology
environmental biology
mathematics and statistics

The environmental science concentrations are outlined in detail beginning on page 122. Assistance in selecting an appropriate concentration can be obtained from the program director.

Cooperative education

Cooperative education gives you a competitive edge. 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

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: http://www.rit.edu/-envsci/.
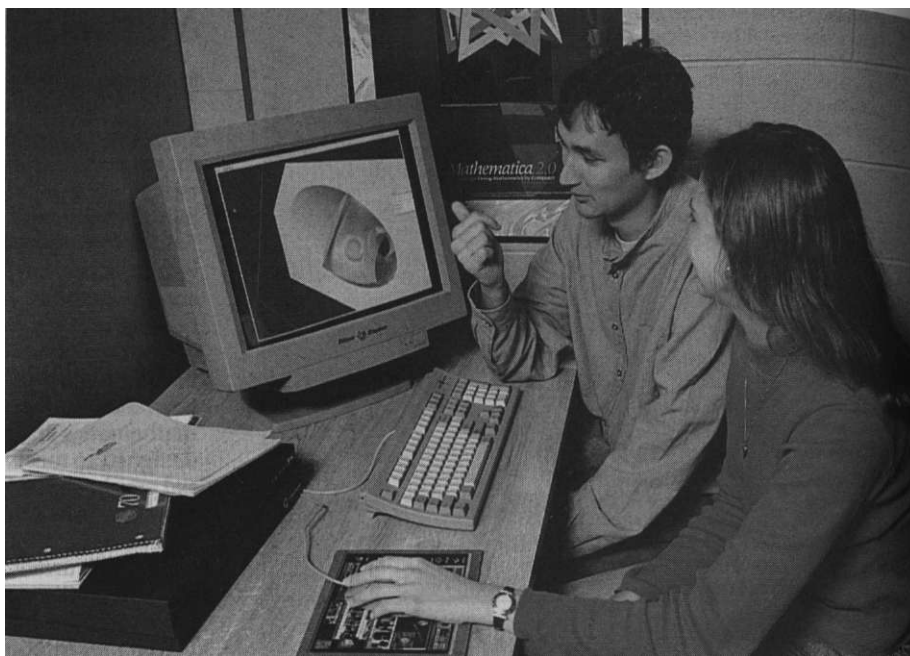
Requirements for the BS degree

The student must meet the minimum requirements of the Institute as described on pages 9 to 11. 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 1031-200	1
Introduction to Environmental Science I, II, ffl 1031-201, 202,203	12
General & Analytical Chemistry I, II, III 1011-215,216,217	10
Chemistry Lab 1011-205,206,227	4
Calculus I, n, III 1016-251,252, 253	12
Introduction to Programming 0602-208	4
Liberal Arts (core) *	8
Physical 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	12
University Physics Lab 1017-371,372,373	3
Liberal Arts (core) *	20
Probability & Statistics I 1016-351	4
Summer Co-op Experience (Optional) 1031-499	Co-op

Third Year
Organic Chemistry 1013-231,232,233	9
Organic Chemistry Lab 1013-235, 236,237	3
General Ecology 1001-340	4
Environmental Geology 0630-370	3
Environmental Geology Lab 0630-372	1
Applied Ecology ‡	4
Hydrology 0608-482	4
Environmental Science Concentration §	4
Great Lakes I, II, III (LA concentration) * 0508-463,464,465	12
Summer Co-op Experience (Optional) 1031-499	Co-op

Fourth Year
Introduction to Microbiology 1001-404	5
Principles of Remote Sensing & Image Analysis I 1051-761	4
Liberal Arts Elective *	12
Environmental Science Concentration §	16
Senior Seminar" 0520-501	2

Total Quarter Credit Hours 185

* See page 10 for liberal arts requirements.
† See page 11 for physical education requirements.
‡ Course approved; number not assigned.
§ See environmental science concentrations on following pages.
It is highly recommended that students, in consultation with their faculty adviser, take additional environmental science electives during the fourth year.

Requirements for the BS/MS degree

The student must meet the minimum requirements of the Institute as described on pages 9 to 11 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 1031-200	1
Introduction to Environmental Science I, II, m 1031-201,202,203	12
General & Analytical Chemistry I, H, III 1011-215,216,217	10
Chemistry Lab 1011-205,206,227	4
Calculus I, n, m 1016-251,252,253	12
Introduction to Programming 0602-208	4
Liberal Arts (core) *	8
Physical 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	12
University Physics Lab 1017-371,372,373	3
Liberal Arts (core) *	16
Probability & Statistics I 1016-351	4
Environmental Science Concentration §	4
Summer Co-op Experience (Optional) 1031-499	Co-op

Third Year
Organic Chemistry 1013-231,232,233	9
Organic Chemistry Lab 1013-235,236,237	3
General Ecology 1001-340	4
Environmental Geology 0630-370	3
Environmental Geology Lab 0630-372	1
Applied Ecology ‡	4
Hydrology 0608-482	4
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) 1031-499	Co-op

Fourth Year
Environmental Science Problem Solving I, II, III 1031-701,702,703	12
Introduction to Microbiology 1001-404	5
Principles of Remote Sensing & Image Analysis I 1051-761	4
Environmental Chemistry 1015-720	3
Liberal Arts Elective *	12
Environmental Science Concentration!	12
Senior Seminar * 0520-501	2
Summer Research or Co-op Experience (Optional) 1031-499	Co-op

Fifth Year
Biochemistry: Bio-molecular Conformation & Dynamics 1009-702	3
Biochemistry: Metabolism 1009-703	3
Probability & Statistics II 1016-352	4
Environmental Microbiology ‡	4
Chemical Toxicology 1013-730	4
Program Elective (Environmental Science Concentration) §	8
Environmental Science Research 1031-879	5
Advanced Geology ‡	4
Environmental Science Graduate Seminar 1031-870	1
Total Quarter Credit Hours	236

* See page 10 for liberal arts requirements.
† See page 11 for physical education requirements.
‡ Course approved; course *number not assigned*
§ See Environmental Science Concentrations on following pages

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).
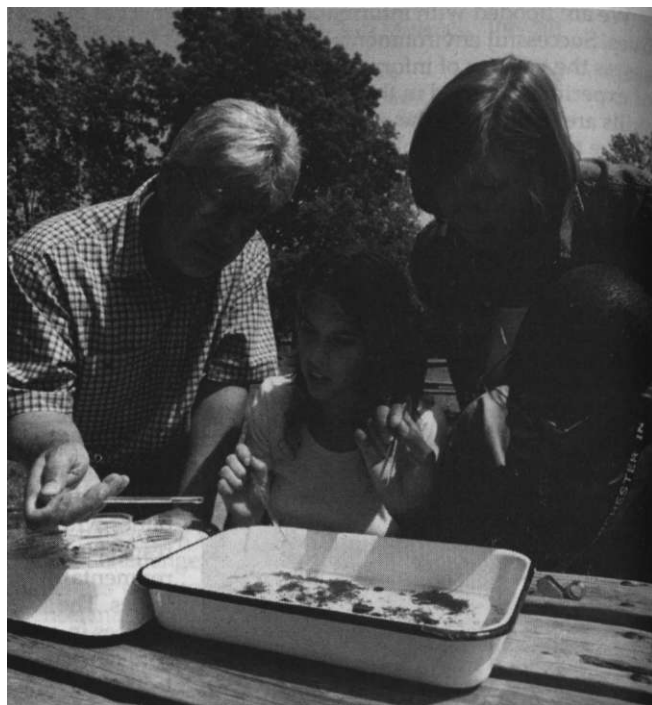
Students in the Great Lakes course examine macroinvertebrates from Oatka Creek with Gary Neuderfer, biologist from the NYS Department of Environmental Conservation, and Professor Ann Howard.

Environmental Science Concentrations/Tracks

Environmental Chemistry Concentration
Survey of Physical Chemistry 1014-742	3
Analytical Chemical Separations 1008-312	3
Separations Lab 1008-319	1
Analytical Chemistry Instrumental Analysis 1008-311	3
Instrumental Analysis Lab 1008-318	1
Inorganic Chemisfay I 1012-562	(4)
ᵒ ʳ	4/5
Advanced Instrumental Analysis 1008-711	(3)
& Advanced Instrumental Analysis Lab 1008-621	(2)
Atmospheric Chemistry 1015-721	3
Aquatic Chemistry 1015-722	3
Total quarter credit hours	21 /22

Remote Sensing Concentration
Programming for Imaging Science 1051-211	4
Radiometry 1051-401	4
Intro to Digital Imaging Processing 1051-782	4
Digital Imaging Processing: Spatial Pattern Recognition 1051-784	4
Environmental Science Remote Sensing 1051-	4
Graduate Electives	
Remote Sensing & Image Analysis II 1051-762	4
Remote Sensing & Image Analysis III 1051-763	4
Total quarter credit hours	28

Civil Engineering Technology Concentration
CE in Resource Recovery & Waste Manage 0608-525	4
Principles of Water & Wastewater Treatment 0608-438	4
Hydraulics 0608-420	3
Hydraulics Lab 0608-421	1]
Groundwater Hydraulics 0608-480	(4) j
or	
Design of Water Treatment Facilities 0608-510 >4	(2)
and	
Construction Equipment 0608-460	(2)
Design of Wastewater Treatment Facilities 0608-520 }	(4) j
or	4
Hydraulic Structures 0608-485	(4)
Total quarter credit hours	20

Environmental Management and Technology Concentration
(Environmental Investigation Track)

§	Environmental Geology 0630-370	3
	Environmental Geology Lab 0630-372	1
	Introduction to Hydrology 0630-380	3
	Introduction to Hydrology Lab 0630-382	1
	Environmental Monitoring & Measurement 0630-360	3
	Environmental Monitoring & Measurement Lab 0630-362	1
	Project Management 0630-490	4
'	Environmental Regulatory Law I 0630-480	4
f	Containment Hydrology 0630-520	4
	Remedial Investigation & Corrective Action 0630-544	4
Total quarter credit hours		28

Environmental Management and Technology Concentration
(Environmental Protection Track)

f	Environmental Geology 0630-370	3
	Environmental Geology Lab 0630-372	1
	Introduction to Hydrology 0630-380	3
	Introduction to Hydrology Lab 0630-382	1
	Environmental Monitoring & Measurement 0630-360	3
	Environmental Monitoring & Measurement Lab 0630-362	1
	Industrial Wastewater Management 0630-352	4
	Environmental Regulatory Law I 0630-480	4
	Solid and Hazardous Waste Management 0630-350	4
	Air Emissions Management 0630-354	4
Total quarter credit hours		28

Environmental Biology Concentration

Invertebrate Zoology 1001-301	4
Vertebrate Zoology 1001-302	4
Botany 1001-304	3
Choose two:	
Galapagos: Ecology & Evolution 1005-250	1-4
Vertebrate Evolution 1001-390	4
Functional Biology of Invertebrate Animals 1001-415	4
Plant Ecology 1001-420	4
Freshwater Ecology 1001-471	4
Marine Biology 1001-473	4
Marine Ecology Field Course 1001-475	3
Total quarter credit hours	20

Mathematics and Statistics Concentration
(Math Thread)

Calculus IV 016-305	4
Differential Equations I 1016-306	4
Dynamical Systems 1016-407	4
Matrix Algebra 1016-331	4
Mathematical Modeling 1016-461	4
Graduate Electives (choose two)	
Applied Statistics 1016-353	4
Linear Algebra 1016-432	4
Boundary Value Problems 1016-318	4
Linear Programming 1016-465	4
Total quarter credit hours	28

Mathematics and Statistics Concentration
(Simulation Thread)

Calculus IV 1016-305	4
Differential Equations I 1016-306	4
Dynamical Systems 1016-407	4
Matrix Algebra 1016-331	4
Introduction to Programming 0602-208	4
Introduction to Programming Lab 0602-208	0
Graduate Elective	
Mathematical Simulation 1016-469	4
(permission of instructor required)	
Total quarter credit hours	24

Mathematics and Statistics Concentration
(Statistics Thread)

Calculus IV 1016-305	4
Differential Equations I 1016-306	4
Dynamical Systems 1016-407	4
Matrix Algebra 1016-331	4
Applied Statistics 1016-353	4
Graduate Electives (choose two)	
Intro to Regression Analysis 1016-354	4
Design of Experiments 1016-355	4
Intro to Time Series 1016-524	4
Stochastic Processes 1016-725	4
Multivariate Analysis 1016-558	4
Total quarter credit hours	28

Mathematics and Statistics

Rebecca E. Hill, 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 continuously 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.

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 frequently get to know their teachers outside the classroom. Job opportunities 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 sequence of courses 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.

Transfer programs

Transfer programs are arranged on an individual basis.

In the Center for Symbolic and Scientific Computation in the College of Science, students learn calculus through Mathematica and other computer algebra systems.

Requirements for the BS degree

The student must meet the minimum requirements of the Institute as described on pages 9 to 11. 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, the BS and MBA can be granted simultaneously.

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
Programming with Classes 0602-210	4
Institute-wide Elective	4
Science Electives	12
Liberal Arts (Core) *	8
Physical Education Electives †	0

Second Year	
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
Dynamical Systems 1016-407 or	
Matrices & Boundary Value Problems 1016-318 or	
Applied Statistics 1016-353	4
Matrix Algebra 1016-331	4
Liberal Arts (Core) *	16
Institute-wide Electives	8

Third Year	
Computer Methods in Applied Math 1016-437 or	
Numerical Analysis I 1016-511 or	
Numerical Analysis II 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

Fourth Year	
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

‡Fifth Year	
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 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ This program can be completed in four years if co-op option is omitted.

Computational Mathematics

_ **mp**utational mathematics prepares students for a mathe-
atical career that incorporates extensive computer science
kills. In this program, much emphasis is given to use of the
c0in**p**uter as a tool to solve mathematically modeled physical
oblems. Graduates of the program often choose positions
as mathematical analysts, scientific programmers, software
Igpoineers 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

First Year	*Quarter Credit Hours*
Freshman Seminar 1016-210,211	2
Calculus I, H, ni 1016-251,252,253	12
Discrete Math I 1016-265	4
Computer Science 1 0603-231	4
Computer Science 2 0603-232	4
Computer Science 3 0603-233	4
Science Electives	12
Liberal Arts (Core) *	8
Physical Education Electives †	0
Second Year	
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 0603-334	4
Intro, to Digital Design 0603-351	3
Computer Organization 0603-352	3
Institute-wide Elective	4
Liberal Arts (Core) *	12
Third Year	
Linear Algebra 1016-432	4
Theory of Graphs & Networks 1016-467	4
Mathematical Modeling 1016-461	4
Software Engineering 0603-361	4
Mathematics Elective	4
Computer Science Elective	4
Liberal Arts (Core) *	8
Cooperative Education 1016-499 (Optional)	Co-op
Fourth Year	
Real Variables I 1016-411	4
Any two of:	8
Numerical Analysis I 1016-511	
Numerical Analysis II 1016-512	
Computer Methods in Applied Math 1016-437	
Mathematics Electives	4
Institute-wide Elective	3
Liberal Arts (Concentration) *	12
Cooperative Education 1016-499 (Optional)	Co-op
tFifth Year	
Abstract Algebra I, n 1016-531,532	8
Mathematics Elective	4
Computer Science Elective	4
Liberal Arts (Electives) *	12
Liberal Arts (Senior Seminar) * 0520-499	2
Cooperative Education 1016-499 (Optional)	Co-op
Total Quarter Credit Hours	189

* See page 10 for liberal arts requirements,
t See page 11 for policy on physical education.
‡ 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 knowl-
edge 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, experi-
ment and interpret the results. Application areas include
product designs, quality control, marketing, customer satis-
faction and actuarial sciences.

The BS in applied statistics may be combined with an MS
in applied and mathematical statistics. An accelerated pro-
gram 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

First Year	*Quarter Credit Hours*
Freshman Seminar 1016-210,211	2
Calculus I, II, HI 1016-251,252,253	12
Discrete Math I 1016-265	4
Introduction to Programming 0602-208	4
Programming with Classes 0602-210	4
Institute-wide Elective	4
Science Electives	12
Liberal Arts (Core) *	8
Physical Education Electives †	0
Second Year	
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Probability & Statistics I, Q 1016-351,352	8
Co-op Seminar 1016-399	0
Applied Statistics 1016-353	4
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
Third Year	
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
Fourth Year	
Nonparametric Statistics 1016-454	4
Mathematics Electives ‡	12
Institute-wide Elective	4
Liberal Arts (Concentration/Electives) *	12
Cooperative Education 1016-499 (Optional)	Co-op
§Fifth Year	
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 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ 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

Arthur Z. Kovacs, Head

The department of physics offers programs leading to the AS and BS degrees in physics. The BS degree in physics is a five-year program with cooperative work experience beginning as early as the summer of the second year. Graduates with this degree 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 enfry into medical, law or business schools.

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: www.rit.edu/~ritobs/.

Requirements for the BS degree in physics

The student must meet the minimum requirements of the Institute as described on pages 9 to 11. 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, contact the head of the department of physics.

Physics, BS degree, typical course sequence

First Year	*Quarter Credit Hours*
Physics Orientation 1017-200	1
University Physics I, II 1017-311,312	8
University Physics Lab I, II 1017-371, 372	2
Calculus I, n, III 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
Physical Education Electives †	0

Second Year	
University Physics III 1017-313	4
University Physics Lab III 1017-373	1
Introduction to Modern Physics 1017-314	4
Introduction to Semiconductor Physics 1017-315	4
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

Third Year	
Intermediate Mechanics I, II 1017-401,402	8
Thermal Physics 1017-415	4
Electronic Measurements 1017-431	4
Theoretical Physics I, II 1017-480,481	8
Liberal Arts (Concentration) *	8
Cooperative Education 1017-499 (Optional)	Co-op 1

Fourth Year	
Electricity & Magnetism I, II 1017-411,412	8
Experimental Physics I 1017-421	3
Optical Physics I 1017-455	4
Introduction to Quantum Mechanics 1017-522	4
Physics Elective (400-500-level)	4
Liberal Arts (Concentration)*	4
Liberal Arts (Elective) *	4
Cooperative Education 1017-499 (Optional)	Co-op

Fifth Year	
Solid State Physics 1017-531	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)
Cooperative Education 1017-499 (Optional)	Co-op I
Total Quarter Credit Hours	183

* See page 10 for liberal arts requirements,
t See page 11 for policy on physical education.

allied Health Sciences

Jalt1es **Aumer,** Acting Head

The depart™611* of allied health sciences includes programs **f study** in biomedical computing, medical technology, vsician assistant and two medical imaging technologies: diagnostic medical sonography (ultrasound) and nuclear medicine technology. Each is designed to prepare students **for entry** into careers in the health sciences. Graduates find ernpl0yment 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 of allied health sciences can serve as preprofessional programs for schools of medicine, veterinary medicine or dentistry.

In addition to the BS programs, the department of allied health sciences offers a certificate option in diagnostic medical sonography and nuclear medicine technology 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.

There are two tracks students can follow 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 die 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 9 to 11 and, in addition, must complete the requirements contained in this program or its equivalent, as determined and approved by the department of allied health 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.

For more information on BS degree requirements, contact the program director or head of the department of allied health sciences.

Biomedical computing, BS degree, typical course sequence computer science (CS track) and information technology (IT track)

	Quarter Credit Hours
First Year	
General Biology 1001-201,202,203	9
General Biology Lab 1001-205,206,207	3
General & Analytical Chemistry 1011-215,216,217	10
General & Analytical Chemistry Lab 1011-205,206,227	4
Computers in Medicine 1026-230	4
M Programming 1027-305	4
Internet, Java & Health Care 1027-315	4
Freshman Seminar 1026-203	1
Liberal Arts (Core) *	8
Physical Education Electives †	0
Second Year	
Required for both tracks:	
Computer Science 1 0603-231	4
Computer Science 2 0603-232	4
Introduction to Biomedical Computing Seminar 1027-201	1
Medical Terminology 1026-301	3
Calculus I, n 1016-251,252	8
or	
Introduction to Calculus I, II 1016-214,215	(6)
Data Analysis I 1016-319	4
Program Electives	8
Liberal Arts (Core) *	12
Physical Education Electives †	0
and	
Computer Science 3 0603-233 (CS track)	4
or	
Programming with Classes (C++) 0602-210 (IT track)	4
Third Year	
Required for both tracks:	
Clinical Lab Instrumentation 1024-432	4
Physiology & Anatomy I, II 1001-305,306	10
Program Elective	4
Liberal Arts (Core/Concentration) *	16
and	
CS track	
Discrete Mathematics I 1016-265	4
Introduction to Digital Design 0603-351	3
Computer Organization 0603-352	3
Computer Science 4 0603-334	4
or	
IT track	
Visual Basic for Programmers 0602-317	4
Computer Concepts & Software Systems 0602-340	4
Data Comm. & Comp. Networks 0602-341	4
Information Technology Elective	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 I, II Lab 1017-271,272	2
or	
University Physics I, n 1017-311,312	(8)
University Physics Lab I, II 1017-375,376	(2)
Electricity & Electronics 1017-331	4
Liberal Arts (Electives/Concentration) *	16
Program Elective ‡	4
Liberal Arts (Senior Seminar)	2
and	
Computer Science Electives (CS track)	8
or	
Information Technology Electives (IT track)	8
Cooperative Education 1026-499 (Optional CS or IT track)	Co-op
Total Quarter Credit Hours	185 (CS track) 187 (IT track)

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ 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.

Medical Technology

James C. Aumer, Program Director

The medical technology program prepares students for employment in hospital laboratories; industrial, medical or research laboratories; and pharmaceutical companies. As medical technologists, they will perform analyses that aid in the diagnosis and treatment of disease. They must be able to carry out complex test determinations, operate sophisticated instrumentation, and detect and correct errors. The program leads to a bachelor of science degree and meets all requirements of the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS).

Students attend classes at RIT during the fall, winter and spring quarters for three years. During the third year, they take a concentration of clinically oriented courses that prepare them for their hospital experience. In the fall quarter of their third year, they apply to hospital schools of medical technology that are approved by the National Accrediting Agency for Clinical Laboratory Science (NAACLS). They will then spend their fourth academic year at the hospital that accepts them as an intern for clinical training in medical technology. While at the hospital, students receive additional course work as well as practical experience in each of the laboratory areas: hematology, microbiology, chemistry and immunohematology.

The medical technology program is affiliated with Rochester General Hospital in Rochester, Daemen College in Buffalo and the Boston Veterans' Administration Medical Center in Massachusetts. Students may, however, seek admission to any approved hospital for their clinical experience.

Upon successful completion of the hospital experience, the bachelor of science degree is awarded. The student is then eligible to take a national registry examination for certification as a medical technologist.

Requirements for the BS degree in medical technology

The student must meet the minimum requirements of the Institute as described on pages 9 to 11 and, in addition, must complete the requirements contained in this program or its equivalent, as determined and approved by the department of allied health sciences. Transfer students will be required to complete a minimum of 45 quarter credit hours on campus and to complete all program requirements before beginning the clinical training experience. Specific requirements will be determined for each transfer student by the program director.

For more information on BS degree requirements, contact the program director or head of the department of allied health sciences.

Medical technology, 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 in 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
Physical Education Electives †	0

Second Year	
Medical Technology Seminar 1024-210	1
Physiology & Anatomy 1001-305,306	10
Organic Chemistry 1013-231, 232,233	9
Organic Chemistry Lab 1013-235,236	2
College Physics 1017-211,212,213	9
College Physics Lab 1017-271,272,273	3
Medical Genetics 1004-315	2
Liberal Arts (Core) *	16

Third Year	
Clinical Laboratory Topics 1026-351,352,353	3
Hematology/Immunohematology 1024-401	4
Microbiology 1001-404	
Biochemistry 1009-502	
Clinical Lab Instruments; Clinical Chemistry 1024-432,433	
Data Analysis I 1016-319	4
Immunology 1001-402	
Microbial Pathogenesis 1001-451	4
Liberal Arts (Concentration) *	12
Elective	4

Fourth year taken at a hospital approved for training medical technologists

Total Quarter Credit Hours   147

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.

Physician Assistant

Heidi Miller, Program Director
Nancy Valentage, Associate Director/Clinical Coordinator
Thomas Richardson, Academic Coordinator
Bridget Skinner, Clinical Coordinator

The RTT 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 331), 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 (716-475-6631). 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.

Medical Imaging Technologies

Nuclear Medicine Technology

Kristen M. Waterstram-Rich, Program Director
Nancy H. McKee, Clinical Coordinator

Nuclear medicine is an exciting, people-oriented allied health career for individuals interested in blending health sciences, computers and advanced technologies. A nuclear medicine technologist (NMT) uses radioactive materials to perform imaging examinations and laboratory tests involved in the diagnosis and treatment of disease. A nuclear medicine study can provide unique information regarding the structure and function of organ systems and is safe for the technologist and the patient. A nuclear medicine technologist can advance from a staff position to that of chief technologist within a department or pursue other career paths: for example, education, technical sales representative, applications specialist, radio-pharmaceutical sales, hospital administration, or radiation health physics.

The program leading to a BS degree in nuclear medicine technology spans four years, the first three of which are spent on campus. The fourth year consists of clinical education at one or more approved hospitals in addition to classes at RIT that reinforce the clinical education.

The program also prepares students for professions in medicine or research. With the addition of a few courses and without extending the student's stay at RIT, the nuclear medicine technology program can prepare students for medical, dental, veterinary or graduate school. A pre-medical advisory committee assists students in preparing for professional school.

Clinical training

Students who have successfully completed all required courses of the first three years of the program with a minimum overall and principal field of study GPA of 2.0 are eligible to begin clinical training in August of their fourth year. During the spring quarter of the third year and one week prior to internship, there is an intensive introduction to the theory and practice of nuclear medicine technology. Classes during this time are held on the RIT campus, and laboratory sessions may take place at affiliated hospitals. Before students are allowed to begin their clinical education, they must be certified in community CPR (cardiopulmonary resuscitation).

Most of the clinical education is provided in nuclear medicine departments of the program's hospital affiliates. Each student is assigned (subject to the hospital's approval) a particular combination of three hospitals and trains approximately three months in each. The teaching is done primarily by physicians and technologists on the hospital staffs. Student progress and performance are monitored by the RIT nuclear medicine technology clinical coordinator, who makes periodic visits to the hospital departments.

The RIT nuclear medicine technology program has affiliations with hospitals in the Syracuse, Rochester, Buffalo, Albany, Binghamton and Elmira areas of upstate New York.

Requirements for the BS degree

The student must meet the minimum requirements of the Institute as described on pages 9 to 11 and, in addition, must complete the requirements contained in this program or its equivalent, as determined and approved by the department of allied health sciences. 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 general medical imaging is possible.

Learning how to do routine medical procedures is an important part of the physician assistant program.

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
Chemistry I, II Lab 1011-205,206	2
General & Analytical Chemistry in Lab 1011-227	2
Computers in Medicine 1026-230	4
Early Clinical Experience 1032-201,202	2
Liberal Arts (Core) *	16
Physical Education Electives †	0

Second Year

Physiology & Anatomy 1001-305, 306	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 10 for liberal arts requirements.*
t *See page 11 for policy on physical education.*
‡ *Mandatory rotations are infields 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 mil be provided with two elective rotations. These latter rotations allow students to individualize their experiences according to their own areas of interest.*

For further information on degree requirements, contact the program director or the head of the department of allied health sciences.

Requirements for the certificate program

The student must meet the Institute requirements and prerequisite course requirements. The certificate in nuclear medicine technology is available to associate and baccalaureate degree graduates and licensed or certified allied health practitioners with equivalent education and experience.

Contact the program director or clinical coordinator for further information.

Accreditation

The nuclear medicine technology program is accredited through the Joint Review Commission on Educational Programs in Nuclear Medicine.

Nuclear medicine technology, 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,DLab 1011-205,206	2
General & Analytical Chemistry HI Lab 1011-227	2
Freshman Seminar 1026-203	1
Calculus for Management Science 1016-226	4
Computers in Medicine 1026-230	
or	
Survey of Computer Science 0602-200	4
Liberal Arts (Core) *	12
Physical Education Electives †	0

Second Year	
Introduction to Diagnostic Medical Imaging 1026-205	2
Medical Terminology 1026-301	3
College Physics 1017-211,212,213	9
College Physics Lab 1017-271,272,273	3
Introduction to Organic & Biological Chemistry 1011-202	3
Introduction to Organic Chemistry Lab 1011-207	1
Biochemistry I 1011-203	4
Physiology & Anatomy 1001-305, 306	10
Liberal Arts (Core) *	16
Physical Education Electives †	0

Third Year	
Radiation Physics 1017-351,352,353	15
Radiation Biology 1001-430	4
Data Analysis I 1016-319	4
Liberal Arts (Concentration) *	12
Program Electives	10
Introduction to Clinical Nuclear Medicine 1025-401 ‡	2
Patient Care 1026-333	2

Fourth Year	
Nuclear Medicine Procedures—Central Nervous System 1025-402	1
NM Procedures—Skeletal System 1025-502	1
NM Procedures—Respiratory System 1025-503	1
NM Procedures—Urinary System 1025-510	1
NM Procedures—Endocrine System 1025-511	2
NM Procedures—Cardiovascular System 1025-512	2
NM Procedures—Digestive System 1025-513	2
NM Procedures—Special Studies 1025-514	1
NM Procedures—Hematological & In Vitro Studies 1025-515	2
Instrumentation & Computers in Nuclear Medicine 1025-516	2
Radiochemistry & Radiopharmacology 1025-517	2
Radionuclide Therapy 1025-518	1
Radiation Health Safety 1025-519	2
Review in Nuclear Medicine 1025-521	2
Clinical Nuclear Medicine I 1025-522 §	7
Clinical Nuclear Medicine II 1025-523 §	7
Clinical Nuclear Medicine HI 1025-524 §	7
Total Quarter Credit Hours	192

See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.
‡ Students should be certified in CPR before taking this course.
§ Clinical internships—affiliated hospitals

Nuclear medicine technology, certificate program, typical course sequence

	Quarter Credit Hours
Introduction to Diagnostic Medical Imaging 1026-205	
Data Analysis I 1016-319	4
Radiation & the Human Body 1025-310	2
Nuclear Medicine Physics & Instrumentation 1017-358	g
Introduction to Nuclear Medicine 1025-401	2
Patient Care 1026-333	2
Nuclear Medicine Procedures—Central Nervous System 1025-402	1
NM Procedures—Skeletal System 1025-502	1
NM Procedures—Respiratory System 1025-503	j
NM Procedures—Urinary System 1025-510	1
NM Procedures—Endocrine System 1025-511	2
NM Procedures—Cardiovascular System 1025-512	2
NM Procedures—Digestive System 1025-513	2
NM Procedures—Special Studies 1025-514	1
NM Procedures—Hematological & In Vitro Studies 1025-515	2
Instrumentation & Computers in Nuclear Medicine 1025-516	2
Radiochemistry & Radiopharmacology 1025-517	2
Radionuclide Therapy 1025-518	1
Radiation Health Safety 1025-519	2
Review in Nuclear Medicine 1025-521	2
Clinical Nuclear Medicine I 1025-522 *	7
Clinical Nuclear Medicine II 1025-523 *	7
Clinical Nuclear Medicine III 1025-524 *	7
Total Quarter Credit Hours	61

Clinical internships—affiliated hospitals

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 an imaging modality that utilizes high-frequency sound waves in the diagnosis and treatment of disease and in the evaluation of the developing fetus. 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.

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. 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.

The program also prepares the student for several professions in medicine and research. A preprofessional committee assists the student with the application process for graduate or medical schools. 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 9 to 11 and, in addition, must complete the curriculum requirements listed here or the equivalent, as determined and approved by the department of allied health 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 allied health sci**ences** 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 a bachelor's degree in a relevant discipline.

Clinical internship

The clinical internship provides hands-on experience in two or more medical facilities in upstate New York. All students begin the internship by attending an intensive four-week experience on the RIT campus. During this time, they learn basic pathology and how to perform complete sonographic examinations and recognize anatomy. They also become familiar with typical hospital department operations. Lectures and case reviews are a large component of the preclinical session. After completing the requirements, candidates are assigned to a medical facility for clinical experience. Each month, they return to campus 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 American Medical Association.
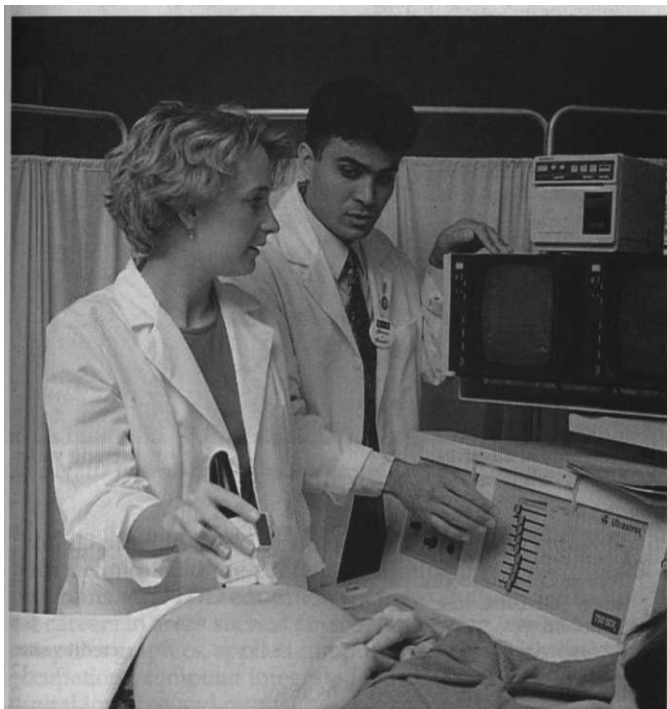
Diagnostic medical sonography majors seeking national certification learn how to perform complete sonographic examinations and recognize anatomy in preparation for a clinical internship.

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, H 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
Physical Education Electives †	0

Second Year	
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 1001-305, 306	10
Data Analysis I 1016-319	4
Liberal Arts (Core) *	16

Third Year	
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

Fourth Year	
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 H 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 10 for liberal arts requirements.
† See page 11 for policy on physical education.

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
Clinical Ultrasound HI 1030-572	7
Total Quarter Credit Hours	62

* Other prerequisites may apply.

Chester F. Carlson
Center for Imaging Science

Ian Catley, Director

Students in imaging science study the applications of physics, computer science, chemistry and mathematics to the formation, recording, manipulation and perception of images. Design of imaging systems, evaluation of the images they produce, and the improvement of those systems are all part of the imaging science curriculum. Concepts presented in the classroom are reinforced through laboratory experiments and by a capstone senior research project. Both theoretical studies and practical application of technologies are integral parts of the program.

The physical and mathematical sciences provide a foundation for advanced studies in imaging principles, chemistry, optics and optical instrumentation, visual and color perception, microscopic structure of images, measurements of radiant energy, digital image processing and remote sensing.

Career opportunities exist around the country in areas such as aerospace technology, office information systems, information handling, microelectronics, scientific and optical instrumentation, graphic arts, and photographic materials and systems. Graduates are employed in industrial and governmental research and development.

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 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 9 to 11. 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 undergraduate students conduct research from medical imaging to remote sensing.

Imaging science, BS degree, typical course sequence

First Year   *Quarter Credit Hours*
Imaging Science First-year Seminar 1051-200	1
Survey of Imaging Science 1051-201	2
Survey of Imaging Science Lab 1051-221	1
Introduction to Imaging Science I 1051-202	3
Introduction to Imaging Science II 1051-203	4
Programming for Imaging Science 1051-211	4
Calculus I, n, III 1016-251,252,253	12
University Physics I 1017-311	4
Liberal Arts (Core)*	12
Physical Education †	0

Second Year
Imaging Systems Lab I 1051-231	2
Imaging Systems Lab II 1051-232	2
Optics for Imaging 1051-303	4
Chemical Principles I, II 1011-211,212	6
Chemical Principles Lab I 1011-205	1
Introduction to Organic Chemistry 1011-213	3
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Probability & Statistics I 1016-351	4
Probability & Statistics II 1016-352	4
University Physics 0, III 1017-312,313	8
Liberal Arts (Core)*	12
Physical Education †	0

Third Year
Interaction Between Light & Matter 1051-313	4
Digital Image Processing I, n 1051-461,462	6
Programming 1051-411	2
Vision & Psychophysics 1051-400	3
Radiometry 1051-401	4
Introduction to Modern Physics 1017-314	4
Electronic Measurements 1017-431	4
Professional Electives	credit varies
Liberal Arts (Core/Concentration) *	16

Fourth Year
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	**184**

* See page 10 for liberal arts requirements.
† See page 11 for policy on physical education.

Rational Technical Institute for the Deaf

r Alan Hurwitz, Dean

The National Technical Institute for the Deaf (NTID), one of RIT's seven 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.

New NTID students quickly become part of a close-knit community.

NTID provides RIT's deaf and hard-of-hearing students with technical and pre-professional training in more than 23 programs. An NTID education prepares students for technical careers in areas such as applied accounting, applied art and computer graphics, applied computer technology, business occupations, computer integrated machining technology, digital imaging and publishing technology, healthcare billing and coding technology, office 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 six 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 an associate degree in ASL-English interpretation.

NTID's centers

To serve its students, NTID is organized into five academic units, or centers. Each center has a major programmatic focus. Through collaboration across the centers, a rich, coherent set of educational experiences is made available to students.

Center for Technical Studies This center is a comprehensive student-oriented academic unit of NTID that serves students with declared majors and those students who affiliate with a major. The center offers a variety of diploma and associate degree programs and courses in a variety of technical fields. Numerous options/concentrations are available within the following technical areas: applied accounting, applied art and computer graphics, applied computer technology, business occupations, computer integrated machining technology, digital imaging and publishing technology, healthcare billing and coding technology, industrial computer electronics, office technology, and ophthalmic optical finishing technology. Program laboratories are equipped with the latest technology and maintain a curriculum that represents current industry trends and technology, based on routine feedback from business and industry advisory groups. In addition, several of our associate in applied science (AAS) degrees will provide students with the necessary skills to transfer within the other RIT colleges.

Center for Arts and Sciences This center is a comprehensive student-oriented academic area that offers an array of arts and science curricular and co-curricular experiences to a broad-based population of NTID students, including those who have matriculated into a program underprepared or undecided. In addition, the center offers an associate degree in educational interpreting and provides a comprehensive sign language education program for students and faculty and staff members.

Center for Baccalaureate and Graduate Studies This center is a student-oriented academic and service area that provides comprehensive programs in support of students enrolled in

more than 250 baccalaureate or graduate programs in RIT's six other colleges. The educational support services available include academic advising, tutoring, audiological, personal and career counseling. In addition, the center provides access services through the department of interpreting services as well as notetaking services through supports departments for deaf and hard-of-hearing students, faculty and staff to be able to participate in all aspects of the RIT community. The center also offers a Pre-Baccalaureate Studies Program and a master of science in secondary education for students who are deaf and hard of hearing.

Center for Research, Teaching and Learning Activities within this center focus on understanding and enhancing the educational, social and communication opportunities for deaf and hard-of-hearing individuals. The center 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.

Center for Outreach This center establishes and maintains programs and linkages with external audiences, including prospective students, parents, alumni, employers, vocational rehabilitation counselors and school personnel, in order to enhance opportunities for students and alumni as well as support the college in fulfilling its mission. Departments within this center include Educational Outreach, Center on Employment, and Recruitment and Admissions. The center also offers two pre-college programs, Explore Your Future (EYF) and the Career Awareness Program (CAP), for deaf and hard-of-hearing high school students.

Admission requirements

To qualify for admission to RTT through NTID, students must meet standards agreed upon by RIT and the U.S. Department of Education, which include:
- 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 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 notetaking.
- testing requirements Applicants applying to NTID must submit scores from the American College Test (ACT). Applicants applying to one of the other colleges of RIT through NTID must submit scores from either the American College Test (ACT) or the Scholastic Assessment Test (SAT-1).
- secondary schooling Although most students have completed a secondary school program, some may be eligible for admission without certification if their school authorities so recommend. Age and personal/social maturity are given special consideration in such situations.

Educational opportunities through NTID

Technical Studies Programs

The technical programs offered through NTID lead to a diploma, associate in occupational studies or associate in applied science degree from RIT.

Diploma: Certification at this level requires 36-45 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____1 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.

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.

Career Exploration Studies Program

The NTID Career Exploration Studies Program 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.

The program 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 physical sciences, humanities and deaf studies/ASL as well as technical sampling courses or experiences. Some students also may take introductory courses in specific technical departments and liberal arts and be involved in extracurricular or other college-oriented activities. A career development counselor is assigned to assist students in evaluating the information and making a career decision. Students can remain in the Career Exploration Studies Program for one to three academic quarters. Additional quarters in the program are possible with the approval of the program coordinator.

Pre-Baccalaureate Studies Program

The Pre-Baccalaureate Studies Program 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. 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. (See program description on pages 156-158.)

College Skills Restoration Program

There are times when students experience such serious academic difficulties that they fail to achieve the grade point average required to continue at the college. Whether a student does poorly due to an inappropriate choice of major, a lack of academic skills or an inability to balance the academic and social aspects of college life, the College Skills Restoration program offers an option to suspension. The primary goal of the program is to help students determine the factors that contributed to academic failure and design a plan of action for gaining the skills, attitudes and habits necessary for future academic success.

To enter the program, students are required to complete a comprehensive application and participate in an interview process designed to evaluate their potential to improve. If accepted, students are required to enroll in courses and planned activities. At the conclusion of the quarter, students apply to return to their original major or to be accepted into a new major. Counselors will provide an individualized report and recommendations to students' departments upon request. For more information or an application, call 716-475-2876 (voice/TTY).

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 six colleges: Applied Science and Technology, Business, 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 and access department that provides services for deaf and hard-of-hearing students. These services may include sign language interpreting, notetaking, tutoring, advising, and personal and career counseling. 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 138 and complete both the NTID Supplemental Admission Application and standard RIT admission forms. (For admission information, see page 138,332.)

Qualified students may choose to enroll in courses taught through the other six colleges of RIT for several reasons: they may take selected courses at other RIT colleges as part of the elective requirements in their NTID programs; complete their programs of study at NTID, then continue their education at another RIT college; enter a program of another RIT college directly from high school; or transfer directly into a program in one of RIT's colleges from another postsecondary program.

First-Year Experiences Program

NTID programs

Beginning with summer orientation programming, NTID provides a special array of auricular and cocurricular activities to help maximize each student's potential for success in the first year. These experiences are designed to enhance students' bonding with the community while providing time and support to enter into a major, select a major and/or progress within a career program.

First-year students qualified to enter NTID participate in a summer orientation program called Summer Vestibule Program (SVP), which includes:
- placement testing in English and mathematics
- orientation/transition to college
- career sampling
- counseling
- application to technical program, Career Exploration Studies or Pre-baccalaureate studies (See program description on pages 156-158).

This summer program is followed by additional first-year experiences that allow students to work with a counselor to select courses and activities that meet individual goals and needs.

Components of first-year experience include:
- enrollment in Freshman Seminar course during the first quarter
- completion of preparatory courses as needed
- work with an academic adviser and counselor
- participation in career exploration and introductory courses, when and if appropriate
- completion of degree requirements, as appropriate
- participation in cocurricular and mentoring activities of choice
- declaring a major and degree level by the end of the first year

Other colleges of RIT

Students who qualify to enter baccalaureate programs in other colleges of RIT participate in the first-year programming and activities designed by the affiliated support department and by the colleges. Most first-year students enrolled in colleges other than NTID are required to:
- participate in summer orientation options:
  - Summer Orientation Services (SOS)
  - Student Orientation Assessment and Registration (SOAR)
- enroll in Freshman Seminar course
- participate in opportunities to explore and select a major, if needed
- work with an academic adviser and counselor.

Arts and Sciences Curriculum

Technical education and preparation for a career at NTID and in the other colleges of RIT are complemented by study in the arts and sciences. The arts and sciences curriculum fosters a spirit of lifelong learning and inquiry. Courses in science, mathematics, English, social science, humanities, and Deaf Studies/American Sign Language are designed to provide students with the opportunity to develop knowledge, intellectual and communication skills, and an understanding of the creative process that will enable them to actively shape their personal, professional and community lives.

The arts and sciences curriculum at NTID satisfies the arts and sciences requirements for the AOS and diploma programs offered at NTID, prepares students for completing the College of Liberal Arts courses required for AAS programs and, along with curricula offered by the Center for Baccalaureate Studies and the Center for Technical Studies, prepares qualified students to pursue course work and degrees in other RIT colleges.

Dr. Robert Davila, vice president for NTID, left, chats with Joyce Song, fifth-year graphic design student from Minneapolis, Minn., and Shane Feldman, fourth-year professional and technical communication student from Rockville, Md., in NTID's Switzer Gallery.

• Degree requirements

Students must complete a minimum number of arts and sciences credits for each degree. The chart on page 137 shows the credit hour and distribution requirements for the certificate, diploma, AOS and AAS. (See the course sequences for individual technical programs.)

• Level of courses in the curriculum

Degree requirements must be completed at the appropriate level in the curriculum. There are four levels of courses in the arts and sciences curriculum: introductory (A), fundamental (B), intermediate (C) and bridging (D). Students not yet prepared for courses required for their degree begin with courses at a lower level and enter required courses when they have completed the prerequisites.

• Course placement

The goal of assessment for course placement is to ensure that each student begins his or her study in the appropriate course. Assessment for initial course placement will be made in the following areas during summer orientation: mathematics, science, American Sign Language, writing and reading.

Course Requirements

• Freshman Seminar

Freshman Seminar is required for all students entering the first year of college. This course helps students to identify personal, social and academic skills that lead to a successful college experience.

• Science and mathematics

Students take math and science courses that foster the reasoning and problem-solving skills that are a part of the foundation of their technical studies. In addition, the curriculum provides an opportunity to develop the mathematical and scientific literacy demanded in today's society.

Students are required to complete three credits in mathematics and three credits in science at the fundamental (B) level or higher. Some students will have additional requirements established by their technical programs. (See the course sequences for individual technical programs.)

• 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 access to the College of Liberal Arts language and literature curriculum required for AAS and baccalaureate degrees while providing the English literacy skills required for AOS and diploma programs at NTID.

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. 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 science and humanities

The social science 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, below).

• 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 science 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 H Eligible students must meet with the liberal arts support writing coordinator before registering for these courses.

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 2000-01 are listed on page 138.

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 2000-01 academic year range from $450-$800.

New students accepted to the Summer Vestibule Program will be charged according to the fee schedule on page 138.

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 2000-01 is $275.

Arts and sciences distribution requirements

Degree	Freshman Seminar	Math & Science	Deaf Studies' (Interdisciplinary)	Humanities		Other Humanities (Including foreign languages)	Social Science	Capstone
				Language & Literature				
				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 y	12		3	3	

'The Deaf Studies/ASL requirement can be satisfied by taking three credits in American Sign Language or an identified Deaf Studies course.
[2]The three-credit course taken to fulfill the Deaf Studies/ASL requirement also fulfills three credits in either humanities or social sciences, depending upon which discipline offers the course selected.

FIXED CHARGES FOR NTID-SPONSORED STUDENTS

	Summer Vestibule Program	Fall Quarter	AH Other Quarters (per quarter)
Tuition	$340	$1,900	$1,900
Room	190	1,306	1,306
Board (standard meal plan)	166	1,026	1,026
Student Fees'			171
Orientation Fee[2]		60	
SVP Accident/Sickness Insurance	23		
Accident/Sickness Insurance (not to exceed)		275	
Total	$719	$4,738	$4,403

' Student fees are required of all full-time students and include: Student Health ($55); Student Activities ($51); Athletic ($5); Student Alumni Union ($58); and NTID Activities ($2).

[2] Charge to cover cost of Fall Orientation Program for new students. Some majors have an additional quarterly lab fee.

Applying to NTID

It is recommended that NTID freshman or transfer applicants submit their applications in the fall of the year before they wish to enroll. The date of application is the date the application for undergraduate admission has been received by NTID's Department of Recruitment and Admissions. The NTID admission year is October 1 through June 30 for applicants seeking fall quarter admission. Applications are also accepted for winter and spring quarters (see Institute calendar, inside front cover). NTID requires a $200 deposit from accepted students.

Students applying for freshman or transfer admission to RIT through NTID must complete both the standard RIT application and the NTID supplemental application forms available from NTID's Department of Recruitment and Admissions. If deaf and hard-of-hearing students want to enroll directly in one of RIT's other six colleges, they still **must complete all application forms** as noted above. In addition to fulfilling NTID's audiological requirements, students must fulfill requirements for admission to the selected program. Additional instructions for completing the application are included in the application packet.

Deaf and hard-of-hearing international students are welcome to apply for admission to NTID. Specific instructions for completing the application process are included in the international student application packet. Applicants should be sure to read the instructions carefully before applying.

Application requirements

In order to complete the application process, students must submit the following:
1. a fully completed application for admission (includes RIT Part 1 and any NTID supplemental forms)
2. a nonrefundable $40 application fee
3. NTID applicants should submit results from the American College Test (ACT). Deaf and hard-of-hearing students applying through NTID to one of the other colleges of RIT should submit results from either the ACT or Scholastic Assessment Test (SAT-I).
4. an official high school transcript for all freshmen and for transfers with fewer than 30 semester hours or 45 quarter hours
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.

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 Department of Recruitment and Admissions, Lyndon Baines Johnson Building, 52 Lomb Memorial Drive, Rochester, NY 14623-5604, or call 716-475-6700 (voice/TTY).

Deaf and hard-of-hearing students may take regularly scheduled tours offered at NTID and arrange personal interviews. Both of these are optional and 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.

The Johnson Building also houses a new state-of-the-art Learning Center. This center provides academic, tutorial and enrichment opportunities for students as well as networked computer workstations.

Visual emergency warning systems are present in academic buildings as well as residence halls. Rooms in Mark Ellingson Hall, Peter N. Peterson Hall and Alexander Graham Bell Hall, as well as some apartment units, also are equipped with strobe light signals.

Television, a basic part of the college's communication network, is used for both education and entertainment. NTID's television system has four viewing channels, and TV monitors are located throughout the Johnson Building. Two well-equipped studios produce class and self-instruction videotapes as well as captioning for use within the Institute and at other organizations.

Telecommunications

Deaf, hard-of-hearing and speech-impaired students can access telephone services through the New York Relay Service. This 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 the N.Y. Relay Service, students are responsible for their personal phone bills.
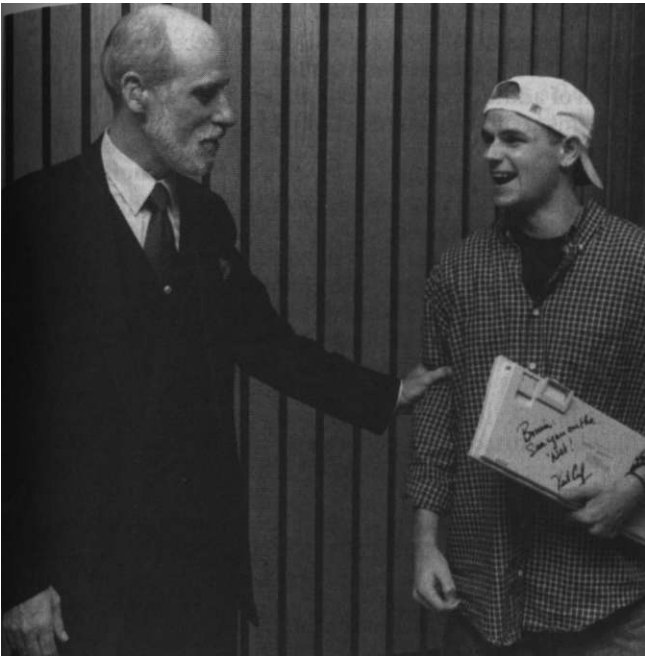
Vint Cerf, "Father of the Internet" (left), autographed the computer keyboard of Brian Mayer, an information technology student, when Cerf spoke at NTID.

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 cocurricular 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 the Center for Technical Studies and the Center for Baccalaureate and Graduate Studies. (See Speech and Language Department services on page 314, Audiology Department services on page 314, Deaf Studies/ASL-English Interpretation curriculum on page 140, and Deaf Studies on page 55.)

Hearing Aid Shop

The NTID Hearing Aid Shop provides students with services related to hearing and amplification. Students may access the shop to schedule clinical appointments, obtain earmolds and other hearing aid supplies as well as hearing aid repairs, and receive information concerning hearing loss and various aspects of amplification use. The shop is located in room 3130 in the Lyndon Baines Johnson Building and can be contacted by calling 716-475-6473 (voice/TTY).

NTID Counseling Services Department

Every NTID-supported student is assigned to a counselor in the NTID Counseling Services Department. Counselors can 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 make academic progress.

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 learning testing; as well as noncredit skill-building workshops on study skills, learning styles and stress management. The CRTC is staffed and administered by the NTID Counseling Services Department.

The CRTC is staffed by a professional counselor with the help of student assistants and is open daily with evening hours available upon request. For additional information or an appointment, call 716-475-2876 (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.

Counseling Center staff members also provide psychodiagnostic assessments for students and collaborate with other counselors and faculty members to interpret results of these assessments and implement strategies for more effective psychosocial functioning and academic performance.

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.

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. Co-op experiences usually occur during the summer so that students' courses of study are uninterrupted during the school year. The number of co-ops required varies from program to program within NTID.

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.

NCE employment advisers are in contact daily by telephone with potential employers throughout the United States. Such services have contributed to the high employment rate of **deaf** RIT graduates. Last year, 95 percent of graduates entering the labor force found jobs.

Research

NTID faculty members conduct research to understand and help improve education and educational access and the communication and personal/social development of deaf and hard-of-hearing students on campus and elsewhere. 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

Richard 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** 330), the ASL-English interpretation program requires completion of additional admission materials obtained from **the** Department of American Sign Language and Interpreting Education.

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.

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 Art and Computer Graphics	College of Imaging Arts and Sciences	• Art Education • Ceramics/Ceramic Sculpture • Computer Graphics Design • Fine Arts (Illustration, Medical Illustration and Fine Arts Studio) • Glass/Glass Sculpture	• Graphic Design • Industrial and Interior Design • Metal and Jewelry Design • New Media Design and Imaging • Woodworking and Furniture Design
Applied Computer Technology • Industrial Computer Electronics • Computer Support	College of Applied Science and Technology	• Computer Engineering Technology • Computer Science • Information Technology	
	College of Business	• Business Administration—Management Information Systems	
Applied Science/Allied Health • Ophthalmic Optical Finishing Technology • Healthcare Billing and Coding Technology	College of Science	• Biology • Biochemistry • Biomedical Computing • Biotechnology	• Chemistry • Diagnostic Medical Sonography • Medical Technology • Nuclear Medicine Technology
Business Occupations • Accounting Technology • Business Technology • Applied Office Technology	College of Business	• Business Administration—Accounting • Business Administration—Finance • Business Administration—Marketing • Business Administration—Management	
Computer Integrated Machining Technology	College of Applied Science and Technology	• Computer Integrated Manufacturing Engineering Technology	
	College of Engineering	• Industrial Engineering • Mechanical Engineering	
Educational Interpreting • ASL-English Interpretation			
Digital Imaging and Publishing Technology	College of Imaging Arts and Sciences	• Biomedical Photographic Communications • Film/Video/Animation • Graphic Communications • Imaging and Photographic Technology • Imaging Arts	• Imaging Systems Management • New Media Publishing • Professional Photographic Illustration

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 interested in enrolling in another RIT college, but not yet ready to enter a baccalaureate-level program.

- 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, goal to become an interpreter, 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 occur on the same day as the interview.

For more information on application requirements and procedures, contact the Department of American Sign Language **and** Interpreting Education (ASLIE) at 716-475-6809 **(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 Comm. for Interpreters 0875-211	4
Deaf Culture & Community 0875-212	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
Physical Education (Wellness Component)	0
Physical Education (Activity Course)	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
Mathematics (College of Science)	4
Philosophy (College of Liberal Arts)	4
History (College of Liberal Arts)	4
Fine Arts (College of Liberal Arts)	4
Social Sciences (College of Liberal Arts)	8
Total Credit Hours	96

Some of the careers open to graduates of the applied art and computer graphics program are computer graphics artist, layout artist, Web page artist, desktop publishing artist or production artist in advertising agencies, art studios, computer graphics studios, newspapers, department store chains, manufacturing firms, printing companies, publishing houses, educational institutions, or government agencies.

Applied Art and Computer Graphics

John W. Cox, Chairperson

Becoming a professional artist requires various kinds of computer-based and traditional art skills. The applied art and computer graphics 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 applied art and computer graphics 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 applied art and computer graphics.

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 applied art and computer graphics or continued study toward a bachelor's degree in the College of Imaging Arts and Sciences.

Work experience

All NTID applied art and computer graphics 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 applied art and computer graphics 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 applied art studio equipment.

Places of employment

Graduates are usually placed 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 higher (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.

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.

Applied art and computer graphics, AOS degree, typical course sequence

First Year	*Quarter Credit Hours*
Visual Idea Development 0825-105	2
Introduction Computer Graphics 0825-110	2
Freshman Art Seminar 0825-115 *	2
Studio Techniques 0825-201	2
Perspective Drawing 0825-204	2
Figure Drawing 0825-206	2
Drawing Composition 0825-208	2
Intermediate Computer Graphics 0825-210	2
Introduction to Design 0825-211	2
Color in Design 0825-212	2
Art Career Seminar 0825-215	2
Introduction to Typography 0825-221	2
Electronic Layout Programs 0825-230	2
Job Search Process 0806-101	2
Art Electives †	4
Mathematics (Level B) ‡	3
English (Level C or above)	12
Physical Education (Wellness Component)	0

Second Year	
Computer Illustration Methods 0825-310	2
Art History I, n 0825-315,316	6
History of Graphic Design 0825-317	3
Type in Design 0825-321	2
Layout for Graphics 0825-331	3
Publication Design 0825-332	3
Introduction to Production 0825-341	2
Production Applications 0825-342	2
Cooperative Education 0825-299	0
Graphic Applications 0825-351	6
Art Electives †	2
Science (Level B)	3
Humanities	6
Social Sciences	3
Physical Education (Activity Course)	0

Third Year	
Employment Seminar 0806-201	1
Graphic Applications/Portfolio Review 0825-352	6
Capstone 0882-295	3
Social Sciences	3
Art Electives †	2
Deaf Studies/ASL §	(3)
Total Quarter Credit Hours	105

* Freshman Art Seminar substitutes for Freshman Seminar,
f Eight or more art elective credits are required for the degree.
‡ Satisfied by Concepts of Measurement (0884-150)
§ This requirement also fulfills three credits in either humanities or social science,
  depending on which discipline offers the course selected.

Applied art and computer graphics, AAS degree, typical course sequence

First Year	*Quarter Credit Hn,*
Visual Idea Development 0825-105	
Introduction Computer Graphics 0825-110	
Freshman Art Seminar 0825-115 *	
Studio Techniques 0825-201	
Perspective Drawing 0825-204	
Figure Drawing 0825-206	
Drawing Composition 0825-208	
Intermediate Computer Graphics 0825-210	
Introduction to Design 0825-211	
Color in Design 0825-212	
Art Career Seminar 0825-215	
Introduction to Typography 0825-221	
Electronic Layout Programs 0825-230	
Job Search Process 0806-101	
Art Electives †	
Mathematics (Level B) ‡	
Liberal Arts (College of Liberal Arts)	
Science (Level B)	
Physical Education (Wellness Component)	

Second Year	
Computer Illustration Methods 0825-310	
Art History I, D 0825-315,316	6
History of Graphic Design 0825-317	
Type in Design 0825-321	
Layout for Graphics 0825-331	3
Publication Design 0825-332	
Introduction to Production 0825-341	
Production Applications 0825-342	
Cooperative Education 0825-299	0
Graphic Applications 0825-351	g
Art Electives †	4
Liberal Arts (College of Liberal Arts)	12
Physical Education (Activity Course)	0

Third Year	
Employment Seminar 0806-201	1
Graphic Applications/Portfolio Review 0825-352	6
Capstone 0882-296	4
Deaf Studies/ASL §	3
Total Quarter Credit Hours	105

* Freshman Art Seminar substitutes for Freshman Seminar,
t Eight or more art elective credits are required for the degree.
‡ Satisfied by Concepts of Measurement (0884-150)
§ This requirement also fulfills three credits in either humanities or social science,
  depending on which discipline offers the course selected.

Mya Drexler, left, a business student from Park City, Utah and Katie Hoheusle, and imaging science major from Bethel, N.Y., look at an exhibit of the Kutani porcelain work by Eiichi Mitsui, a deaf Japanese ceramicist, permanently on display in the first-floor street area of the Lyndon Baines Johnson Building.

applied Computer Technology

ponna Lange, Chairperson

Careers that involve work with computers increase daily. Comp^{uters are 311} 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.

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.

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 departmental sampling program

English—Diploma: Placement into level B English or higher (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.
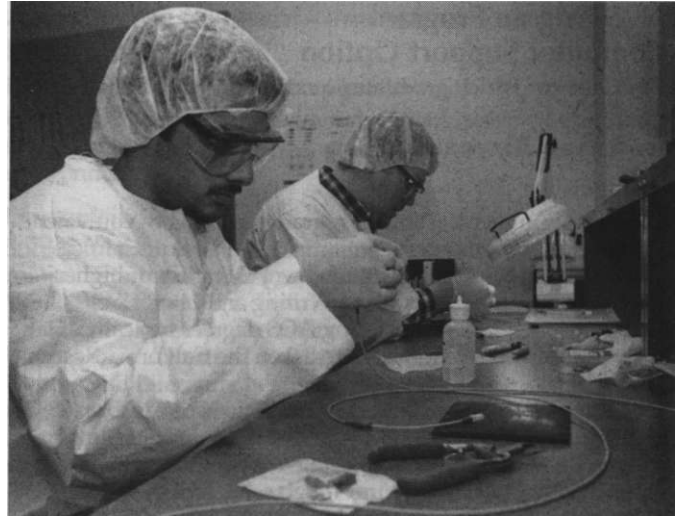
All students in the applied computer technology program receive a foundation in computer hardware, networking, and computer applications and can choose to concentrate in computer support or industrial computer electronics.

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 Sciences	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 & 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

Complete Summer Vestibule Program sampling or equivalent Career Exploration course

English—AOS: Placement into level C English or higher (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 Geography (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

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
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	3
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 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.*

§*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 a departmental sampling program.

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 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
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 Mathematics Applications for the Business Technologies (currently under special topics).

†*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

r mputer operator, trainee or network technician and per-
nal computer specialist in an industrial/manufacturing

environment

prerequisites

Complete Summer Vestibule Program sampling or equivalent Career Exploration course

English—AOS: Placement into level C English or higher CKonfiction 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 Geography (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**

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
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
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	3
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,
t 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 a departmental sampling program.

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
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
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 n 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 Mathematics Applications for the Business Technologies (currently under special topics),
f 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).

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	
Total Quarter Credit Hours	14

Candidates will be granted the introductory programming certificate upon successful completion of each of the core courses. All of the required courses are currently offered as part of the associate programs in applied computer technology.

Applied Science/Allied Health

Dominic J. Peroni, Interim Chairperson

Students interested in science and helping people can combine both interests in an applied science/allied health career. These careers prepare students for employment in medical or health service settings or in research.

Students may choose programs in healthcare billing and coding technology and ophthalmic optical finishing technology.

Healthcare Billing and Coding Technology

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.

Healthcare billing and coding technology, diploma, typical course sequence

First Year	Quarter Credit Hours
Introduction to Healthcare Billing & Coding Technology 0820-115	4
Records Management/Business Calculations 0804-211	3
Office Automation Skills Formatting 0804-112	2
Office Automation Skills Document Production I 0804-113	4
Medical Terms with Human Anatomy I,* II, III 0820-211,212,213	12
Medical Office & Billing Procedures I, II 0820-221,222	6
Foundations of Algebra 0884-180	4
Job Search Process 0806-101	2
English (Level B or above)	8
Freshmen Seminar 0887-200	2
Humanities †	3
Communication Technologies 0880-160	(3)
Cooperative Work Experience 0820-299	0

Second Year	
Orientation to Business 0804-101	3
Medical Terms with Human Anatomy IV 0820-214	4
English (Level B or above)	4
Social Science	3
Deaf Studies/ASL ‡	(3)
Employment Seminar 0806-201	1
Total Quarter Credit Hours	65

* Satisfies science requirement
t This requirement is satisfied by Communication Technologies (0880-160)
‡ This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.

frOS Degree Program

.   ]yZe and use patient information to prepare billing and insur-
ace claims, perform tasks in ambulatory care coding and outpa-
fignt 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: medi-
cal 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 higher
(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 Foundations of Algebra
(0884-180) or a higher-level course. Typically, students enter-
ing 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 health-
care billing and coding either through the Summer Vestibule
Program or first-year programming.

Healthcare billing and coding technology, AOS **degree,
typical course sequence**

First Year	Quarter Credit Hours
Introduction to Healthcare Billing & Coding	
Technology 0820-115	4
Records Management/Business Calculations 0804-211	3
Office Automation Skills Formatting 0804-112	2
Office Automation Skills Document Production I 0804-113	4
Medical Terms with Human	
Anatomy I *,n,m 0820-211,212,213	12
Medical Office & Billing Procedures I, II 0820-221,222	6
Foundations of Algebra 0884-180	4
Job Search Process 0806-101	2
English (Level C or above)	8
Freshman Seminar 0887-200	2
Humanities †	3
Communication Technologies ‡ 0880-160	(3)
Cooperative Work Experience 0820-299	0
Physical Education (Wellness Component)	0

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, n 0820-261,262	6
Outpatient Reimbursement 0820-270	4
Humanities †	3
Physical Education (Activity Course)	0
Capstone 0882-295	3
Cooperative Work Experience n 0820-299	0
Employment Seminar 0806-201	1
Total Quarter Credit Hours	92

' Satisfies science requirement
f This requirement also fulfills three credits in either humanities or social science,
  depending on which discipline offers the course selected,
f This requirement is satisfied by Communication Technologies (0880-160)

Ophthalmic Optical Finishing Technology

Douglas Wachter, Director

An ophthalmic optical finishing 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 ophthalmic optical finishing 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 ophthalmic
optical finishing 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, mathe-
matics and science.

Accreditation
Ophthalmic optical finishing technology programs are
accredited by the Commission on Opticianry Accreditation.
This accreditation recognizes the high standards of program
quality provided to NTID students. Graduates of the AOS
and AAS degree programs in ophthalmic optical finishing
technology are eligible to take the American Board of
Opticianry (ABO) National Examination.

*The recent addition of surface finishing technology has kept the ophthalmic
optical finishing technology program on the cutting edge in the preparation
of prescription eyewear.*

AOS Degree Program

On-the-job responsibilities

Ophthalmic laboratory 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 and offices of ophthalmologists, optometrists and dispensing opticians

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 dying, final inspection and evaluation

Prerequisites

Introduction to Optical Finishing Technology I, II, III (0827-105,106,107)

   Successful completion of a sampling experience in ophthalmic optical finishing technology, either through the Summer Vestibule Program or a departmental sampling program

   English—AOS: Placement into level C English or higher (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 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 Finishing Physics (0885-200) or a higher-level course. Typically, students entering this program will have completed at least two years of high school science.

Ophthalmic optical finishing technology, AOS degree typical course sequence

First Year — *Quarter Credit Hou,*

   OFT Mathematics I, II   0827-111,112
   Prescription Analysis I   0827-115
   Optical Finishing Techniques I, II, III   0827-121,122,123
   Optical Finishing Terminology I, II, III   0827-161,162,163
   Job Search Process   0806-101
   Foundations of Algebra   0884-180
   Freshman Seminar   0887-200
   English (Level C or above)   , 9 9
   Physical Education (Wellness Component)
   Cooperative Education   0827-200

Second Year

   Optical Finishing Techniques IV   0827-224
   Lab Simulation I   0827-225
   Orientation to Lens Surfacing   0827-270
   Applications of Lens Surfacing   0827-280
   Optical Finishing Technology Physics   0885-200 *
   Lens Design   0827-117
   Elements of Geometry 0884-170
   Humanities
   Internet Communication †   0880-210
   Social Science   g
   Physical Education (Activity Course)   **q**

Third Year

   Lab Simulation II   0827-226   5
   Capstone   0885-295   3
   Employment Seminar   0806-201   1
   Optical Finishing Technology Seminar   0827-251
   Technical   3
   Deaf Studies/ASL §   (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.

Students who eam AOS and AAS degrees in ophthalmic optical finishing technology qualify for jobs that require lens surfacing and finishing skills, everything from lens layout to final inspection.

AAS Degree Program

On-the-job responsibilities

Ophthalmic laboratory 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 and offices of ophthalmologists, optometrists and dispensing opticians

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 dying, final inspection and evaluation

prerequisites

production to Optical Finishing Tech-

ology ¹>ⁿ'ᵃⁿᵈ ¹¹¹ (⁰⁸²⁷"¹⁰⁵'¹⁰⁶'¹⁰⁷)

Successful completion of a sampling expe-
'**ence** in ophthalmic optical finishing tech-
nology/ either through the Summer
Vestibule Program or a departmental
sampling Program

English—AAS: Placement into the
Colleg^e 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
Finishing Physics (0885-200) or a higher-
level course. Typically, students entering
this program have completed at least two
years of high school science.

The business occupations department offers three majors to prepare studentsfor careers in business and industry. They become proficient in computer applications to support finance, administrative, and information functions for business.

Ophthalmic optical finishing technology, AAS degree, typical course sequence

First Year	Quarter Credit Hours
OFT Mathematics I, II 0827-111,112	6
Prescription Analysis I 0827-115	3
Optical Finishing Techniques I, II, III 0827-121,122,123	12
Optical Finishing 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

Second Year	
Optical Finishing 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 Finishing Technology Physics 0885-200 *	4
Liberal Arts (College of Liberal Arts)	8

Third Year	
Capstone 0882-296	4
Lab Simulation H 0827-226	5
Employment Seminar 0806-201	1
Deaf Studies/ASLt	3
Optical Finishing Technology Seminar 0827-251	2
Technical Elective ‡	3
Physical Education (Activity Course)	0
Total Quarter Credit Hours	**107**

* Satisfies science requirement
t This requirement fulfills three credits in the humanities.
‡ Students may choose Orientation to Business (0804-101) or Medical Word Analysis (0820-105).

Business Occupations

Dr. William J. Rudnicki, Chairperson

Employment opportunities in business and industry increase daily. Business careers programs respond to industiy's need for people skilled in operating office equipment, maintaining financial records, performing administrative duties and using computers.

Students may choose an AOS program in business technology as well as diploma and AAS degree programs in applied accounting technology and/or office technology.

Applied Accounting Technology

This program offers a diploma and an AAS degree and provides graduates with a basic knowledge of computer technologies as applied to general and cost accounting systems. Job experience projects familiarize students with computer applications as they relate to management decisions.

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 higher (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.

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.

Graduates of the applied accounting technology program are in demand in financial offices that require technical business skills, including using computers to maintain and reconcile financial records and process information for management decision making.

Applied accounting technology, diploma, typical course sequence

First year	*Quarter Credit*	*I*
Principles of Accounting I, II 0801-201, -202		
Orientation to Business 0804-101		
Business English 0804-110		
Keyboarding 0804-111		
OAS Formatting 0804-112		
OAS Document Production I 0804-113		
Records Management/Business Calculations 0804-211		
Payroll/Spreadsheet Applications 0804-212		
Mathematics requirement *		
Freshman Seminar 0887-200		
Job Search Process 0806-101		
English (Level B or above)		
Science (Level B)		
Cooperative Education 0804-299		
Second Year		
Principles of Accounting HI 0801-203		1
Data Processing for Business Occupations 0802-210		
OAS Document Production II 0804-221		<
Fundamentals of Management 0804-284		
Employment Seminar 0806-201		
Law & Society 0882-242		
or		
Marketing 0804-286		
Humanities		, 3
Social Science		3
Deaf Studies/ASL †		(3)
English (Level B or above)		4
Total Quarter Credit Hours		74

* Special Topics: Mathematics Applications for Business Technology is required.
† This requirement also fulfills three credits in either humanities or social sciences, 1 depending on which discipline offers the course selected.

Applied accounting technology, AAS degree, typical course sequence

First Year	*Quarter Credit Hours*
Principles of Accounting I, D 0801-201, -202	8
Orientation to Business 0804-101	3
Business English 0804-110	3
Keyboarding 0804-111	
OAS Formatting 0804-112	2
OAS Document Production I 0804-113	4
Records Management/Business Calculations 0804-211	
Payroll/Spreadsheet Applications 0804-212	
Fundamentals of Marketing 0804-286	
Mathematics requirement *	
Freshman Seminar 0887-200	2
Job Search Process 0806-101	2
Liberal Arts (College of Liberal Arts)	12
Science (Level B)	3
Cooperative Education 0804-299	0
Physical Education (Wellness Component)	0
Second Year	
Principles of Accounting III 0801-203	4
Cost Accounting I, II † 0801-252,-253	8
Data Processing for Business Occupations 0802-210	
OAS Document Production II 0804-221	4
Fundamentals of Management 0804-284	
Liberal Arts (College of Liberal Arts)	8
Capstone 0882-296	4
Economics I, n 0801-231,-232	6
Principles of Accounting IV 0801-204	4
Applied Accounting Techniques 0801-260	
Law & Society 0882-242	3
Employment Seminar 0806-201	1
Deaf Studies/ASL	3
Cooperative Education 0804-299	0
Physical Education (Activity Course)	0
Total Quarter Credit Hours	110

* Special Topics: Mathematics Applications for Business Technology is required.

Office Technology

A program offers a diploma and an AAS degree. It provides students with opportunities for developing keyboarding skills and experience in producing documents found in typical business offices. The program focuses on up-to-date word processing procedures using a variety of computer hardware and software.

on-the-job responsibilities

Input manipulate and retrieve data; use interactive software, electronic mail and information processing skills such as word processing, records processing and database; and perform 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 **higher** (Nonfiction Reading, Academic Writing and **Literature**). Students successfully completing a diploma typi **cally** 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.

AAS Degree Program

Positions for which graduates qualify

Word processing technician, accounts receivable/payable clerk, general office clerk, records management clerk and payroll records clerk

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.

Office technology, diploma, typical course sequence

First Year	Quarter Credit Hours
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
Office Technologies 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
Job Search Process 0806-101	2
English (Level B or above)	12
Cooperative Education 0804-299	0
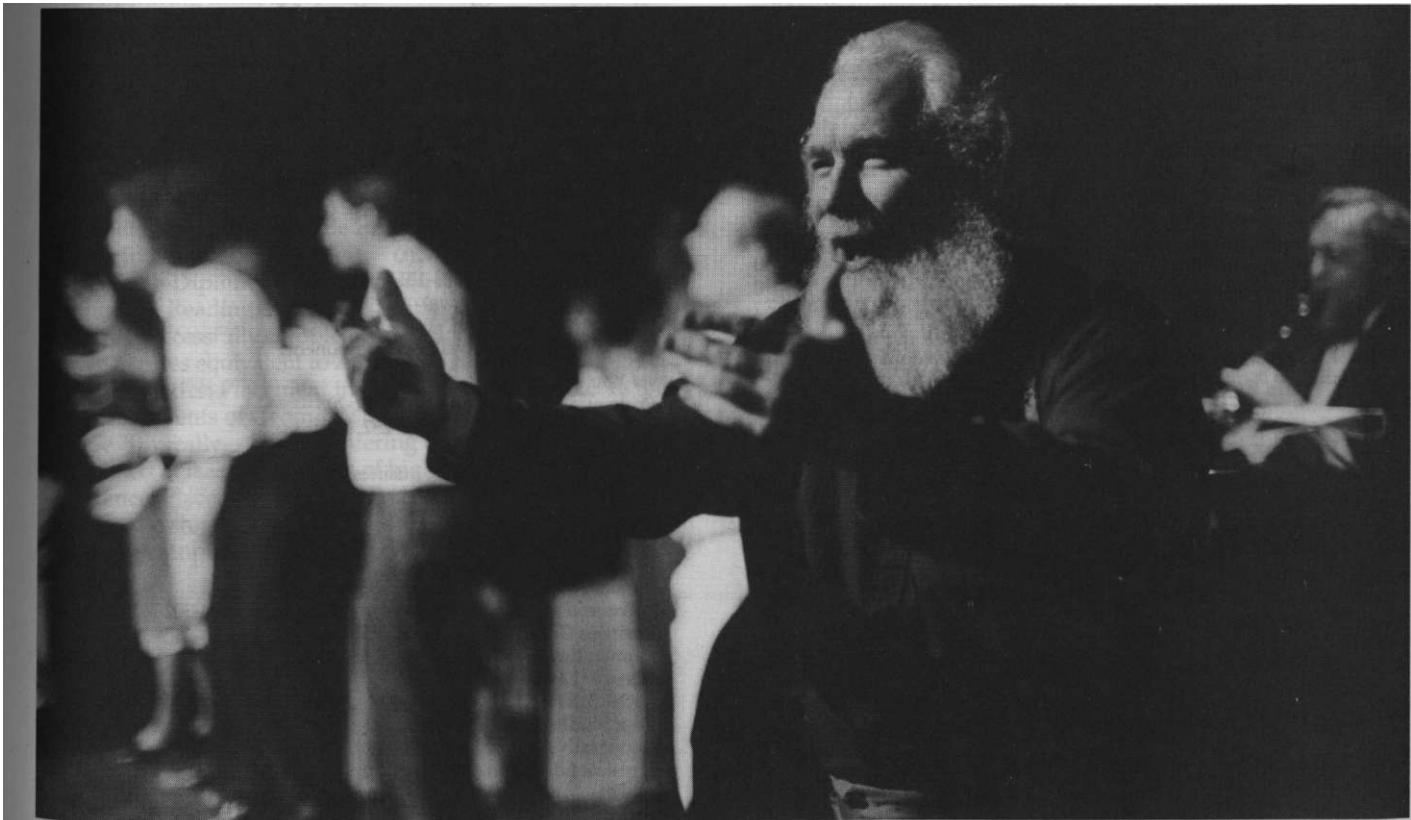
More than 100 full-time and about 150 free-lance interpreters help to mainstream deaf students at RIT. Here, 20-year veteran Interpreting Services staffer Dave ; McCloskey interprets a performance of the RIT production of The American Clock.

Second Year

Principles of Accounting I, II 0801-201,202	8
Data Processing for Business Occupations 0802-210	3
Fundamentals of Management 0804-284	3
Applied Business Techniques 0804-291	2
Advanced Applications for Word Processing 0804-302	4
Employment Seminar 0806-202	1
Business Elective †	3/4
Humanities	3
Social Sciences	3
Science (Level B)	3
Deaf Studies/ASL ‡	(3)
Total Quarter Credit Hours	79/80

* Satisfied by Foundations of Algebra (0884-180) or Special Topics: Mathematics Applications for Business Technology
† 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.

Office technology, AAS degree, typical course sequence

First Year	*Quarter Credit Hours*
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
Records Management/Business Calculations 0804-211	3
Payroll/Spreadsheet Applications 0804-212	3
Fundamentals of Marketing 0804-286	3
Mathematics Elective *	3
Freshman Seminar 0887-200	2
Job Search Process 0806-101	2
Liberal Arts (College of Liberal Arts)	12
Deaf Studies/ASL	3
Cooperative Education 0804-299	0
Physical Education (Wellness Component)	0

Second Year	
Principles of Accounting I, II 0801-201,202	8
Data Processing for Business Occupations 0802-210	3
Office Technologies 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
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 Special Topics: Mathematics Applications for Business Technology

Business Technology

AOS Degree Program

This AOS degree program includes technical course work in accounting, computers, payroll, general office skills and vvo **h** processing/information processing skills. Students elect to complete a sequence of courses that provide either an appijgjrl accounting or office 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 **higher** (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.

Business technology, AOS degree, typical course sequence

First year	*Quarter Credit Hours*
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	
Payroll/Spreadsheet Applications 0804-212	3
Mathematics requirement *	3
Freshman Seminar 0887-200	2
Job Search Process 0806-101	
English (Level C or above)	12
Cooperative Education 0804-299	0
Physical Education (Wellness Component)	0

Second Year	
Principles of Accounting **III** 0801-203	4
Cost Accounting I, nt 0801-252,253	8
or	
Database Applications for Business ‡ 0804-304	4
and	
Office Technologies 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 Sciences	6
Deaf Studies/ASL §	(3)
Cooperative Education 0804-299	0
Physical Education (Activity Course)	0

W^inclied Accounting Techniquest   0801-260   2

     or

     pesktop Publishing Concepts & Applications ‡ 0801-310   3
     Data Processing for Business Occupations   0802-210   3
     . plied Business Techniques   0804-291   2
     Capstone   0882-295   3
     Employment Seminar   0806-201   1
     i aw&!Society   0882-242   3
     f^fQuarter Credit Hours   106

| *, gyecuil Topics: Mathematics Applications for Business Technology is required.*
I‡ Courses required for applied accounting option
  i Courses required for office technology option
*I fi This requirement also fulfills three credits in either humanities or social science,
  depending on which discipline offers the course selected.*

Computer Integrated Machining Technology

Dominic J. Peroni, Interim Chairperson

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

Complete Summer Vestibule Program sampling or equivalent Career Exploration course.

  English—Diploma: Placement into level B English or higher (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 higher. Typically, students entering this program will have completed at least two years of high school science.

Computer integrated machining technology, diploma, typical course sequence

First Year   *Quarter Credit Hours*
   Manufacturing Processes I, II, ffl 0813-131,132,133   12
   Blueprint Reading I, H 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
   Communication Technologies 0880-160   3
   English (Level B or above)   12
   Cooperative Education 0813-299   0

Second Year
   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
   Social Sciences   3
   Science (Level B)   3
   Deaf Studies/ASL †   (3)
   Humanities   3
Total Quarter Credit Hours   84

* Typically satisfied by Special Topics: Trigonometry of Precision Machines
*t 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

Complete Summer Vestibule Program sampling or equivalent Career Exploration course

  English—AOS: Placement into level C English or higher (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.

Computer integrated machining technology, AOS degree, typical course sequence

First Year	Quarter Credit Hours
Manufacturing Processes I, II, II 0813-131,132	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
Communication Technologies 0880-160	3
English (Level C or above)	12
Cooperative Education 0813-299	0
Physical Education (Wellness Component)	0

Second Year	
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
Humanities	6
Science (Level B)	3
Cooperative Education 0813-299	0
Physical Education (Activity Course)	0

Third Year	
Computer Numerical Control I, II, HI 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 0882-295	3
Deaf Studies/ASL †	(3)
Social Sciences	6
General Education Elective	3
Technical Elective ‡	3
Total Quarter Credit Hours	121

* Typically satisfied by Special Topics: Trigonometry of Precision Machines
t This requirement also fulfills three credits in either humanities or social science, depending on which discipline offers the course selected.
‡ Technical electives with department approval; suggested areas include Welding II

The need for faster and better communication is growing at a phenomenal rate, creating exciting new career opportunities for graduates. Our digital imaging and publishing technology classes and labs on the cutting edge of technology prepare students for the future by providing technical knowledge and hands-on experience with the same equipment that is used in the industry today.

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, World Wide Web pages and CD-ROM. 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: computer publishing, digital media publishing, digital image manipulation, digital prepress production, offset lithography, and custom color lab. 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 platemaking systems; operate digital printing systems; operate offset printing presses; operate simple bindery and finishing equipment; operate film and 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.

position® for which graduates qualify

Erhnician in digital image capture and image preparation,
A sital prepress, film processing, media production, presenta-
«fn graphics, or basic video production; photographic labo-
E o r y technician, custom copy technician, custom color
ᶠ**rinter,** custom color print inspector/evaluator; operator of
digital printing systems, offset lithographic printing press

p r e r e q u i s i t e s

Successful completion of an orientation/sampling experience
offered during the Summer Vestibule Program and also dur-
ing the academic year. The sampling activities provide oppor-
tunities for students to learn about the digital imaging and
publishing industry, identify career opportunities, and evalu-
ate their interest and aptitude for the imaging and publishing
field.

English—Diploma: Placement into level B English or
higher (Nonfiction Reading, Academic Writing, and
Literature). Students successfully completing a diploma typi-
cally 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

First Year   *Quarter Credit Hours*
Overview of DI&P Software 0878-200	3
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
j 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 Sciences (Level B or above)	3

Second Year
Image Processes & Markets 0878-255	3
DI&PT technical elective courses	9
Production Procedures & Quality Control 0878-361	3
Job Search Process 0806-101	2
Humanities (Level B or above)	3
Science (Level B or above)	3
English (Level B or above)	4
Deaf Studies/ASL †	(3)

Total Quarter Credit Hours   70

* 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.

Digital imaging and publishing technology, AOS **degree,**
typical course sequence

First Year   *Quarter Credit Hours*
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)	8
Social Sciences (Level C or above)	3
Physical Education (Wellness Component)	0

Second Year
Image Processes & Markets 0878-255	3
DI&PT Technical Concentration Courses	12
DI&PT Technical Electives	9
Production Procedures & Quality Control 0878-361	3
Job Search Process 0806-101	2
Humanities (Level C or above)	6
Science (Level B or above)	3
English (Level C or above)	4
Social Sciences (Level C or above)	3
Deaf Studies/ASL †	(3)
Cooperative Work Experience	0
Physical Education (Activity Course)	0

Third Year
DI&PT Technical Concentration Courses	6
DI&PT Technical Elective	3
AOS Capstone 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

First Year   *Quarter Credit Hours*
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)	8
Physical Education (Wellness Component)	0

Second Year
Image Processes & Markets 0878-255	3
DI&PT Technical Concentration Courses	12
DI&PT Technical Electives	9
Production Procedures & Quality Control 0878-361	3
Job Search Process 0806-101	2
Science (Level B or above)	3
Deaf Studies/ASL	3
Liberal Arts (College of Liberal Arts)	12
Cooperative Work Experience	0
Physical Education (Activity Course)	0

Third Year
DI&PT Technical Concentration Courses	6
DI&PT Technical Elective	3
AAS Capstone 0882-296	4
Employment Seminar 0806-201	1

Total Quarter Credit Hours   101

* Satisfied by Concepts of Measurement (0884-150) or higher level

Pre-Baccalaureate Studies

Business, Computer Science and Information Technology

James Biser, Chair, 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

Rosemary Saur, Chairperson, Science and Engineering Support

Social Work

Dean Santos, Chairperson, Social Work Support

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
Visual Basic I 0602-215	4
Electronic Imaging 0602-320,330	8
Liberal Arts *	12
Algebra & Trigonometry 1016-204 †	4
Calculus for Technology I, H 1019-420,421 †	8
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 1 (0502-225), Writing 6r Literature 11 (0502-226), depending on placement. See page 10 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 301 for available courses.

Pre-Baccalaureate studies in computer science, typical course sequence

First Year	*Quarter Credit Hour*
Freshman Seminar 0853-200	
Computing Fundamentals 0853-310	
Computer Science 1,2 & 3 0603-231,232,233	
Liberal Arts *	
Calculus I, n & m 1016-251,252,253 †	
Pre-Baccalaureate courses ‡	2-4
Total Quarter Credit Hours	^jH

* 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 10 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 301 for available courses.

Pre-Baccalaureate studies in business, typical course sequence

First Year	*Quarter Credit Hours*
Freshman Seminar 0853-200	
Business Computer Applications 0106-320	4
Financial Accounting 0101-301	4
Laboratory Science	4
Liberal Arts *	12
Algebra, Calculus for Management Science 1016-225,226 †	8
Pre-Baccalaureate courses ‡	6-8
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 10 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 301 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 Sciences 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 10 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 301 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 0223-201,202,203	6
Basic Drawing Media I, II, III 0224-201,202, 203	6
Basic Computer Graphics 0223-280	2
Introduction to Photo for Non-Photo Majors 2067-552	4
Liberal Arts *	12
Pre-Baccalaureate courses †	2-4
Total Quarter Credit Hours	36-38

* Portfolio erf 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 10 for liberal arts requirements.
‡ Pre-baccalaureate courses are available to strengthen students' skills in critical thinking, learning strategies and specific discipline areas. See page 301 for available courses.

gₐccalaureate studies in School of Photographic Arts
A Sciences in imaging arts and science, professional
hotographic illustration option, typical course sequence

• r^ct Year	Quarter Credit Hours
I Still Photography I, II, HI 2060-257,258,259	3
History & Aesthetics of Photography 2060-301,302,303	12
Intro, to Photography for Non-majors 2067-264	4
I Two-dimensional Design 2013-231,232,233	9
Liberal Arts *	12
Pre-Baccalaureate courses t	6-8
f^lQitarter Credit Hours	38-40

I • *Writing sequence beginning with Written Communication I (0502-110), Written
Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Lit-
erature II (0502-226), depending on placement. See page 10 for liberal arts requirements.*
 *† pre-baccalaureate courses are available to strengthen students' skills in critical think-
ing, learning strategies and specific discipline areas. See page 301 for available courses.*

**pre-Baccalaureate studies in imaging arts and science,
biomedical photography option, typical course sequence**

first Year	Quarter Credit Hours
InfTO. to Photography for Non-majors 2067-264	4
Still Photography I, II, HI 2060-257,258,259	3
Medical Terminology 1026-301	3
Human Biology 1004-211	3
Human Biology Lab 1004-231	1
Liberal Arts *	12
I Pre-Baccalaureate courses †	6-8
Total Quarter Credit Hours	32-34

** Writing sequence beginning with Written Communication I (0502-110), Written
f§; Communication 11 (0502-111) or Writing & Literature I (0502-225), Writing & Lit-
erature II (0502-226), depending on placement. See page 10 for liberal arts requirements.
 † Pre-baccalaureate courses are available to strengthen students' skills in critical think-
ing, learning strategies and specific discipline areas. See page 301 for available courses.*

Pre-Baccalaureate studies in imaging arts and science, film
and video option, typical course sequence

First Year	Quarter Credit Hours
Intro, to Portable Video 2065-243, 244	4
Writing for Film/Video I, II 2065-342,343	3
Film Language 2065-222	2
Theater electives *	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
f Communication II (0502-111), or Writing & Literature I (0502-225), Writing b Lit-
erature II (0502-226), depending on placement. See page 10 for liberal arts requirements.
 ‡ Pre-baccalaureate courses are available to strengthen students' skills in critical think-
ing, learning strategies, and specific discipline areas. See page 301 for available courses.*

Pre-Baccalaureate studies in imaging arts and science,
printing option, typical course sequence

First Year	Quarter Credit Hours
Graphic Software Tools I, II 2081-216,217	1
Intro, to Graphic Communication 2081-254	3
Ink & Substrates 2081-316	3
Lithographic Processes 2081-367	3
Liberal Arts *	12
Algebra for Management Science 1016-225†	4
Pre-Baccalaureate courses †	6-8
Total Quarter Credit Hours	32-34

** Writing sequence beginning with Written Communication I (0502-110), Written
Communication II (0502-111) or Writing b Literature I (0502-225), Writing & Lit-
erature II (0502-226), depending on placement. See page 10 for liberal arts requirements.
 † Pre-baccalaureate courses are available to strengthen students' skills in critical think-
ing, learning strategies and specific discipline areas. See page 301 for available courses.*

**Pre-Baccalaureate studies in biology, biotechnology, allied
health, or 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
Biological Concepts I & n 0814-398	8
and	
Survey of Computer Science 0602-200	4
or	
General Biology I, O, m 1001-201,202,203	12
and	
General Biology Lab 1001-205,206,207	
or	
Chemical Principles I, n, III 1011-211,212,213 †	13
and	
Chemistry Lab 1011-205, 206,207	
Liberal Arts ‡	12
Introduction to Calculus 1016-214 §	4
or	
Calculus for Management Science 1016-226 §	4
Pre-Baccalaureate courses *	3-5
Total Quarter Credit Hours	42-15

** Pre-baccalaureate courses are available to strengthen students' skills in critical think-
ing, learning strategies and specific discipline areas. See page 301 for available courses.
 † Chemical Principles I, II and III option only for environmental management
 ‡ Writing sequence beginning with Written Communication I (0502-110), Written
Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Lit-
erature II (0502-226), depending on placement. See page 10 for liberal arts requirements.
 § NTID 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 Chem. I, II, HI 1011-215,216,217	13
and	
Chemistry Labs 1011-205, 206,207	
or	
General Chemistry I, II 1010-251,252	8
and	
General Chemistry Lab 1010-255	
and	
Quantitative Analysis 1008-261	4
and	
Quantitative Analysis Lab 1010-265	
Liberal Arts †	12
Calculus I, n, m 1016-251,252,253 ‡	12
Pre-Baccalaureate courses *	3-5
Total Quarter Credit Hours	46-49

** Pre-baccalaureate courses are available to strengthen students' skills in critical think-
ing, learning strategies and specific discipline areas. See page 301 for available courses.
 f Writing sequence beginning with Written Communication I (0502-110), Written
Communication II (0502-111) or Writing & Literature I (0502-225), Writing & Lit-
erature II (0502-226), depending on placement. See page 10 for liberal arts requirements.
 ‡ NTID 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, HI 1001-201,202,203	12
and	
General Biology I, H, HI Lab 1001-205,206,207	
or	
Chemical Principles I, D, III 1011-215,216,217	**12**
and	
Chemistry Labs 1011-205,206,207	
or	
College Physics I, II, HI 1017-211,212,213 †	12
and	
College Physics Labs 1017-271,272,273	
University Physics I, II, ID 1017-311,312,313 †	12
and	
University Physics Labs 1017-371,372, 373	
Liberal Arts §	12
Calculus I, II, III 1016-251,252,253 †	12
Pre-Baccalaureate courses *	3-5
Total Quarter Credit Hours	46-48

* Pre-baccalaureate courses are available to strengthen students' skills in critical think-ing, learning strategies and specific discipline areas. See page 301 for available courses,
t NTID mathematics courses may be required as prerequisites, depending on placement.
‡ Students must choose one of the txvo physics sequences for the physics option.
§ Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing b Literature I (0502-225), Writing b Lit-erature II (0502-226), depending on placement. See page 10for 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**
Processes of Science **0853-220** *	3
College Chemistry **1011-0208**	4
University Physics **I, II** **1017-311,312**	8
Liberal Arts †	12
Calculus **I, n, III** **1016-251,252,253** ‡	12
Pre-Baccalaureate courses *	3-5
Total Quarter Credit Hours	46-48

* Pre-baccalaureate courses are available to strengthen students' skills in critical think-ing, learning strategies and specific discipline areas. See page 301 for available courses,
t Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing b Literature I (0502-225), Writing b Lit-erature II (0502-226), depending on placement. See page 10 for liberal arts requirements.
‡ NTID 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
Processes of Science 0853-220 *	3
Engineering Technology Seminar 0606-101	**2**
Major-related courses depending on area of interest	12
Liberal Arts †	12
College Algebra & Trigonometry 1016-204 *	4
Analytical Geometry 1016-228 ‡	4
Calculus for Technology 1019-420 ‡	4
Pre-Baccalaureate courses *	3-5
Total Quarter Credit Hours	48-50

* Pre-baccalaureate courses are available to strengthen students' skills in critical think-ing, learning strategies and specific discipline areas. See page 301 for available courses.
† Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing b Literature I (0502-225), Writing b Lit-erature II (0502-226), depending on placement. See page 10for liberal arts requirements.
‡ NTID 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	
The Professional Social Work Role 0516-210	**2**
Self-Awareness in the Helping Role 0516-212	**4**
Liberal Arts *	**4**
Mathematics †	**12-16**
NTID Humanities & Social Sciences ‡	8
and/or	
Pre-Baccalaureate courses §	
Total Quarter Credit Hours	

* Writing sequence beginning with Written Communication I (0502-110), Written Communication II (0502-111) or Writing b Literature I (0502-225), Writing b Lit-erature II (0502-226), depending on placement. See page 10for liberal arts requiremen
† 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 think-ing, learning strategies and specific discipline areas. See page 301 for available course

There are days when sunshine takes precedence over books—at least for awhile.

Course Number Index

RIT 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 EL, digits are unique o each course and identify whether the course is noncredit (less than 099); lower division (100–399); upper division (400–699); or • ; level (700 and above).

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

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).

Information Technology

0602-200   Survey of Computer Science
Survey of computers and problem solving by using general-purpose application software. Students use several general purpose software tools, such as a spreadsheet, database package, word processor and graphics software to complete a series of required projects. Emphasis is on using software for personal productivity and to enhance effectiveness and communication. Required projects utilize packages individually and in an integrated fashion. Class 2, Credit 4

0602-201   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, Credit 1

0602-205   Computer Techniques—Fortran Language
Students are introduced to computer systems, learn problem-solving techniques and learn to program in the FORTRAN language. Topics available for study include straight line programming, decision and repetition capabilities, input/output, data structuring and the use of subprograms. Programming projects are required. (Precalculus) Class 3, Credit 3-4

0602-207   Computer Techniques—C Language
Students are introduced to computer systems, learn problem-solving techniques and learn to program in the C programming language. Topics available for study include straight line programming, decision and repetition capabilities, input/output, data structuring and the use of subprograms. Programming projects are required. (Precalculus) Class 3, Credit 3-4

0602-208   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++. (0602-200 or computer literacy) Class 3, Credit 4, Lab 2

0602-210   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. (0602-208 or 0602-215) Class 3, Credit 4, Lab 2

0602-212   Data Structures
A course in the implementation and use of classical data structures and algorithms in C++. Topics will include a discussion of abstract data types and the use of C++ data encapsulation mechanisms in implementing seamless types. A study will be made of classical ADTs, including lists, strings, stacks, queues, trees and graphs. Algorithms will also be examined, including the use of recursion, sorting and searching algorithms. (0602-210) Class 4, Credit 4

0602-215   Introduction to Visual Programming I
A first course in programming using Visual Basic. Topics include elementary data types, control structures, procedures and functions, arrays, user-defined types, external files and intrinsic controls. Weekly programming assignments are required. (0602-200 or computer literacy) Class 3, Credit 4, Lab 2

0602-216   Introduction to Visual Programming II
A second course in programming where students use Visual Basic to implement moderately large programs. Topics include classes, objects, composition, inheritance, collections, object oriented design and the application of these concepts to solve problems of intermediate complexity. Programming projects are required. (0602-215) Class 3, Credit 4, Lab 2

0602-230   Introduction to Programming for New Media
This course provides an introductory programming experience to student 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 function in their scripts. They will learn iterative user-centered strategies for program design and implementation. (0602-320 or equivalent) Class 3, Credit 4, Lab 2

0602-300   Business Applications Using COBOL

A study of elementary COBOL programming, using structured design and programming concepts developed in 0601-210. Emphasizes the use of COBOL in solving common business, commercial and managerial problems. Topics include COBOL program organization, sequential file I/O, COBOL control structures, arithmetic operations and report editing, control break processing and table handling. Students write programs that adhere to specific programming and documentation standards. (0602-210) Class 4, Credit 4

0602-317   Visual Basic for Programmers

This course is intended for students with previous programming experience in a language other than Visual Basic and some background in object oriented programming. It is not to be taken as an information technology elective. The first half of the course covers Visual Basic syntax. Topics include elementary data types, control structures, procedures and functions, arrays, user defined types, external files and intrinsic controls. The second half focuses on the fundamentals of object-oriented programming. Topics include classes, objects, composition, inheritance, collections, object-oriented design and the application of these concepts to solve problems of intermediate complexity. Programming projects are required. (A two-course programming sequence in any language except Visual Basic) Class 3, Credit 4, Lab 2

0602-320   Introduction to Multimedia: The Internet & 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. (0602-200 or Computer Literacy) Class 3, Credit 4, Lab 2

0602-330   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. (0602-320; corequisite 0602-330) Class 3, Credit 4, Lab 2

0602-340   Computer Concepts & 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, system performance, evaluation, and discussions of historical and current technological developments and commercially available computers. (0602-208 or 0602-215 or 0602-317) Class 4, Credit 4

0602-341   Data Communication & 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. (0602-340) Class 4, Credit 4

0602-342   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 also will 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 remote access techniques to control and diagnose computers and network will also be introduced. (0602-340 and 0602-341; corequisite: 0602-342 lab) Class 3, Credit 4, Lab 2

0602-360   Introduction to 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, 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. (0602-216 or 0602-317) Class 4, Credit 4

0602-402   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 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. (0602-216 or 0602-317 or 0602-210; corequisite 0602-402 Lab) Class 3, Credit 4, Lab 2

0602-409   Web Site Design & Implementation

Builds on the basic aspects of HTML and multimedia programming that are presented in 0602 320 and 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. (0602-330) Class 4, Credit 4

0602-413   Internetworking Lab II

This course explores local area networking technologies and equipment. As its basis it uses the fundamental concepts and technologies learned in 0602-342 and expands upon them to include other contemporary and emerging technologies. In this course we will discuss topics such as FDDI, radio, infrared, cable and xDSL systems. We also will examine the dynamic cellular telephony and cellular digital packet data systems. Finally we will explore the concepts of network integration, construction and design. (0602-342) Class 3, Credit 4, Lab 2

0602-421   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. (0602-402, corequisite: 0602-421 Lab). Class 3, Credit 4, Lab 2

0602-422   Systems 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. (0602-421; corequisite: 0602-422 Lab) Class 3, Credit 4, Lab 2

0602-425   Human Factors

Exploration of the nature of the mind, exploring the foundational concepts of cognitive psychology, sensation, perception, attention, knowledge, problem solving and memory. Cognitive theories are discussed and related to computer human interactions and the representation of knowledge and information in the computing environment. (2nd-year standing) Class 4, Credit 4

0602-426   Interface Design

A rapidly expanding and evolving community of computer users has inspired exciting research into the design of computer-human interfaces. Students discuss technique and technology representing current practice plus explore new and experimental directions in the field. Interdisciplinary teams from a variety of backgrounds enhance the scope of this work. Class work includes the design, implementation and evaluation of interfaces. (0602-208 or 0602-215 or 0602-317 and 0602-330 and 0602-425) Class 4, Credit 4

0602-434   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 in-groups. The class or instructor may create low-level routines and classes that will be used by students to complete programs of their own design. (0602-215 and 0602-330 or 0602-230) Class 4, Credit 4

0602-455   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. (3rd-year standing) Class 4, Credit 4

0602-460   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) Class 4, Credit 4

0602-475   Concepts of Distributed Interactive Multimedia
This introductory class is designed to provide the student with a comprehensive overview of the technologies and applications that support distributed multimedia network environments. The course emphasizes concepts in switching, transmission, and design of distributed interactive multimedia systems. Highlights include ATM, Frame Relay, ISDN, and cable modem technology. Class 4, Credit 4

0602-484   Fundamentals of Databse Client/Server Connectivity
Students will confisgure, 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. Lowe-level data and file structures used in the implementation of databases and database indexing will be explored. Programming exercises are required. (0602-360; corequisite: 0602-484 lab) Class 3, Credit 4, Lab 2

0602-485   Fundamentals of DBMS Architecture & 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. (0602-360; corequisite; 0602-485 lab) Class 3, Credit 4, Lab 2

0602-486   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/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. (0602-484 and 0602-485) Class 3, Credit 4, Lab 2

0602-499   Information Technology Co-op
Credit 0

0602-510   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 design instruction—either in a business or an educational context. This couse enables the student to be able to plan, organize, and systematically develop instructional materials. The course uses and Instructional Systems Design (ISD) model ot analyze, design, deliver, and evaluate instruction. (Third year standing) Class 4, Credit 4

0602-512   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 (0602-722/510) into the actual application of these principles in a computer-based environment. Although the basic principles of instructional design hold try in all media environments, using these teaching and learning prinicples is 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. (0602-510 and 0602-216 or equivalent)

0602-514   Java for Programmers
An introduction to an object-oriented programming language, such as Java, for the World Wide Web. This course will cover the creation of applet and application programs. Topics include Internet concepts, basic language concepts (declaring and evaluating data, statements, expressions control flow and input), the development environment, essentials of applet programming (URL, audio, image, test, animation), classes and objects, error handling, debugging, threads, and the client/server environment. Programming projects will be required. (0602-210 or 0602-216 or 0602-317) Class 4, Credit 4

0602-515   Internet: Network Transport
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. TCP/IP will be the predominant protocols suite studied. Others (such as Novell Netware) may be studied to learn how to implement TCP/IP in concert with, or over the top of other protocols. Students will learn how to connect together computers in a network, and then how to connect the separate networks together to form an internetwork. Monitoring and diagnosis of an operational network, plus administration of the infrastructure are studied. Routing is the major topic of this course. (0602-342, Co-requisite: 0602-515 Lab) Class 3, Credit 4, Lab 2

0602-516   Internet: Service Provision
An investigation of the tasks of selecting, configuring and administering services in an internetworking environment. Topics include service administration, user administration, and security and privacy issues. Students completing this course have experience in administering an internetwork of computers with a variety of services,including file service, print service, application service, name service, anonymous ftp service, Web service and others. (0602-342 and 0602-402; corequisite: 0602-516 lab) Class 3, Credit 4, Lab 2

0602-517   Backbone Routing & Switching
Backbone 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, 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). (0602-515) Class 4, Credit 4

0602-522   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. (0602-216 or 0602-317, and 0602-515; corequisite: 0602-522 lab) Class 3, Credit 4, Lab 2

0602-525   Performance Support Systems
An Electronic Performance Support System (EPSS) is a software technology designed to give each user what he or she needs when he or 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 or 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. (0602-510 and 0602-216 or equivalent)

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0602-527 Digital Audio & 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. (0602-330 and 3rd-year standing) Class 4, Credit 4

0602-528 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. (0602-537) Class 4, Credit 4

0602-529 Introduction to VRML
This course will focus on basic and advanced concepts of 3 D 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 large scale group environment. (0602-409 or 0602-434) Class 4, Credit 4, Lab 0

0602-535 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 multimedia 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. (0602-409) Class 4, Credit 4, Lab 0

0602-537 Design of Interactive Media
To give students a working knowledge of the content development and information design process in multimedia development. Students will look at examples of information delivery in a variety of deployment environments. They will perform market analysis and audience evaluations and develop flowcharts, storyboards, user testing and prototypes for an interactive media application. (0602-330) Class 4, Credit 4

0602-539 Programming for the 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 will enable 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. (0602-409 and a two course programming sequence) Class 4, Credit 4

0602-540 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. (0602-455 and 0602-515) Class 4, Credit 4, Lab 0

0602-545 Backbone Routing & Switching
Backbone 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, layer 2 and layer 3 switching, multicast routing and the MBONE, and accommodating IPV6 and the 6 BONE, enterprise-wide networking, special-purpose protocols (e.g., VTP). (0602-515) Class 4, Credit 4

0602-570 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 4.0. Students will learn how to write development standalone 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, KERNAL 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 Java and VBScript, two examples of a new class of scripting languages for creating dynamic WWW pages. (0602-210 or 0602-216 or 0602-317) Class 4, Credit 4

0602-574 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. (0602-570) Credit 4

0602-590 Seminar in Undergraduate Applications Computers
Current topics and advances in applications of computer technology for undergraduate students. (Permission of instructor and 3rd-year standing) Credit 2-4

0602-595 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

0602-599 Independent Study
The student will work independently under the supervision of a faculty adviser on a topic not covered in other courses. (Proposal signed by a faculty member) Credit 1-4

Computer Science

0603-101 First Year Seminar
This course provides first-year students an opportunity to build the skills necessary for success in the RIT computer science program. Through interactions in a small group environment, students will meet other computer science students, create a stronger bond with RIT and their college and receive extended orientation. There will be a focus on communication and small group skills valuable for future project work. The students will become more familiar with the computer science curriculum, career options and ethical issues. Credit 1

0603-203 AP C++
This course is only used for the purpose of transferring in Advanced Placement credit. Amount of credit (either four or eight credit hours) will depend upon the student's score in the AP exam. Transfer credit of four credit hours will be granted for scores representing mastery of the princples 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 eight 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, liked lists, stacked queues, and trees. May not be taken for credit. Credit 4-8

0603-221 Introduction to Computer Science
An introduction to basic topics needed to succeed in computer science combined with the course material covered in 0603-231. 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 0603-232, Computer Science 2. Class 5, Credit 6, Lab 2

0603-231   Computer Science 1

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, Credit 4, Lab 2

0603-232   Computer Science 2

The goal of this course is to continue with the introduction to 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. (0603-221 or 0603-231) Class 3, Credit 4, Lab 2

0603-233   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. (0603-232) Class 3, Credit 4, Lab 2

0603-263   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 0603-233; not to be taken as a computer science elective. Class 4, Credit 5, Lab 2

0603-309   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.(0603-263 or 0603-334) Class 2, Credit 2

0603-319   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. (0603-263 or 0603-334) Class 4, Credit 4

0603-334   Computer Science 4

The first part of this course is a C++ language course. Topics cover the basic syntax language, how it supports the object-oriented programming paradigm, templates and input/output. The second part of the course explores advanced data structures such as graphs and B-trees. Students will work individually and in small groups on programming assignments, which are an integral part of the course. (0603-233) Class 3, Credit 4, Lab 2

0603-341   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 skills also are emphasized. Small and large group activities will be used to simulate a wide range of work and communications environments. (0603-233, or 0603-263 as a corequisite) Class 4, Credit 4

0603-351   Introduction to Digital Design

An introduction to computer architecture and implementation. Topics include number systems, boolean algebra, combinatorial and sequential circuit design, flip-flops and adders, and storage mechanisms and their organization. Laboratory experiments introduce elementary integrated circuit building blocks, including gates, flip-flops, registers, counters and elementary sequential circuits. (0603-232 and 1016-265) Class 3, Credit 3

0603-352   Computer Organization

A continuation of 0603-351. Topics include instruction fetching, decoding and execution, CPU specification through a descriptive language, bus structures, microprogramming, interrupts, architectural differences, the assembly process, addressing, storage allocation, subroutines, parameter passing, looping, address modification, floating point representation, and simple I/O. Programming projects will be required. (0603-351) Class 3, Credit 3

0603-380   Introduction to Computer Science Theory

Introduction to the classical and contemporary theory of computation covering regular, context-free and computable (recursive) languages with finite slate machines, pushdown automata and Turing machines. Basic concepts of computability theory and NP-theory. (1016-265 and 1016-366 as a corequisite) Class 4, Credit 4

0603-406   Systems Programming I

This course is an introduction to systems programming concepts and techniques. Topics include: the MIPS R4000 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. (0603-263 or 0603-334; 0603-352) Class 4, Credit 4

0603-420   Data Communications & Networks I

This course is an introduction to the concepts and principles of computer communication subsystems. It examines the effects of communication's media and software protocols on network performance, cost and reliability. The course covers the physical interconnection of machines, first-level software considerations of the hierarchical model for computer network design, and local-area networks. (1016-351 and third-year standing in computer science) Class 4, Credit 4

0603-440   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. (0603-263 or 0603-334; 0603-352) Class 4, Credit 4

0603-450   Programming 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. (0603-263 or 0603-334) Class 4, Credit 4

0603-455   Artificial Intelligence

An introduction to the field of artificial intelligence, including both theory and applications. A programming language that allows effective symbolic manipulation (PROLOG) 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. (0603-450) Class 4, Credit 4

0603-456   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. (0603455) Class 4, Credit 4

0603-480   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. (0603-380) Class 4, Credit 4

0603481   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. (0603-380) Class 4, Credit 4

0603-482   Cryptography
The course is devoted to the review of basic cryptographic algorithms, their implementations and usage. Classical encryption techniques and those of Merkle-Hellman and Rivest-Shamire-Adleman will be seen in depth, and an overview of several others will be presented, especially those denominated as public-key cryptosystems. The popular implementations, like DES or PGP, and others, will be studied. The course also presents authentication schemes and interactive proof protocols. Students will write a term paper, either theoretical based on literature or reporting a students' 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. (1016-366 and 0603-334) Class 4, Credit 4

0603-485   Database 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. (0603-263 or 0603-334) Class 4, Credit 4

0603-499   Cooperative Education
Credit 0

0603-506   Systems Programming II
Application of operating system concepts to the design of hardware interfaces for a multiprogramming environment. Laboratory work includes the development of a 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. (3010-361; 0603406; and 0603-440) Class 4, Credit 4

0603-515   Analysis of Algorithms
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. (1016-366 and 0603-334) Class 4, Credit 4

0603-520   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 nonparallel machines. Programming projects are required. (0603-440) Class 4, Credit 4

0603-530   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. (1016-309 or 1016-352 and third-year standing in computer science) Class 4, Credit 4

0603-531   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. (0603-440) Class 4, Credit 4

0603-532   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. (0603-531) Class 4, Credit 4

0603-541   Data Communications & Networks II
The course presents the concepts and principles of the higher-level protocols of the ISO reference model, as introduced in 0603420, Data Communications and Networks I. Included in this course will be the investigation of network topologies, delay analysis, routing techniques, interconnection of networks, security issues and user-level services. (0603-420) Class 4, Credit 4

0603-542   Data Communications & Networks III
This course will build on topics developed in 0603-420, Data Communications and Networks I, and 0603-541, 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. (0603406 and 0603-541) Class 4, Credit 4

0603-544   Operating Systems II
This course is a more in-depth look at the concepts in Operating Systems I (0603-440). 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. (3010-361 and 0603-440) Class 4, Credit 4

0603-560   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. (0603-580) Class 4, Credit 4

0603-570   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 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

0603-571   Computer Graphics II
This project-oriented course builds on topics developed in 0603-570, Computer Graphics I. Expanded topics include standard graphics software, animation techniques, 3-D modeling methods, hidden surface and line algorithms, shading, antialiasing, color models and design of the user interface. Students will be required to design and implement an interactive system for an application that incorporates several of the above areas. Programming projects will be required. Class 4, Credit 4

0603-580   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. Common types of language processors (such as assemblers, interpreters, compilers, macro processors, and others) will be discussed. Programming projects will be required. (0603-450) Class 4, Credit 4

0603-590   Seminar in Computer Science
Current advances in computer science, (set by instructor) Class 2-4, Credit 2-4

0603-599   Independent Study
Class 1-4, Credit 1-4

0603-690   Seminar in Computer Science
Current advances in computer science. Open to graduate students and fourth- and fifth-year undergraduates, (set by instructor) Class 1-4, Credit 1-4

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

0607-301   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. Class 1, Credit 3, Lab 3

0607-302   CAD Drawing
A course in computer-aided drafting (CAD). Students learn how drawing is accomplished using a CAD application package. Begins with basics and progresses to advanced CAD practices. Drawing assignments required, concentrating on packaging applications. (0607-301) Class 1, Credit 3, Lab 3

0607-311   Packaging Materials I
The physical and chemical properties, and uses of common packaging materials. Emphasis is on metals and plastics used in packaging. The structural and properties of plastics used in packaging is a key focus of the class and their end use. 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 and glass 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 fibre, metal, plastic and glass packaging materials. (0607-201) Class 1, Credit 3, Lab 4

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 2, Recitation 1, Credit 4, Lab 2

0607-322   Flexible Containers
Corollary course for 0607-321. Primary emphasis is on flexible, foil, plastic and laminated materials and on selected processing techniques. Heatsealing and flexible container manufacture are some of the flexible package topics covered. Permeation theory and barrier calculations are also covered through lectures and lab. (0607-301,311,312) Class 2, Credit 4, Lab 2

0607-341   Computer Application
Application of computer techniques and data processing for packaging Review and analysis of current computer software packages for packaging including optimum sizing, process control, simulation and specification preparation. Computer program development and coding projects associated with packaging are assigned. Class 2, Credit 4, Lab 4

0607-401   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. 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 writing skills certification process under the RIT policy. (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. The characteristics of such equipment and maintenance programs are considered. Students gain practice in prject managaement of packaging line development. (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. (0607-301,321,322) Class 2, Credit 4, Lab 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. (0607431, 432) Class 2, Credit 4, Lab 4

0607-462   Packaging Regulations
A detailed study of federal, state and local regulations that affect packaging. Flistory 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. Class 3, Credit 3

0607-485   Principles of 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, Credit 4, Lab 4

0607-499   Packaging Co-op Work Block
One quarter of appropriate work experience in industry. Two quarters of co-op experience are required. 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; professional elective) 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. (Professional elective) Class 3, Recitation 1, Credit 4

I (£07-524   Packaging Economics
I 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. (Professional elective) Class 4, Credit 4

0607-530   Packaging & 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 life cycle, solid waste disposal and materials and energy shortages is considered. Other topics of current social interest are discussed. Primarily a discussion class for senior students. Open tononmajors. (Professional elective) 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. (0607-431, 1016-309; or equivalent; professional elective) Class 3, Recitation 1, Credit 4

0607-536   Medical Products Packaging
Study of unique requirements for packaging materials and containers for sterilized medical devices. Current sterilization techniques, impacts on materials properties and distribution requirements are considered for this specialized product group. (0607-433; professional elective) Class 2, Recitation 1, Credit 4, Lab 2

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. (0607-432; professional elective) Class 3, Credit 4, Lab 2

0607-568   Food Preservation & Packaging
Study of food products, deterioration mechanisms, 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. (0607432; professional elective) Class 3, Credit 4, Lab 2

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.) (Professional elective) Class 2, Credit 4, Lab 2

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. 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 adviser, subject to approval of the department. Credit 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 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 1-4

Engineering Technology

0606-101   Freshman Seminar
A career discovery course for freshmen in undeclared engineering technology. In partnership with the Freshman Experience courses, this course emphasizes the various potential career paths available in the engineering technologies, packaging science, environmental management and information technology. Faculty, upperclassmen, alumni, and professionals in the various professions share information and career descriptions. On- and off-campus tours of facilities support the career discovery mission. Class 0, Studio 3, Credit 2

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 preregistration procedures. Discussion of topics including 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 preregistration procedures. Discussion of topics including 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. (For students in manufacturing and mechanical engineering technology and undeclared engineering technology) Class 2, Credit 4, Lab 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, Credit 4, Lab 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

0608-310   Computer Applications II
Introduction to various computer applications used in civil engineering practice. Examples include STAAD-III structural analysis software, and the civil engineering application package in AUTODESK (AutoCAD R14). (0610-302, 0610-303,0608-320,0608-340,0608-380,0608-420) Class 1, Credit 2, Lab 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 lessions to assignments in the field using up-to-date equipment. 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 (NYSDOT 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 modem 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 0608-420, 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 Systems

Brief 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 & Sewers

An introduction to water and wastewater treatment, interpretation of analyzed physical, chemical and biological parameters of water quality with regard to the design and operation of treatment processes and to the control of the quality of natural water; fundamental principles and applications of physical, chemical and biological processes employed in water and waste-water treatment; analysis of waste assimilative capacity of streams, with an introduction to microbiology. (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, psychrometrics, 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 earthmoving 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, cut-off methods, and groundwater's interaction with engineered structures. Application of elementary groundwater computer 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 involves the analysis of stream and surface water hydrology, management of stormwater runoff, practical engineering procedures (e.g., TR-55 methodology) and hydrologic computer software. (0608-420) Class 4, Credit 4

0608-485   Hydraulic Structures

Analysis and design of engineered systems in lakes and streams. Topics 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 third of the course work involves the application of various computer software in analysis and design. (0608-432) Class 4, 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; and introduction to pre-stressed concrete. Emphasis is on the use of the ACI code, and a comprehensive group design project is assigned. Some computer work using a spreadsheet program is involved. (0608-310,404,490) 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, noncomposite 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 using a spreadsheet program is involved. (0608-310,404,490) Class 4, Credit 4

0608-499   Civil Engineering Technology Co-op

One quarter of appropriate work experience in industry. (0606-099) Credit 0

0^08-500   Labor Relations
Introduction to the fundamentals of labor laws as well as the understanding that good work place 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 ^ith Disability 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 work place 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 workers 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 of 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 may be covered also. (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 0608-432) Class 4, Credit 4

0608-520   Design of Wastewater Facilities
Principles of wastewater treatment plant design, conceptual and hydraulic design of activated sludge and trickling filter plants are studied. Tertiary treatment facilities, such as nitrogen and phosphorous removal, are discussed. Processes, plant design and construction elements are stressed. (0608-438) Class 3, Credit 4, Lab 2

0608-525   Civil Engineering in Resource Recovery & Waste Management
An introduction to the civil engineering aspects of dealing with resource recovery and "waste" management, with a focus on source reduction and beneficial resource recovery. Topics covered are the history of the problems, the resulting societal reaction and legislation, and present day handling, minimizing, and recovering or disposing of materials historically treated as "wastes." Emphasis is placed on those aspects in which the civil engineer plays a prominent role such as municipal solid waste landfills and hazardous waste permanent storage facilities, land application of municipal wastewater biosolids, composting, and other resource recovery and environmental protection engineering projects, including reclaiming of urban lands under the "brownfields" program. Use is made of lectures, reading materials, outside speakers, field trips and certain projects. (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. In addition, a class design project is completed to combine class work and laboratory work. 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 preform 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. Class 2, Credit 2

0608-546   Professional Principles & Practices
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

0608-550   Construction Practices
An introduction to basic construction management and organization with CPM scheduling, estimating, bidding, safety, labor, cost control and contracts. This is a survey course for other than civil engineering technology students. Class 4, Credit 4

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

I.

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, Kirchoff's Laws, Thevenin's and Norton's Theorems, Mesh and Nodal analysis and Superposition. (Corequisite 1016-204) Class 3, Credit 3

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 DC Circuits (Corequisite 1019-420) Class 3, Credit 3

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 and 1019-420) Class 3, Credit 4, Lab 3

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. Credit 1

0609-221   DC Circuits & Simulation
This course complements the lecture material of 0609-201, DC Circuits. It introduces students to dc measurements, data recording, technical report writing and to modern schematic capture and simulation tools. (Corequisite 0609-201) Class 1, Credit 2, Lab 2

0609-222   AC Circuits & Simulation
This course complements the lecture material of 0609-202, AC Circuits. It introduces students to ac measurements, data recording, technical report writing and to modern schematic capture and simulation tools. (0609-201, 0609-221)(Corequisite 0609-202) Class 1, Credit 2, Lab 2

0609-333   Concepts in Systems & Signals
This course is an extension of ac circuit theory to s domain concepts, Fourier analysis of repetitive signals, and the z domain of sampled data systems. MATLAB is taught and used extensively. (0609-202 AC Circuits)(Corequisite 1019-421) Class 4, Credit 4

0609-337   Electric 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 three-phase dynamos, three-phase circuits, phasors , transformers-properties, isolation, efficiency and voltage regulation. (0609-202 or 0609-411) Class 3, Credit 4, Lab 2

0609-361   Electronics II
A continuing course in the analysis and design of electronic circuits. Emphasis will be on the characteristics, operation and biasing of both junction and insulated gate field effect transistors and the use of small signal parameters. Students are introduced to frequency response of circuits. (0609-203 Electronics I) Class 3, Credit 4, Lab 2

0609-362   Electronics III
A continuation course in the analysis and design of electronic circuits for students who have completed the introductory course sequence in transistor amplifiers. Included are Class A and B power amplifiers and the differential amplifier. The operational amplifier is introduced, and a wide range of its applications is explored.(0609-361 Electronics II) Class 3, Credit 4, Lab 2

0609-363   Electronics IV
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. (0609-362,0609-361) Class 3, Credit 4, Lab 2

0609-403   Advanced Circuit Theory
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. (1019422,0609-333,0609-202 or equivalent with Pspice or other similar software) Class 4, Credit 4

0609-404   Control 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, 1019-422) Class 3, Credit 4, Lab 2

0609407   Career Orientation
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 cooperative education placement process and team building activities. Class 1, Credit 1

0609408   Transmission Lines
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. (1019-422,0609-202,0609-403) Class 3, Credit 4, Lab 2

0609411   Electrical Principles for Design I
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 College Algebra and Trigonometry or equivalent) Class 3, Credit 4, Lab 2

0609412   Electrical Principles for Design II
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. (0609411) Class 3, Credit 4, Lab 2

0609414   Basic Electrical Principles
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. (1019421) Class 3, Credit 4, Lab 2

0609416   Auto Data Acquisition
This course is an introduction to automated data acqustion and analysis, the Lab VIEW software package is introduced and used to perform data acqusition, analysis of data, and control of instrumentation. (0609-202, 0609411) Class 3, Credit 4, Lab 2

0609426   Analog Simulation Seminar
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, 0609-202) Class 1, Credit 2, Lab 2

0609-442   Advanced Electronics
A review of basic operational amplifier circuits is supplemented by applications of special-purpose amplifiers. Use of op amps in signal generation, regulation and active filtering is examined. Use of discrete transistors to augment power capabilities of integrated devices is included. (0609403,**0609**-362 or equivalent) Class 3, Credit 4, Lab 2

0609-445   Integrated Electronic Packaging Design
This course provides an overview of the design of multilayer printed circuit boards for both surface mount and through hole electronic components. An emphasis will be placed on the design of products for efficient manufacturing. This course is intended as a service course for non-electrical majors. (0617455 and 0609411) Class 2, Credit 3, Lab 2

0609-499   **Electrical Technology Co-op**
One quarter of appropriate work experience in industry. (0609-362,0618-438, 0609-407) or permission of adviser. Credit 0

0609-534   **Communication Systems I**
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 introduc**tion** to digital communication signals and systems are presented. **(0609-363, 0609-333) Class 3, Credit 4, Lab 2**

0609-535   **Communication Systems II**
The study of various types of digital and data communicaiton systems and their components is continued. Digital communication modulation schemes and transmission teachniques are introduced. Data communication concepts such as protocols, error control, transmission methods, coding and circuit configurations are explained. Microwave radio, satellite communicaiton, and fiber optic systems concepts are studied. Applications including cellular and wireless communications are introduced. (069-534) Class 3, Credit 4, Lab 2

0609-547   **Digital Signal** Processing
Basic concepts of linear systems are covered, followed by an introduction to digital signal processing. Emphasis is placed on digital filter design and digi**tal** spectral analysis. (1019-422) Class **4**, Credit **4**

0609-550   **Power Systems I**
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 for Mech.Eng.Tech.students **w**/perm of instructor) **Class 3, Recitation 2, Credit 4**

0609-552   **Power Systems II**
Load Flow and econimic 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**

0609-580   **Senior Project**
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**

0609-599   **Independent Study**
A supervised investigation within an electrical engineering technology area of student interest. Consent of the instructor and the student's academic adviser is required. **Credit 2-4**

Mechanical Engineering Technology

0610-101   **Freshman Seminar**
A course for incoming freshmen in mechanical and manufacturing engineering technology programs. The course partners with freshman experience courses to facilitate the transition to college. This course emphasizes creative and innovative problem solving incorporating teamwork and interactions with upperclassmen, alumni and faculty showing the potential career opportunities flowing from their degree studies and the interrelationship of current and future coursework.. Class 0, Credit 1, Studio 2

0610-102   **Sophomore Seminar**
A continuation of Freshman Seminar with additional emphasis on the cooperative education experience and particular career paths, faculty, uppperclassmen and alumni with participate with students in design projects related to potential work experiences. Teams develop conceptual analysical and/or prototype solutions to real world engineering problems. The emphasis is on innovation and researching for available tools for achieving potentially viable solutions. Class 0, Credit 1, Studio 2

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, and applications. Class **3,** Credit **3**

0610-220   **Mechanical Design Drawing**
This course focuses on dimensioning and tolerancing of parts and assemblies. Geometric dimensioning and tolerancing is emphasized through 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, 2-D prints, and a bill of materials. **Class** 2, **Credit** 4, **Lab** 4

0610-230   **Computing Tools for Engineering Technology**
The computer is one of the fundamental tools of mechanical technologists. This course instills 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 calculations. The course also teaches computer-related topics such as file-management, antivirus protection, using e-mail and World Wide Web use as an educational resource and means to post information. A unit on basic computer set-up and repair is included. Class **3,** Credit 4, Lab 2

0610-302   **Introduction to Statics**
An introduction to statics covering forces, moments, vectors, equilibrium, friction, areas, volumes and masses. (1017-211) **Class 4, Credit 4**

0610-303   **Strength of Materials**
The study of strength of materials and the effect of external forces on the internal stresses and deformation of elastic solids. Normal and shear stress and also deformations are determined for axial, torsional and bending loads. Combined stresses using the Mohr's circle technique are studied. Tension test and the relationship between stress and strain are examined. (0610-302) Class 4, Credit 4

0610-304   **Materials Testing**
A laboratory course dealing with standard physical tests of various materials, instrumentation used in these tests and the preparation of laboratory reports. (Corequisite 0610-211) **Class 0, Credit 1, Lab 2**

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, Credit **4, Lab** 2

0610-315   **Principles of Mechanical Design I**
Mechanics of materials as applied to mechanical design. Principles of deflection, stress, bending and torsion in parts. Working stresses and failure in parts. Design shafts, springs, and screws. (0610-303) Class 4, Credit 4

0610-316   **Principles of Mechanical Design II**
Mechanical design of machine components—clutches, brakes, lubrication ball and roller bearings, spur gears. (0610-315) 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**

0610-404   **Applied Mechanics of Materials**
The basic concepts of strength of materials as applied to mechanical design are reviewed in depth. Includes the study of the concepts of stress and strain, the stress-strain relationship and combined stress. Fatigue and properties of materials and analysis of mechanical fatigue, theories of failure. Application of these concepts to the analysis of machine members. (0610-303, 1019-420 concurrently) **Class** 3, **Recitation** 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 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. (1019-421 or concurrently) **Class 3, Recitation** 2, **Credit** 4

0610-406   **Dynamics of 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 432) **Class** 3, **Credit** 4, **Lab** 2

0610-407   **Mechanical Engineering Technology Lab I**
A course in mechanical laboratory techniques and the preparation of laboratory reports; experimental work in statics, strength of materials, experimental stress analysis and dynamics. Instruction in the preparation of laboratory reports. (0610-405 and 0610-230 or 432 concurrently) **Class 1,** Credit **2, Lab 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 2, Credit 4

0610-409   **Mechanical Engineering Technology Lab II**
A course in laboratory techniques, the analysis of experimental result and the preparation of laboratory reports. Experimental work in materials science and plastics technology will be conducted with special emphasis on plastics technology. (1011-273; corequisite 0610-416) **Class** 1, **Credit** 2, **Lab** 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; corequisite 1016-421) **Class 3, Recitation 2, 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 and ceramics properties and structure. (1011-273, 0610-211) **Class** 3, **Recitation 2, Credit 4**

0610-432   **Computers in Mechanical Technology**
This course introduces several software applications and the use of the Microsoft Windows (Windows 95) operating system. Basic use of the PC computer is taught: file management, setting up file systems, formatting floppy disks, virus protection. Students learn the fundamental operations of Windows, such as file copying, drag-and-drop operations, using the "clipboard," saving files. Students are given a thorough grounding in the use of Microsoft Office: Word for word processing, Excel for spreadsheets, and PowerPoint for presentations. Special features of the applications are covered such as equation writing preparing charts and graphs, drawing figures, use of clip-art, and object linking and embedding (OLE). All instruction and testing are done in the PC laboratory with one student per computer. Class I, Credit 2, Lab 2

0610-440   **Applied Thermodynamics 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. (1019-421 or permission of adviser) 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 gases and pure substances, are studied. Introduction to heat transfer by conduction, radiation and convection. Selection of heat exchangers. (0610-421 or permission of adviser) **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, 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. (1019-422 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 **con**servation principle, dimensional analysis and fluid momentum. Also covered are laminar and turbulent flow in pipes and products, fluid machinery, fluid meters and lifting vanes. (1019-422 or permission of adviser) **Class 3 Recitation 2**, **Credit** 4

0610-465   **Thermodynamics/Fluids 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, **Credit 3, Lab 3**

0610-499   **Mechanical Technology Co-op**
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 gears. The design and selection of hydrodynamic and relling element bearings are studied. (0610-404,230 or equivalent) **Class 3, Credit** 4, **Lab** 2

0610-508   **Machine Design II**
The study of the machine design principles in a design term 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, Credit** 4, **Lab** 4

0610-509   **Product Design**
Integrates the product development and design process 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, **Credit** 4, **Lab 3**

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 Products 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**

0610-530   **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.(0609411,460,1019422) **Class 4, 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. Field trips are taken to representative energy facilities. (0610440,460) **Class** 4, **Credit** 4

0^10-542   **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. (0610-460 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 useenvironments. 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 18

Telecommunications 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. Enrolled as a freshman in the telecommunications engineering technology program. Class 1, Credit 1

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

0614-464   Signaling,Transmission & Switching in Voice Communications
This distance learning 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. This course covers many of the topics in the Voice Communications (0614-474) 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 0602-200 or equivalent) Class 4, Credit 4

0614-473   **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 should be able to choose the most efficient and cost-effective transmission medium for communication circuits and be able to design the links based on the data to be transmitted and the environment. (0609-333) **Class 3, Credit 4, Lab 2**

0614-474   **Voice Communications**
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. (0614-271 and 0602-200 or equivalent) Class 3, Credit 4, Lab 2

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. (0614474,0614477) Class 4, Credit 4

0614-477   Networking Technologies
Provides a practical overview of data communications from the point of the OSI seven-layer protocol model. This course covers the operation of the lower four layers in detail by examining various protocols. Examples of protocols which do not exactly fit the OSI model are included and compared to the reference model. Special emphasis is placed on internetworking and local-area networking. A laboratory ensures a level of networking competency and provides reinforcement of some of the concepts developed in the lecture. (1016-319 or equivalent, 0614-271 or UNIX proficiency) Class 3, Credit 4, Lab 2

0614479   Network Management
Provides an intensive practical experience in network management. The technical and management issues associated with the administration of complex, highly integrated networks are examined using various hardware and software tools. Case studies and projects emphasize "real world" experience. (0614474,0614477) Class 4, Credit 4

0614480   Introduction to Telecommunications Policy & Issues
This course provides an introductory overview of domestic and international telecommunications policy and issues including trends and standards. The course starts off with a brief history of U.S. telecommunications development with the emphasis on the regulatory environment and continues with a discussion of current U.S. regulatory status at the state and federal level in the face of sweeping changes in the regulatory arena. (0614-271) Class 4, Credit 4

0614-499   Telecommunications Co-op
One quarter of appropriate work experience in a telecommunications related industry. (0609-363, 0609407, 0614474, 0614477 or permission of academic adviser) Credit 0

0614-571   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. Routers are configured for IP, IPX, frame relay, over various LAN, WAN and synchronous facilities. (0614475, 0614477,1019422) Class 3, Credit 4, Lab 2

0614-574   Network Planning & Design
This advanced course exposes the student to the practical aspects of network design. The emphasis is on providing the student with design skills applicable across a multi-vendor environment. (0614479,0614-571) 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 24

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, Credit 4, Lab 3

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, Credit 4, Lab 2

0617-262   **CAD for Mechanical Drafting & Design**
A second course in engineering documentation for students in mechanical and manufacturing engineering technology. Emphasis is on advanced 2-D construction, 3-D solid modeling and design drawing generation. A PC-based CAD package is used for all work related to the course. Emphasis is also placed on proper dimensioning and modeling techniques. In addition, students observe demonstrations of links to other 3-D CAD systems and to both computer-aided manufacturing and computer-aided engineering tools. Class 3, Credit 4, Lab 2

0617-271   Fundamentals of Solid Modeling
This course is intended for transfer students who have a background in a solid modeling package other than is used in 0610-220. Students will learn the fundamentals of Mechanical Desktop, in preparation for taking 0610-220. Credit 1, Lab 2

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 & actuators and real-time programming. Concepts in networking and distributed systems will be introduced also. Students will use C or C++ programming language to control experimental setups in the laboratory. (C or C++ programming language) Class 3, Credit 4, Lab 2

0617-420   Manufacturing Processes II
This course will focus on the basic understanding and application of non-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. (Manufacturing Processes I) 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. (1016-319) Class 4, Credit 4

0617-440   Production & Operations Management I
This course is designed to provide the student with knowledge of statistical quality control (SQC) and value analysis/value engineering (VAVE). (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, Synchronous Manufacturing, Theory of Constraints, Work Simplification and Operations Research. The theories of Goldratt, Deming, Schonberger, Suzaki, Shingo, Black and other current authors will be introduced. (0617-436) Class 4, Credit 4

0617-455   Introduction to Electronic Manufacturing
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 3

0617-456   Electronics Manufacturing with SMT
This course provides an in-depth study of materials, analytical procedures and manufacturing processes related to surface mount electronics manufacturing. The lecture topics will include design and manufacturing standards, stencil printing, component placement, soldering, cleaning, testing inspection, real-time process control, and CAD/CAM integration. The laboratory projects for this course will include analytical analysis of raw materials, solder joint reliability substrate inspection and a detailed process study of stencil printing, component placement, soldering, post-solder inspection and rework and repair. (0617-455 or prior work experience in the field) Class 2, Credit 3, Lab 2

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 3-D solid models using an industry leading hybrid parametric 3-D 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. (0608-210,0617-262) Class 3, Credit 4, Lab 2

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. (0609-411) Class 2, Credit 3, Lab 2

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 modem their instructions to CNC machine tools to actually cut the finish part from raw stock. CAD/CAM integration concepts are presented. (0617-220,261, or 460) Class 3, Credit 4, Lab 2

0617-472   Tool Engineering
This course teaches the principles of design for industrial tooling. The course discusses the concepts of jig, fixture, measurement, die and automated equipment design, engineering analysis and manufacture. Workplace locating, supporting and clamping systems are emphasized. (0617-420, 261) Class 2, Credit 3, Lab 2

0617-475   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. (0617-410,470,471,485) Class 3, Credit 4, Lab 2

0617-485   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. (0617-410, 470) Class 3, Credit 4, Lab 2

0617-499   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. (0617-436, 0617-440, and 0617-441, 0617-475, 0617-485) Class 1, Recitation 4, Credit 3-4

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I (1*17-53® Special Topics in Computer Integrated Manufacturing
^HfJ^js course is designed as a technical elective offered to enable students to
^Ej$ue subjects of special interest to themselves. Subject matter is limited to
the area   CIM. Students will be given the opportunity to present a proposal
outlining their goals for the course. Upon approval by the course instructor
tudents 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
I .xpected to work in areas and on problems of concern to the manufacturing
I 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, intercolle-
giate 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 stu-
dent 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 nec-
essary 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 adviser. The students will become
more knowledgeable about the computer engineering technology discipline,
career options and ethical issues. (Enrollment as a freshman in the computer
engineering technology program) Class 1, Credit 1, Lab 0

0618-220 Electronic Fabrication Techniques
An introduction to the electrical/computer/telecommunications engineering
technology field with an emphasis on the hands-on laboratory skills that stu-
dents will need during their first two academic years. These skills include cir-
cuit 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. Class 1, Credit 2, Lab 2

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 program-
ming 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. (Satisfactory Computer
Competance Placement Test, 0610-230 or 0602-200)Class 3, Credit 4, Lab 2

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, Credit 4, Lab 2

0618-233 Technical Programming III
The final course of a three-course sequence, in developing software for the
solution of technical applications. Specifically, clasical 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 sci-
entific 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, Credit 4, Lab 2

0618-301 Digital Fundamentals
A first course in digital fundamentals. Topics include binary arithmetic,
Boolean algebra, logic gates, Karnaugh mapping, sequential and combinato-
nial logic circuits, and an introduction to state machines. (0609-201,0609-221;
corequisite 0609-222) Class 3, Credit 4, Lab 2

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,
Credit 4, Lab 3

0618-320 Principles of Electronic Design Automation
An introductory 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 behavior, data-flow and structural modeling
of both combinatorial and sequential logic, design methodologies, synthesis
and optimization. Synthesis of VHDL for PLD, CPLD and FPGA applications
will be emphasized, as well as ASIC migration. (0618-438 and a formal, struc-
tured programming course) Class 3, Credit 4, Lab 2

0618-339 Microcontrollers
An advanced course in interfacing microcontrollers to sensors, actuators and
input/output devices. Topics include measurement of light and temperature
levels, interfacing issues related to keypfds, LCD panels and LED display
modules, 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.
(0618-301,0618-303) Class 3, Credit 4, Lab 2

0618-413 Applied Microprocessors
Applications of microprocessors for engineering technology students. The
applications of the INTEL 8085 microprocessor, with an emphasis on the
interface to SDK-85 microcomputers are used in the course. (0609-411) Class
2, Credit 4, Lab 2

0618-438 Digital Systems Design I
An advanced course in the design techniques of complex combinatorial and
sequential logic circuits and subsystems. Emphasis is on the use of system-
atic 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, Credit 4, Lab 2

0618-499 Computer Engineering Technology Cooperative Education
One quarter of appropriate work experience in a computer related industry.
(0618-339,0602-212,0609-407 or permission of academic adviser) Credit 0

0618-561 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 ana-
lyzed. 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,
Credit 4, Lab 2

0618-562 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, Credit 4, Lab 2

0618-563 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 build in 0618-562.
More complex peripherals, cache principles, multimaster 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, Credit 4, Lab 2

0618-571 Topics in Computer Engineering Technology
A project-based capstone course for the students in the computer engineering
technology program. Working in design teams of two to four students each,
they will specify, design, manage and implement a complete design project.
The specific projects will be based on the students' and faculty's profes-
sional/personal interest, but it is required that the design projects emphasize
the product development cycle of an embedded system design. (Fifth-year
status) Class 3, Credit 4, Lab 2

0618-580 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 sponsor-
ing faculty. The design project must be within the computer engineering
technology discipline. (Fifth-year status in the computer engineering technol-
ogy program) Credit 4

0618-599   **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 program chair, academic adviser) **Credit 2-4**

Hospitality & Service Management

0619-220   **Service Management Career: Hospitality Industry**
Seminar designed to define career opportunities in the food, hotel and travel industries. Students receive guidance in developing career objectives. Leading industry executives participate. **Class 2, Credit 2**

0619-410   **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. (1016-301,311 or permission of instructor) **Class 4, Credit 4**

0619-426   **Technology in Service Systems**
A survey of the technologies used in the food, nutrition, hotel and travel service industries. Technologies explored include those associated with product quality, production, raw materials handling, measurement, distribution, information, marketing, waste reduction, security, customer interface and supplies interface. Tours and guest speakers enrich the classroom learning. Student teams chart product/service systems and identify technologies that could be applied to increase quality and/or decrease cost. **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 additionally will begin to establish your own personal leadership and management style based on these examples and exercises. The course makes extensive use of lectures, laboratories and industry expertise. **Class 4, Credit 4**

Nutrition Management

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**

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**

0620-525   **Advanced Nutrition/Diet 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   **Advanced Nutrition/Diet 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 practicums involving nutrition care in community facilities are required. Assignments are arranged by the instructor Practicum hours by arrangement. Class **3,** Credit **8**

0620-551   **Food Systems Management II**
A supervised practice course providing practical learning experience in food systems management in a large health-care setting. Students observe, analyze and practice. The theoretical basis for practice has been provided in courses throughout the sophomore and junior years. Practicum in hospital by arrangement. **Class 1, Credit 8**

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**

0620-560   **Clinical Dietetics I**
An intensive integrated study and application of advanced nutrition and diet therapy theories and principles. Primarily structured to integrate class lectures with practicum experience in a hospital setting. Practicum hours by arrangement. **Class 4, Credit 4**

0620-561   **Clinical Dietetics II**
An intensive integrated study and application of advanced nutrition and diet therapy theories and principles. The course is primarily structured to integrate class lectures with practicum experience in a hospital setting. Designed for senior students in the coordinated dietetics program. Practicum hours by arrangement. Credit **4**

0620-562   **Clinical Dietetics III**
A continuation of 0620-560,561 in the succeeding quarter, with the practicum experience being conducted primarily in the hospital. Practicum hours by arrangement. **Class 4, Credit 4**

0620-563   **Clinical Dietetics IV**
A continuation of 0620-560,561 in the succeeding quarter with the Practicum experience being conducted primarily in the hospital. Practicum hours by arrangement. Credit **8**

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 markets. 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 the global economics of food-service 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**

^ftl-315 Food Service Marketing

provides students with a business-to-business perspective of the marketing of nroducts 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

0621-321 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,copyrighting, 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

0621-324 Food Purchasing

Principles of foodservice purchasing; selection and procurement, distribution systems and the purchasing function and activities. Topics include measurement, foodservice purchasing terminology, organization, specifications, recipe standardization, recipe conversion, optimal purchasing practices and purchasing principles for major food commodity categories including government and industry standards. 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. (0621-314) Class 3, Credit 6, Lab 10

0621-410 Food Processing & Quality Assurance

An introduction to traditional and contemporary food processing methodwith 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 6, Lab 6

0621-424 Food & Labor Cost Control

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 food, hotel, travel industry monitored by the Office of Cooperative Education and Career Services and the food, hotel and travel management program. Designed for the student to experience progressive training on the job as related to the academic option. Freshmen begin co-op in 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

0621-511 Banquet & Catering Management

Designed to give students management experience in planning, organizing, supervising, preparing and serving foods for specially booked functions. Students plan catered events for 80 people and invite the public to attend. Class 1, Credit 4, Lab 12

0621-512 Design & Layout of 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

0621-515 Food Service Concepts Development & Planning

Provides students with the theoretical basis for developing and implementing sound foodservice plans and theme concepts. Gives consideration to the variety of financial, economic and demographic factors influencing concept planning. Special emphasis is placed on developing foodservice business plans, budgets, site selection and understanding the importance of these variables on the theme, atmosphere, style of service, menu prices and labor costs of the operation. Class 4, Credit 4

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

0621-531 Foodservice Commodity Assessment

Technical and economic analysis of common foodservice commodities. Special emphasis is placed on examining product value relative to price, cost savings, service enhancement, nutritional value and overall customer preference. Both fresh and processed commodities are examined. Extensive exposure to industry representatives. Class 4, Credit 4

0621-532 International Food Distribution Seminar

Presentation and discussion of current and relevant issues in foodservice 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

0621-545 Beverage Operations

A study of the principles, methods and practical applications of beverage management as they apply to the commercial beverage industry. Emphasis is on administrative objectives, operational procedures and internal control. Class 2, Credit 2

0621-554 Senior Career Seminar

A variety of courses are offered under this course number. Titles will appear in the course listing 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

Hotel & 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 & 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 — Facilities & 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 FHTM 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, and capital budgeting strategies are examined. (0101-301 or permission of instructor) Class 4, Credit 4

0622-480 — Human Resources Management
This course presents FHTM 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 HRM 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

0622-510 — Convention Management
Provides the student an opportunity to explore the function of conventions from the point of view of die 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

0622-530 — Hotel Law
Policies, laws and liabilities are examined as they pertain to the innkeeper. Focus is on current management problems and on the legal responsibilities of management. The rights of innkeepers also are discussed. 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 organizational already developing space tourism. Students will make recommendations for

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

0622-560 — Tourism Concepts
Emphasizes tourism as a system and develops its interrelated and interdependent elements. Major economic, environmental and socio-cultural concepts are discussed, including interactions between visitors and host communities. The role of private and public sector tourism organizations is introduced by examining tourism destinations throughout the world. Class 4, Credit 4

0622-570 — Tourism Planning & Development
Examines the processes involved in planning and developing a tourist 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

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, visitors, 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 & Tourism Management

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

0623-210 — Introduction to American Airlines SABRE
Students acquire operational proficiency with American Airlines, SABRE reservation system. Using SABRE's live and training modes, they address topics such as creating passenger name records, itinerary pricing, fare quotes, queues and flight information. This course is equally divided between lecture and Travel Lab simulations. Class 4, Credit 4

0623-312 — Travel Reservation Procedures

0623-375
Geographers are concerned with the physical, politica... tion of the world. Geography is a field in which th... social and physical sciences converge in the study of s... geography applies these themes to the travel, touri... industries. It is also concerned with the social, cultu... ronmental aspects of places. The identification of maj... attractors of people's leisure time, energies and inte... course. Class 4, Credit 4

0623-410
Introduces the student to the field of meeting man... point of view of a corporate or independent meeting... the various phases of meeting planning. Students als... tion of goals and how meetings may be evaluated... investment perspective and the satisfaction of the att... grams are investigated and tested, and a variety o... examined. Class 4, Credit 4

0623-413 — Corporate Trav...
The processes and techniques used to promote touris... munities to the corporate buyer. Emphasis is on the ro... plays in marketing the corporation. How promotional... used by the corporate meeting planning and travel ma... is discussed. Class 4, Credit 4

0623-420 — Corp...
The specific travel goals, accounting policies and infor... of corporate (commercial-business) travel. Three majo... rate travel are examined: corporate travel operated th... coordinator, corporate travel provided by the retail tr... tive travel. Major topics include corporate travel policy... bition marketing, requests for proposal (RFP), house... and the sales blitz. Class 4, Credit 4

0623-520
Examination of the budgeting process associated wit... keting corporate exhibits. A major focus of the cour... exhibits based on cost-to-revenue ratios. Class 2, Credi...

0623-522 — Negotiation &...
Examines the negotiation process within the hospitalit... exploring the nature and sources of interpersonal con... Collaborative versus competitive approaches to man... cussed. Role-play situations are used to differentiate... tion strategies. Class 2, Credit 2

0623-530 — Intermediate...
Enables students to progress to the total automation... SABRE. The focus is to provide an overall picture of h... provides accurate invoicing and readable itineraries. T... ticketing, queues, currency conversions, segments and... Most of the course work is done in SABRE's live mode.

0623-535 — SABRE...
Uses SABRE's direct reference system (DRS) as a basi... cerning non-airline-oriented information. Designed... travel and tourism majors. Topics include car sales... descriptions, hotel availability, tour index, immigratio... and FAACTS reports. Class 4, Credit 4

Instructional Technolog...

0630-380   Introduction to Hydrology
An introduction to hydrology, covering surface water, groundwater and water chemistry. Students learn theoretical background as well as practical applications of the science to environmental management. Topics include the hydrologic cycle, surface water, vadose zone, groundwater flow, groundwater monitoring, normal and polluted water chemistry, landfill hydrology and hydrology of Monroe County. (0630-370,372) **Credit** 3

0630-382   Introduction to Hydrology Lab
Laboratory to accompany 0630-380, Introduction to Hydrology. (Credit for or coregistration in 0630-380) Credit 1

0630-440   **Environmental Permitting**
A practitioner-oriented examination of why environmental permits are required; how to get a permit; when the procedure must begin; how long each step will take; where to get information, forms, guidance, etc.; who will be involved and what are their roles, perspectives and motivations; and what does it take to "live with" permit provisions and requirements. Students learn to develop realistic strategies, sequences and schedules for securing permits and to develop appropriate methods for complying with the provisions and restrictions of environmental permits. (Open only to fourth-year environmental management majors or with departmental approval) **Credit 4**

0630-444   **Remedial Investigation/Coirective 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) **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, (college chemistry, physics and general biology) **Credit 4**

0630-451   **Environmental Health & Safety Lab**
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0630-454   **Occupational Safety**
This course is a continuation of 0630-450, expanding on the identification and management of employee safety concerns in the working environment. Topics include OSHA/NIOSH requirements regarding occupational noise exposure, work place monitoring and measurement, exposure to asbestos and related materials, lockout/tagout, established industry-specific and activity-specific safety standards and practices, and development and implementation of project-specific and ongoing operations contingency plans. **Credit** 4

0630-455   **Business, Public Policy & Environment**
Covers concepts of public goods, value of environmental assets, economic development and environmental protection, corporate environmental responsibility, costs and opportunities arising from environmental regulations, new approaches to environmental challenges and international environmental issues. **Credit 4**

0630-480   **Environmental Regulatory Law I**
An overview of environmental law and regulations pertaining to solid waste management at the federal and state levels, with emphasis on New York State. Topics include the federal Resource Conservation and Recovery Act, especially Subtitle D; state environmental statutes and regulations for solid waste management; environmental impact assessments; state environmental policy laws; and the New York State regulatory process for solid waste management facilities. (Open only to fourth-year students) **Credit 4**

0630-490   Project Management
Students gain hands-on, practitioner-oriented skills in resource allocation task scheduling, critical path development, use of Gantt and Pert charts and project management software packages, project budget management, proposal and solicitation development and procurement practices. Applicable to a broad range of educational fields and work situations; projects are tailored to student's area of programmatic interests. (Open only to fourth- or fifth-year students) Credit **4**

0630-509   Senior Project Planning
This individualized course prepares the student for the senior project 0630-511. (Open only to fifth-year environmental management majors) Credit 1

0630-511   Senior Project
Independent work demonstrating the ability to solve a significant solid waste management problem in a comprehensive fashion. The problem focuses on future or emerging technologies as well as current techniques. (0630-509) **Credit 4**

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 the fifth-year environmental management majors) Credit **4**

Health Systems Administration

0635-310   Survey of 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. (Previous experience or course work in health care and permission of chair; pre calculus) 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) **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) 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) 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) Credit **4**

0635-441   **Health Planning & Programming 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) Credit 4

0635-510   **Survey of Complementary & Alternative Medicine**
As the use of alternative and complementary medical treatments grows rapidly among the public and is increasingly found among the therapeutic services offered in conventional medical settings, it is important that the professional health systems administrator and also the lay consumer of medical services have a basic understanding of these alternate treatments and treatment systems. This course will not teach the application of particular techniques or therapies. This course is a descriptive and analytic survey and comparison of different approaches to health and healing, the research bearing their effectiveness and to what extent, clinically and administratively, they can be integrated into conventional medical practice and settings. Credit 4

0635-512   **Energetic Therapy in Communication**
This course is a descriptive and analytic survey of complementary medicine therapies that involve principles of individual energetic manipulation or cognitive therapies. The course will focus on therapies that are most likely to be integrated into western medical care or have the highest utilization rates among consumers. This course is part of a series of courses in the complementary/integrated medicine certificate program. A portion of the class will be devoted to direct clinical observation experience. Included in course content are: Fundamental principles that support the therapeutic effects of particular energetic or cognitive therapies; clinical research into the use of selected therapies; integration of treatment with these energetic or cognitive therapies.; where to find reliable sources of information for these therapies; and simple case studies for illustrative purposes. **Class/Lecture** 4, **Credit** 4

Department of Military Science
Reserve Officers Training Corps, Army (ROTC)

0640-201   **Introduction to Military Science/Master Student**
Provides a practical introduction to the United States Army, its organization and rank structure; the historical basis for customs and traditions found in the military, discussions of military history, and the impact of the military on American Society. Class 2, Credit 2, Lab 2

0640-202   **Applied Military Dynamics**
Gives the student an introduction to the dynamic capabilities of the U.S. Army. Topics of primary interest include Code of Conduct, Army writing style, operational terms and graphics, and military briefings. Studnts must register for lab under the Department of Physical Education. **Class** 2, **Credit** 2, **Lab** 2

0640-203   **Military Heritage**
Provides a continuation of the dynamics of the U.S. Army Topics of primary interest include Army Writing Style, Counseling, Operational Terms and Graphics, Orders, U.S. Military History, and Military Briefings. Students must register for lab under the Department of Physical Education. **Class** 2, **Credit** 2, **Lab** 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, Credit 2, Lab 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, Credit 2, Lab 2

0640-303   Military & American Society
An introduction to the principles of war and the study of their application to Army decision making process. To use this process to analyze problems can come up with a courses of actions. To understand the command and staff functions. Class 1, Credit 2, Lab 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 level; leadership laboratory. Students must register for lab under the department of physical education. Class 2, Credit 3, Lab 2

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; develop military briefings. Leadership laboratory. Students must register for lab under the department of physical education. Class 2, Credit 3, Lab 2

0640-403   Military Operations
A continuation of military skills training with emphasis on military intelligence/security; operations at the platoon level; staff functions and leadership laboratory; field training exercise. Students must register for lab under the department of physical education. Class 2, Credit 3, Lab 2

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, Credit 3, Lab 2

0640-502   Military Administration & Logistics
Includes discussions and seminars on the Army logistics and processes, supply and property accountability, maintenance management, officer-enlisted personnel management systems: leadership laboratory. Students must register for lab under the department of physical education. Class 2, Credit 3, Lab 2

0640-503   Military Ethics
Examines the ideas and issues that define the role of the military in our society. Emphasis is on the professional and ethical standards required of the military officer and military justice system. 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, Credit 3, Lab 2

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 1700s 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 Science, Reserve Officers Training Corps, Air Force (ROTC)

0650-201   Leadership Lab I
Leadership Laboratory I focuses on benefits, opportunities, privileges and responsibilities associated with an Air Force commission. AF customs and courtesies, AF environment, drill and ceremonies also are covered. Demonstrates flight movement procedures. Responsibility of base units to mission accomplishment. Credit 1

0650-202   Leadership Lab I
Leadership Laboratory I focuses on benefits, opportunities, privileges and responsibilities associated with an Air Force commission. AF customs and courtesies, AF environment drill, and ceremonies are also covered. Demonstrates flight movement procedures. Responsibility of base units to mission accomplishment. Credit 1

0650-203   Leadership Lab I
Leadership Laboratory I focuses on benefits, opportunities, privileges and responsibilities associated with an Air Force commission. AF customs and courtesies, AF environment, drill, and ceremonies are also covered. Demonstrates flight movement procedures. Responsibility of base units to mission accomplishment. Credit 1

0650-210   The Air Force Today I
Course series on the basic characteristics of air doctrine; U.S. Air Force mission and organization; functions of U.S. strategic offensive, general purpose and aerospace support forces; officership; and assessment of written communicative skills. Credit 1

0650-211   The Air Force Today II
Course series on the basic characteristics of air doctrine; U.S. Air Force mission and organization; functions of U.S. strategic offensive, general purpose, and aerospace support forces; officership; and assessment of written communication skills. Credit 1

0650-212   The Air Force Today III
Course series on the basic characteristics of air doctrine; U.S. Air Force mission and organization; functions of U.S. strategic offensive, general purpose, and aerospace support forces; officership; and assessment of written communicative skills. Credit 1

0650-301   Leadership Lab II
Demonstrates commanding effectively in individual drill positions and flight formations, effective execution of cadet officer functions within parade ceremonies and squadron drill movements. Application of personal leadership to both military and civilian activities and comprehension of field training are covered. Credit 1

0650-302   Leadership Lab II
Demonstrates commanding effectively in individual drill positions and flight formations, effective execution of cadet officer functions within parade ceremonies and squadron drill movements. Application of personal leadership to both military and civilian activities and comprehension of field training are covered. Credit 1

0650-303   Leadership Lab II
Demonstrates commanding effectively in individual drill positions and flight formations, effective execution of cadet officer functions within parade ceremonies and squadron drill movements. Application of personal leadership to both military and civilian activities and comprehension of field training are covered. Credit 1

0650-401   Leadership Lab III
Advanced leadership experiences in officer activities give students opportunity to apply principles learned in labs and courses. Orientation for active duty. Credit 1

0650-402   Leadership Lab III
Advanced leadership experiences in officer activities give students opportunity to apply principles learned in labs and courses. Orientation for active duty. Credit 1

0650-403   Leadership Lab III
Credit 1

0650-404   Leadership Lab IV
Advanced leadership experiences in officer activities give students opportunity to apply principles learned in labs and courses. Orientation for active duty. Credit 1

0650-405   Leadership Lab IV
Advanced leadership experiences in officer activities give students opportunity to apply principles learned in labs and courses. Orientation for active duty. Credit 1

0650-406   Leadership Lab IV
Advanced leadership experiences in officer activities give students opportunity to apply principles learned in labs and courses. Orientation for active duty. Credit 1

0650-501   Leadership Lab V
Advanced leadership experiences in officer activities give students Opportunity to apply principles learned in labs and courses. Orientation for active duty. Credit 1

0650-502   Leadership Lab V
Advanced leadership experiences in officer activities give students opportunity to apply principles learned in labs and courses. Orientation for active duty. Credit 1

0650-503   Leadership Lab V
Advanced leadership experiences in officer activities give students opportunity to apply principles learned in labs and courses. Orientation for active duty. Credit 1

Note: Other AFROTC courses can be found under the College of Liberal Arts and College of Business.

Accounting & 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

0680-311   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

0680-341   Information Resources/New Tool
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

0681-200,201,202   **Management Process I, II, III**
A comprehensive three-quarter course in effective supervision and manage-
ment for supervisors and potential supervisors. Approximately 50 topics of
current importance to supervisors are presented, as well as essential manage-
ment principles, business communication and practical supervision tech-
niques. 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 exer-
cises and case studies. (Course extends over three consecutive quarters and
should be taken in sequence.) A management certificate is awarded for suc-
cessful completion of the course. **Credit 4/Qtr. (12 cr. hr. total)**

0681-205   **Organization & Management**
A general introduction to the major management functions and the organiza-
tion of business. Topics include business and personal planning, organizing,
staffing, implementing, directing, control, time management, appraisal, com-
pensation, organization theories, decision making, problem solving, influ-
ences 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 considera-
tion, 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, purchas-
ing 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

0681-239   **Human Resources Administration**
An introduction to personnel administration including an overview and dis-
cussion of employment, equal employment opportunity, job evaluation,
training, performance appraisal, compensation, benefits, personnel planning,
labor relations and other related topics. **Credit 4**

0681-251   **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

0681-253   **Traffic & Transportation Law, Rates, Accounting & Control**
Introduces the role of government in the transportation industry. The evolu-
tion of 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 also are discussed. Credit 4

0681-255   **International Logistics & Transportation**
Introduces the basic skills required to move materials in support of the logis-
tics function internationally. Includes discussions of duties, customs regula-
tions and the various instruments used to facilitate international trade. 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 spe-
cial emphasis on the role of advertising in the marketing mix. Special topics
include agency/client relationship, radio and TV ratings, history of advertis-
ing, the creative process and psycho-graphics. Guest lecturers discuss corpo-
rate campaigns. **Credit 4**

0681-264   **Advertising Evaluation & Technology**
Course presents basic approaches used in planning, preparation and evalua-
tion 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**

0681-333   **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**

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, behav-
ioral 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**

0681-433   **Benefits Administration**
A study of the theory, design, and practical administration of employee ben-
efit 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.
(0681-239) **Credit 4**

0681-434   **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. (0681-239 or
equivalent) **Credit 4**

Quality Management

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-qual-
ity, and the history of quality; a systematic examination of the leading defini-
tions 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 deter-
mining 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 interpreta-
tion of charts for variables and attributes; tolerances, specifications and pro-
cess 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, concep-
tual and communication skills for successful team building and team work-
ing, conferencing, negotiating, and assessing and promoting quality behav-
ior. Case studies, interactive simulations and assessment of individual
leadership characteristics. **(0684-310** or approval of department) 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

0684-410   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

0686-201   Humanities
An interdisciplinary course in which literature, architecture, art, music and philosophy are related to selected historical, economic and scientific forces that have shaped Western civilization. Part of a three-course sequence, this course is concerned with the modern period from the end of the Romantic Age to the present day. Despite the relatedness of these three courses, any of them can be taken alone, and no one course is prerequisite to either of the others. Credit 4

0686-202   Humanities
An interdisciplinary course in which literature, architecture, art, music and philosophy are related to selected historical, economic and scientific forces that have shaped (particularly) Western civilization. Part of a three-course sequence, this course focuses on ancient Greece, Rome and Israel, as well as the Middle Ages. This course has no prerequisites, nor does it serve as a prerequisite for other course. Credit 4

0686-203   Humanities
An interdisciplinary course in which literature, architecture, art, music and philosophy are related to selected historical, economic and scientific forces that have shaped (particularly) Western civilization. Part of a three-course sequence, this course focuses on the development of the humanities from the Renaissance through the Romantic Age. This course has no prerequisite, nor does it serve as prerequisite for other courses. Credit 4

0686-298   Special Topics: Humanities
Experimental lower-division courses are offered under this number; titles appear in each quarter's course listing. Credit 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 multi-paragraph 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 Communications 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

0688-271   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 1-5

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 sucessful business and media communication. (0688-220 or 0502-220 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

0688-345   **Oral Skills for Technical Communications**
Focuses on effective techniques for oral presentation of technical material and participation, both as leader and member, in formal and informal meetings. Credit 2

0688-347   **Promotional Writing**
Focuses on practical guidelines for preparing marketing materials including brochures, data sheets, trade press articles, press kits and advertising copy. (0688-220 or equivalent) Credit 2

0688-348   **Managing the Project**
Principles of project management are studied and applied in cases and examples taken from the field of 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. Credit 2

0688-351   **Writing for the Organization I**
Designed for non-professional writers whose positions frequently require preparation of public relations correspondence as well as copy for inbound and outbound company publications. Emphasis is on developing clarity, precise use of language, and style in writing letters and news releases, reporting information and creating feature articles. (0688-220 or equivalent) Credit 2

0688-352   **Writing for the Organization II**
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 news and feature copy, including crisis communication, adapting interviews for print and statements for various media. (0688-351 or equivalent) Credit 2

0688-353   **Scripting AV & Video Presentations**
Introduces writing and production techniques for audiovisual and videopresentations. 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

0688-361   **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. Credit 4

0688-363   **Techniques for 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. 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 arenas. The editing of scientific writing is 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 of Power Point, HTML editors 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 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. (0688-371 or equivalent) 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. (0688-262, 0688-371 or equivalent; must be taken in sequence) Credit 3

0688-373   Electronic Presentation Design

This course introduces basic techniques for the creation of electronic presentations using computer software. Students learn to design individual slides and transparencies and dynamic and effective assembled presentations. The software application PowerPoint is used. 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. 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 flatbed 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

0688-398   Special Topics: Communications

Special topics are experimental courses announced quarterly. Credit 1-8

0688-465   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

Deaf Studies

0690-211   American Sign Language I

The course includes introduction to approximately 300 basic conversational signs and grammatical principles needed to engage in survival-level conversations with deaf people. Fingerspelling and background information on Deaf culture and community are included. Each class period we will have small group, large group and pair interactions. Credit 2

0690-212   American Sign Language II

This course expands the basic principles presented in ASL I. The course develops the participants' ability to use linguistic features, culture protocols, and core vocabulary to function in basic ASL conversations that include ASL grammar for giving directions, describing others, making requests, talking about family, occupations and routines, and attributing qualities to others. Videotaping of participants for evaluation and feedback is included as aninstructional strategy. (0690-211 or equivalent sign skill) Credit 2

0690-213   American Sign Language III

This course is a continuation of ASL II expanding the emphasis on ASL grammar, syntax, spatial referencing, and vocabulary development. This course is designed to develop further communicative competency in ASL conversations beyond the basic level that include telling life events, telling time, asking for clarification, and giving directions. Classroom activities include practicing dialogues, short stories, narratives, and short conversations. Fingerspelling and background information on Deaf culture and community are included. Students will be videotaped. Each class period we will have small group, large group and pair interactions. (0690-212 or equivalent sign skill) Credit 2

0690-241   Aspects & Issues of Deafness I

Develops knowledge and understanding of the effects of hearing impairment, particularly with regard to the audiological, psychological, educational and vocational implications. Class activities include a simulated deafness experience, films, lectures and discussions. Credit 3

0690-242   Aspects & Issues of Deafness II

Examines deafness from a cultural perspective, focusing on what constitutes culture, what characterizes deaf culture, dynamics of interaction between the deaf and the larger community and historical perspectives on deaf heritage. Films, individual case studies, cultural simulation, discussions and lecture are implemented. (Recommended: 0690-241) Credit 3

0690-311   American Sign Language IV

Students continue sign language skill development as the language is used among deaf community members. Students are exposed to many new signed expressions: grammar, syntax and lexical items of ASL. Videotapes, dialogues, language games, lecture and readings are used in presentation of this content. (0690-213 or equivalent sign skill) Credit 2

0690-312   American Sign Language V

A continuation in a series of American Sign Language courses. This course continues the study of grammar, syntax and lexical items of ASL. Cultural aspects of the deaf community are considered as they relate to the language of deaf people. (0690-311 or equivalent sign skill) Credit 2

Math & Science

0692-201   Mathematical 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. A math assessment is required. Credit 4

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 I

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. (Intermediate Algebra) 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 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

0692-221   Technical Math I

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. (0692-201 or 0692-211 or 0692-221 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, (high school algebra) Credit 4

0692-250   **Introduction to Computers & Programming**
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. (Distance learning offering) (High school intermediate algebra) Credit 4

0692-311   **Business Statistics I**
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 arealso included. (0692-212) Credit 4

0692-312   **Business 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

0692-331   **Sport Physiology/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) Credit 4

0692-332   **Exercise Prescriptions 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.(1001-313 or 0692-331) Credit 4

0692-333   **Exercise Prescriptions for Special Populations**
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 that would benefit from appropriately designed and prescribed exercise programs. The course will review theoretical and diagnostic value oftesting, create exercise prescriptions, and understand the therapeutic benefit exercise will have on specific conditions. Some of the 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. (1001-313 or 0692-331,0692-332) Credit 4

Emergency Management

0694-311   **Earth Science**
Applied meteorology and crustal dynamics (earthquakes, volcanic activity, hurricanes, tornadoes, floods, etc). Credit 4

0694-321   **Man-made Hazards**
Chemistry of hazardous materials, including toxics, caustics, flammables, and reactives, and their effects on humans. Also, the physics of radiation, the design of commercial power reactors, and reactor disaster scenarios. Credit 4

0694-401   **Emergency Preparedness Law**
Principle statues, regulations, and court cases governing emergency preparedness. (0694-311 or 321) Credit 4

0694-471   **Emergency Planning & Methodology**
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. (0694-401,311,321) Credit 4

0694-475   **Terrorism**
The course examines the issues of terrorism as they relate to the planners and responders at the local level. The course examines the history and patterns of terrorism 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 operations 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. Additonally, a significant emphasis will be placed on examining incident management tools, such as the incident command system. Class/Lecture 4, Credit 4

0694-481   **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. (0694-401, 311, 321; 0694-471 may be taken concurrently) Credit 4

Multi/Interdisciplinary 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, roleplays, 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

0697-240   **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

0697-428   **Training Design & Delivery**
The new work place 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

0697-431   **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 area history of the study of corporate culture, an analysis of leadership styles and communication patterns in the work place, 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 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. The strategies covered include, but are not limited to, community building, managing change, identifying resistance, negotiation/mediation. Teaching strategies include case studies, experience logs, organization assessment inventories, and assigned readings. Credit 4

0697-433   **Teams & Team Development**
Meets the increasing need to understand and participate in teams in the work place. 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 teamskills and reinforce team theory. Credit 4

0697-441   **Creative 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

0697-442   **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

0697-444   **Self-Directed Learning in the Work Place**
This multidisciplinary course provides a practical overview of self-directed learning: theory, design, development and implementation. Students examine self-directed learning from personal and organizational perspectives that include individual learning differences. Students' projects focus on indentifying learning objectives and utilizing a systems approach for promoting active learning in the work place Credit 4

0697-448   **Managing Learning & Knowledge**
The new work place requires new solutions. In this environment, training that is well-planned, presented, and meets organization need stakes 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

0697-451   **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 andscience BS degree students. (Approval of adviser) Credit 4

0697-452   **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

0697-462   **Empowered Leadership**
This Multidisciplinary course has a three-tier structure: a fundamental look at the theories and practices of leadership; a study of leadership styles and their impact on the work environment; and are flection 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

College of Business

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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

0101-303   **Ethics & Accounting**
Introduction to major philosophies of ethical behavior and theories of justice. The focus is on developing skills for solving ethical problems facing professionals such as accountants. Several specific accounting cases, current and "classic," are analyzed. (0101-301) Credit 2

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, bailment 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

0101-408   **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, prior or concurrent registration in 0104-441, 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

0101-431   **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

0101-435   **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

0101-541   **Analytical Skills in Accounting**
Integrates knowledge obtained in earlier accounting courses. Uses cases to consider such topics as financial reporting and managerial accounting projects with uncertainty, incomplete information and errors in the underlying data. (0101-409, senior status) Credit 2

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

Management

0102-011   **Freshman Seminar**
Introduction to college life for College of Business freshmen. Students meet weekly in small groups with a facilitator. Individual sessions focus on getting to know RIT and the College of Business, self-discovery, establishing effective relationships, coping with stress and other topics important to the group. The seminar is experiential by design and relies on the active participation of each student. Required of all freshmen in the College of Business. Credit 0

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

0102-231   **Quality Concepts**
Introduction to quality and to career planning. Topics include total quality management, the quality gurus, diversity in the work place and self assessment career goals. Faculty present information on career areas of concentration in the college. Credit 4

0102-232   **Quality Applications I**
A continuation of TQM. Topics include teamwork and empowerment; the use of quality tools to organize, present, and understand data; and problem solving. Students work in teams to solve problems, using the quality tools, and present their results to the class. Credit 2

0102-233   **Quality Applications II**
In this final course of the sequence, students use the Xerox Quality Improvement Process as a vehicle to study customer satisfaction, the relationship between customer requirements and supplier specifications, benchmarking and continuous improvement. Meeting skills are reinforced through practice of the skills developed in previous quarters and extended through development of a code of conduct. Tools from the 7 Management Tools are introduced as needed. Focus on the individual student's success culminates in discussion of the cooperative education process and generation of a resume. 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

0102-310   **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 each

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 each

Note: other Air Force ROTC course listing can be found under the college of applied science and technology.

0102-350   **Principles of Managerial Leadership**
Familiarizes printing management students with basic principles and techniques of managerial leadership and organizational behavior. Organized around the key management functions of planning, organizing, leading and controlling, with an emphasis on the human aspects of management, and achieving high productivity and total quality. Case preparation about a problem relevant to the printing industry is required. (Service course for printing majors only) Credit 4

0102-360   **Survey of International Business**
Survey of international business issues and strategies. Subject areas include the macro issues related to the economic, political and human environments of international business; i.e., how governments intervene in global markets, business, etc. In addition, the functional operations of a global firm will be examined; i.e., international marketing, international finance. (Sophomore status) Credit 4

0102-405   **Introduction to Work Organizations**
Introduction to the concept of work organizations and how they function. Students learn of the different industries in which work organizations fall and how to become and help others become effective members of organization through motivation, leadership, interpersonal conflict management and stress handling. Additionally, the student learns about the diverse work force, social issues and government regulation of work. (Distance Learning course, not for College of Business majors) Credit 4

0102-406   **Management Concepts**
Introduction to the four functions of management: planning, organizing staffing and controlling. In addition, topics such as organizational change, stress, productivity and decision making are covered. (Distance Learning course, not for College of Business majors) 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. Concepts of organizational behavior such as creative problem solving are applied to total quality management. (Junior status) Credit 4

0102-432   **International Management**
An analysis of international business issues facing small, medium and large firms conducting business in Europe, the Middle East, Asia, Africa, Latin America and North America. Particular emphasis is placed on the differential effect of cultures on management, individuals, groups and organizational performance. Variations in leadership styles, communication, negotiation, risk tolerance and motivation in different cultures are examined. (0102-360, junior 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. (0102430, junior 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 total quality. The human resources section of the Malcolm Baldrige Quality award is studied, along with case analysis of Baldrige winners. (0102-430, junior status) Credit 4

0102-460   **Management & Leadership**
The role of managerial leadership in guiding employee contributions to the attainment of organizational goals. The personal attributes of leaders are described, along with the leader's contributions to teamwork and achieving total quality management. Also includes an overview of management functions. (0102-430, junior status) Credit 4

0102-462   **Management Development**
Emphasizes the acquisition of management skills such as communicating, delegating, motivating and coaching. Students are given feedback on their management skills. An overview of management development and training techniques also is presented, along with basic aspects of career management. Examines manager's role in achieving total quality management. (0102-430, junior status) Credit 4

0102-465   **Multinational Business Operations/Strategy**
Focuses on the strategic challenges faced by the management of a corporation operating in a global environment. Specifically addresses the issues faced by planners in functional areas as they develop strategic planning to manage in a global economy. (0102-360, junior status) Credit 4

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

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

0102-520   **Seminar in Quality Management**
Brings together elements of TQM from operations management, marketing, and human resources management and training. Emphasis is on customer satisfaction, quality improvement, problem solving, team building and benchmarking. (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

0102-547   **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

0102-551   **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 the role of quality in the value chain. Students learn how to formulate and implement effective business and corporate-level strategies. Extensive use is made of complex cases and a computer simulation of decision making in a highly competitive industry environment. (0102-430, 0105-363,0104441,0106-401, senior status) Credit 4

0102-575   **International Seminar**
A variety of special-interest topics in the field of international business. Sample topics include international negotiation, regions of the world (Europe, Middle East, Japan), global technology, the role of multinational corporations, economic transformation in transnational economies and the impact of highly developed industries on home and host countries. (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. Credit 4

0104-420   **Theory & Application in Basic Financial Concepts**
Develops some of the basic principles of finance and shows some of the ways in which they can be applied to business decisions and problems. Concepts and applications include time value of money, ratio analysis, cash budgeting and pro forma forecasting, credit decisions, capital budgeting techniques, forms of borrowing and capital structure decisions. (Distance Learning course, not for College of Business majors) Credit 4

0104-441   **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. (1016-319,0101-301,0511-301, junior 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. (0104-441, 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. (0104-441, junior status) Credit 4

0104-504   **International Finance**
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. (0104441, 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. (0104-441, 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

0105-415   **Marketing Total Customer Satisfaction**
Review of the fundamentals of marketing: formulating marketing strategy (segmentation and positioning) and the marketing mix (price, product, promotion and distribution decisions). The mechanisms of delivering total customer satisfaction throughout the marketing mix are emphasized through applying quality management principles to the marketing function. (Distance Learning course, not for College of Business majors) Credit 4

0105-440   **Marketing on the Internet**
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 or equivalent) 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 types 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. (0105-336 or equivalent, 0112-310 or equivalent) Credit 4

0105-505   **Buyer Behavior & Satisfaction**
A study of the determinants of consumer and business buying behaviors. Emphasis is on identifying customer requirements and measuring customer satisfaction using a decision-making process. (0105-363, junior status) Credit 4

0105-530   **Marketing Channels**
Focuses on the problems and techniques of marketing by and through channel members (i.e., retailers, distributors, agents and independent reps). Customer satisfaction depends not only on the decisions that manufacturers make but also on what happens in the channel; therefore, this course addresses how to plan, develop and maintain effective interorganizational partnerships in distribution so that sustainable competitive advantages can be achieved. (0105-363, junior status) Credit 4

0105-550   **Marketing Management Problems**
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 management 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 customers in order to guide the decision making of marketing managers. Topics include problem formulation, sources of marketing data, research design, data collection and analysis. (0105-363, 1016-319, junior status) Credit 4

0105-553   **Sales Management**
The role, activities and tools employed by sales managers. Continuous improvement and defining and meeting the requirements of both internal and external customers are presented as the foundations of effective sales management. (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   **International Marketing**
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 management environment is emphasized. Relationship management/partnering with customers and truly seeking to meet their requirements are discussed as key to long-term success. (0105-363, junior status) Credit 4

0105-560   **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 and strategic considerations. (1016-319, 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 and total quality. Addresses, as a theme, what tools and techniques may be used, and in what manner, to 1) help understand and capture customer requirements accurately the first time; 2) transmit and translate the requirements faithfully to those who design products and operations; 3) control and continuously improve the production, delivery and repair or recovery of goods and services; and 4) assure that customer requirements are satisfied the first time, every time? Perspectives include quality planning, control and improvement. The basic tools for total quality are covered, including quality function deployment (QFD), 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

0112-300   **Business Computer Applications**
Information systems in organizations and the use of personal computers to enhance personal productivity. Extensive hands-on experience with PC spreadsheets and presentation graphics. 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 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. Credit 4

0112-321   **Microsoft Access Basics**
This course is designed to make the student proficient in the use of the various features of Microsoft Access. Topics include the basics of relational databases, the relationship between the results desired and the data gathered and developing effective business reports. (0112-300) Credit 4

0112-330   **Business Programming in Visual Basic**
Programming concepts and practice are covered in this course along with the basics of good graphical user interface (GUI) design. Students who successfully complete this course will know the fundamentals of computer programming, as well as how to create graphical interfaces that are intuitively usable for specific tasks. (0112-300) Credit 4

0106-335   **Visual Basic & GUI Design**
Advanced programming concepts and practices are covered in this course. Students who successfully complete this course will be able to write programs that interact with spreadsheets and databases. Advanced concepts in graphical user interface (GUI) design are also covered, along with a survey of more advanced data structures and object design. (0112-330 or programming language) Credit 4

0112-340   **Database Management Systems**
This course focuses on requirements, design and the development of databases that facilitate easy storage and access of information to aid decision making. It covers data modeling including ER diagramming, normalization, database architectures, query design using SQL and QBE, distributed databases, database concepts and data administration. A database engine such as Access or Oracle will provide students with hands-on experience. (Programming language, sophomore status) Credit 4

0112-360   **MIS Hardware & Operating Systems**
The basic principles of computer technology are covered. Students who successfully complete this course can distinguish between commonly used computer architectures and components. They learn about various operating systems concepts including multiprocessing, multitasking, multithreading, virtual memory management, registries, and file organizations. Students will be able to intelligently and effectively evaluate and select computer technologies that are most appropriate for the systems they design. (0112-300, sophomore status) Credit 4

0112-370   **Systems Analysis & Design I**
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. (Programming language, sophomore status) Credit 4

0112-380   **Network Technology**
This course stresses a top-down, business-oriented approach to evaluating and selecting network technology. Concepts, principles and standards are explored. The students gain practical knowledge of network and telecommunications technology, including hardware and software. Students who successfully complete this course will understand the technical language and concepts associated with local area networks (LAN) and wide area networks (WAN). They learn enough to allow them to help design systems that include network components. (0106-355, sophomore status) Credit 4

0112-420   **Business Network Design**
This course is intended to develop an understanding of how network design affects managerial decision making with respect to networks and their total cost of ownership. The course will explore the topics of connectivity, modern communications links, and network infrastructure with a heavy emphasis on matching the appropriate networking technology to the business directives of management. (0106-375, junior status) Credit 4

0112430   **Network Applications Development**
This course is intended to lay the underpinnings for electronic commerce applications. Students will learn Web page design for business, data validation and how to create Internet interfaces for databases. Students will also learn the techniques to interact with multiple distributed databases from a single Web interface. (0112-335,0112-340 or equivalent, junior status) Credit 4

0112-410   **System Analysis & Design II**
Computer-aided software engineering (CASE) software is introduced to model system designs. Software quality metrics are also introduced in this course as a means to understanding software engineering practices that lead to better systems design. Finally, object-oriented systems analysis and design concepts and techniques are covered. Students who successfully complete this course and the prerequisite Systems Analysis & Design I course will have acquired knowledge of the full range of systems analysis and design concepts currently used in systems development. (0112-370, junior status) Credit 4

0112-500   **Designing the E-Business Organization**
Students in this capstone 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. The role of the faculty is to facilitate the interaction of the students; mentor student teams toward complete e-business solutions; and provide some additional knowledge. Most of the work for this course will involve research and analysis of electronic marketplaces and, ultimately, the design and development of competitive e-businesses. (0105-440,0105-445) Credit 4

0112-520   **Project Management & Practice**
The course emphasizes concepts, techniques, methods, principles, problems and issues that are associated with project management. Students who complete this course will be able to plan, schedule, budget, estimate, control and monitor projects. In addition, they will also become familiar with resource allocation, resource loading, CPM, CMM, GANTT and PERT. The use of project management software will be a major part of the course. (0112-370, senior status) Credit 4

College of Engineering

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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

0301-203   **Freshman Seminar**
Gives the entering first-year student an overview of electrical engineering and helps integrate the incoming student into the RIT EE community. Topics discussed include the electrical engineering course of study, the cooperative work experience, an overview of RIT facilities and career options in electrical engineering. Also gives the student an opportunity to interact with EE faculty, upper-division students and other first-year EE students. Credit 1 (F)

0301-204   **Introduction to MatLab**
This is an introductory course in Matlab, which has become the software of choice for instruction of a variety of electrical engineering topics. Freshmen and transfer students form the target audience. Topics covered include variables (real and complex), basic operations, display formats, common functions, arrays and matrices (construction, addressing and operations, relational and logical operators, loops, M-file, functions, graphics), 2-D & 3-D plots, and polar and other special plots. After completing this introductory course, a student is expected to use Matlab effectively in other courses and easily learn the use of appropriate toolboxes independently. Class 1, Credit 1 (F, W)

0301-240   **Introduction to Digital Systems**
Introduces students to the basic components used in digital systems and is usually the student's first exposure to engineering design. Mixed logic is taught as a design tool for combinational logic. The flip-flop and its combination into registers and counters is introduced. Programmable devices are surveyed. A traditional approach to the design of state machines is taken with an end object of hardware implementation on a programmable device. 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 of EPLDs and EPROMs. Class 3, Lab 2, Credit 4 (W)

0301-345   **Introduction to C Programming**
Introduction to computer programming using the C programming language on personal computers. Includes an introduction to good programming practices such as top-down planning, structured programming, modularity, debug strategies, and a strong emphasis on program clarity and documentation. How charting and pseudo code are introduced to analyze program flow. Programming models including straight line, branching and looping programs are discussed. Students are introduced to C data types, variables, operators, expressions, and standard C control structures. C functions are studied thoroughly. Students also learn additional C features such as pointers, arrays, structures, and unions. A wide variety of computer programming exercises are featured. Class 4, Credit 4 (S)

0301-346   **Advanced Programming for Engineers**
This course is a continuation of 0301-345. It is intended to discuss advanced topics in C as well as teach students the basics of Object-Oriented Programming (OOP) with an emphasis on C++. Advanced skills of applying pointers will be emphasized throughout the course so as to improve the portability and efficiency of programs. Advanced skills of preprocessors generic functions, linked lists, and the use of Standard Template Library will be developed. Class 4, Credit 4 (F)

0301-347   **Computer Architecture & Data Structures**
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. (0301-240,345,346,365) Credit 4 (F, W)

0301-362   **Introduction to Electrical Engineering**
Introduction to the basic concepts of electrical circuits including AC and DC analysis, network theorems and RCL circuits. For non-majors. 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   **Introduction to Microcomputers**
Introductory course on microcomputers. Begins with a discussion of computer arithmetic, logic operations, number systems and codes. This is followed by a study of computer architecture, including a detailed discussion of the memory unit and the central processing unit (CPU). Computer programming is introduced at the assembly language level, with emphasis on computer instruction sets and addressing modes. Efficient methods for designing and developing assembly language programs are presented. Concepts of input/output are studied in detail. Emphasis is placed on program controlled I/O. The course includes extensive hands-on lab exercises involving both software and hardware. (0301-240) Class 4, Lab 2, Credit 4 (W)

0301-381   **Circuits I with Lab**
Covers the fundamentals 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 the analysis of circuits having series, parallel and other combinations of elements. Circuits with both dependent and independent voltage and current sources are studied. These concepts are generalized into branch, loop, mesh and nodal analysis. Thevenin, Norton and maximum power transfer theorems are proved and applied. Inductance and capacitance are introduced and the response RL and RC circuits step inputs is established. In preparation for the study of electronics, the ideal operational amplifier is discussed and basic inverting and noninverting amplifier circuits are analyzed. The laboratory introduces the student to the use of the oscilloscope and other common laboratory instruments. Also introduces the student to the use of engineering workstations in the design process for both analog and digital electronic circuits. (1017-313 and 1016-253) Class 4, Lab 1, Credit 5 (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, and three phase systems are analyzed. Two-port network theory is developed and applied to circuits and interconnections. Basic magnetics is introduced; and the analysis of mutual induction as applied to coupled coils and linear ideal transformers, in conjunction with RLC circuits, is pursued. Simple filters are studied via transfer functions, plotting amplitude, and phase diagrams, and are extended to cover the phenomenon of resonance. (0301-381) Class 3, Credit 3 (F, W)

0301-453 Linear Systems I (Continuous)
Provides the foundations of signal and system analysis including signal and system description and modeling. Topics include input-output relationship of a linear system; convolution; Fourier series; evaluation of Fourier coefficients; circuit analysis with periodic inputs; exponential and trigonometric forms of Fourier series and their properties, relationships and applications. Fourier transforms including energy spectrum and energy spectral density (along with applications) are covered. A comprehensive treatment of the Laplace transform and its inverse; concepts of transfer function, poles and zeros; frequency response of systems and Bode diagrams; application of Laplace transforms to system modeling; solution of differential equations; and circuit analysis are also taught. (0301-382, 0301-452, 1016-328, 1016-420) Class 4, Credit 4 (S,SU)

0301-455 Linear Systems for Microelectronics
Primarily for microelectronics students as an introduction to signal and system analysis. Topics include exponential and trigonometric forms of Fourier series and their properties, Fourier transforms and elements of linear systems. Spatial signals and applications of transform theory to optical systems are also covered. Cannot be used by EE majors as a substitute for 0301453. (1016-306,0301-352) Class 4, Credit 4 (S, SU)

0301473 Electromagnetic Fields I
Study of electrostatic and magnetostatic 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 electric 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's 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) Class 4, Credit 4 (S, SU)

0301474 Electromagnetic Fields II
Study of propagation, reflection and transmission 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)

0301481 Electronics I with Lab
Introduction to electronics and basic principles of small signal analysis of circuits with nonlinear components. Covers the use of ideal operational amplifiers in nonlinear applications such as comparators and circuits with hysteresis. The PN junction is introduced followed by a study of basic junction and field effect transistor function. 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 junction field effect 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. The laboratory continues exposure of students to common laboratory instruments and to the structure of electronic design. The use of engineering workstations in the design process is emphasized. The design, simulation, construction, and evaluation of a single-stage electronic amplifier are required. (0301-381) Class 3, Lab 1, Credit 4 (F,W)

0301482 Electronics II with Lab
Continuation of 0301-481. Primarily concerned with analog electronics, the course covers cascaded amplifiers and the design of IC operational amplifiers (including differential amplifiers, active loads, current mirror and level shifting circuits) as well as more advanced op amp subjects such as offsets and component mismatching; NMOS, PMOS and CMOS circuits and basic analog/digital interfacing; amplifier frequency response, Bode diagrams, multivibrators and power amplifiers; 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 Introduction to Automatic Control
A first course in the study of linear control systems and their physical behavior, including stability and transient response, approached through the classical methods of the Laplace domain. Topics include transfer function models of physical systems, signal flow graphs, transient and stability analysis of closed loop systems using classical techniques of root locus and Bode diagrams. Design of feedback systems, lag and lead compensators using root locus and frequency response techniques. Students are expected to use computer-aided design packages (ACDL, CTRL-C, etc.) both in class assignments and in the laboratory projects. (0301-554) Class 4, Lab 3, Credit 5 (S, SU)

0301-531 Electrical Machines
An introduction to transformer systems and AC and DC machines. Basic relationships for power and energy in rotating systems, magnetic fields and electrical circuits are developed into an understanding of the operational characteristics of electrical machines. (0301-382) Class 3, Lab 3, Credit 4 (F, W)

0301-534 Introduction to Communications 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)

0301-544 Semiconductor Electronics
Teaches students the physical mechanisms that govern the operation of the most widely used semiconductor devices. Topics include semiconductor fundamentals, pn junction diodes, bipolar and field-effect transistors, and metal-oxide semiconductor capacitors. Emphasizes the relationships between the physical and structural parameters of these devices and their electrical performance. (0301442) Class 4, Lab 2, Credit 4 (F, W)

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, practical realities and ground rules, and bipolar digital circuits. The laboratory portion of the course introduces the student to fabrication of integrated circuits, simulation of digital circuits and design of basic logic circuits using workstations and software packages. (0301-442, 544) Class 3, Lab 3, Credit 4 (S,SU)

0301-554 Linear Systems II (discrete)
Topics include continuation of the linear systems concepts from 0301-453 except that in this course they are applied to discrete signals and systems. The origins of discrete sequences and systems; an introduction to sampling of continuous signals and the sampling theorem; a description of discrete systems via difference equations and convolution; the z transform and inverse z transform; system transfer function; system frequency response function and interpretation of frequency response; an introduction to the design of digital filters; filter block diagrams for FIR and IIR filters; the discrete Fourier transform, its properties and its application to the solution of signal processing problems; and a brief introduction to fast algorithms for computation of the discrete Fourier transform are discussed. (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

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

0301-614   **Design of Digital Controls Systems**

This course adds to the analytical skills developed in 0301-514 and 0301-554 and applies them to sampled data systems and digital control systems. Stress is on classical design techniques based on the Z-Transform. Root locus, Bode, Bode diagrams and the direct method of design are discussed and examples presented. The student is expected to utilize available computer-aided design packages (ACSL, CONTROL-C, etc.) in both class assignments and in laboratory projects. Each student is required to participate in the design of a digital control system or detailed design of a system component as the laboratory portion of the course. (0301-514,554) Class 3, Lab 3, Credit 4 (F, W)

0301-621   **Microwave Engineering**

Studies the theory and design of microwave components and circuits. Begins with a review of basic EM theory, TEM waves in transmission lines, and TE and TM waves in rectangular waveguides. Continues with discussion of micro-striplines and striplines; TE and TM waves in cylindrical wave-guides; 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; wave guide and coaxial line filters and frequency meters; microwave integrated circuit high-pass and band-pass filters; ferrite components such as the isolator and circulator. The laboataory portion illustrates the various microwave component design and microwave measurement techniques uisng state-of-the-art equipment. Also required is a design project on the design of a microwave component. Class 3, Lab 3, Credit 4 (W)

0301-622   **Antenna Design**

A design course in antennas. The primary objective is to study the fundamental principles of antenna theory and apply 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 Dolf 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 will also be exposed to the measurement techniques of antenna characteristics, such as radiation pattern, gain and input impedance, using state-of-the-art equipment. The primary part of the course is a design project involving the design, construction and testing of an antenna. The project requires a report and a presentation with a demonstration. Class 3, Lab 3, Credit 4 (S)

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 switching-mode power supplies and regulators. (0301-545) Class 3, Lab 3, 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 state diagrams, ASM charts and microprogramming applications. Students will also learn how to rapidly develop digital systems with the hardware description language VHDL. Design strategies for testability are discussed along with their impact on performance. The practical aspects of component interconnection (maximum clock rate, clock skew, and transmission line effects) with effects on performance are also surveyed. The laboratory portion consists of four distinct projects proposed, designed, simulated (two of which 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 (F, W, S)

0301-651   **ASIC Design**

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 will also be introduced to CAD tools for schematic capture, placement and routing of standard cells. The projects will be designed and simulated using commercial CAD tools and will be fabricated by MOSIS. Top-down design using a hardware description language (VHDLS) is included. (0301-650) Class 4, Credit 4 (S)

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. Credit 4

0301-664   **Microcontroller Embedded System Design**

This course is designed to give the student detailed knowledge of the hardware and software organization of 8-bit microprocessor systems with an emphasis on design. Memory system design, including dynamic RAMS and DMA control, will be studied. Peripheral interfacing, serial and parallel I/O, including interrrupts, are considered. Special attention is given to interfacing microcomputers with the analog world, including the use of A/D and D/A converters. Software organization as well as design tools will be discussed. Design case studies of typical microcomputer-based systems are examined. (0301-365) Class 3, Lab 3, Credit 4 (F, SU)

0301-666   **32-Bit Microcomputer Systems**

Covers both the hardware and software aspects of 32-bit microcomputer systems. The architecture, timing and enhanced instruction sets will be discussed. Memory and serial and parallel I/O interfacing techniques, including standard interface chips, will be examined. Modular programming concepts and the software tools will be introduced. Use of A/D and D/A converters to interface with the analog world will be discussed. Class 3, Lab 3, Credit 4 (F, SU)

0301-670   Introduction to Microelectronics

Introduction to the processing techniques and systems used in the fabrication of integrated circuits (primarily silicon). Topics include crystal growth and wafer preparation, crystalline defects, solid state diffusion, thermal oxidation, ion implantation, epitaxy, metallization, plasma fundamentals, sputter deposition and etching, ion milling, plasma etching, reactive ion etching, and overall process design and integration (bipolar, NMOS, CMOS). The students use CAD tools such as ICE (computer-aided integrated circuit layout), SUPREM (process modeling) and SPICE (device and circuit modeling). This course is a prerequisite for 0301-676,1.C. Processing Laboratory, in which students actually process wafers in the clean room and fabricate and test integrated circuits. (0301-544) Class 4, Credit 4 (SU, F)

0301-672   Optical Devices & Systems

An introductory course in applied optics. Reviews fundamentals of geometrical and physical optics, including lenses, interference, and diffraction. Introduces devices employed in modem engineering optics such as lasers, detectors, holograms, acousto-optic and electro-optic devices; and applies optical techniques and concepts to the acquisition and transfer of information defined by the traditional areas of communications and signal processing. The laboratory component includes experiments selected from these topics: lenses and Fourier transform optics, optical heterodyning, holography, electro-optic effect, Gaussian beams, photodetectors. (0301-474 concurrently) Class 3, Lab 3, Credit 4

0301-674   Fiber Optics: Theory & Applications

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 & Signal Processing

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 (F, W)

0301-679   Analog Filter Design

The objective of this course is to study 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

0301-692   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. Class 4, Credit 4 (S)

0301-693   Digital Data Communication

A course on the 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 trade-offs and a discussion of digital telephony. Class 4, Credit 4 (W, S)

0301-694   Information Theory & Coding

This course introduces the student 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 (S)

0301-697   Senior Design Project I

The first half of a two-quarter sequence in electrical engineering design devoted to the creative portion of the design project and its logistics. Under the guidance of a faculty adviser, teams of three or four students are formed early in the quarter to attack a specific design problem. By the end of the quarter, a written project proposal and an oral presentation must be prepared. The report should include a schedule, a parts list (if appropriate), a budget and the analytical basis of design. An oral design review before the student's peers is required as well as a written status report. Class 2, Open Lab, Credit 2 (F)

0301-698   Senior Design Project II

The sequel to 0301-697, Senior Design Project I. The prototype in part one (if the project indeed involved hardware) must be constructed (or implemented) and evaluated. The design teams give a written and an oral presentation of the prototype's design and its validation by demonstration. In this second quarter, there are also a few lectures focusing mainly on professional aspects of engineering such as intellectual property rights, ethical considerations and entrepreneurship. (0301-697) Class 4, Open Lab, Credit 2-4

Undeclared Engineering

Required Courses

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 six engineering curricula offered by 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)

0302-215   Computing for Engineers

A first course in computer programming for engineers that involves extensive development of programming skills required in the engineering disciplines."C" is the current language of choice. Class 4, Credit 4 (F)

General Engineering

0302-610   Multidisciplinary Product Design I

The first course of a two-course sequence. Most products designed today reflect the fusion of efforts of a team of engineers from many disciplines. Successful product designers must be able to converse and work with engineers and managers from a variety of backgrounds. A group of students drawn from at least three different disciplines is formed into a team to design an actual product. These products are sponsored by industry or agencies who cooperate closely with the team during the entire design process. Elective course, open normally to undergraduate and graduate students. Includes lectures and seminars about organizing and planning techniques, an introduction to team dynamics, and courses and seminars relating to the specific design and manufacture. At the conclusion of the course, the team is expected to produce a written proposal for the design accompanied by an oral presentation. Credit 4 (F, W)

0302-620   Multidisciplinary Product Design II

The second of a two-course sequence with the main thrust on the completion of the design begun in 0302-610 and on the construction and evaluation of an engineering prototype. A written final report is required along with an oral presentation to the faculty and the sponsoring organization. Since this is usually a very busy time, the lectures and seminars are rim at a somewhat lower level than in the first course. The topics addressed are more general in nature and involve ethical and professional considerations, ergonomics and some general system considerations. (0302-610) Credit 4 (W, S)

Industrial & Manufacturing Engineering

The following courses are required, except as noted, of industrial and manufacturing engineering students.

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   Credit 4 (F)

0303-203   **Freshman Seminar**
Gives the first-year student an overview of college life and helps integrate the incoming student into the RIT IME community. Topics include the industrial and manufacturing engineering course of study, the cooperative work experience, an overview of RIT facilities and career options in engineering. Also gives the student an opportunity to interact with IME faculty, upper-division students and other first-year IME students. Credit 1 (F)

0303-204   **Computer Tools for Increased Productivity**
Builds a basic computer competence. Students learn about various computer software programs including word processing, spreadsheets, presentation graphics and database programs. Class 2, Credit 2 (W)

0303-302   **Computing for Industrial Engineering**
A first course in computer programming for engineers. Involves extensive development of programming skills required in the engineering disciplines. "C" is the current language of choice. Class 4, Credit 4 (S)

0303-401   **Introduction to Operations Research I**
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. (1016-331 or permission of instructor) Class 4, Credit 4

0303-402   **Introduction to Operations Research II**
A survey of nonlinear mathematical models within the field of systems and industrial engineering. Areas of study include queuing theory, network analysis, and inventory theory. (1016-351, 306 or permission of instructor) Class 4, Credit 4

0303-415   **Ergonomics**
Physiological and biomechanical aspects of human performance. The human capacity for physical work and human anthropometry is studied to enable the student to design work places, processes, products and procedures that are consistent with human capabilities and limitations. A systems approach to design is emphasized. Topics include repetitive motion disorders, manual materials handling, hand tool design and selection, as well as current OSHA requirements. (1016-351 or permission of instructor) Class 3, Lab 3, Credit 4

0303-420   **Work Measurement & Analysis**
An introductory course to familiarize students with various analytical tools needed to evaluate and improve worker performance. Topics include methods of measuring and analyzing work (e.g., operations process charts, flow analysis, motion analysis, etc.), human capabilities related to work place design, various techniques for generating time standards (time study, MOST, etc.) and design of workstations. Class 3, Lab 3, Credit 4

0303-422   **Systems & Facilities Planning**
A basic course in plant layout. Topics include product-quantity analysis, flow of materials, relationship charts, activity charts, material handling systems design and factors influencing the layout design. Introduces computer-aided drafting tools as well as state-of-the-art computer-aided layout design packages. (Permission of instructor) Class 3, Lab 3, Credit 4

0303-450   **Applied Human Factors Design of Experiments**
An applied approach to the problem of how one goes about running a study or experiment in human factors. Topics include issues relating to interactive measures of performance, sources of bias in human experimentation, need for human subjects review committees, need for informed consent from subjects, etc. Students will be expected to design and conduct an experiment utilizing human subjects. Professional elective. (0303-511 or permission of instructor) Class 4, Credit 4

0303-481   **Management Theory & Practice**
Development of the fundamental management principles of the industrial enterprise. Internal organization as well as general economic conditions are considered. Emphasis is on the role of behavior science. (Permission of instructor) Class 4, Credit 4

0303-482   **Production Control I**
A basic course in production control emphasizing the systems approach. Topics include forecasting, mathematic inventory models, material requirements planning and scheduling including PERT. Professional elective. (0303-511 and 0303-503, or permission of instructor) Class 4, Credit 4

0303-483   **Production Control II**
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. (0303-482) Class 4, Credit 4

0303-503   **Simulation**
A first course in simulation emphasizing the role of the computer in developing simulation models. Simulation language usage is emphasized. (0303-302, 1016-351 or equivalent) Class 4, Credit 4

0303-504   **Introduction to Operations Research III**
Provides an integrated view of advanced programming techniques and their applications to industrial problems. Selected topics may include a working knowledge of advanced operations research software. Professional elective. (0303401,402 or permission of instructor) Class 4, Credit 4

0303-505   **Simulation Modeling Techniques**
Increases simulation modeling skills primarily in the areas of network and discrete event simulations. Emphasis is on methods of model construction, design of simulation experiments, model validation and output data analysis. Students utilize these techniques to analyze the performance of production systems. Professional elective. (0303-503,1016-352 or permission of instructor) Class 4, Credit 4

0303-510   **Applied Statistical Quality Control**
An applied approach to statistics utilizing theoretical tools acquired in other math-stat courses. Heavy emphasis on understanding and applying statistical analysis methods in real-world situations in engineering. Topics include quality control and reliability. (1016-351,352) Class 4, Credit 4

0303-511   **Applied Linear Regression Analysis**
An applied approach to statistics utilizing theoretical tools acquired in other math-stat courses. Heavy emphasis on understanding and applying statistical analysis methods in real-world situations in engineering. Topics includes analysis of variance and regression. (1016-351,352) Class 4, Credit 4

0303-512   **Reliability Engineering**
Deals with concepts and techniques of analysis useful in measuring systems reliability. Topics include probability distributions, component reliability, system reliability and reliability models. Emphasis is on failure data analysis model development. Students utilize the techniques to study reliability, availability and maintainability of systems. Professional elective. (0303-510, 511 or permission of instructor) Class 4, Credit 4

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. A systems approach to design is emphasized. Topics include the human senory, memory, attention and cognitive processes; display and control design principles; as well as human computer interface issues. (1016-352 or permission of instructor) Class 3, Lab 3, Credit 4

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 IME majors. Non-IME majors may choose this as a professional elective. Class 4, Credit 4

0303-530   **Engineering Design**
An introduction to engineering design as it relates to unstructured problems in terms of objectives, constraints, criteria, resources, solution ideation and multi-criteria-weighted analysis method. Topics include an overview of value analysis/value engineering and design strategies. Students participate in group design exercises. (Fourth-year status) Class 4, Credit 4

0303-540   **Introduction to Operations Research IV**
An introduction to some advanced topics in operations research and industrial engineering. Areas of study may include game theory, Markov chains and their applications, decision analysis, network analysis. Professional elective. (Fifth-year IME standing or permission of instructor) Class 4, Credit 4

0303-545   **Mathematical Techniques of System Engineering**
Laplace, Fourier and Z transforms; transform methods for solving differential, difference and differential-difference equations; feedback networks; classical optimization techniques; search techniques; theory of graphs. Professional elective. (Fifth-year IME standing or permission of instructor) Class 4, Credit 4

0303-550   **Safety Engineering**
Acquaints students with practical aspects of safety engineering. Students acquire a working knowledge of legal and technical aspects of safety. Focuses on a systems approach to safety engineering. Topics include workers compensation, OSHA, Consumer Product Safety Commission and NIOSH Workplace Guidelines and various hazard analysis techniques. Students also are exposed to various theories of accident causation, research methodology and ways of evaluating safety programs and related research. Professional elective. Class 4, Credit 4 (S)

0303-560   **Project Design**
A design course oriented to the solution of on-site industrial engineering problems. Each student group attempts to define, analyze, design and implement a solution to unstructured, open-ended, actual ongoing problems in the Rochester community. (0303-530 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

0303-601   **Value Analysis**
This course examines the nature and measurement of value. The concept and construction of a value index representing average value is developed. Numerical estimation methods such as ranking, paired comparison, magnitude estimation and criteria analysis are explained and used to measure the value of diverse items. The methods used are applicable to the study of a wide variety of problems and have special utility in engineering design studies. Credit 4

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. Cannot be used as a professional elective. Credit 4

0303-625   **Concepts in Manufacturing**
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. Credit 4 (F)

0303-630   **Advanced Systems Integration**
To familiarize students in industrial engineering with the basic concepts and techniques needed to specify, design and implement systems that are computer controlled. Emphasis is on real-time data acquisition and process control as related to computer-integrated manufacturing. Physical simulations of real-world systems such as automated storage and retrieval systems, material handling systems and flexible manufacturing systems using robots will be reviewed. Topics include real-time programming, interface electronics, and microprocessor-based data acquisition systems and programmable controllers. (0303-503,0303-302, or permission of instructor) Class 3, Lab 3, Credit 4

0303-690   **Seminar-Computer Integrated Manufacturing**
Overview of current technology and management practice and trends related to the evolving factory of the future. A multidisciplinary offering for upper-division undergraduate and graduate students enrolled in any RIT program. Seminar format. Topics of discussion may include quality assurance, robots, CAD, group technology, MRP, flexible manufacturing systems, material handling, systems integration through computer applications and TQM. Professional elective. Class 4, Credit 4

Mechanical Engineering

The prerequisites are listed in parentheses after each course description. A course that does not specify a prerequisite may be taken by any student matriculated in the BSME program. When fifth-year or upper-level standing is specified as a prerequisite, it means such standing in the BSME program. Fifth-year standing requires completion of at least three co-op blocks and one technical elective.

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, an overview of the RIT facilities and career options in mechanical engineering. In addition this course gives the student an opportunity to interact with the faculty, upper-division students and other first-year students. Credit 1 (F, W)

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 (TBA)

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 & Tolerancing**
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 (W,S)

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; corequisite: 1016-306) Class 5, Credit 5 (W, S)

0304-331   **Mechanics I**
For students majoring in industrial engineering. Statics: equilibrium, the principle of transmissibility of forces, couples, centroids, trusses, frames, machines and friction. Introduction to strength of materials: axial stresses and strains, statically interdeterminate problems, torsion and bending. (1017-311,1016-252) Class 4, Credit 4 (F)

0304-332   **Mechanics II**
For students majoring in industrial 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 (W)

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, shear force and bending moment diagrams and equations, friction, fluid statics, centroids and moments of intertia. (1016-252; 1017-311) Class 4, Credit 4 (F, W)

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 (Microsoft Excel) or a symbolic algebra system (Waterloo Maple) with supplemental documentation and communication of results using a word processor (Microsoft Word). (Corequisite: 1016-252) Class 2, Lab 2, Credit 3 (W, S)

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 make a project in the lab portion of the course. Class 3, Lab 2, Credit 4 (F, W)

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 (W, S)

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; corequisite: 0304-348) Class 4, Credit 4 (W,S)

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, strain gage mounting and usage, and effective report writing. (0304-336; corequisite: 0304-347) Lab 2, Credit 1 (W, S)

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 (W, S)

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. (1016-252,0304-336,1017-312) Class 4, Credit 4 (F, W)

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: 0304416) Class 4, Credit 4 (S, SU)

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 four systems: steam power plant, vapor compression, refrigeration, viscous pipe flow and centrifugal pumps. Extensive spreadsheet analysis is used to calculate system characteristics and to graph and predict system behavior. (0304-413; corequisite: 0304-415) Lab 2, Credit 1 (S, SU)

0304-437   Design of Machine Elements
The analysis and theory of machine design in the context of failure theories. Particular emphasis on the design and analysis of machine elements and fatigue. A discussion of engineering professionalism and ethics is also included. (0304-347,348) Class 4, Credit 4 (F, W)

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. (0304-342 or 0304-441, 1016-318; corequisite: 0304-347) Class 4, Credit 4 (F,W)

0304-441   Computer Tools
The course covers the use of a personal computer for solving engineering problems and for documenting their solutions. Students learn techniques that use a spreadsheet (Microsoft Excel), a symbolic algebra system (Waterloo Maple), and a word processor (Microsoft Word) on personal computers. This course is intended for transfer (internal and external) students who have not taken the course 0304-342, Problem Solving with Computers. (Corequisite: 0304-440) Lab: first three Saturdays, Credit 1 (F)

0304-464   Design for Manufacture
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. (0304-312, 344) Class 4, Credit 4 (S,SU)

0304-514   Heat Transfer
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 (F,W)

0304-518   Advanced Computational Techniques
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 (S, SU)

0304-540   Introduction to Auto Design & Manufacturing
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 OEMs to introduce the students to current manufacturing technologies. (Fourth-year standing in ME program) Class 4, Credit 4 (W)

0304-543   System Dynamics
This required course introduces the student to systems modeling, analysis and design. Lumped-parameter mechanical, electrical, electromechanical, acoustic and thermal systems are considered. 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; corequisite: 0304-545) Class 4, Lab 2, Credit 5 (F, W)

0304-550   Transport Phenomena
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 (F, W)

0304-551   Thermal Fluids Lab II
A laboratory course based on the materials covered in Heat Transfer I, 0304-514, and Transfer Phenomena, 0304-550. Students perform four experiments in the area of fin performance comparison, transient heat conduction, wind tunnel, laser-doppler measurement techniques. Each lab is preceded by a two-hour lecture covering an in-depth analysis of the lab experiment. Students are required to work on an assignment related to the experiment using the text-books and reference material available in the library. After performing the experiments, students perform the required analysis, including an 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. (0304-514,550) Lab 2, Credit 1 (S, SU)

0304-560   Introduction to Aerospace Engineering
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. (0304-359,415) Class 4, Credit 4 (F)

0304-599   Independent Study
A student project course encompassing both analytical and experimental work. (Fourth- or fifth-year standing) Credit variable (F, W, S, SU)

0304-630   Senior Design I
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. (Fifth-year standing as defined immediately above first mechanical engineering course listing in this bulletin.) Class 4, Credit 4 (F, W)

0304-631   Senior Design II
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 (S)

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) Lab 2, Credit 1 (S)

Technical Electives

0304-610   Topics in Mechanical Engineering Design
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 (TBA)

0304-615   Robotics
An applied course in the fundamentals and applications of industrial robots. Topics include coordinate systems, drive motors, encoders, sensors, programming, gripper design, safety, economics, machine vision and flexible manufacturing systems. A major emphasis is placed on a design project involving an industrial problem. (Fifth-year standing) Class 3, Lab 2, Credit 4 (F, W)

0304-618   Computer-Aided Engineering
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 the computer hardware and software used in mechanical design: solids modeling, finite elements, dynamic analyses, etc. The student uses software on the academic computing system, the workstation laboratory and personal computers. Concepts associated with the design of interactive graphics display programs for design applications are presented. A design project is selected from one or more of the topics covered. (0304437,518) Class 3, Lab 2, Credit 4 (S)

0304-620   Introduction to Optimal Design
An introduction to some basic optimization techniques for engineering design synthesis. Topics 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 by interfacing with available software. A design project is required. (0304-437, 440) Class 4, Credit 4 (F or W)

0304-624   Vehicle Dynamics
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) Class 4, Credit 4 (S)

0304-626   Automotive Control Applications
Examines several key vehicle control subsystems. Such subsystems include engine sensors and controls, anti-lock brake systems and semi-active suspensions. Recent ITS (intelligent transportation systems) developments in the area of AVCS (advanced vehicle control systems) such as collision avoidance will also be studied. Relevant modeling and computer simulations will be performed. (0304-543) Class 4, Credit 4 (W)

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. A major design project is undertaken by the students. (0304-440, 514) Class 4, Credit 4 (S orSU)

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. (0304-413,514,550) Class 4, Credit 4 (S)

0304-642   Air Pollution Dispersion
An introduction to air pollution meteorology and the fundamentals of dispersion modeling. Topics include atmospheric structure and circulation, atmospheric stability, gaussian diffusion and dispersion, gaussian plume models for point and line sources, plume rise calculation, mobile source modeling and an overview of regulatory models. (0304-460, 514, 550; corequisite: 0304-518) Class 4, Credit 4 (TBA)

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 (TBA)

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 (F or W)

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 (S, SU)

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) Class 4, Credit 4 (S)

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, complex number 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 synthesized mechanism for specific application is kinematically and dynamically analyzed. (0304-543) Class 4, Credit 4 (S, SU)

0304-675   Aerodynamics
Presents the essentials of aerodynamic theory. Topics include airfoil theory, wings of finite span, inviscid potential flows, laminar and turbulent boundary layer, compressible flows, wave drag and aerodynamic design. (0304-560 or 0304-550 with instructor's consent) Class 4, Credit 4 (S)

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 turbo fans) as well as liquid and solid propellant chemical rockets. (0304-514 and 0304-550 or 0304-560) Class 4, Credit 4 (W)

0304-682   Flight Dynamics
The three-dimensional dynamics of aircraft, including general aircraft performance, stability and control. Topics include determination of range, endurance and rate of climb; simulation of aircraft trajectory; static and dynamic stability; and aircraft control. (0304-560) Class 4, Credit 4 (W)

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 and photoelasticity. A design project is assigned that utilizes numerical and/or experimental methods. (0304-437; corequisite: 0304-518) Class 4, Credit 4 (SU)

0304-698   Independent Study Design Projects
A design-oriented independent study requiring a major design project. (Senior standing) Credit 4

0304-743   Control Systems
Introduces the student to the study of linear control systems, their behavior, and their design and use in augmenting engineering system performance. Topics include control system behavior characterization in time and frequency domains, stability, error and design. This is accomplished through classical methods that employ the use of Laplace transforms, block diagrams, feedback control, root locus, Nyquist plots and Bode diagrams. A companion laboratory will provide students with significant hands-on analysis and design experience. (0304-543) Class 3, Lab 2, Credit 4 (S)

0304-758   Engineering Vibrations
This is a course on the theory of mechanical vibrations with an emphasis on design applications and instrumentation. Fourier analysis and design methods are presented in addition to theoretical concepts. Vibrations of single-degree of freedom systems are covered including free damped and undamped motion; harmonic and transient forced motion including support motion, machinery unbalance, and isolation. Modal analysis of multi-degree of freedom systems is introduced. In addition to laboratory exercises on vibration instrumentation, an independent design project is assigned. (0304-543) Class 3, Lab 2, Credit 4 (F, W)

Free Electives

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 IME majors. Non-IME majors may choose this as a professional elective. Class 4, Credit 4

0304-540   Introduction to Auto Design & Manufacturing
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 OEMs to introduce the students to current manufacturing technologies. (Fourth-year standing in ME program) Class 4, Credit 4 (W)

0304-560   Introduction to Aerospace Engineering
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. (0304-359,415) Class 4, Credit 4 (F)

0304-599   Independent Study
A student project course encompassing both analytical and experimental work. (Fourth- or fifth-year standing) Credit variable (F, W, S, SU)

0304-600   Topics in Mechanical Engineering
In response to student and/or faculty interest, special courses of current interest and/or logical continuation of regular courses are presented. Class 4, Credit 4 (TBA)

Microelectronic Engineering

0305-201   **Introduction to Microelectronics**
An overview of the fabrication and operation of silicon-based integrated circuits 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)

0305-215   **Introduction to Microelectronics-Transfer**
An introductory level course on the fundamental properties of semiconductors, silicon processing technology and device layout. Topics include fundamental properties of semiconductors (crystals, doping, carrier densities, drift, diffusion, resistivity, recombination), qualitative analysis of pn junctions and MOSFET's, solid state diffusion, thermal oxidation of silicon, ion implantation and associated equipment. Students design (using CAD layout software) and process aluminum gate PMOS integrated circuits at RIT's IC manufacturing facility. The IC's are fabricated during the laboratory hours and electrically tested at the end. Combines 0305-201 and 0305-350 in one course. For third-year transfer students only. Class 3, Lab 3, Credit 4 (F)

0305-221   **Introduction to Microlithography**
An introduction to the fundamentals of microlithography. Topics include IC masking, sensitometry, radiometry, resolution, contact lithography, projection lithography, photoresist materials and processing. Laboratories include mask-making, source characterization, resist characterization and stepper operation. (1011-212) Class 3, Credit 4 (F, S)

0305-350   **Integrated Circuit Technology**
An introduction to the physics, chemistry and materials of integrated circuit fabrication. Topics include the basic process steps of crystal growth, oxidation, photolithography, diffusion, ion implantation, CVD and metallization used to build these junctions. The laboratory uses a four-level metal gate PMOS process to fabricate a working IC and provide experience in device design, process design, materials evaluation, in-process characterization and device testing. (0305-201) Class 3, 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 on 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. Non-idealities associated with real diodes are introduced. Design of an IC resistor or diode is required. (1017-314; 0305-350,530) Class 4, Lab 0, Credit 4 (F, W)

0305-514   **Design of Experiments**
An introduction to experimental design concepts for engineering application. Topics include analysis of variance, screening designs, response surface methodology and design robustness. Students utilize statistical software packages to analyze case studies and design optimal experiments. A student design project is required. (1016-314) Class 4, Lab 0, Credit 4 (F, W)

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. (0301-240,442; 0305-350,560) Class 4, Lab 0, Credit 4 (S, SU)

0305-525   **Optics for Microelectronic Engineers**
An introduction to the principles of optics in which reflection, refraction, and transmission are explained as the 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 other optical instrumentation utilized in IC manufacturing. Lab required. (1017-313) Class 3, Lab 3, Credit 4 (F, W)

0305-530   **Electromagnetic Fields I**
An introduction to the fundamentals of electro- and magnetostatic fields. Topics include a review of vector calculus required for 3-D problem solving, the electric field and its associated scalar potential, the non-conservative electric field of an emf source (such as a battery) which drives the dc current density field, and the magnetic field. Understanding the relationships between the electric and magnetic fields and their sources, namely charge and current, will enable the student to develop LCR circuit models to simulate the distributed resistance, capacitance and inductance of real devices. This understanding is key to the design and modeling of high speed ICs. (1016-328,1017-313) Class 4, Lab 0, Credit 4 (F, W)

0305-540   **Electromagnetic Fields II**
An introduction to time-varying electro- and magnetostatic fields and the resulting propagation of light. Topics include a synopsis of Fields I concepts to refresh the key relationships, the concept of displacement current density and Maxwell's equations, Faraday's Law of Induction, and the study of the wave equation and Plane Waves; both propagation and their relationships at the boundary between two materials. This course provides the foundation for the study of light waves and optial systems. Lab required. (0305-530) Class 3, Lab 3, Credit 4 (S, SU)

0305-560   **Semiconductor Devices II**
An introduction to the physical mechanisms that govern the operation of metal-oxide semiconductor (MOS) capacitors, MOS field-effect 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. Device design and SPICE models for these devices are investigated. BJTs are covered after a thorough investigation of MOSFETs. (0305-460) Class 4, Lab 0, Credit 4 (F, W)

0305-563   **Microlithography I**
Covers the chemical aspects of microlithography and resist processes. The chemistry of positive (novalac-based) and negative (crosslinking) resist systems is studied along with processing technologies and methods of process optimization. Concentration is on single-layer resist materials and processing for optical lithography. Material characterization is studied through experimental design techniques. (0305-221,350,514) Class 3, Lab 0, Credit 3 (S, SU)

0305-573   **Microlithography I Lab**
Laboratory to be taken concurrently with 0305-563. Topics emphasize optical lithography and single-layer resist materials. Material characterization is studied through experimental design techniques. (0305-221, 530, 514) Class 0, Lab 3, Credit 1 (S, SU)

0305-599   **Independent Study**
A supervised investigation within a microelectronic area of student interest. (Permission of instructor) Class variable, Credit variable

0305-631   **Microelectronic Manufacturing I**
A course for undergraduates in CMOS manufacturing. Topics include CMOS process technology, work in progress tracking, CMOS calculations, process technology, long channel and short channel MOSFET, isolation technologies, back-end processing and packaging. The laboratory for this course is the student-run factory. Lot tracking, data collection, lot history, cycle time, turns, Cpk and statistical process control are introduced to the students. Silicon wafers are processed through an entire CMOS process and tested. Class 3, Lab 3, Credit 4 (W)

0305-632   **Silicon Processes**
An intermediate course in the study of integrated circuit processing. Topics include atomic models for diffusion, oxidation and ion implantation. Process integration for bipolar and MOS device fabrication is studied in detail. Students learn how to design processes to realize a variety of device structures and properties. Extensive use of CAE tools such as SUPREM. (0305-350,560,563,573; 0301-442) Class 3, Lab 3, Credit 4 (F, W)

0305-643   **Thin Film Processes**
Covers materials issues and thin film processing techniques used to manufacture semiconductor devices. Topics include basic vacuum technology, plasma physics, sputtering, evaporation (resistive, electron beam, laser ablation), chemical mechanical planarization, chemical vapor deposition and etching. Explores the mechanisms of each and discusses relevant material chemistries. Explains thin film growth models and relates processing variables to material properties. Laboratories complement the lectures and give students practical, hands-on experience with thin film processing equipment. (0305-350, 514) Class 3, Lab 3, Credit 4 (S, SU)

0305-645   Advanced Microelectronics
An advanced-level course on CMOS manufacturing and CMOS scaling. Topics include well processing (single well, twin well and retrograde well), device isolation (field implants, LOCOS, SILO, PBL, shallow trench), latch-up and its prevention, MOSFET operation and modeling, short channel effects and submicron NMOS design and modeling, ion implanted channels, buried-channel PMOS, CMOS scaling based on the subthreshold scaling technique, SRAM's, DRAM's, EPROM's, EEPROM's (including flash EEPROM's). 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) Class 4, Lab 0, Credit 4 (F,W)

0305-650   Integrated Circuits Process 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 photolithography. Analog and Digital CMOS devices are made and tested. MOS capacitance voltage measurements and surface charge analysis are studied. (0305-632) Class 2, Lab 6, Credit 4 (F, W)

0305-665   Microlithography II
Covers advanced resist systems for optical lithography including antireflective coatings, bilayer resists, trilayer resists and silylation. Electron beam lithography, x-ray lithography and deep-UV lithography also are covered. Technologies are studied from both chemical and physical standpoints. Process characterization is studied through experimental design techniques. (0305-563,573) Class 3, Lab 0, Credit 3 (F, W)

0305-670   Advanced Microlithography
An advanced course covering the physical aspects of optical lithography. Image formation in projection and proximity systems are studied. Makes use of optical concepts as applied to lithographic systems. Fresnel diffraction, Fraunhofer diffraction and Fourier optics are utilized to understand diffraction-limited imaging processes and optimization. Topics include illumination, lens parameters, image assessment, resolution, phase-masking and resist interactions. Lithographic systems are designed and optimized through use of modeling and simulation packages. (0301-455; 0305-665, 675; 0305-525) Class 3, Lab 3, Credit 4 (S)

0305-675   Microlithography II Lab
Laboratory to be taken concurrently with 0305-665. Topics emphasize multiple layer processes, including antireflective coatings, contrast enhancement, deep-UV bi-layer and silicon resist processes. Process characterization is studied through experimental design techniques. (0305-563,573) Class 0, Lab 3, Credit 1 (F, W)

0305-680   Seminar/Research I
This is the first half of a capstone design experience for microelectronic engineering seniors. Students propose a design project related to microelectronic devices and processing, design experiments and timetable, and carry it through to completion. The first half includes a technical presentation and written project proposal. The written proposal will be made available via the microelectronic engineering Web page (http://www.microe.rit.edu). Mask designs and other long lead time items are to be completed/identified so that they will be available at the start of the second half of this design experience. (0305-650 concurrent) Class 1, Lab 3, Credit 2 (F, W)

0305-690   Seminar/Research II
This is the second half of a capstone design experience for microelectronic engineering seniors. Students propose a design project related to microelectronic devices and processing, design experiments and timetable, and carry it through to completion. Technical presentations of the results, including a talk and poster, are required at the annual department conference in May. A written paper on the project following IEEE format for conference papers is required. These written documents will be made available via the microelectronic engineering Web page (http://www.microe.rit.edu). (0305-650) Class 1, Lab 3, Credit 2 (S)

Computer Engineering
Required Courses

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. Mentor Graphics tools are used for a laboratory session. Class 1, Credit 1(F)

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. (0603-232 or equivalent) Class 4, Credit 4 (W, S)

0306-341   Introduction to Digital Systems-Computer Engineering
The course 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. (1016-265 concurrently) Class 3, Lab 3, Credit 4 (F, W)

0306-361   Modeling of Linear Systems
An introduction to mathematical modeling of dynamic systems. Linear models are developed in terms of state-variable and input-output differential equations and transfer functions. Time-domain, linear algebra and Laplace transform methods are introduced to solve systems of simultaneous differential equations. Mechanical and electrical systems are studied. Assignments involve the use of MATLAB to verify and simulate dynamic systems modules. (1016-306) Class 4, Credit 4 (S)

0306-452   Linear Control Systems
A comprehensive introduction to the basic theory and essential techniques for and analysis and design of linear control systems using the conventional transform method and frequency response approach. MATLAB and the Control System Toolbox are utilized throughout the course to introduce students to the notion of computer-aided analysis and design of feedback control systems. (0301-352,1016-306,0306-361) Class 4, Credit 4 (F, W)

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 microoperations, 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). (0306-341,0603-440) 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
This course concentrates on the analysis, simulation and design of digital control systems using the state variable representation. It also deals with the microprocessor-based implementation of digital filters for control applications. (0306-452,560) Class 3, Lab 3, 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. (Fourth-year status in computer engineering) Class 3, Lab 3, Credit 4 (F, W)

0306-561   Digital System 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, 560) Class 3, Credit 3 (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

0306-630   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 or equivalent) Class 4, Lab 2, Credit 4 (F, S, SU)

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 1, Credit 1 (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)

Technical Electives

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 taught and 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 Mentor Graphics Corporation QuickVHDL, QuickSIM and Autologic tools. (0306-550 or 0603-520 or 0603-720) Class 4, Credit 4 (F, W)

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 sub-systems. 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 or 730) Class 4, Lab 2, Credit 4 (W, S)

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. (Knowledge of software engineering process models and related activities, basic familiarity with a high-level programming language) Class 4, Credit 4 (F, W)

0306-662   Concurrent Software Design
This course introduces methods for developing and designing concurrent software, which consists of many cooperating processes. 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. (Permission of instructor) Class 4, Credit 4 (S)

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

0306-683   Survey of Electronic Document Processing
Suitable for both undergraduate and graduate students interested in document image processing. Several topics are covered in the field, including input scanning, output printing and image processing. Interpolation techniques for scaling and resolution conversion are discussed. Rotation, edge extraction, halftoning and compression of digital images are covered. Feature extraction and recognition of image characters are described. Provides a framework for showing the relationships among these various topics in electronic document processing. Class 4, Credit 4 (S)

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. (Fifth-year standing in computer engineering or permission of instructor) Class 4, Credit 4 (S)

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 1-4

College of Imaging Arts & Sciences

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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(s) 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) Class 4, Credit 4

School of Art

Illustration

Prerequisite for all 300-level illustration courses: foundation program or equivalent

2019-304   **Anatomical Figure Drawing**
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. Lab 6, Credit 3

Prerequisite for all 400-level illustration courses: sophomore illustration core or equivalent

2019-405   **Figure in 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. Class 6, Credit 3

2019-406   **Graphic Elements of Illustration**
Exploration using illustration with typography in a coherent design that pays special attention to composition and work with graphic media most often employed by the illustrator. Students also will work with black and white media and effective use of the silhouette to convey information. Techniques include work with marker and airbrush for layout and design, as well as other materials. Class 6, Credit 3

2019-407   **Illustration Source: Creating the Scene**
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. Class 6, 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. Class 6, 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. Class 6, Credit 3

2019-410   **The Illustrator & Editorial Statement**
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. Class 6, Credit 3

2019-415   **Computer Application for 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. Class 6, Credit 3

2019-421   **Computer Illustration: Advertising**
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. Class 6, Credit 3

2019-423   **Computer Illustration: Editorial**
This course emphasizes effectively communicating information in a given article or story, from political themes and news stories to plays and poetry. Exploring the computer's ability to make many variations and subtle changes to the images quickly. Class 6, Credit 3

2019-504   **Illustrator as a Journalist**
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. Class 6, Credit 3

2019-505   **Contemporary History of 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. Class 6, 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. Class 6, 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. Class 6, Credit 3

2019-510   **Personal Focus in Illustration**
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. Class 6, 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

2019-516   **Animating Digital Illustrations**
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. Lec 2, Lab 3, 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. Lec 2, Lab 3, 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 that reinforce the students' knowledge of time-based authoring tools, such as Macromedia Director, QuickTime Movies or Adobe Premiere. Lec 2, Lab 3, Credit 3

Medical Illustration

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. Lab 6, 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. Class 6, 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. Class 6, 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. Lab 6, Credit 3

2020-407   **Anatomical Illustration in 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. Lab 6, 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. Lab 4, 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. Lab 4, Credit 3

2020-431   **Human Gross Anatomy I**
Dissection and the study of the human body is presented with such topics as developmental comparative and applied anatomy. Emphasis is directed toward osteology, radiographic anatomy. Lec 2, Lab 4, Credit 4

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. Lab 6, 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 instruction. Illustrations created in this course will be produced using traditional and electronic media. (Introduction to Illustration) 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. (Introduction to Illustration) Lab 6, Credit 3

2020-506   Computer Animation in 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. Lab 6, Credit 3

2020-507   Marketing & Business Practices in 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. Lab 6, 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. Lab 6, Credit 3

Fine Arts Studio

Prerequisite for all 300-level courses: foundation program or equivalent

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. Class 6, 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 straight forward confrontation offers no flashy techniques, seductive material or process to hide behind. Instead, at the onset, basic sculptural manipulation must occur. Class 6, Credit 3

2021-362   Introduction to Sculpture: Figure
This sculpture course investigates the study of human form through the development of sculpted clay 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 and surface anatomy, gesture; support and balance; figurative spatial relationships; expressive qualities of the human form; use and control of basic material and processes related to figure sculpture. Class 6, Credit 3

2021-381   Watercolor
Use and control of the technique of water color painting. Exploring watercolor as an illustrative and painting media. Class 6, Credit 3

Prerequisites for 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 studio work in a three-year degree sequence. Increased development of mastery of fine art media and the experience of drawing. Emphasis placed upon individual solutions and expression. Lab 6, Credit 3

2021-411, 412, 413   Fine Arts Advanced Elective
An elective providing the opportunity for exploration of personal expression through a painting medium or a variety of mixed media. Lab 6, Credit 3

Prerequisites for 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. Lab 6, Credit 3

School of Design

New Media Design

2009-211   Ideation & Visualization
This course will deal with both the concepts of ideation and problem solving and visualization. An introductory course in visualization with freehand drawing at its core. Students will learn to use drawing and sketching as tools to help create new ideas, solve problems and visually communicate ideas. Lec 2, Lab 6, Credit 4

2009-212   3-D Form & Space
An introductory course in visualization that extends previous experience and skills to incorporate third dimension. The course will provide fundamentals for more advanced studies in 3-D 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 3-D understanding from simple objects to more complex environmental spaces. Lec 2, Lab 3, Credit 3

2009-213   Elements of Graphic Design for New Media
This course introduces the student to visual communications 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. Lec 1, Studio 5, 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 vector graphic software programs will serve as the basis in the development of illustrative assignments. (NM core, CIAS foundation or permission of instructor) Lec 2, Lab 3, Credit 3

2009-401   Advanced Design Networking
This course extends previous networking experience and skills to emphasize advanced visual Web design layout skills 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, Dreamweaver and CyberStudio will be used. (Third-year NM design and imaging major or permission of instructor) Lec 2, Lab 3, Credit 3

2009-402
                          Emerging Multimedia Design & Imaging Tool
This course will deal with whatever is "new" in the world of multimedia. With software changing all the time and new products being released every time we turn around this course will be important to the D & I student. As new software comes into the market place this is where the D & I student will first encounter it. An ever-changing course that will stay on the leading edge of new technology in the field. (NM design & imaging major or permission of instructor) Lec 1, Lab 4, 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. (Third-year NM major or permission of instructor) Lec 2, Lab 3, Credit 3

2009-411   Time-Based Imaging
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 of time-based authoring tools, such as Macromedia Director, QuickTime Movies, or Adobe Premiere. (The Interactive Illustration, Interactive Media Design, the NM core or permission of instructor) Lec 2, Lab 3, Credit 3

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 2-D and 3-D type can be manipulated in a time based manor. (Third-year NM Design & Imaging major or permission of instructor) Lec 1, Lab 4, Credit 3

2009-413   Advanced 3-D Techniques

This course extends previous three-dimensional experience and skills to include advanced 3-D 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. (Third-year NM design and imaging major or permission of instructor) Lec 2, Lab 3, 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, Postscript, CAD-CAM, etc. The impact of computers on animation will also be covered. Lec 3, 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, CDs, kiosks and video teasers and trailers. (Fourth-year NM major or permission of instructor) Lec 2, Lab 3, Credit 3

2009-502   Virtual Entertainment

A course dealing with design and gaming concepts, delivery systems and software for the entertainment industry. Working with 2-D and 3-D 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 and imaging major or permission of instructor) Lec 1, Lab 4, 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 photorealistic 3-D 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 and imaging major or permission of instructor) Lec 2, Lab 3, Credit 3

2009-512   Interactive Graphics

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. (Animating Digital Illustration, Interactive Media Design, the NM core or permission of instructor) Lec 2, Lab 3, Credit 3

Graphic Design

Prerequisite 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. Class/Lab *5,* 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 that 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. Class/Lab 5, 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 that will involve both graphic imagery and typography. Students will refine their professional skills through applications requiring a digital format. Class/Lab 5, Credit 3

Prerequisite for 400-level graphic design: sophomore graphic design courses or their equivalent or permission of the instructor

2010-401   Typography II

Students expand their understanding of basic typography 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 system for providing structure. Class/Lab 6, 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 and typography. Class/Lab 6, Credit 3

2010-403   Symbols & Icon Design

The focus of this course is on the principles, theory, and terminology of symbols (primarily pictogrammic, 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. Class/Lab 6, Credit 3

2010-404   Design for Public Action

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, instructional materials, brochures, magazines, books, etc. Class/Lab 6, 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. Class/Lab 6, 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; to convey an identity; interaction of design with the environment; and to protect the safety of the public. Class/Lab 6, Credit 3

2010-411, 412, 413   Graphic Design Elective

Electives offer concept development, aesthetics, visual communication theory and methods, applied problem solving, and computer-based design aspects that are integrated into the course work. Class/Lab 6, Credit 3

Desktop Publishing Design (offered each quarter); Typographic Design Elective (F); Personative Typographic Elective (W); Experimental Typographic Elective (S)

2010-501   Career Skills & Professional Practice
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. Class 6, Credit 3

2010-502   Corporate Design
An overview of the role of graphic design within a business environment and
an in-depth, hands-on study of the corporate design process and work flow.
This includes research, analysis, and interpretation of company information to
create design that convincingly supports concepts aligned with company
goals, objectives, project intent and considerations related to intended audi-
ences. Students will create design continuity within a group of complex inter-
related project components involving development, exploration, application,
implementation and legalities. Class 6, 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 copywriting 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 cri-
tiques. Class 6, Credit 3

2010-504   Design Systems
Advanced problems incorporating 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. Class 6, 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 develop-
ment and the use of imagery in advertising are stressed. Class 6, 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. Class 6, 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 ter-
minology. The goal is to bring into play marketing concepts with design prac-
tice, focusing on short- and long-term marketing and design projects. When
possible, specific firms are contacted and engaged as client/consultants. Class
6, 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.
Lab 6, Credit 3

2010-509   Design Specifications
Advanced creative problem-solving experiences that deal with the develop-
ment of design concepts to meet budget specifications and with the working
relationships with printers, paper reps, illustrators, photographers, etc. Class
6, 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 pre-
sentations are also part of this course. Class 6, 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 comput-
erized information systems. Class 6, Credit 3

2010-512   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 consider-
ations in this field. Students are expected to complete assigned readings and
projects. Lab 6, Credit 3

2010-513   Senior Projects
Advanced creative problem-solving experiences relating to visual communi-
cation 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 modifi-
cations may be made based on consultation with the student. The project may
be thought of as a senior thesis project. This class can be used for internship
credit based upon department approval. Class 6, Credit 3

2010-514   Editorial Design/Graphic Design
Explores the role of the graphic designer in developing appropriate and com-
municative editorial design. Students interpret and develop concepts for the
author's text and point of view for each assigned editorial article. Content in-
cludes 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 photog-
rapher and the designer, particularly in regard to editorial design. (Graphic
design senior or permission of instructor) Class 6, Credit 3

2010-518   Public & Social Service Design
Gives the graphic design senior professional experience developing and creat-
ing visual communications for nonprofit organizations. Through various com-
munity 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) Class 6, 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. Lec. 1, Studio 2, Credit 2

2015-305   Architectural Drawing
An introduction to interior design through architectural drafting. Lab 6,
Credit 3

2015-306   Perspective Rendering
An introduction to residential interior design and perspective rendering. Lab
6, Credit 3

2015-307   Introduction to Interior Design
An introduction to interior design with emphasis on basic process, spatial
relationships, design conceptualization and development. Lab 6, Credit 3

2015-308 CAD Application
An introduction to the use of the computer as a tool in the interior design process. Use of the computer is required. Lab 6, 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. Lab 6, Credit 3

Prerequisite for 400-level interior design courses: sophomore interior design courses or their equivalent or by permission of instructor

2015-404 Hospitality Design
The applications of design methods and skills to the design of interior space for hospitality use. Lab 6, Credit 3

2015-405 Applications Color & Light
Introduction to color and light for spatial development. Lab 6, Credit 3

2015-406 Retail Design
Introduction to designing interior space for retail use. Lab 6, Credit 3

2015-407 Building Construction Systems
Introduction of building construction systems for interior design. Lab 4, Credit 3

2015-408 Office Design & Planning
Introduction to interior design and planning for office use. Lab 6, 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. Class 3, Credit 3

2015-411, 412, 413 Interior Design Elective
An elective offering basic instruction and involvement in design application projects. Each quarter concentrates on a specific topic of design study. 411 Environmental, 412 Interior, 413 Environmental Class 6, Credit 3

Prerequisite for 500-level interior design courses: sophomore interior design courses or their equivalent or by permission of instructor

2015-504 Multistory/Multipurpose Design
The application of design methods and skills to professional-level projects in interior design. Lab 6, Credit 4

2015-505 Building Codes & Regulations
Application projects concerned with building codes, regulations, fire safety, public safety and health, barrier-free design and Americans with Disabilities. Lec. 2, Credit 2

2015-506 Environmental Control Application
Application projects involving plumbing, heating, ventilation, electrical, vertical transportation and acoustic concerns. Class 5, 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. Class 6, Credit 4

2015-508 Interior Design Business Practices
An introduction to professional practices with emphasis on business formation, design marketing, legal and ethical responsibilities. Lec. 2, Credit 2

2015-509 Career Planning
Development of a resume, portfolio and job-search techniques with a focus on career planning. Lec. 2, Credit 2

2015-510 Working Drawings
Professional interior design projects with an emphasis on the construction sequence and construction documentation. Class/Lab 6, Credit 4

2015-511 Special Projects
Special projects in interior design emphasizing communication skills, theory and methods for the professional. Class 6, 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. Lec. 1, Studio 2, Credit 2

Prerequisites 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. Class 6, Credit 3

2035-306 Technical Drawing
An introduction to drafting in the field of industrial design. Emphasis is on basic skills in orthographic drawing and dimensioning. Class 6, Credit 3

2035-307 Graphic Visualization
Sketching and rendering techniques are developed through exercises that also promote abilities to visualize three-dimensional objects in two-dimensional representation. Class 6, Credit 3

2035-310 CAD Applications
An introduction to CAD Application for industrial design. Course work in computer modeling of solids and surfaces. Lab 6, 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. Lab 6, Credit 3

2035-312 Concept Design Sketching
Freehand concept sketching technique for the industrial designer. (Foundation program) Lab 6, Credit 3

Prerequisites for 400-level industrial design courses: sophomore industrial design core or its equivalent or permission of instructor

2035-405 Materials & Processes Application
The acquisition of a technical and theoretical base in industrial design through a formal introduction to materials and processes. Class 6, 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. Class 6, Credit 3

2035-407 Human Factors Application
The acquisition of a technical base in human factors for industrial design, emphasizing function and safety applications. Class 6, 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. Class 6, Credit 3

2035-409 Product Style
The study of style, fashion and graphics as they apply to product form storage and distribution. Class 6, 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 as determents of product form. Class 6, Credit 3

2035-411,412,413 Industrial CADDesign Elective
An elective that provides basic instruction in three-dimensional computer graphics applications for designers. Lab 6, Credit 3

Prerequisites for 500-level industrial design courses: junior industrial design core or its equivalent or permission of instructor

2035-505   **Outstanding Designers**
Design issues and ethics are explored through examination of biographical material. Selected outstanding designers are reviewed and discussed. Class 6, Credit 3

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. Class 6, Credit 3

2035-507   **Advanced Product Design**
The application of design methods, universal design principles and team skills to professional-level projects in industrial design. Class 6, 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. Class 6, Credit 3

2035-509   **Furniture Research & Development**
Students become acquainted with the ergonomic, material construction and marketing considerations in the design of furniture. An understanding of factors affecting furniture style is gained through the study of 20th century furniture designers. Class 6, 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. Class 6, 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. Class 6, Credit 3

2035-512   **Advanced Product Design II**
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. Class 6, Credit 3

2035-513   **Career Planning**
Practical considerations in planning a career in industrial design are explored. Included are issues of choosing an appropriate career direction, researching potential employers, contacting and meeting with potential employers, knowing what to expect on the job, and understanding the possible dynamics of a career path as it relates to other aspects of life. Class 6, Credit 3

Extended Studies Art, Crafts and Design

2012-201, 202, 203   **Basic Design I, II, III**
Study of basic elements of design—line, shape, texture, color, space—and their incorporation of design principles as applied to two- and three-dimensional design problems. Credit 2/Qtr.

2012-211, 212, 213   **Basic Drawing & Media I, II, III**
An intense study of the fundamentals of drawing and application of media, designed to develop a flexible, creative mind capable of interpreting ideas. Specific emphasis is placed on problems confronting the student who has had little or no drawing experience. Credit 2/Qtr.

2012-215   **Basic Figure Drawing**
Drawing from costumed and nude models. The students make a visual analysis of action and gesture through quick sketches. Short poses gradually extend to longer studies so that the student can develop techniques, skills and control of media. (2012-211/212/213 or equivalent) Credit 2/Qtr.

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/Qtr.

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 then once for credit. (2012-201/202/203 & 2012-211/212/213 or equivalent) Credit 2/Qtr.

2012-221   **Advanced Drawing**
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/Qtr.

2012-225   **Figure Drawing**
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 then once for credit. (2012-215) Credit 2/Qtr.

2012-229   **Portfolio Workshop**
A workshop designed to help students take what they have learned in art classes (or workstations) to prepare and present a portfolio. Students produce a resume and cover letter appropriate for their career goals. Projects are tailored to the needs of individual students, allowing them to compile an accurate representation of their skills in a concise, positive and beneficial manner. Includes visits from prominent people in the field showing their work and sharing their experiences. Credit 2/Qtr.

2012-231, 232, 233   **Graphic Design I, II, III**
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; or equivalent; 2012-246/247/248 recommended) Credit 2/Qtr.

2012-241, 242, 243   **Advertising Design I, II, III**
The arts and the 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 or equivalent; 2012-246/257/248 recommended) Credit 2/Qtr.

2012-246, 247, 248   **Advanced Design & Typography I, II, III**
Study commercial layout procedures from rough layouts to comprehensives, type selection, copy fitting, pictorial indication and production procedures as related to contemporary practices. Course emphasizes the design, structure, historical development, and techniques of lettering. Proceed from rough letter indication to development of finished lettering and application in commercial advertising problems. Typography and photo lettering methods are studied relative to their use in commercial design. (2012-201/202/203 & 2012-211/212/213) Credit 2/Qtr.

2012-251, 252   **Interior Design I, II**
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/Qtr.

2012-254   **History: Interior Design**
Historical survey of period decoration and furniture styles from antiquity to the present. Credit 2

2012-256, 257, 258   **Display Design I, II, III**
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/Qtr.

2012-259   **Commercial Interior Design**
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/Qtr.

2012-261, 262, 263   **Environmental Design I, II, III**
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/Qtr.

2012-264   **Business Aspects/Environmental Design**
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.

2012-266, 267   Rendering Techniques I, II
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/Qtr.

2012-268   Marker Rendering Techniques
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

2012-274   Illustration
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/Qtr.

2012-276   Calligraphy
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

2012-277   Cartooning
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 or permission of chairperson) Credit 2/Qtr.

2012-278   Interpretive Landscape Drawing
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

2012-279   Human Anatomy for Artists
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

2012-284   Airbrush Techniques
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/Qtr.

2012-286   Introduction to Painting
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/Qtr.

2012-288   Painting
Painting with opportunities for gifted and 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/Qtr.

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/Qtr.

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/Qtr

2012-296   Introduction To Non-Toxic Printmaking
An introduction to the methods, materials, tools and techniques non-toxic 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/Qtr.

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 free-lancing 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/Qtr.

Foundation

2013-205, 206, 207   Creative Sources
Creative Sources is a lecture series designed to expose students to a broad range of faculty, other professionals and topics mainly in the fields of art, design, and craft. Class 1, Credit 1/Qtr.

2013-211, 212, 213   Drawing
A basic foundation in drawing as a form of creative expression and a means to communicate information. Through the use of organic and inorganic materials, attention is given to individual response to "seeing" as interspersed with all sensory conditioning. The figure is utilized in the analysis of action, structure and gesture. Lab 6, Credit 3/Qtr.

2013-231, 232, 233   2-D Design
A structured introduction to the fundamentals of design and color with media exploration in two dimensions, concentrating on concept development, visual recognition and organization, and skill development through creative problem solving. Lab 6, Credit 3/Qtr.

2013-241, 242, 243   3-D Design
The elements of design and their structural relationship as applied to problems in three dimensions. A variety of media are used. Lab fee required. Lab 6, Credit 3/Qtr.

Art History

2039-225, 226, 226 Art & Civilization
Survey of the history of art from prehistory to the present, with particular attention given to the social and cultural backgrounds of art production and to the relationship between the arts: architecture, sculpture, painting, and decorative arts and crafts. Lectures, independent study, discussion groups, assigned gallery visits, papers, reports. Class 3, Credit 3/Qtr.

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. Lec. 3, 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. Class 3, Credit 3

2039-320 History of Art Criticism
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) with direct applications to the life and work of the artist and craftsperson/designer. Class 3, Credit 3

2039-330 Philosophy in Art
Traces the historical changes that art has undergone. Traces the interaction between philosophic thought and artistic styles throughout art history. Explores art as a reflection of human values. Class 3, 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. Class 3, Credit 3

2039-350 Asian Art
A study of the art of India, China and Japan in the area of painting, printmaking, sculpture, architecture and the crafts with emphasis on their implications for contemporary artists, designers and craftspeople. Class 3, Credit 3

2039-360 18th & 19th Century Art
The development of the arts in these two centuries in the areas of painting, printmaking, sculpture, architecture and the crafts with emphasis on their influence of 20th century styles and focusing on their impact on the artist/craftsperson/designer. Class 3, Credit 3

2039-370 20th Century Art
The development of the arts in the 20th century in the areas of painting, printmaking, sculpture, architecture and the crafts with focus on their impact on the artist/craftsperson/designer. Class 3, Credit 3

2039-380 Contemporary Art
A study of the painting, printmaking, sculpture, architecture and crafts from the 1960s to the present year with focus on the current American scene. Class 3, 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. Class 3, Credit 3

2039-420 American Art
A survey of the development of the visual arts (art, architecture, crafts, design, sculpture) in America from pre-Colonial times through 1865. Class 3, Credit 3

2039-430 Dada & Surrealism
Explores the Dada and Surrealist movements in Europe and the United States from 1916 through the post-World War II period. Emphasis is on identifying the major works of artists involved in these aesthetic developments. Ideology and formal ideas are analyzed in paintings, literary works, films and objects. Class 3, Credit 3

2039-440 Conceptual Art
Explores the mid-1960s movement in which artists began to regard the phenomenon of art making more in terms of process or concept and less in terms of the end product. The student will be acquainted with various facets of theory and design-oriented works in the United States, Canada, South America and Europe. Class 3, Credit 3

2039-450 Pop Art & Pop Culture
Explores the social, cultural and political context within which this movement of the 1960s developed. Emphasis is on artists in New York and Britain. Lectures, discussions and films compose the course content. Class 3, Credit 3

2039-460 Media & Advertising & Consciousness
Provides a discourse on the interaction of media and advertising through both historical and theoretical means. The historical part of the course deals with the social impact of industry on "modern life" at the turn of the century. The theoretical part of the course discusses the impact of advertising and media on social consciousness. Class 3, Credit 3

School for American Crafts

Ceramics & Ceramic Sculpture

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. Lec. 1, Studio 3, 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, hand-building, glaze and decorating. Material fee required. Lab 6, Credit 3

Prerequisite 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. Projects will provide training and experience in clays, clay bodies, wheel forming techniques and firing techniques (gas and electric, glaze and bisque). The student should strive to express individual judgment in the design and execution as they relate to functional pottery. The study will include the use of slip, glaze, and decorating techniques. Class 18, Credit 6 (F)

2040-302 Materials & Processes: Ceramics Sophomore II
A course with continuing concentration on the fundamentals of pottery making processes. This quarter's emphasis will explore lidded forms, pouring vessels and serving vessels. Further testing of slips and glazes will accompany electric and gas-reduction firings. (2040-301) Class 18, Credit 6 (W)

2040-303 Materials & Processes: Ceramics Sophomore III
A course with concentration on the fundamentals of pottery making. This quarter the students will design and produce a complete dinnerware set comprising of plates, cups, pitcher, teapot, casserole serving dishes and other accessories. Glazes from previous glaze research will be used in conjunction with gas-fired reduction stoneware. (2040-302) Class 18, Credit 6 (S)

Prerequisite for 400-level courses: successful completion of sophomore-level courses in ceramics and ceramic sculpture

2040-401 Materials & Processes: Junior I
The focus of this course is to design and manufacture tiles for use in a specific architectural setting and/or to satisfy a particular functional requirement. (2040-303) Lec. 2, Critique 1, Studio 12-15, Credit 6 (F)

2040-402   Materials & Processes: Junior II

The purpose of this course is to develop each student's personal aesthetic and visual thinking with technical knowledge. Assigned projects will evoke the student's imagination and ceramic vocabulary through the relationship between concept, design, form, surface embellishment, and choice of firing methods and glaze. A systematic investigation of ceramic clays, raw materials, glaze materials, glaze composition, and glaze calculation will be presented in a lecture/lab format. (2040-401) Lec. 2, Critique 1, Studio 12-15, Credit 6 (W)

2040-403   Materials & Processes: Junior III

The third quarter will introduce the student to industrial forming methods. The student will design a teapot and cups, produce two- and three-part drain molds in plaster and cast an edition of forms in porcelain. (2040-402). Lec. 2, Critique 1, Studio 12-15, Credit 6

Prerequisite for 500-level courses: successful completion of junior-level courses in ceramics and ceramic sculpture

2040-501   Materials & Processes: Senior I

This course will entail current marketplace research and production of marketable ceramic objects. Students will design and manufacture prototypes using commercial or non-commercial methods. Emphasis will be on the use of the computer to generate design strategies (2040-403). Class 18, Credit 6 (F)

2040-502   Materials & Processes: Senior II

A senior thesis proposed by the student and approved by the faculty will be offered as evidence of qualification as a candidate for the baccalaureate degree. This proposal should develop self-expression and a personal direction in clay. The contract should state clearly the goals and ideas as well as the materials and processes that will be used to fulfill the project. Emphasis is on expression and technical qualities of the objects plus the historical and philosophical foundation needed to establish the role of the work in society. This project is to produce a coherent body of work of high standards that will be exhibited at the end of the school year. (2040-501) Class 18, Credit 6 (W)

2040-503   Materials & Processes: Senior III

The final quarter of the senior year is a continuation of the work begun in the winter quarter and the thesis proposal refined and completed. Discussions of the problems relating to career choice, job hunting, portfolio, resume writing, operating a studio, merchandising, and business practices will take place. (2040-502) Class 18, 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's expression and design application. Topics regarding history, contemporary issues, science and technology of glass are discussed. Students will conceive, design and execute glass work with engraving, glass blowing, casting and stained glass processes. Emphasis will be placed on the entry level of learning and career opportunities that are available with the material glass. The course includes visits with professionals working with glass and the Corning Museum of Glass. Lec. 1, Studio 3, 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. Material fee required. Lab 6, Credit 3

Prerequisite 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. Fundamental projects will lead to the fabrication of constructivist sculpture. Lec. 2, Critique 1, Studio 12-15, Credit 6 (F)

2041-302   Materials & Processes: Glass Sophomore II

The class will introduce the student to processes of copper foil and lead cane for flat and three-dimensional stained glass structures. 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 lighting techniques for the final presentation of the work. (2041-301) Class 18, 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, luster, and polymers will be used as a painting medium for artistic exploration and for decorative purposes. Painting will be examined from a historical, modernist, and post-modernist perspective. Construction and use of plaster molds for blown glass will be introduced as a way to create sculptural elements for a final project. Lec. 2, Critique 1, Studio 12-15, Credit 6 (S)

2041-361   Corning Glass: Glassforming I

Introduces students to the properties, history and techniques of glass casting, fusing, stained glass, glassblowing and sandblasting—techniques taught at the Studio at the Corning Museum of Glass. Work focuses on one or more of the techniques. Students will become familiar with the permanent collection and the Rakow Library. (Sophomore glass major status or above) Lec. 1, Lab 5, Credit 3 (F,S)

2041-371   Corning Glass: Introduction Process

Work at the glass furnace and study from the permanent collection of the Corning Museum of Glass and Rakow Library to create a body of personalized work. The media will employ aesthetic, style and technique of the Venetian master glass artisans. The working properties of colored borasilicate glasses are explored through flame-working techniques. (2041-361 and glass major status) Lec. 1, Lab 5, Credit 3 (F,S)

Prerequisite for 400-level courses: successful completion of 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. Lec. 2, Critique 1, Studio 12-15, 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 that 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) Lec. 2, Critique 1, Studio 12-15, Credit 6 (W)

2041-403   Materials & Processes: Glass Junior III

Utilizing the Corning Museum of Glass study collection and the Rakaw Research Library for glass, students will develop a body of work that 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. Lec. 2, Critique 1, Studio 12-15, Credit 6 (S)

Prerequisite for 500-level courses: successful completion of 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) Class 18, 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 two of this term. The student will refine and develop a body of work for the senior exhibition. The student will submit an initial draft of the thesis at the end of this quarter. (2041-501) Class 18, Credit 6 (W)

2041-503   **Materials & Processes: Glass Senior III**
Each student will conclude the senior year with a solo exhibition of his or her 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, artist's statement and resume will be presented to the department head before graduation. Alternative or additional prerequisites may be required according to individual necessities. (2041-502) Class 18, Credit 6 (S)

Metalcrafts & Jewelry

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, hand-on experience and critiques will be used. Lec. 1, Lab 3, 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 hollowware or jewelry. Material fee required. Lab 6, Credit 3 /Qtr.

Prerequisite for 300-level courses: successful completion of foundation program or equivalent or permission of instructor

2042-301   **Materials & Processes: Metals Sophomore I**
This class will introduce the student to basic jewelry hand tools. Ferrous and nonferrous metals—their composition and working priorities—will serve as the primary materials. Class 18, Credit 6 (F)

2042-302   **Materials & Processes: Metals Sophomore II**
This class will introduce the student to basic machine skills, silver soldering and gem setting. (2042-301) Class 18, Credit 6 (W)

2042-303   **Materials & Processes: Metals Sophomore III**
This class will introduce the student to basic forming skills for hollowware, flatware and jewelry. (2042-302) Class 18, Credit 6 (S)

Prerequisite for 400-level courses: successful completion of sophomore-level courses in metals and jewelry design

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) Class 18, Credit 6 (S)

2042-402   **Materials & Processes: Metals/Jewelry Junior II**
This course introduces jewelry and hollowware rendering, chasing and repousse, and tool making. (2042-401) Credit 18, Class 6 (W)

2042-403   **Materials & Processes: Metals/Jewelry Junior III**
This course introduces jewelry and hollowware design and production through the use of kumboo and eunboo overlay technique, aluminum anodizing, and acid etching. (2042-402) Class 18, Credit 6 (S)

Prerequisite for 500-level courses: successful completion of junior-level courses in metals and jewelry design

2042-501   **Materials & Processes: Metals/Jewelry Senior I**
This course concentrates on hollowware 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) Class 18, 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) Class 18, 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) Class 18, Credit 6 (S)

Weaving & Textile Design

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. Material fee required. Lab 6, Credit 3

Woodworking & Furniture Design

2044-215   **Freshman: Woodworking & Furniture**
This course is designed to introduce the beginning student to the field of woodworking 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 craftsperson. Slide talks, technical demonstrations, field trips, design and design review will be some of the ways we experience this area first-hand. Lec 1, Studio 3, 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. Material fee required. Lab 6, Credit 3

Prerequisite 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 18, Class 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) Class 18, 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) Class 18, Credit 6 (S)

Prerequisite for 400-level courses; successful completion of sophomore-level courses in woodworking and furniture design

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; aesthetics, ergonomics, structure (geometry, triangulation), materials, etc. The course includes a machine maintenance program. (2044-303) Class 18, 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) Class 18, 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. (2044402) Class 18, Credit 6 (S)

Prerequisite for 500-level courses: successful completion of junior-level courses in woodworking and furniture design

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 woodworking students may wish to pursue after graduation. Students select from a menu of topics, including jigs and fixtures (shaper, router, etc.), industry related, series, production, outdoor, site specific, multiple seating, multimedia, 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. (2044403) Class 18, 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, multimedia 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) Class 18, 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 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, multimedia, 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) Class 18, Credit 6 (S)

General Crafts Studies

2045-311   Concept Drawing
A one-quarter course covering the freehand concept sketching technique for the crafts major. Lab 6, 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. Lec. 2, Critique 1, Studio 3, 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, associatively of views, generating working drawings, printing, and plotting. Lec. 2, Critique 1, Studio 3, Credit 3

2044-511   Planning Career 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 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 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 elective courses in any sequence. This course is required for all School for American Crafts BFA seniors. Class 3, Credit 3

2044-512   Crafts: Promotional Packaging
One of the 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 stationary, 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. This course is required for all School for American Crafts BFA seniors. Class 3, Credit 3

2045-513   Operating Business: 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 a 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. Class 3, Credit 3

Crafts Extended Studies

2046-201   Introduction to Ceramics
An extensive survey of on and off the wheel formation techniques using stoneware and porcelain clays. Students are introduced to a variety of decorative methods as well as the basics of glazing and firing finished work. Class projects will emphasize the development of competent skills and good design. Credit 2

2046-202   Intermediate Ceramics
A exploration of Japanese wheel throwing techniques. Students will work with raku, stoneware and porcelain, using methods and tools common to the Japanese potter. Class projects will concentrate on production techniques with special emphasis being given to glazing and firing procedures. (2046-201 or equivalent) Credit 2/Qtr.

2046-206   Introduction to Metalcraft/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   Introduction to Woodworking
Elementary problems in choice of woods, joinery, finishing, use and care of hand tools, and basic procedures in machine woodworking. Suggested introductory project: Construct a dovetailed box from a hardwood with hand-cut dovetails. May be elected more than once for credit. Class limited to 20 students. Credit 2/Qtr.

2046-266   Intermediate Metalcrafts
Work of a more complex nature is introduced. Some techniques included are surface treatment of metal, more sophisticated stone setting, basic hollowware, and casting. Independent and creative statements are emphasized in keeping with the student's technical and aesthetic development. May be elected more than once for credit. (2046-206 or presentation of portfolio) Credit 2/Qtr.

2046-271   Intermediate Woodworking I
Students who have acquired the ability to use hand and powered tools will advance at their own pace on an individually challenging technique and project. The development of design skills and technical ability is emphasized. May be elected more than once for credit. (2046-211 or equivalent) Credit 2/Qtr

2046-301   Advanced Ceramics
An introduction to the world of the professional potter. Work will center on advanced forming and decorative techniques. Special emphasis is placed on projects that require the student to master clay and glaze formulation, design, production, and firing techniques, kiln design and construction and marketing techniques for finished work. (2046-202) Credit 2

2046-306   Advanced Metalcrafts & Jewelry
For advanced students in the arts and crafts interested in and capable of
exploring a particular area. Content and method decided by conference
between student and instructor and directed toward development of stu-
dent's own creative ability. Advanced-level academic credit is variable in pro-
portion to class and outside assignments scheduled. May be elected more
than once for credit. (Presentation of portfolio) Credit 2/Qtr.

2046-311   Advanced Woodworking
For advanced students in the arts or crafts interested in and capable of explor-
ing a particular area. Content and methods decided before registration by
conference between student and instructor and directed toward development
of student's own creative ability. Advanced-level academic credit is variable
in proportion to class and outside assignments scheduled. May be elected
more than once for credit. (Presentation of portfolio) Credit 2/Qtr.

School of Film & Animation

2065-101   Film/Video Freshman Seminar
The subject of this course is the film/video freshman. Filmmaking is a collab-
orative effort: before filmmakers can work creatively with others, they must
understand themselves and group dynamics. The course involves exercises in
team building, personality testing, practice critiques, diversity, values
discussions and career review with working filmmakers. Class 2, Credit 2

2065-201   Film/Video Production 1
A fundamental course in 16mm non-synchronous film production.
Filmmaking is presented as a means of interpretation and expression. This
course combines technical information in motion picture exposure and editing
with a theoretical and practical approach to motion picture continuity.
Production is in 16mm (nonsync) format. Students furnish film, tape and pro-
cessing. Equipment is furnished by the department. Class 3, Lab 4, Credit 5

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 S-VHS format taped projects designed to
address specific editorial concerns. Students provide videotape; equipment is
furnished by the department. (2065-201) Class 3, Lab 4, Credit 5

2065-203   Film/Video Production III
This is the third course of three for freshman film/video students. It intro-
duces the nature and importance of the sound component in creating
cinematic works. Students are exposed to a variety of possible treatments of
sound using historical and contemporary examples in cinema. Students
engage in the creation of soundtracks that are rich, complex and meaningful.
They learn the processes, equipment and techniques, as well as creative and
efficient strategies, for multitrack soundtrack creation for both film and video.
This course is essential for students of the film/video curriculum, who must
be able to create not only images, but also mature and appropriate
soundtracks for their film and video works. Also essential for students who
wish to pursue sound-related careers in film and video. (2065-201, 2065-202)
Class 3, Lab 4, Credit 5

2065-221   Materials & Processes of Moving Images 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. Class 4, Credit 4

2065-223   Creative Processes
A discipline-specific follow-up to the more general theories of film language.
The course varies in its approach from year to year; i.e., one year it may take
the whole quarter to study one film. (2065-222) Credit 2

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" video cassettes.
This course does not count as elective credit for F/V majors. Class 3, Lab 3,
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 super-
vised 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. Class 3, Lab 3, Credit 4 (W)

2065-300   Introduction to Media Theory
Media theory provides a tool for analyzing and comparing numerous forms
of human communiation, including live encounters, performances, radio and
television, photography, computer interaction, etc. Using student insights
against a background of original, modern and classical philosophical and sci-
entific insights, the course hopes to reframe human communication in an
orderly paradigm. Lec. 4, Credit 4

2065-305   Media Theory
While introduction to media theory is not a prerequisite, media theory makes
use of a taxonomy established in the introductory course and then continues
to explore the development of communication forms into compound forms,
including dynamics of the forms. Lec. 4, Credit 4

2065-311   Video Tools & Technology
An intensive tools and technology course that allows the student to work in
the S-VHS and 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)

2065-313   Color Theory: Film & Animation
This course examines the use if 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. Lec. 2, Credit 2

2065-317   Advanced Production Workshop: Documentary I
Students produce short documentary projects in either film or video, depend-
ing 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 that were
begun during the quarter or during the previous quarter in Production
Workshop: Documentary I for presentation at public departmental
screenings. (2065-311 or 2065-431) Class 2, Lab 4, Credit 4 (F)

2065-318   Advanced Production Workshop: Documentary II
Students produce short documentary projects in either film or video, depend-
ing 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 depart-
mental screenings or may plan and shoot more ambitious projects to be
completed the following quarter in Production Workshop: Documentary II.
(2065431 or 2065-311) Class 2, Lab 4, Credit 4 (W)

2065-319   Production Workshop: Documentary
Students produce short documentary projects in either 16mm film or 3/4"
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 that are begun during the
quarter, or were begun in Production Workshop: Documentary n. (2065-311
or 2065431) Credit 4 (S)

2065-327   **Advanced Production 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 begun during the quarter or during the previous quarter in Production Workshop: Experimental I for presentation at public departmental screenings. (2065-431 or 2065-311 or consent of the instructor) Credit 4

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 or may plan and shoot more ambitious projects to be completed the following quarter in Production Workshop: Experimental II. (2065431 or 2065-311 or consent of the instructor) Credit 4

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 3/4" 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. 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 that are begun during the quarter or were begun during previous quarters in Production Workshop: Experimental II. (2065431 or 2065-311 or consent of instructor) Credit 4

2065-331   **Introduction to Animation I**
An introduction to the techniques and practices of graphic and animated film production. 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 both existing and original artwork. Some techniques covered in the course are direct modification of the film surface; cell, ink and paint animation; and kinestasis. Screenings of professionally made films illustrate each technique. Proficiency in drawing is required. Class 3, Lab 2, 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) Lab 3, Credit 4

2065-333   **Animation Production**
Provides practice in all phases of single-frame film production. Students produce a 16mm 60-second film with sound utilizing one or more techniques learned in the preceding two quarters. (2065-332) Class 3, Lab 2, 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 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 begun during the quarter or during the previous quarter in Production Workshop: Fiction I for presentation at public departmental screenings. (2065-431 or 2065-311 or consent of the instructor) Credit 4

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 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 or may plan and shoot more ambitious projects to be completed the following quarter in Production Workshop: Fiction II. (2065431 or 2065-311 or consent of the instructor) Credit 4

2065-339   **Production Workshop: Fiction**
In this course students will produce short fiction projects in either 16mm film or 3/4" 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 that are begun during the quarter or were begun during the previous quarter in Production Workshop: Fiction II. (2065-311 or 2065431) Credit 4

2065-342   **Writing for Film/Video I**
Explores the writing of nonfiction and fiction for theatrical and non-theatrical films and television. Experience in the writing of fiction concentrates on the elements of dramatic construction. The exploration of non-fictional writing examines information gathering techniques and methods of investigation. Both nonfiction and fiction are treated as expository, story-telling forms. Students are responsible for writing film or television scripts on subjects of their own choosing and for completing several brief written exercises in areas such as character, dialogue, the interview, suspense and plot. Although this course is designed primarily to meet the needs of film and television majors, it is not restricted to those students. Class 2, Lab 3, Credit 3 (W)

2065-343   **Writing for Film/Video II**
Continuation of 2065-342. (2065-342 or consent of instructor) Class 2, Lab 3, Credit 3 (S)

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. Studio 4, Class 1, 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. Studio 4, Class 1, 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 be asked to draw rapidly and conjecture form from unseen shapes and flowing motion. Frame per frame, video of live model's movement will be examined and compared to students' drawings. (At least one figure drawing class of permission of instructor) Studio 6, Credit 3

2065-352   Animation Pre-Production
Student s collect and produce short film ideas and learn to express them in a variety of methods. Short film scripts will be written a in a workshop setting and shared with a 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. As another tool for initalizing animation production, the students will also work with storyboards scanned into the computer and manipulated in time with sound as Animatics. (2065-203 and 2065-244 or 2065-331) Lab 4, 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. Class 3, Credit 3

2065-356   History & Aesthetics of the Moving Image: Fiction
A non-scholarly 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) Class 3, Credit 3

2065-357   History & Aesthetics of the Moving Image: Documentary
A non-scholarly 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) Class 3, Credit 3

2065-358   History & Aesthetics of the Moving Image: Animation
A non-scholarly 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) Class 3, Credit 3

2065-360   Animation in the Netherlands
Offers the student the unique opportunity to creatively explore and experience animation production and history in one of Europe's most active and innovative countries in this moving art form. Students interested in production credit learn basic and advanced techniques of the medium and engage in 16mm animated film production. Combined processes involving live-action filmmaking, photography and video are also possible. Equipment is provided. Students interested in receiving history/critical studies credit research topics in film archives, museums and libraries; conduct interviews with artists; and write papers. These students also participate in aspects of production experience to complement their general understanding of the medium. All students are exposed to the rich history of the animated film in the Netherlands, as well as in other European countries. Credit 6-9

2065-361   Introduction to 3-D 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 3-D computer animations as part of the learning process and then a final short 3-D computer animation of their own design. Students will become familiar with a variety of three-dimensional computer animation techniques and applications. Lec. 3, Lab 2, 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, superimposition, and mattes. Techniques for hand processing of black-and-white motion picture film will also be demonstrated. Class 5, 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. Class 3, Credit 3

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 Videotheque 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 non-majors, with or without production experience. Credit 6

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 stop motion technique or animator. (2065-331) Lec. 3, Lab 2, 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 International Film History
Examines selected, varying film topics in a wider social-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

2065-382   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 2-D 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. Lec. 2, Lab 3, Credit 4

2065-383   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 search 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 investigated both the programming and visual communication aspects of developing good interface design. Lec. 2, Lab 4, Credit 3

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

2065-400   Media & the Mind
This course is designed to ask questions about why we should or shouldn't use new media to communicate. It will examine thinking and the process of learning as it relates to new media. Much of this exploration is guided by a fresh examination of well-known classical and modern thinkers and their work. Lec. 4, Credit 4

2065-405   Media Symposium
Upper-class and graduate students with Internet capabilities will provide materials from Internet sites to piece together the current state of affairs of communication policy. New laws, and corporate and media policies will be induced from the joint research effort. Lec. 4, 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 adviser from among the film/video faculty. (2065-432) Class 2, Credit 1

2065-427   Introduction to 2-D Computer Animation
Students in this course create a motion picture portfolio consisting of a number of short animation projects composed on a digital computer. Lectures discuss a number of topics, both aesthetic and technical, related to the field. Lec. 3, Lab 4, Credit 5

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) Class 3, Lab 4, Credit 5

2065-437, 438   Advanced Animation Workshop I, II
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) Lab 4, Credit 4

2065-441   Drawing Animation: Dynamics
Three different courses in drawing for animation are offered. Each course provides a different focus. The courses do not need to be taken in sequence. 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-through and exaggeration. 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) Studio 6, Credit 3

2065-442   Drawing Animation: Sequences
Three different courses in drawing for animation are offered. Each course provides a different focus. The courses do not need to be taken in sequence. Flexibility is provided for students at different stages of development. This course focuses on structuring the shots in a scene. Students learn how to break a scene into shots. They develop the shots into a sequence. They storyboard the sequence. They learn to compose the frame for action and to juxtapose one shot against the next. Students learn to use exposure sheets to plan out animation. They animate short sequences using acquired skills. 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) Studio 6, Credit 3

2065-443   Drawing Animation: Characters
Three different courses in drawing for animation are offered. Each course provides a different focus. The courses do not need to be taken in sequence. This course focuses on character development for animation. Students produce character sheets. They explore different perspectives of the character drawing from the imagination. They use the characters in sequential frames of motion. 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) Studio 6, 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) Class 2, Discussion 4, 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. It is also an opportunity for students to involve acquired skills from other disciplines in the research and actualization of their experimental work. 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. Lec. 2, Lab 4, 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. Class 1, Lab 2, Credit 3 (F)

2065-454   Advanced Production Workshop: Script 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) Lec. 4, Credit 4

2065-457   Introduction to 3-D Modeling: Animation
Beginning modeling for animation in 3-D software. Students learn modeling techniques that can be used in the 3-D animation course. Students learn the techniques of digital cinematography. These skills are used to create and light a 3-D environment. Lec. 2, Lab 4, 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 multitrack recording and mixing. (2065-452 or permission of instructor) Class 2, Lab 2, 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. Lec 2, Lab 3, Credit 3

2065-400   Media & the Mind
This course is designed to ask questions about why we should or shouldn't use new media to communicate. It will examine thinking and the process of learning as it relates to new media. Much of this exploration is guided by a fresh examination of well-known classical and modem thinkers and their work. Lec. 4, Credit 4

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). Class 4, Credit 4

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 charater animation. Students will produce a series of short 3-D computer animations of digital characters using inverse kinematics as part of the learning process. Then they will produce a final short 3-D digital character animation of their own design. Students will become familiar with a variey of three-dimensional digital character animation techniques and applications. (2065-361 or permission of instructor) Lec. 2, Lab 4, 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/Qtr. (F, W, S)

2065-507   Senior Project I
The student develops the pre-production planning and completes all major production work on the senior project, meeting weekly with his or her faculty adviser 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) Lec. 1, Lab 6, Credit 4

2065-508   Senior Project 2
Work on the senior project continues into the post-production process. Course work includes post-production processes: editing, construction of soundtracks, sound mix, preparation of log for negative cutter and communicating with labs. (2065-507) Lec. 1, Lab 6, Credit 4

2065-511   Senior Forum 1
These courses accompany and complement the Senior Project 1 and 2 courses. Students in Senior Forum meet as a group to screen dailies, discuss production problems and plan jointly for the use of departmental production resources. (2065-413) Class 2, Credit 2 (each quarter)

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. (2065-511). Credit 2, Seminar 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 4 (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

2065-581   New Media Production Management
Multimedia production from a more holistic viewpoint is examined. Topics such as project planning, choosing a target audience, story-boarding, prototyping and testing, and designing for delivery mediums are discussed. A more 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. (Introduction to Multimedia Production or permission of instructor) Lec 4, Credit 4

2065-582   Group Production Workshop I
The first course in a two-quarter sequence designed to engage the new media major in a "cap stone" production experience. The instructor will form student teams that will design and complete new media projects sponsored by clients' external to the class. (New Media Production Management or Dynamic Persuasion Design) Lec 2, Lab 4, Credit 4

2065-583   Group Production Workshop 2
The second course in a two-quarter sequence designed to engage the new media major in a "cap stone" production experience. Students continue to work until 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. (Group Production Workshop 1) Lec 2, Lab 4, Credit 4

2065-599   Independent Study
A student-proposed advanced project sponsored by an instructor. Approval of the proposal by the faculty sponsor and 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 & Sciences

Fine Art Photo

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. Class 2, Lab 6, Credit 3

2060-258   Still Photography II
A basic studio course for the hobbyist or someone who occasionally uses 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) Class 2, Lab 4, Studio 2, 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; permission of instructor) Class 2, Lab 6, 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. Class 3, Credit 3/Qtr.

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) Lec./Critique 4, Credit 4/Qtr.

2060-324   Photography Media Survey
Students experiment 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. Class 1, Lab 4, Credit 3

2060-334   Introduction Computer Graphics
Introduction to computers and computer graphics emphasizing their use in photographic image-making. Course utilizes basic graphics and photographic manipulation programs to introduce important concepts in computers and computer-based image-making. Integration of tools to student's own artistic process is emphasized. (2060-257) Class 3, Lab 2, 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 20th century—capitalism, 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 dadaism, 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 non-silver, photography techniques may be utilized. (2060-311) Class 3, Field trip 2, Credit 4/Qtr.

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. Class 2, Credit 4/Qtr.

2060-463   Women & Visual Imaging
Exploration of 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) Lec. 2, Critique 2, 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) Class 4, Credit 4/Qtr.

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. Class 3, Credit 3 (not offered every quarter)

2060-556   Photography 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) Class 2, Lab 4, Credit 4 (not offered every quarter)

2060-566, 567, 568   Color Photography 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) Class 2, Lab 4, Credit 4 (not offered every year)

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. Class 2, Lab 4, 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

2061-001   Biomedical Freshman Seminar
Freshman seminar assists students with issues that are of major importance in their first year at RIT. It investigates how to learn, set goals and stay motivated and includes other issues of importance to young students beginning their careers at RIT. Additionally, areas of specific interest to scientific photographers, such as ethics and animal rights, are investigated. Class 1, Credit 0

2061-201   Biomedical Photography I
This course 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. Lec. 2, Lab 4, Studio 3, Credit 4

2061-202   Biomedical Photography II
This course 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) Lec. 2, Lab 4, Studio 3, Credit 4

2061-203   Biomedical Photography III
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) Lec. 2, Lab 4, Studio 3, Credit 4

2061-221   Photography with Digital Tools
This course explores the traditional experiences found in film photography with the sophisticated tools of dynamic digital age. Students can experience photography and the conceptual process required in the making the photographs as an integrated activity of their imagination, the selection of tools and methods, to create visual solutions using the electronic world and its technology to reveal craft and successful delivery of ideas. Lec. 2, Lab 4, Credit 4

2061-276   Basic Photography: Scientists
This basic photography course for non-photo majors emphasizes theory, craftsmanship and visual communication based in technical photography. Forensic, technical, biological and other relevant subject matter are incorporated into this foundation course. Students explore camera operation and lens selection, depth-of-field relationships, exposure meters and choosing and using films as well as the use of supplementary artificial light sources. Lec. 2, Lab 4, 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 and 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) Class 4, Lab 4, Credit 5

2061-311   Prep Photography 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. Class 3, Credit 3

2061-312　　　　　　　　　　　　　　　Prep 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. Lec. 2, Credit 2

2061-313　　　　　　　　　　　　　　　Prep 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) Class 2, Lab 4, Credit 3

2061-316　　　　　　　　　　　　　　　Digital Media: Biomed 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. Lec. 2, Lab 6, Credit 4

2061-318　　　　　　　　　　　　　　　Digital Media: Biomed 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 2-D animations, and speaker support materials. Lec. 2, Lab 6, 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) Class 2, Lab 4, Credit 4

2061-357　　　　　　　　　　　　　　　Macro Photography
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) Class 1, Lab 6, Credit 4

2061-401　　　　　　　　　　　　　　　Audio Visual Production I
Design, creation and presentation of 35mm slide and 35mm slide/tape productions as applied to medical and scientific needs. Planning, research, scripting, production, revision, evaluation. Dissolve programming; graphics; combination of music, words and images. For biomedical photography majors only. (2061-303, strong still-photography background) Class 2, Lab 4, Credit 4

2061-402,403　　　　Advanced Photography in Biomedical Communications
Sophisticated and creative applications of photography serving the needs of the scientific community are explored in this two course sequence. Students use a variety of specialized photographic techniques as well as a variety of philosophies that are required to make images of phenomena such as a sneeze, a headache, the invisible spectrum and many other problems that require visual support. This course has been designed to foster risk taking and time management as well as long-term planning. Assignments can be selected from a menu that would be similar to those activities encountered in biomedical and research institutes. Projects are delivered in an environment that exemplifies a free-lance media specialist. Students are exposed to the business principles required to generate bills, handle customer demands as well as the considerations for developing repeat business. Class 4, 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) Class 2, Lab 4, Credit 4

2061-455　　　　　　Advanced Application in 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 goniography. 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) Class 3, Lab 2, Credit 4

2061-463　　　　　　　　　　　　　　　Photo & the Microscope
This photomicrography course goes beyond the basics of imaging through a microscope. This course investigates 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) Class 2, Lab 4, Credit 4

2061-499　　　　　　　　　　　　　　　Biomed 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　　　　　　　　　　　Photo 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) Class 2, Lab 8, 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

Applied Photography

2067-200　　　　　　　　　　　　　　　Photography I
An intensive 10-week summer course for students entering the transfer program in professional photographic illustration. This is the minimum photographic education needed to gain entry to second-year standing and replaces 2067-201, 202. Since this course is such an intensive offering, previous photographic experience is highly advisable. Class 10, Lab 20, Credit 12

2067-201, 202　　　　　　　　　　　　　Applied Photography 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. Lec./Critique 2, Lab/studio 4, Credit 6 (for two sequential quarters)

2067-208　　　　　　　　　　　　　　　Introduction to Color
A one-quarter course introducing color as a new element in making photographs. Offers a theoretical, technical and aesthetic foundation in color photography. The student gains familiarity with the materials through shooting assignments. Emphasis is placed on developing printing skills. Class 2, Lab 4, Credit 5

2067-263　　　　　　　　　　　　　　　Studio Light
A lighting workshop course that uses visual exercises to teach student how to evaluate light conditions outside and control and reproduce those conditions in the studio. (2067-201, 202) Lec. 2, Critique 2, Studio 4, Lab 4, Credit 5

2067-264   Introduction to Photography for Non-Photo 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 or her own film and processing. (Non-photo major only, no prerequisites) Class 4, Credit 4

2067-268   Visual Images: Source/Resources

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) Lec./Critique 5, 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). Lec./Critique 6, 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 Arts 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. (No prerequisites) Class 4, Credit 4

2067-300   BFA Photography II

A concentrated 10-week summer course for students entering the transfer program in photographic illustration. Students must have had previous photography, design and an AAS degree (or its equivalent) from another institution. All selections will be verified by portfolio. This course is designed for exclusive admission to the complete third/fourth-year BFA program (AAS degree or its equivalent and previous photography and design) Credit 15

2067-301, 302   Applied Photography 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) Class 4, Studio 5, 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. Lec. 2, Lab 4, Credit 4

2067-363   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) Lec. 4, Credit 5

2067-373   Non-Traditional Photography II

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   Non-Traditional 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) Lec. 2, Critique 2, Lab 4, Credit 5

2067-378   Photo Journalism: 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) Lec. 2, Critique 2, Field 5, Credit 5

2067-379   Photo Journalism: 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) Lec. 4, Lab 5, Credit 5

2067-383   Hand-held Electronic Flash

Hash 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) Lec. 2, Critique 2, Lab 4, 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) Lec. 2, Lab 5, Credit 4

2067-401   Visual Journalism-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 Visual Journalism is a personal one. It is simply about the photograph. It is about the act of photographing; and it is about being a visual journalist. (2067-302 or equivalent) Lec. 4, Lab 3, Credit 5

2067-402   Visual Journalism 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 United States and foreign markets. (2067-302 or equivalent) Lec. 4, Lab 3, Credit 5

2067-403   Visual Journalism 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 (2067-302 or equivalent) Lec. 4, Lab 3, 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) Class 4, Studio 5, Credit 5

2067-451   Advertising & 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. (2067412) Lec. 2, Critique 2, Studio 5, 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. Class 4, 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

2067-462   Portrait 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. (2067-301 or equivalent) Credit 4

2067-463   Portrait 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. (2067463 or equivalent) Class 2, Studio 4, Credit 4 (S only)

2067-465   XL-Summer Ad 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) Class 37, Credit 10 (SU)

2067-468   Self-Promotion & Business
Contemporary marketing and business issues for free-lance photographer 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 and 2067422) Lec./Critique 4, Credit 4

2067-469   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. Lec. 1, Critique 2, Studio/Location 4, Credit 5

2067-470   Studio Photography/Still Life

Still life as a medium for creative expression and visual experimentation. Assignments cover a range of professional experiences particular to advertising and editorial still-life photography. They introduce the student to the tools and techniques of studio still-life photography and to concepts of visual communication inherent to the still life. This course is an alternate to the first quarter of Advertising I core course and also may be taken as a photo elective. (Third-year status or permission of instructor) Lec. 4, Lab 12, Credit 7 (SU)

2067-471   Advertising & Design Photography

The Advertising and Design Photography course teams photographer's and graphic designers together 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 placed on producing multiple or sequential images. Historical and contemporary studies of layout and style will be examined. (Advertising photo or permission of faculty) Lec. 2, Critique 2, Studio 5, 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? Lec. 2, Critique 2, Studio 3, Credit 5

2067-474   Studio Skills

General studio course for non-advertising majors. Topics include working with light, selection of lenses, advertising concepts and working with other people's direction. Basic skills in large-format cameras and studio lighting expected. (Third- or fourth-year status, non-advertising majors) Credit 4

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; prerequisite 2067-325 or equivalent or instructor's approval) Lec. 2, Critique 1, Lab 4, 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 the second year courses or permission of the instructor) Class 4, Credit 4

2067-488   People Illustration/Studio

Advanced study of people photography focusing on file development of the photographic and social skills of the studio photographer. Learning to orchestrate the tangible and emotional studio environment 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 the instructor) Credit 5

2067-493   Problem & 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

2067-498   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

2067-501, 502   Photojournalism II

Photojournalism II is a continuation of PJI in its eclectic approach; however, students will have perhaps focused their career goals to some of the specific areas of press, documentary, editorial and corporate photography. The class encourages and helps students direct parts of the course work to their specific goals. Skills covered are an amplification of those in PJ I, with special emphasis given to advanced lighting skills on location. In addition, students work specifically with color transparency materials and the requisite knowledge of color correction techniques under various lighting situations. Students gain insight into the "business" of photojournalism and have an awareness of the various publications, agencies and career options available to them. A student's personal vision is encouraged and supported, and this class facilitates the development of a mature portfolio. Credit 5

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. (2067454 or permission of the instructor) Class 2, Lab 3+, 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; 2067-412 or instructor's permission) Class 3, Studio 4, 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). Lec. 2, Critique 2, Studio 5, Credit 5

2067-573   Macintosh Workstation Installation & 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 2067454, instructor approval [significant experience with Macintosh]) Lec/Lab 4, Credit 3

2067-574   Portfolio Seminar/Illustrations
Provides an opportunity to re-shoot 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

2067-588   Advanced People Illustration
An advanced study of people photography, this course is a continuation of People Illustration/Studio with emphasis on the continued development of the photographic and social skills of the studio photographer of people. Another specific subject is the development of the photographer's portfolio. Course assignments are open-ended, giving the student freedom to generate independent projects specific to his or her portfolio format. A completed mini portfolio is required for successful completion of this course. (2067-488) Lec. 2, Critique 2, Lab 5, Credit 5

2067-593   Advanced Still Life
Introduces the student to advanced concepts of visual communication and studio techniques. Students are encouraged to work on projects in which they have a significant interest. Assignment content is open to student input. Work is shown to various audiences for criticism and experience. Evaluation of these criticisms is an important part of the experience. The tools and techniques of studio still-life photography are discussed and demonstrated as appropriate. (Photojournalism I or Advertising I or permission of instructor) Lec. 2, Critique 2, Studio 5, 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   Photographic 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) Class 2, Lab 6, 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) Class 2, Lab 6 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) Class 2, Lab 6 Credit 4

2068-421   Photo 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) Class 3, Lab 3, 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 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, chemical mix, control charts, chemical control, use of quality control computers, and the operation of several types of processing equipment. Class 2, Lab 4, 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) Class 3, 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) Class 3, 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, 0606-411) 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) Lec. 4, Credit 4

2068-550, 551, 552, 553   Special Topics
A seminar approach offered on demand when adequate numbers of students and a facility 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
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. Class 10, Lab 20, Credit 12

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, pre-production planning and postproduction analysis are taught. Concepts learned in Materials and Processes of Photography are put to practical application in this class. Class 2, Lab 4, Studio 4, 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.) Class 9, 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. Class 3, Credit 3

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. (2076-211, 212, 213; 2076-201, 202, 203) Lec. 2, Lab 4, 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) Lec. 2, Lab 4, 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) Lec. 2, Lab 4, 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. Class 2, Lab 4, 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. Class 2, Lab 4, 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. (2076-321 or equivalent) Class 2, Lab 4, Credit 4

2076-321   Applied Computing for Tech Photography

An applications-oriented computing course that requires students to integrate software and hardware with new and existing imaging systems and technologies. Students are introduced to concepts associated with machine vision, instrument control, quality management, virtual reality and other situations requiring the interfacing of computers, imaging technology, and the analysis and display of information. (0602-208, 0602-210) Class 2, Lab 2, Credit 3

2076-376   Law Enforcement Photography II

Applies photographic techniques to the field of forensic science and law enforcement in general. Emphasizes the recording and visualization of visible and invisible evidence of criminal activities. Among the topics are the use of special techniques, such as infrared and ultraviolet luminescence for forgery analysis, close-up and photomacrography, photomicrography of physical evidence, traffic accident and crime scene photography and the admissibility of photographs in courtroom proceedings. (Law Enforcement Photography I or one of the 2076-201, 202, 203 courses and/or, with permission of instructor, equivalent photo background) Lec 2, Lab 1, Credit 4

2076-381   Introduction to Photography for Publications

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) Class 2, Lab 4, 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. Class 1, Lab 4, Credit 3

2076-401   System Design for Graphic Presentations

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) Class 2, Lab 2, 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) Class 2, Lab 4, 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   Photo 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. Class 1.5, Lab 4, 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) Class 1, Lab 4, 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) Class 4, Field 4, 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 a minimum of several hours per week shooting in natural environments. (Photo I or instructor permission) Class 4, Field 4, Credit 4

2076-479   Introduction to Scientific & Technical 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. Class 2, Lab 4, 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.

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) Lec. 1, Lab 6, 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) Lec. 1, Lab 6, Credit 4

2076-486   Photoscanning 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, photofinish, strip enlarging and panoramic recording methods. (For upper-division 2076 students; others with permission of the instructor) Class 2, Lab 4, 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) Class 2, Studio 4, 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) Class 2, Lab 4, 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. (2076-211/212/213 and 2076-491) Class 6, 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 the senior research project (2076-502). 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) Class 3, 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, 3-D, holography, electrophotography, X-ray and non-silver applications. (For upper-division 2076 students, others with permission of the instructor) Class 2, Lab 2, Credit 3

2076-511   High-Speed/Time-Lapse Photography
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. (For upper-division 2076 students, others with permission of the instructor) Class 2, Lab 4, 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) Class 2, Lab 4, 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 2076-50X. 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. (2076-50X) Class 2, Lab 2, Credit 2

2076-599   Independent Study
A student-proposed advanced project sponsored by a faculty member. Approval of the proposal by the faculty sponsor and administrative chairperson of the school is required. Available to upper-level students with a GPA of 3.0 or higher. Credit variable

School of Printing Management & Sciences

Printing Management

2080-001   Student Seminar
A required seminar course for incoming freshmen and transfer students. Discussion, presentations and student activities to help students adjust to college-level studies and college life. Individual and group activities to develop or enhance career-related needs and skills, such as group communication, career-path information, personal style, assertiveness and leadership needed for success in the graphic arts industry. Journal writing each session. Class 1.5, Credit 0

2080-211, 212, 213   Newspaper Seminar I
This three-quarter, sequential, one-credit-hour course is required for all newspaper operations management majors. All other majors must have faculty approval to enroll. Course topics revolve around the newspaper industry in relation to the printing industry in general. The basic purpose is to provide an understanding of how the newspaper industry is similar to, and different from, the printing industry in general. Specific topics include the technological and management considerations unique to newspaper production. This course also serves as an introduction to the technology and procedures applied in the Newspaper Production Laboratory (NewsLab), which plays a major role in the other required newspaper courses. Class 1, Credit 1 (each quarter)

2080-301   **Print 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. Class 4, Credit 3

2080-302   **Print Planning Concepts**
A required professional course that provides the student with the basic principles of price determination as it relates to marketing. Special emphasis on estimating links those marketing concepts with practice to arrive at a selling price for printed materials. Class discussions, readings and problems are directed toward a better understanding of the relationship of marketing and planning in a printing environment. Class 4, Credit 3

2080-317   **Professional & Technical Writing**
Development of writing skills for business correspondence, proposals, and reports. Consideration of techniques, organization, format, and style to achieve desired writing purposes. Consideration of the computer as a writing, editing, and re-writing tool. A formal technical research report is required. Class sessions consist of lectures on research techniques, documentation, audience analysis, writing formats as well as consideration of grammatical topics. (Writing & Literature I and II (0502-225, 226) Class 3, Credit 3

2080-319   **Electronic Communication in the Printing & Publishing Industry**
Presentation of an overview of electronic communication theory and its application to the publishing industry. Provides the student with the background necessary to relate publishing requirements to electronic system parameters. Several practical newspaper systems are discussed. (1016-225, 226) Class 4, Credit 3

2080-321   **Newsroom Operations Management**
The modern news operation seeks a newsroom whose activities are tightly integrated with those of several non-news departments in the organization. This course concentrates on these points of integration and surveys the technical management challenges of a variety of news department subsystems such as page layout, budgeting, imaging, archiving, scheduling, and projects. Students will explore contemporary issues arising between news operations, production, and advertising in laboratory projects that address such issues as the "news/advertising" ratio (2080-211/212 & 213). Lec. 1, Lab 3, Credit 2

2080-323   **Management Overview of the Graphic Communication Industry**
Dramatic industry changes in technology, global competition, and economic restructuring are presenting today's managers with difficult challenges forcing them to adopt new skills and attitudes. The focus of this course will be providing students with an understanding of the critical management functions and behaviors necessary to lead our industry to sustained growth and profitability. The purpose will be to prepare students for interacting with all levels of management as they begin their career and to understand many of the dynamics of the management process to which they will be exposed. Class 3, Credit 3

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. Class 3, 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. (2080-302) Class 4, Credit 4

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 three-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. Class 3, 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. Class 4, 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. Class 4, Credit 4

2080-404   **Dynamics of Personal Leadership in Printing**
Prepare for more effective leadership and personal success in the printing industry. Provides guided opportunities for students to consider printing management principles in more practical, laboratory-type situations than can be provided in larger lecture-hall concept courses. The purpose is to facilitate applications of management theory in career-related situations. Helps students understand the nature of the printing industry and the personal skills, habits, etc., that will improve their effectiveness in an industry position. Class 4, Credit 3

2080-421   **Labor Relations in the Graphic Arts**
A study of the organization of the U.S. labor force through the impact of national legislation and the construction of the same by U.S. 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. Class 4, 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) Class 4, 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 U.S. Supreme Court decisions as they relate to the unique rights granted to the graphic arts industry. Cases cover Article I, Section 8 of the U.S. Constitution and the First and other amendments. Class 4, Credit 4

2080-502   **Systems Planning**
An introduction to problem-solving techniques utilizing applied statistical tools in management situations. Class 4, Credit 4

2080-503   **Newspaper Management**
Consideration of personnel, organization, finance, maintenance, advertising, circulation and other sources of revenue as they pertain to the metropolitan press; problems and practices of plant supervision. Class 4, Credit 4

2080-550, 551, 552, 553   **Special Topics-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. Class 4, Credit 4

2080-582   Management of Training in the Graphic Arts
Students examine the role of and issues associated with training in the graphic arts industry. Topics include the growth and importance of training in the industry, roles and responsibilities of training personnel, the nature of training, resources available to training managers and financial considerations of training. (2081416) Class 3, Credit 3

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. Class 4, 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. Class 4, 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

2081-216   Graphic Software Tools 1
Laboratory introduction to computer basics and the fundamental tools and concepts of "management" software programs, specifically Microsoft Office. Features of Microsoft Office are stressed during structured laboratory time and homework assignments. Lab 3, Credit 1

2081-217   Graphic Software Tools 2
Laboratory introduction to the fundamental tools and concepts of "page makeup" software programs, specifically QuarkXPress. Features of QuarkXPress are stressed during structured laboratory time and homework assignments. (2081-216) Lab 3, Credit 1

2081-218   Graphic Software Tools 3
Laboratory introduction to the fundamental tools and concepts of "paint" software programs, specifically Adobe Photoshop. Features of Photoshop are stressed during structured laboratory time and homework assignments. The laboratory assignments reinforce imaging theory discussed in 2081-321, Imaging Technology (2081-216 and 2081-217) Lab 3, Credit 1

2081-231   Graphic Communication Distribution Systems
The first part of this course will familiarize the students with conventional printing, the importance for good graphic communication from the design through the planning stages. The main emphasis is to familiarize the students with the mechanical limitations in print-production. In addition, they will gain extensive knowledge of the various methods and techniques used in finishing and distribution to "package," customize and personalize conventionally printed products. The second part will familiarize the students with electronic distribution of graphic images using conventional and emergent techniques. Class 3, Credit 3

2081-254   Introduction to the Graphic Communication Industry
This course introduces the graphic communications industry through history, culture, technology, markets and people. Establishes a basic understanding of the current industry by examining the technologies and the businesses that employ them. Students gain a comprehension of the various businesses and roles that exist in the industry. Class 3, Recitation 1, Credit 3

2081-255   Information Formatting
An introductory course designed to acquaint students with the function of the format designer within the graphic communication industry. The course will give the student necessary fundamental terminology associated with the typographic and design aspects of document formats. The basic considerations for process of reproduction, materials and distribution are incorporated into the discussions of the various kinds of traditional and digital document formats. Included in lecture information is a basic overview of the historical development of type design and document design. Extensive use of slides, overhead materials, handouts. Homework assignments are designed to reinforce assimilation of basic information contained in lectures (2081-254) Class 3, Credit 3

2081-256   Principles of Copy Preparation
A basic course involving fundamental methods and techniques of electronic preparation of copy for reproduction from desktop computers. Stresses the digital formatting of copy for various reproduction methods and compares likenesses and differences. Lectures cover all aspects of copy as used in electronic assembly and formatting for reproduction. Lab projects incorporate basic principles of electronic copy preparation on desktop computers using a variety of software programs. Class 2, Lab 3, Credit 3

2081-307   Newspaper Production
A study of the methods of producing a newspaper by the use of digital pre-press systems and the offset process. Students organize a staff, design a newspaper, create the digital files to make plates and go to press. Class 2, Lab 3, Credit 3

2081-308   Advanced Concepts of Newspaper Production Systems
The production of a newspaper by digital prepress methods and the offset process. A continuation of 2081-307, in more depth, with special emphasis on prepress operations and the production of special editions. Also, emphasis on the use of color in newspaper production. (2081-307) Class 2, Lab 3, Credit 3

2081-316   Ink & Substrates
Provides a basic understanding of the many different kinds of ink and substrates utilized by the various printing processes. Substrate composition, runability, printability and end-use requirements are covered, as well as the different formulation of inks and their drying systems. Requirements of each printing process and the printed product as they relate to the ink and substrate properties are covered. Class 3, Credit 3

2081-321   Imaging Technology
Introduces the student to fundamental imaging concepts that apply to the graphic communications industry. Provides the student with opportunities to develop basic digital imaging skills in image capture processing and reproduction. Encourages the student to exercise communication and information search skills using a variety of media, both print and electronic. Class 3, Recitation 1, Credit 3

2081-356   Copy Preparation
Preparation of copy for reproduction: working from layouts and analyzing and deciding on electronic format requirements. Use of type and illustrative copy to create properly assembled and formatted electronic files for output from desktop computers as films or plates and for electronic transmission. Scanning resolutions, trapping considerations, output resolutions and file formats (e.g., EPS, TIFF, PICT, etc.) are some of the areas covered in lectures and incorporated into lab projects. (2081-255, 321) Class 2, Lab 6, Credit 4

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 letter forms. Consideration of historical origins of letters, use of basic tools, understanding of methods and disciplines stressed. Class 3, 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 desirable. Class 2, Lab 3, 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. Class 3, 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) Class 2, Lab 3, Credit 3

2081-364 Flexographic Process
A fundamental course based on the principles and practices of the flexo-graphic 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. (2081-254) Class 2, Lab 3, Credit 3

2081-366 Techniques of Image Assembly
An introductory course in black-and-white as well as color image assembly. Lab projects are assigned with the purpose of covering a wide variety of layouts requiring different techniques stressing the basic concepts of assembly of images. In addition to traditional methods the student also receives instruction in assembly of images for digital systems. (2081-321) Class 2, Lab 3, Credit 3

2081-367 Lithographic Process
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 (2081-254) Class 2, Lab 3, Credit 3

2081-368 Screen Printing Process
Acquaints students with screen-printing and how it is used as a commercial printing process, stressing recent technological advances. Areas of emphasis include frame construction, fabric selection, stretching of fabric, photo-mechanical stencil systems, screen printing inks, substrates, and an overview of modern screen printing presses. The economics of screen-printing and its relationship to the total area of the graphic arts industry is stressed throughout the course. (2081-254) Class 2, Lab 3, Credit 3

2081-372 The 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. Class 3, 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. Class 2, Lab 6, Credit 4

2081-382 Applications of Printing Design Concepts
An elective course that introduces students to the application of digital technology as a tool for creating visual solutions to printing design problems. Emphasis on the arrangement of typographic and pictorial elements to illustrate and expand on the concepts gained from the prerequisite course. Design solutions are developed through thumbnails and roughs, then refined with the appropriate digital software. Typographic mark-up is also incorporated into projects. Class 2, Lab 3, 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. Class 2, Lab 3, Credit 3

2081-401 Image Capture & Analysis
Introduces students to the theory and practice of image capture methodology for graphic reproduction of monochrome images and provides students with opportunities to perform fundamental lab experiments using conventional photographic and desktop systems to promote understanding of their operations and provide data for analysis. Students develop problem-solving and analytical skills using practical and scientific techniques to assess printability of monochrome images. (2081-321) Class 2, Lab 3, Credit 3

2081-408 Newspaper Presses
An introduction to the printing processes and press designs used in the production of newspaper products. Letterpress, offset and flexographic presses are considered along with modified processes now being adopted and tested for newspaper applications. (2081-307) Class 2, Lab 3, 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. (2081-401) Class 2, Lab 3, Credit 3

2081-411 Circulation & Packaging
A study of the organization and functions of newspaper circulation and packaging departments. An overview of equipment and techniques used in modern newspaper packaging. A study of readership and how it relates to newspaper circulation. (2081-307) Class 3, 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. (2081-367) Class 2, Lab 2, 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. Class 3, 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. (2081-231) Class 2, Lab 3, 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. Class 4, 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) Class 2, Lab 6, Credit 4

2081-467 Litho Press Problems
An advanced course in the theory and practice of offset presswork. Through lecture, discussion, reading, and preparing assignments the student gains a greater understanding of multicolor printing and problem solving models for use in trouble-shooting and managing. Through demonstration and hands-on laboratory experience the student will test press theory by applying it to a printed environment. The course expands on topics, introduced in the Lithographic Process course (2081-367) Class 2, Lab 6, Credit 4

2081-468 Screen Printing II
Further study of the theory and practice of screen printing. Areas of concentration with this course will deal with new technologies or products in the screen printing process, such as new fabrics, film making technologies, stencil products, inks or squeegees or other topics related to the process. Individual related projects will be stressed with each student in the course (2081-368) Class 2, Lab 3, Credit 3

2081-482 Layout & Print Design II
An advanced course involving discussion of traditional design, use of grids, historical evolution of design and contemporary design solutions. Typical commercial printing design problems are explored in laboratory projects, from thumbnails to rough to comprehensive layout. The laboratory problems incorporate traditional rendering techniques with desktop digital output to assemble "dummy" presentation comprehensives. (2081-382) Class 2, Lab 6, Credit 4

2081-486   Advanced Gravure
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) Class 2, Lab 3, Credit 3

2081-550, 551, 552, 553   Special Topics-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 modern 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. (2081-321) Class 2, Lab 3, Credit 3

2081-562   Color Perception & Measurement in the Graphic Arts
Addresses principles of human color perception and its relationship with objective measurement methods including densitometry and CIE colorimetry. Discusses the role of visual perception and instrumentation methods of color measurement and communication in graphic arts imaging for color matching and pleasing color image reproduction. (2081-416) Class 2, Lab 3 Credit 3

2081-572   Electronic Color Imaging & Color 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) Class 2, Lab 3, Credit 3

2081-574   Electronic Publishing
Introduces the student to the rapidly evolving concepts, technologies and practices in electronic publishing and provides the student with opportunities to perform fundamental experiments with electronic publishing technology and to discover its application within the printing and publishing industries. Coverage includes PDF, interactive media, Web production and traditional publishing. (2081-321 and 2081-561) Class 3, Credit 3

2081-576   Digital Printing & Publishing
Introduces the rapidly evolving concepts, technologies and practices in digital printing and publishing. Provides opportunities to perform fundamental experiments with digital printing technology and to discover its application within the printing and publishing industries. Students complete projects on a variety of digital printing systems (2081-321 and 2081-561) Class 2, Lab 3, Credit 3

2081-577   Test Targets & Evaluation in Graphic Arts Imaging
Introduces the student to theories of 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) Class 2, Lab 3, Credit 3

New Media Publishing

2083-202   Freshman Seminar New Media
A required seminar course for incoming freshmen and transfer students. Discussion, presentations, and student activities concerned with helping students adjust to college-level studies and college life. Individual and group activities to develop or enhance career-related needs and skills, such as group communication, career path information, personal style, assertiveness, and leadership needed for success in the graphic arts industry. Journal writing each session. Class 1.5, Credit 1

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 introduced the student to frameworks for understanding, explaining, and analyzing new media publishing. Lec. 2, Lab 3, Credit 3

2083-311   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. Lec. 3, Credit 3

2083-402   Law: Multimedia Communication Systems
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. Lec. 3, 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. (Financial Accounting 0101-301 and Finance 0104-420 or 0104-441) Lec. 4, Credit 4

College of Liberal Arts

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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 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. (501-400) Class 4, Credit 4

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; option for minors and concentrators in criminal justice; and also may be taken as a liberal arts elective. Class 4, Credit 4

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

0501-403   **Field Experience**
Internship practicum for all preservice criminal justice students. Gives the student fast-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 preprofessional 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; option for minors and concentrators in criminal justice; and also may be taken as a liberal arts elective (Junior or Senior status) Class 4, Credit 4

0501-406   **Technology in Criminal Justice**
Introduces students to the use of computer and other technologies in the field of criminal justice. Standard application software packages and computer hardware systems are discussed as they can be utilized in criminal justice settings. In addition, students will have experience with a variety of software and Web-based applications that will provide a necessary foundation for further study. Required course for criminal justice majors. Class 4, Credit 4

0501-409   **Legal Rights of Offenders**
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 post-conviction 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 periodically)

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

0501-412   **Social Control of Deviant 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 that 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 periodically)

0501413   **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 "non-criminals," civil disobedience with the criminal justice system and the role of riot commissions. Professional elective for criminal justice majors. (0501400) Class 4, Credit 4 (offered periodically)

0501415   **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. (0501400) Class 4, Credit 4 (offered periodically)

0501440   **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; option for minors and concentrators in criminal justice; and also may be taken as a liberal arts elective. Class 4, Credit 4

0501-441   **Corrections**

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 major, option for minors and concentrators in criminal justice; and also may be taken as a liberal arts elective. (0501-400) Class 4, Credit 4

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, option for minors and concentrators in criminal justice. Also may be taken as a liberal arts elective. (0501-400) Class 4, Credit 4

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, option for minors and concentrators in criminal justice. Also may be taken as a liberal arts elective. (0501-400) Class 4, Credit 4

0501-445   **Minority Groups & 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 the 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. 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; option for minors and concentrators in criminal justice; and also may be taken as a liberal arts elective. Class 4, Credit 4

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, option for minors and concentrators in criminal justice. Also may be taken as a liberal arts elective. Class 4, Credit 4

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; option for minors and concentrators in criminal justice; and also may be taken as a liberal arts elective. (0501-400) Class 4, Credit 4

0501-460   **Current Issues in Criminal Justice**
This course involves yearlong 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

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 periodically)

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. (0501400) Class 4, Credit 4 (offered periodically)

0501-507   **Computer Crime**
Examines the multifaceted issues associated with computer crime from a variety of perspectives. Topics include techniques employed by offenders, etiology of behaviors, crime prevention, techniques of investigation, epidemiology, current and proposed legislation, civil/criminal statutory and evidentiary issues. Computer crime, computer criminals and victims are analyzed from a criminological foundation. Professional elective for criminal justice majors. (0501400) Class 4, Credit 4 (offered periodically)

0501-510   **Interviewing/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

0501-511   **Alternatives to Incarceration**
Analyzes possible sentencing options available to the criminal courts as well as preadjudicatory 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, preprobation 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 periodically)

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. (0501400) Class 4, Credit 4 (offered periodically)

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 inter-group 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 periodically)

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 periodically)

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 periodically)

0501-528   Etiology of Crime
A comprehensive survey of the sociological, psychological and psychiatric views of the etiology of crime and other forms of deviant behavior. With major emphasis on the sociological forms of explanation, the course undertakes a historical review of criminality theory and progress to present-day concerns of both etiological origins. Required course for criminal justice majors. (0501-201) Class 4, Credit 4

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. (0501400) Class 4, Credit 4 (offered periodically)

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 periodically)

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

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

0501-599   Independent Study
A combined student/faculty-member effort on a chosen topic beyond the normal sequence of course selections. It provides the qualified, self-motivated student with a creative orientation the opportunity to develop an autonomous and personal sense of academic growth and achievement. Class variable, Credit variable

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 and Literature or English Composition. Class 2, Credit 3

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. Class 4, Credit 4

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 present in Written Communication I. Registration by permission of the Department of Liberal Arts Support. Class 4, Credit 4

0502-225   Writing & Literature I
Part of a two-quarter, eight-credit sequenced course designed to develop students' proficiency in written composition, critical reading and critical thinking. Students read, study, and write about representative poems, dramas and 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. This will substitute for English Composition and Literature. Students must take both quarters in sequence. Class 4, Credit 4

0502-226   Writing & Literature II
Part of a two-quarter, eight-credit sequenced course designed to develop students' proficiency in written composition, critical reading and critical thinking. Students read, study, and write about representative poems, dramas and 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. This will substitute for English Composition and Literature. Students must take both quarters in sequence. (Writing and Literature I) Class 4, Credit 4

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 English composition. Class 1, Credit 1 (offered quarterly)

0502-443   Written Argument
Seeks to develop in students the language and reasoning skills necessary to create responsible and effective written arguments. Part of the language communication concentration and may also be taken as an elective. (0502-226 or equivalent) Class 4, Credit 4

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 professional and technical communications. Option for minors and concentrators in language communication. Also may be taken as a liberal arts elective. (0502-226 equivalent) Class 4, Credit 4

0502-445   The Evolving English Language
What makes the English language so difficult? Where do our words come from? Why is it a challenge for native speakers to master English grammar? This course surveys the development of the English language from its beginning to the present to answer such questions as these about the nature and flexibility of the English language. Designed for anyone who is curious about the English language. Part of the language concentration and also may be taken as an elective. Also an elective for professional and technical communication majors. (0502-226 or equivalent) Class 4, Credit 4

0502-446   Writing Technical Manuals
Develops in students those skills necessary for designing, writing and editing long technical manuals. Special emphasis given to graphics and page layout. Students enrolling should have command of concise English prose. Course is an elective for professional technical communication majors. Option for minors and concentrators in language communication. Also may be taken as a liberal arts elective. (0502- 226,444) Class 4, Credit 4

0502-449   **Worlds of Writing**
Introduces students to the varieties of popular writing produced by specialists in a particular professional field or academic discipline—for example, business, medicine, engineering, architecture, photography, physics, etc. Includes reading assignments that introduce issues, ideas, problems and personalities from a particular field to readers who are not specialists in that field. Also includes writing assignments in which each student introduces topics from his or her own field to readers unfamiliar with the field. Part of the language concentration and also may be taken as an elective. Class 4, Credit 4

0502-450   **Advanced Composition**
Builds on the writing skills developed in English Composition (0502-220) or its equivalent. Neither a remedial course nor a technical or business writing course, Advanced Composition is designed for the student who wants to develop writing skills beyond the level attained in English Composition. Part of the language concentration and also may be taken as an elective. (0502-226 or equivalent) Class 4, Credit 4

0502-451   **Creative Writing: Poetry**
An exploration of the techniques of writing poetry in both open and closed forms. Professional elective for professional technical communication majors. Part of language concentration; the creative writing minor; also may be taken as a liberal arts elective. (0502-226 or equivalent) Class 4, Credit 4

0502-452   **Creative Writing: Prose Fiction**
An exploration of some of the most important contemporary techniques of prose fiction in the short story form. Professional elective for technical professional communication majors. Part of the language communication concentration; the creative writing minor; and also may be taken as a liberal arts elective. (0502-226 or equivalent) Class 4, Credit 4 (offered occasionally)

0502-453   **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 file 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. Professional elective for professional technical communication majors. Part of the language communication concentration; the creative writing minor; and also may be taken as a liberal arts elective. (0502-451, 452 or equivalent) Class 4, Credit 4

0502-454   **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. PTC writing elective; option for minors and concentrators in language communication; and also may be taken as a liberal arts elective. (0502-226) Class 4, Credit 4

0502-524   **Communication & Documentary Film**
An examination of the documentary film and video as case studies in communication media. Focuses on film techniques used as argument, persuasion, propaganda and reconstruction of reality. Such elements as director, subject, shooting style and editing techniques are analyzed in terms of message, purpose and audience. PTC elective. (0502-226) Class 4, Credit 4 (offered occasionally)

Foreign Language

0503-400   **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. Not part of any concentration. The course may be taken as an elective. Class 4, Credit 4

0503-405   **Beginning Arabic I**
Arabic I is the first course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language both to spoken Levantine Arabic and to Modem Standard Arabic. The program integrates spoken and written Arabic in a way that reflects the use of Arabic by native speakers today. Arabic I introduces the Arabic writing system and lays the foundation of the skills of speaking, listening, reading, and writing by means of a communicative approach. Tape work is an integral part of the course. Arabic I or equivalent proficiency is the prerequisite for the Arabic language/culture concentration. It may also be taken as an elective. (Permission of the foreign language coordinator) Class 2, Credit 4

0503-408   **Beginning Chinese I**
Chinese I is the first course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language to Mandarin as it is used today. Students will learn both Kanji (characters) and Pinyin right from the start. Extensive tape work is an integral part of the course. Students must be able to spend eight hours weekly on tape work outside of class. Chinese I or equivalent proficiency is the prerequisite for the Chinese language/culture concentration and also may be taken as an elective. (Permission of the foreign language coordinator) Class 2, Credit 4

0503-412   **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 also may be taken as an elective. Class 4, Credit 4

0503-420   **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. Students learn how to use language in real-life situations for different communication purposes. Hiragana and Katakana syllabaries, supplemented by some Kanji, are taught in this course. The course is a prerequisite for the Japanese foreign language/culture concentration. It is also a prerequisite for the KIT/RIT summer program in Kanazawa, Japan. The course also may be taken as an elective. Class 4, Credit 4

0503-424   **Russian I**
First course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence provides students without prior exposure to the language with a sound basis for learning Russian as it is used today in its spoken and written forms. Students leam the Russian alphabet and sound system. Focus is on the development of functional competence in the four skills (listening, speaking, reading, and writing) with special emphasis on oral communication. Expansion of cultural knowledge is stressed. Intensive tape work is an integral part of the course. Russian I or equivalent proficiency is the prerequisite for the Russian language/culture concentration. It may also be taken as an elective. Class 2, Credit 4

0503-425   **Russian II**
Second course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASLIP. The sequence provides students without prior exposure to the language with a sound basis for learning Russian as it is used today in its spoken and written forms. Focus is on the development of functional competence in the four skills (listening, speaking, reading, and writing) with special emphasis on oral communication. Expansion of cultural knowledge is stressed. Intensive tape work is an integral part of the course. Part of the Russian language/culture concentration and may also be taken as an elective. (0503-424 or equivalent) Class 2, Credit 4

0503-426   Russian III

Third course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence provides students without prior exposure to the language with a sound basis for learning Russian as it is used today in its spoken and written forms. Focus is on the development of functional competence in the four skills (listening, speaking, reading and writing) with special emphasis on oral communication. Expansion of cultural knowledge is stressed. Intensive tape work is an integral part of the course. Part of the Russian language/culture concentration and may also be taken as an elective. (0503-425 or equivalent) Class 2, Credit 4

0503-427   Russian IV

Fourth course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence provides students without prior exposure to the language with a sound basis for learning Russian as it is used today in its spoken and written forms. Focus is on the development of functional competence in the four skills (listening, speaking, reading and writing) with special emphasis on oral communication. Expansion of cultural knowledge is stressed. Intensive tape work is an integral part of the course. Part of the Russian language/culture concentration and may also be taken as an elective. (0503-426 or equivalent) Class 2, Credit 4

0503-428   Russian V

Fifth course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence provides students without prior exposure to the language with a sound basis for learning Russian as it is used today in its spoken and written forms. Focus is on the development of functional competence in the four skills (listening, speaking, reading, and writing) with special emphasis on oral communication. Expansion of cultural knowledge is stressed. Intensive tape work is an integral part of the course. Part of the Russian language/culture concentration and may also be taken as an elective. (0503-427 or equivalent) Class 2, Credit 4

0503-429   Russian VI

Last course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence provides students without prior exposure to the language with a sound basis for learning Russian as it is used today in its spoken and written forms. Focus is on the development of functional competence in the four skills (listening, speaking, reading, and writing) with special emphasis on oral communication. Expansion of cultural knowledge is stressed. Intensive tape work is an integral part of the course. Part of the Russian language/culture concentration and may also be taken as an elective. (0503-427 or equivalent) Class 2, Credit 4

0503-430   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 in. This course may be taken as the prerequisite for the Spanish language/culture concentration and the Spanish language/culture and Spanish language minors. It also may be taken as an elective. See instructor for placement in the appropriate course. Class 4, Credit 4

0503-435   Beginning French I

This course gives students with one or two years of high school French a sound basic knowledge of French as it is spoken and written today. A strong emphasis is placed on speaking and reading skills. In addition to language, students also study contemporary life and culture in the French-speaking countries. This course may be taken as the prerequisite for the French language/culture concentration; the French foreign language minor; and also may be taken as an elective. Class 4, Credit 4

0503-440   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. Not part of any concentration. The course may be taken as an elective. Class 4, Credit 4

0503-441   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. Not part of any concentration. The course may be taken as an elective. Class 4, Credit 4

0503-445   Beginning Arabic II

Arabic II is the second course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language both to spoken Levantine Arabic and to Modern Standard Arabic. The program integrates spoken and written Arabic in a way that reflects the use of Arabic by native speakers today. The focus of Arabic II is the development of proficiency in the skills of speaking, listening, reading and writing by means of a communicative approach. Tape work is an integral part of the course. Arabic II is part of the Arabic language/culture concentration and also may be taken as an elective. Class 2, Credit 4

0503-446   Beginning Arabic III

Arabic III is the third course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language both to spoken Levantine Arabic and to Modern Standard Arabic. The program integrates spoken and written Arabic in a way that reflects the use of Arabic by native speakers today. The focus of Arabic III is the development of proficiency in the skills of speaking, listening, reading, and writing by means of a communicative approach. Tape work is an integral part of the course. Arabic III is part of the Arabic language/culture concentration and also may be taken as an elective. Class 2, Credit 4

0503-447   Beginning Arabic IV

Arabic IV is the fourth course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language both to spoken Levantine Arabic and to Modem Standard Arabic. The program integrates spoken and written Arabic in a way that reflects the use of Arabic by native speakers today. The focus of Arabic IV is the development of proficiency in the skills of speaking, listening, reading, and writing by means of a communicative approach. Tape work is an integral part of the course. Arabic IV is part of the Arabic language/culture concentration. It is required for international business majors concentrating in Arabic. It also may be taken as an elective. Class 2, Credit 4

0503-448   Beginning Arabic V

Arabic V is the fifth course in a six-course sequence offered in a modified self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language both to spoken Levantine Arabic and to Modem Standard Arabic. The program integrates spoken and written Arabic in a way that reflects the use of Arabic by native speakers today. Arabic V continues the development of proficiency in the skills of speaking, listening, reading, and writing by means of a communicative approach. There is a strong emphasis on reading. Arabic V is part of the Arabic language/culture concentration. It is required for international business majors concentrating in Arabic. It also may be taken as an elective. Class 2, Credit 4

0503-449   Beginning Arabic VI

Arabic VI is the last course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language both to spoken Levantine Arabic and to Modern Standard Arabic. The program integrates spoken and written Arabic in a way that reflects the use of Arabic by native speakers today. The focus of Arabic VI is the continued development of proficiency in the skills of speaking, listening, reading, and writing with a strong emphasis on the reading skills. Arabic VI is part of the Arabic language/culture concentration. It is required for international business majors concentrating in Arabic. It also may be taken as an elective. Class 2, Credit 4

0503451   Beginning Chinese II

Chinese II is the second course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language to Mandarin as it is used today. Students will learn to read both Kanji (characters) and Pinyin right from the start. Students must be able to spend eight hours weekly on tape work outside of class. Chinese II is part of the Chinese language/culture concentration and also may be taken as an elective. Class 2, Credit 4

0503452   Beginning Chinese III

Chinese IH is the third course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language to Mandarin as it is used today. Students continue to study both the Kanji (characters) and Pinyin writing systems. Extensive tape work is an integral part of the course. Students must be able to spend eight hours weekly on tape work outside of class. Chinese III is part of the Chinese language/culture concentration and also may be taken as an elective. Class 2, Credit 4

0503453   Beginning Chinese IV

Chinese IV is the fourth course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language to Mandarin as it is used today. Students continue to study both the Kanji (characters) and Pinyin writing systems. Extensive tape work is an integral part of the course. Students must be able to spend eight hours weekly on tape work outside of class. Chinese IV is part of the Chinese language/culture concentration. It is required for international business majors concentrating in Chinese. It also may be taken as an elective. Class 2, Credit 4

0503-454   Beginning Chinese V

Chinese V is the fifth course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP), The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language to Mandarin as it is used today. Students continue to study both the Kanji (characters) and Pinyin writing systems. Extensive tape work is an integral part of the course. Students must be able to spend eight hours weekly on tape work outside of class. Chinese V is part of the Chinese language/culture concentration. It is required for international business majors concentrating in Chinese. It also may be taken as an elective. Class 2, Credit 4

0503-455   Beginning Chinese VI

Chinese VI is the last course in a six-course sequence offered in a modified, self-instructional format developed by the National Association of Self-Instructional Language Programs (NASILP). The College of Liberal Arts is certified by NASILP and uses course materials and examiners accredited by NASILP. The sequence introduces students with no prior knowledge of the language to Mandarin as it is used today. Students continue to study both the Kanji (characters) and Pinyin writing systems. Extensive tape work is an integral part of the course. Students must be able to spend eight hours weekly on tape work outside of class. Chinese VI is part of the Chinese language/culture concentration. It is required for international business majors concentrating in Chinese. It also may be taken as an elective. Class 2, Credit 4

0503-464   Beginning French II

This course gives students with one or two years of high school French a sound basic knowledge of French as it is spoken and written today. A strong emphasis is placed on speaking and reading skills. In addition to language, 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

0503-465   Beginning French III

This course gives students with one or two years of high school French further basic knowledge of French as it is spoken and written today. A strong emphasis is placed on speaking and reading skills. In addition to language, students also study contemporary life and culture in the French-speaking countries. 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

0503-466   Intermediate French I

This course at the intermediate level gives students more advanced practice in the skills of speaking, reading, comprehending and writing French. In addition to language, students study contemporary life and culture through a variety of carefully selected readings. Although this course is part of a six-course sequence, it may be taken separately. It may be used to complete the French foreign language/culture concentration; the French foreign language minor; and also may be taken as an elective. This course is part of the language requirement for international business majors. Class 4, Credit 4

0503-467   Intermediate French II

This course at the intermediate level continues to give students more advanced practice in the skills of speaking, reading, comprehending and writing French. The course also includes segments of the use of French for business. In addition to language, students study contemporary life and culture through a variety of carefully selected readings. Although this course is part of a six-course sequence, it may be taken separately. It may be used to complete the French foreign language/culture concentration; the French foreign language minor; and also may be taken as an elective. This course is part of the language requirement for international business majors. Class 4, Credit 4

0503-468   Intermediate French III

This course at the intermediate level gives students further advanced practice in the skills of speaking, reading, comprehending and writing French. The course also includes segments of the use of French for business. In addition to language, students study contemporary life and culture through a variety of carefully selected readings. Although this course is part of a six-course sequence, it may be taken separately. It may be used to complete the French foreign language/culture concentration; the French foreign language minor; and also may be taken as an elective. This intermediate course is part of the language requirement for the international business majors. Class 4, Credit 4

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; and also may be taken as an elective. Class 4, Credit 4

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; and also may be taken as an elective. Class 4, Credit 4

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 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. Class 4, Credit 4

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 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 foreign language minor; and also may be taken as an elective. It is also required for international business majors concentrating in German. Class 4, Credit 4

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 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 foreign language minor; and also may be taken as an elective. It is required for international business majors concentrating in German. Class 4, Credit 4

0503-477   **Contemporary German Culture**
Course examines the role of culture as manifested in everyday German life 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. Liberal arts elective. German concentration culture course. Class 4, Credit 4

0503-480   **Beginning Japanese II**
This is the second 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. Students learn how to use language in real-life situations for different communication purposes. In addition to Hiragana and Katakana syllabaries and Kanji taught in level I, a greater number of Kanji are introduced 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/culture concentration and also may be taken as an elective. (0503-420) Class 4, Credit 4

0503-481   **Beginning Japanese III**
This is the third 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. Students learn now to use language in real-life situations for different communication purposes. In addition to Hiragana and Katakana syllibaries and Kanji taught in level I and II, a greater number of Kanji are introduced in this course. The course is a prerequisite for the KIT/RIT summer program in Kanzawa, Japan. It is part of the Japanese foreign language/culture concentration and also may be taken as an elective. (0503-480) Class 4, Credit 4

0503-482   **Intermediate Japanese I**
This is the first course in the second-year sequence designed to give students more advanced instructions and practice in the skills of speaking, reading, writing and comprehending contemporary Japanese. A strong emphasis is placed on oral proficiency. Students 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 also may be taken as an elective. (0503481) Class 4, Credit 4

0503-483   **Intermediate Japanese II**
This is the second course in the second-year sequence designed to give students more advanced instructions and practice in the skills of speaking, reading, writing and comprehending contemporary Japanese. A strong emphasis is placed on oral proficiency. Students 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 also may be taken as an elective. (0503-482) Class 4, Credit 4

0503-484   **Intermediate Japanese III**
This is the third course in the second-year sequence designed to give students more advanced instructions and practice in the skills of speaking, reading, writing and comprehending contemporary Japanese. A strong emphasis is placed on oral proficiency. Students learn how to use language in real-life situations for different communication purposes. It is part of the Japanese foreign language/culture concentration and also may be taken as an elective. (0503483) Class 4, Credit 4

0503-490   **Beginning Spanish II**
This is the second course in the Beginning Spanish sequence continuing through the basic language structures, vocabulary and situations. 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 also may be taken as an elective. Course II or equivalent proficiency is a prerequisite for Course III. See instructor for placement. Class 4, Credit 4

0503-491   **Beginning Spanish III**
This is the third course in the Beginning Spanish sequence continuing through the basic structure, vocabulary and situations, and expanding practice in all skills. Course III is part of the Spanish language/culture concentration and the Latino/Latina Latin American concentration. 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

0503-492   **Intermediate Spanish I**
This is the first course in the Intermediate Spanish sequence. Intermediate I (fall) emphasizes tourist survival situation dialogues and culture. The Intermediate courses continue the study of Spanish on a more advanced level with a strong culture component (detailed study of the Spanish-speaking countries) and 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. 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. (0503-491 or equivalent proficiency) See instructor for placement in the appropriate course. Class 4, Credit 4

0503-493   **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), and culture. The intermediate courses continue the study of Spanish on a more advanced level with a strong culture component (detailed study of the Spanish-speaking countries) and 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. Class 4, Credit 4

0503-494   Intermediate Spanish III
This is the third course in the Intermediate Spanish sequence. Intermediate in (spring) emphasizes conversation and composition along with culture. The intermediate courses continue the study of Spanish on a more advanced level with a strong culture component (detailed study of the Spanish-speaking countries) and 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 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. Class 4, Credit 4

Literature

0504-440   Drama/Theatre
Drama as a genre and theater as a performing art. Intensive study of at least one major playwright or period complements a general survey of drama/ theater from ancient Greece to modern Broadway. Part of the literature concentration; literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4

0504-441   The Art of Poetry
Emphasizes the enjoyment and study of poetry with primary attention to major poetry in English. Part of literature concentration; the creative writing and literature minors; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4

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 literature concentration; the creative writing, and literature minors; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4

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 literature concentration; the creative writing and literature minors; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4

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. A non-technical, non-chronological study of film with a balance of roughly 50 percent literature and 50 percent film. Part of the literature concentration; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4

0504-447   Literature Topic
A focused, in-depth study and analysis of a selected advanced topic in literature. Specific topics vary according to faculty assigned and are published when the course is offered. Part of the literature concentration and minor and may also be taken as an elective. (0502-225) Class 4 Credit 4

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 literature concentration; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4

0504-449   Mark Twain
Consists of readings from the bitter-comic writings of the last part of Twain's career, focusing on his philosophy of total determinism, his disenchantment with the "damned human race" and its institutions of government, his trust in and later disillusionment with industrialism, and his romantic nostalgic desire to return to an idyllic pre-Civil War existence. Part of the literature concentration and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

0504-450   Ibsen, Family & Society
Reading and/or viewing ten 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 literature concentration; the literature minor; and also may be taken as an elective. (0502-225 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 literature concentration and also may be taken as an elective. (0502-225 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 literature concentration and also may be taken as an elective. (0502-225 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 theater and its traditions. Part of the literature concentration; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

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 literature concentration; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

0504-456   Dostovsky
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 nineteenth-century Russia and for the implications his works and life continue to have for twentieth-century Western culture. Part of the literature and Russian foreign language/culture concentrations; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

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 nineteenth-century Russia and for the implications his works and life continue to have for twentieth-century Western culture. Part of the literature and Russian foreign language/culture concentrations; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

0504-458   Walt Whitman
In 1967, the Nobel Laurete poet Pablo Neruda said, "We live in a Whitmanesque Age." 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. 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 literature concentration; the literature minor; and also may be taken as an elective. (0502- 225 or equivalent) Class 4, Credit 4 (offered occasionally)

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 functions. Part of the literature and women's studies concentrations; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4

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 literature concentration, the creative writing and literature minors; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

0504-461   Latin American Literature
Reading short stories, novels and poetry 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 literature, the Spanish foreign language/culture, the Latino/Latina Latin American concentrations; the Spanish foreign language/culture and literature minors; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

0504-462   Literature & Technology
A study of 19th and 20th century American literature (short stories, essays, poems and novels) commenting on the impact of technology on society. The works selected reflect mostly the skeptical response of American writers to the technological Utopia. Part of the literature and science and technology studies concentrations; the literature and the science, technology and environmental studies minors; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

0504-463   Literature of the Bible
A close and rapid reading of selected Old and New Testament books to show the range and variety of literary genres and styles in the Bible. Part of the literature concentration and perspectives on religion concentration and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

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 literature concentration; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

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 literature concentration; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

0504-466   Black Literature Before 1920
Traces the literary contributions of selected black writers in the various genres from their roots in the African heritage through slavery to the Harlem Renaissance. Part of the literature and minority relations concentrations; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

0504-467   Black Literature After 1920
Traces the literary contributions of selected black writers in the various genres from the Harlem Renaissance to the present day. Part of the literature and minority relations concentrations; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

0504-468   American Spirit in Literature
A survey of the development of American philosophy through the study of selected works from the colonial period through the mid-19th century. Particular attention is given to the ideas of the writers under consideration and their effect on modern American thought. Part of the literature concentration; the literature minor; and also may be taken as an elective. (0502-225 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 under-represented voices in writing 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 literature concentration; the literature minor; and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4

0504-470   Tolkien & Mythlore
J. R. R. Tolkien's major works are analyzed to see how fantasy and myth are significant vehicles for dealing with major issues of our contemporary world. Tolkien's mythlore is studied in terms of how it relates to twentieth century European politics, ethics and interplay between fate (historical, economic or mechanistic determinism) and free will, cultural heritage and religious belief. Part of the literature concentration and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

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 women's studies concentration and also may be taken as an elective. (0502-226 or equivalent) Class 4, Credit 4

0504-481   Literature of War & Peace
Gives students an awareness of the different views on war and peace in world literature and cinematic works. Part of the peace studies concentration and the literature concentration and also may be taken as an elective. (0502-225 or equivalent) Class 4, Credit 4 (offered occasionally)

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 and the literature concentrations; the literature minor; and also may be taken as an elective. (0502-226 or equivalent) Class 4, Credit 4

0504-487   Literature of French Black Africa & Caribbean
Reading (in English translation) short stories, novels, plays, poems, and essays of modern French-speaking writers from Black Africa (countries such as Senegal, Mali, Ivory Cast, Congo) and the Caribbean (Martinique, Guadeloupe, Haiti), 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. Part of the literature and foreign language/culture concentrations, literature minor, and may be taken as an elective. Class 4, Credit 4

0504-488   Literature of French North Africa & Canada
Reading (in English translation) short stories, novels, plays, poems, and essays of modern French-speaking writers from Canada and North Africa (Algeria, Morocco, and Tunisia) as well as viewing films by French-speaking directors, enables 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. Part of the literature and foreign language/culture concentrations, literature minor, and may be taken as an elective. Class 4, Credit 4

0504-524   Contemporary Film
A study of contemporary world films, to be drawn from those presently showing in the Rochester area (theaters, television, film festivals). Emphasis is on both technical and aesthetic aspects of the films. Class 4, Credit 4

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**
Students develop ability to view analytically and evaluate the film arts, both still and moving (motion) pictures, through consideration of their technologies, histories, aesthetics and critical writings. Class 4, Credit 4

0505-216   **Fine Arts: Theater Arts**
The course will develop student's 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

0505-441   **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 and also may be taken as an elective. Class 4, Credit 4

0505-442   **Music in the United States**
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 also may 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 also may 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 and also may be taken as an elective. Class 4, Credit 4

0505-445   **Issues in American Art**
A comprehensive overview of American attitudes and philosophies as the 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 also may 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 and also may be taken as an elective. Class 4, Credit 4

0505-447   **American Musical Theatre**
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 and the music concentration 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 and the music concentration 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 and style. Part of the music concentration and also may be taken as an elective. Class 4, Credit 4 (offered occasionally)

0505-450   **Music and the Stage**
Survey of the development of opera and the American musical theater, highlighting representative works, composers, librettists and performers. Part of the music concentration and also may be taken as an elective. Class 4, Credit 4 (offered occasionally)

0505-451   **Music Performance**
The historical and theoretical study of musical forms and styles in the context of active participation in the RIT Singers or the RIT Philharmonia. As an experiential outcome of such study, the group prepares significant musical compositions for public performance. Part of the music concentration and also may be taken as an elective. Credit: one hour per quarter, a total of four such credits may count as a liberal arts elective or music concentration course. Class 1, Credit 1 (offered quarterly)

0505-452   **Special Topics: 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 American 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 United States**
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 (offered occasionally)

0505-454   **American Orchestra & Its Repertoire**
A survey on the history and development of the orchestra and its repertoire from th Baroque to the present, focusing on the 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 music concentration, the American artistic experience concentration, 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 and 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 also may be taken as an elective. 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 and also may be taken as an elective. Class 4, Credit 4 (offered occasionally)

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, this course 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. Also part of the German language/culture minor and may be taken as an elective. Class 4, Credit 4 (offered occasionally)

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. It is also part of the German language/culture minor and may be taken as an elective. Class 4, Credit 4 (offered occasionally)

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 concentration. It is also part of the German language/culture minor and may be taken as an elective. Class 4, Credit 4 (offered occasionally)

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 also may be taken as an elective. (0505-449) Class 4, Credit 4 (offered occasionally)

0505-486   **German Theatre & Drama**
A survey of the cultural and artistic achievements of German-language dramatists in the modem period (1885 to present). The course spans the last hundred years of changing styles, major playwrights, and political-social conditions for the making of theater. Beginning with two classical works (Goethe's *Faust, Part I* and Schiller's *Maid of Orleans)* to establish the tradition of Germanic drama and theater, the course's readings cover chief works of Naturalist, Expressionist, and Postmodernist drama, emphasizing the plays and practice of Bertolt Brecht (1898 -1956). Special topics include drama in the Nazi period, East German theater, and experimental avant-garde theater since the Berlin Wall. Part of the German language/culture concentration and the German language/culture minor. Also may be taken as an elective. Class 4, Credit 4

0505-487   **Art of Islam**
A survey of artistic traditions (architecture, decorative arts, art of the book and painting) for 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 interest in depth. Part of the - Arabic foreign language/culture concentration and may also taken as an elective. Class 4, Credit 4

0505-502   **Shakespeare: Dramatist**
This is a course in Shakespeare's drama that emphasizes the plays as potential theater 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. May be taken as a liberal arts elective. Class 4, Credit 4

Humanities

0506-483   **The Biblical Tradition**
An examination of Judaism and Christianity as they are presented in the Old and New Testaments. Part of the perspectives on religion concentration and also may be taken as an elective. Class 4, Credit 4

0506-484   **Introduction to New Testament**
Provides the student with a basic understanding of Christianity as it is presented in the New Testament. Christian thought is examined against the background of the economic, social, political and historical setting of the New Testament period. A modern critical biblical scholarship, as well as the traditional approaches to the New Testament, is applied. Part of the perspectives on religion concentration and also may be taken as an elective. Class 4, Credit 4

History

0507-301   **History: Modern America**
The political, social, cultural and economic development of the American people in the modem period. Studies the United States in its foreign relations.
   Class 4, Credit 4 (offered quarterly)

0507-302   **History: Modern European**
An examination of social, economic, political and intellectual movements of Europe from the Modern Period to the 20th century, which played major roles in shaping our contemporary world. Class 4, Credit 4 (offered quarterly)

0507-440   **United States Social & Intellectual History**
Examines the American people, their society and their culture in relation to the nation's institutions: government, courts, business, labor, and political and private associations. The interplay between the American people and the institutions that structure their lives sheds light on the dynamic forces that shape American history and helps to explain the present. Instead of detailing day-to-day chronology, this study highlights the sweep of major trends and movements over longer periods of the American experience. 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

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

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, 215 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

0507-444   **Strategy & Diplomacy: 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

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 20th 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. Also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4

0507-446   Europe Since 1945
An analysis of the political, economic, social and cultural events that have shaped the new system of Europe since 1945. Part of the history and global studies concentrations; part of 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

0507-447   United States Since 1945
An analysis of the major themes characterizing post-World War II U.S. history. Investigates the specific characteristics of America as a modern state. Selected themes have an intellectual, cultural, and political history focus. Part of the history concentration; 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

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

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

0507-450   Stalin, Mussolini, Hitler
A study of the European states and peoples in the inter-war period, the diplomatic and military history of World War II, the reconstruction of Europe, the Cold War, detente and contemporary Europe. Part of the history concentration and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4

0507-451   United States Community 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)

0507-452   Race & Society
A social, historical, political, religious and anthropological appraisal of the factors that have produced the differences between social appearances and social attainments of the world's population. Primary emphasis is on the fact that such differences are not sufficient reason for believing that there are underlying disparities or innate capacities among races. 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   United States-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)

0507-454   Crime, Violence, Urban Crisis
Analyzes the causes of the outbreak and rapid increase of violent and criminal trends in the world as the most serious realities of the 20th century. A comparative study on America's and the world's problems of violence, crime and urban crisis. Part of the history concentration and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-455   Italian American Experience
Examines the history and culture of Italian Americans from the colonial period to the present. Stresses their role in the arts, business, politics, the Church and the labor movement. Italian history is studied as it relates to the Italians in America. Part of the history concentration and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-456   United States & 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 U.S. 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)

0507457   History: Popular American Culture
American myths, icons, heroes and institutions as represented in American popular culture from the late 19th 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)

0507458   Civil Liberties
Teaches the history of civil liberties in America. Emphasis is on the current state of civil liberties. Students make philosophical as well as historical analyses of cases. Part of the history concentration and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-459   Social Justice & American Constitution
Analyzes how well the Constitution has met the social and political expectations of citizens. Emphasis is on analyzing Supreme Court cases that explain the current state of social justice. A companion course to 0507-532, Civil Liberties in American History. 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: 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. Part of the history concentration, the American history minor; and also may be taken as an elective. Class 4, Credit 4

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. Class 4, Credit 4

0507-464   American Environment & Character
Students will study the ways in which American thought, culture and politics have been shaped by the environment and physical landscape. The course will focus on a range of topics, such as land-use concepts, western expansion, conservation and environmental politics. Part of history concentration; environmental studies concentration; science, technology and environmental studies minor; and also may be taken as an elective. Class 4, Credit 4

0507-465   Survey of African American 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. Class 4, Credit 4

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. Class 4, Credit 4

0507-480   History of American Women
A history of women in North America from the colonial period to the present. Concentrates on the social, political, cultural, diplomatic and economic history of women in the United States and Canada. Part of the women's studies and history concentrations; the American history minor; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4

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: 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 concentration and the history concentration; also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4

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 concentration and the history concentration; also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4

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)

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

0507490   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

0507491   Black Experience in America
Examines the history of blacks in America, treating the subject primarily from a social and cultural perspective. Studies the impact of whites on black Americans and describes the contribution of blacks to the development of the United States. Part of the minority relations concentration and the history concentration; also may be used as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4

0507-492   Selected Problems 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)

0507-493   History: Social Discrimination
A study of the discriminatory practices, present and historical, found in the United States. Includes the cultural values and problems of acculturation for the American Indian, Black, Puerto Rican, Chicano, Asian, women and religious groups, with emphasis on their implication to social work. Part of the minority relations and history concentrations; the American history minor; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4

0507-494   Immigration & Ethnicity
Explores the personal and collective experience of immigrants arriving in North America from colonial times to the present. Categories of special interest include immigrant expectations and adaptation, the tension between ethnic exclusiveness and assimilation, the role of the immigrant in the urban communities of the United States and Canada, native-born reactions to immigrants, the ethnic revival of the 1960s and 1970s, and the condition of ethnicity and the new immigration in contemporary America. Part of the minority relations and history concentrations; the American history minor; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4 (offered occasionally)

0507-495   Black Civil Rights: 20th Century
Examines the social and legal history of civil rights in the United States 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 modem world minors; and also may be taken as an elective. (0507-301, 302 or equivalent) Class 4, Credit 4

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

0507-497   Psychological Insights in History
The course will examine the psychological motivations of individuals and groups that 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)

Science & Technology

0508-211   Science, Technology & Values
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 been affected by our values. 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)

0508-440   History of Science
A study of the origins, nature and development of Western science and its social, economic and cultural context. 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 also may be taken 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. 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
Helps the student understand the life of modern science through the lives of modern scientists. Modern science is understood to be science from the scientific revolution of the 16th and 17th centuries to the present. Much recent scholarship has been devoted to analyzing science in context, i.e., the way it actually develops in particular social and political environments as well as through the lives of individuals. 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

0508-447   Special Topics: Science & Technology
Offered periodically in the social impacts of science and technology 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 (offered occasionally)

0508-448   Space, Time & Reality
In this course we learn the conceptual development of the 20th century theories of time and space with major emphasis on their applications in the present decade. These views, which grew out of the rigorous, mathematical logic of relativity theory and quantum theory, represent one of the most profound revisions of intellectual thought in human history. We learn how any vestige of an absolute frame of reference in space and time, and how cause and effect and strict determinism were demolished and how probability was introduced by means of these theories. Part of the science and technology studies concentration and also may be taken as an elective. Class 4, Credit 4 (offered occasionally)

0508-460   Introduction to Environmental Science I
Three-quarter sequence: 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/policy, ethics, economics, sociology, history, and engineering will be embedded in the course. Part of the environmental studies concentration and science technology and environmental studies minor. Class 2, Lab 4, Credit 4(F)

0508-461   Introduction to Environmental Science II
Continuation of 0508-460. Part of the environmental studies concentration and science technology and environmental studies minor. 0508-460 or permission of instructor. Class 2, Lab 4, Credit 4 (W)

0508-462   Introduction to Environmental Science III
Continuation of 0508-461. Part of the environmental studies concentration and science technology and environmental studies minor. 0508-460 or permission of instructor. Class 2, Lab 4, Credit 4 (S)

0508-463   Great Lakes I
Three-quarter sequence that continues the integrated presentation of the inter-related, interdisciplinary principles of environmental science through an in-depth study of the Great Lakes ecosystem. Part of the environmental studies concentration and science technology and environmental studies minor. Class 2, Lab 4, Credit 4(F)

0508-464   Great Lakes II
Continuation of 0508-463. Part of the environmental studies concentration and science technology and environmental studies minor. 0508-463 or permission of instructor. Class 2, Lab 4, Credit 4 (W)

0508-465   Great Lakes III
Continuation of 0508-464. Part of the environmental studies concentration and science technology and environmental studies minor. 0508-463 or permission of instructor. Class 2, Lab 4, Credit 4 (S)

0508-481   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

0508-482   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

0508-483   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 used 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 and American politics concentrations; the American politics and science, technology and environmental studies minor; and also may be taken as an elective. Class 4, Credit 4

0508-485   Development of U.S. Energy Policy
An examination of the development of U.S. energy policy from the mid-19th century to the present. A number of policies have affected the supply of and demand for energy for many years, and an examination of the development of these policies aids in understanding some of the current energy conflicts and debates. Part of the environmental studies concentration and also may be taken as an elective. Class 4, Credit 4 (offered occasionally)

0508-486   Modern War Technology & Arms Control
Study of the importance of science and technology to defense matters. Investigates how modern weapons, both nuclear and conventional; their delivery systems; and reconnaissance and surveillance methods have seriously affected the character of armed conflict and of preventing wars. Also how scientists, by providing their expertise, have been able to influence national security and attempts to control arms. Part of the peace studies concentration and the social impacts of science and technology concentration; also may be taken as an elective. Class 4, Credit 4 (offered occasionally)

0508-487   Special Topics: Environmental Study
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

0508-507   Community Energy Planning
Allows the student to understand the concepts underlying community energy self-reliance, how to analyze a community's energy supply and consumption, and how to evaluate possible energy futures for a community based as much as possible on conservation and alternative energy strategies. Class 4, Credit 4 (offered occasionally)

0508-514   History of American Medicine
A survey of the development of medical thought and practice in America from the 17th century to the present. Class 4, Credit 4 (offered occasionally)

0508-515   Community Environmental Issues
Explores three general areas of community environmental concern: land use, solid waste and energy. These issues focus attention on potential conflict over technology and societal values. While the emphasis is on events and issues relating primarily to Monroe County, the topics are prevalent in any community in the United States today. The student learns how to evaluate different options for dealing with land use, solid waste and energy in a community context and to be able to see that these decisions, involving technology and society, can and should be made by all affected parties. Class 4, Credit 4 (offered occasionally)

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 quarterly)

0509-211   Philosophy: Ethics
An introduction to moral philosophy through an analysis, comparison an 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 quarterly)

0509-213   Philosophy: Critical Thinking
An introduction to philosophical analysis, especially as it may be applied in contexts other than professional philosophy. Class 4, Credit 4 (offered quarterly)

0509-214   Ethical Issues in Professions
An examination of ethical issues that arise within the professions. We shall analyze the ethical issues for professionals raised by such problems as the Challenger disaster, physician-assisted suicide, whistle-blowing, and so on. Class 4, Credit 4

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

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; the philosophy minor; and also may be taken as an elective. (0509-210, 211, 213 or equivalent) Class 4, Credit 4

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; the philosophy minor; and also may be taken as an elective. Class 4, Credit 4

0509-442   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; the philosophy minor; and also may be taken as an elective. (0509 -210, 211, 213 or equivalent) Class 4, Credit 4

0509-443   Philosophy of Science
An examination of the nature of the scientific enterprises; 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; the philosophy minor; science and technology studies concentration; science, technology and environmental studies minor; and also may 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

0509-444   The Great Thinkers
Introduces the student 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." The student 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; the philosophy minor; and also may be taken as an elective. Class 4, Credit 4

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; the philosophy minor; and also may be taken as an elective. (At least one prior course in philosophy, political science or sociology) Class 4, Credit 4

0509446   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; the philosophy minor; and also may be taken as an elective. Class 4, Credit 4

0509-447   Ethics
Presents moral issues that arise in the professions and other areas of technical expertise. These problems in applied ethics are studied through contemporary literature by moral philosophers (Donegan, Frankena, Gadamer, Habermas, Jonas, Singer and Wellmer), as well as key classical texts (Plato, Locke, Reid, Kant and Dewey). Each section of the course applies moral theory to one of a number of professional areas, such as business, communications, medicine and bioethics, public policy and technology. Part of the philosophy concentration; the philosophy minor; and also may be taken as an elective. (0509-211) Class 4, Credit 4

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 the philosophy concentration; the philosophy minor; and also may be taken as an elective. Class 4, Credit 4

0509-449   Special Topics: Philosophy
A critical examination of issues in some area of philosophy not covered in any other concentration course. Examples of likely topics are metaphysics, epistemology, the philosophy of mind and the philosophy of language. Part of the philosophy concentration; the philosophy minor; and also may be taken as an elective. Class 4, Credit 4 (offered occasionally)

0509-450   Seminar Philosophy
Examines some area of philosophy at an advanced undergraduate level. The area examined may vary from quarter to quarter. 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; the philosophy minor; and also may be taken as an elective. (Two courses in philosophy or permission of the instructor) Class 4, Credit 4 (offered occasionally)

0509-451   Professional Ethics
Course critically examines ethical issues that arise in professional life. It 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 and the professions of the others with whom the student must live and work. Part of the philosophy concentration, the philosophy minor, and may be taken as an elective. Class 4, Credit 4

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)

0510-440   Cultural Change
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 lifeways 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 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 United States
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 social change in a technological society concentration and also may be taken as an elective. (0510-210 or permission of instructor) Class 4, Credit 4 (offered occasionally)

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 (offered occasionally)

0510-501   Anthropological 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   American Culture: Archaeology of United States
American history and contemporary American society are examined through the only unexpurgated record of our behavior, the material remains. Illustrates how the techniques of archaeology can throw new light on the lives of our Pilgrim forebearers, the founding fathers, on slaves and free blacks, on the American industrial revolution and even on the contemporary middle class of a city like Tucson, Arizona. Class 4, Credit 4 (offered occasionally)

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 inter-group 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

0511-301   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)

0511-401   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 a liberal arts elective. (0511-3 01) 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) Gass 4, Credit 4

0511-441   Economics of Human Resources
The microeconomic study of human resources encompasses aspects of human involvement in the production and 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) Class 4, Credit 4

0511-442   Contemporary International Economics 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

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) Class 4, Credit 4

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) Class 4, Credit 4

0511-445   Survey of Economics Thought
A survey of the various schools of thought that have developed in economics from the late 18th 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) Class 4, Credit 4

0511-446   Economics: Public Policy & Competition
A study of society's responses to imperfections in an otherwise competitive marketplace. Economic analysis, along with some legal analysis, is used to examine not only the problems but also some solutions to such problems as monopolies, externalities and other forms of market failure. Responses examined include regulation, antitrust, public enterprise and other forms of government action. Part of the economics concentration and also may be taken as an elective. (0511-301) Class 4, Credit 4

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 concentration and the economics concentration; also may be taken as an elective. (0511-301) 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 a liberal arts elective. (0511-301) 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 a liberal arts elective. (0511-401 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 a liberal arts elective. (0511-401 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 a liberal arts elective. (0511-301, 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; and also may be taken as a liberal arts elective. (0511-401 or equivalent) Class 4, Credit 4

0511456   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; and also may be taken as a liberal arts elective. (0511-401 or equivalent) Class 4, Credit 4

0511457   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; and also may be taken as a liberal arts elective. (0511401, 1016-319, 1016-226) Class 4, Credit 4

0511458   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; and also may be taken as a liberal arts elective. (0511-401) Class 4, Credit 4

0511459   Managerial Economics
A further elaboration of the elementary principles of economic analysis in Principles I and 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 a liberal arts elective. (0511401) Class 4, Credit 4

0511460   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; and also may be taken as a liberal arts elective. (0511401,1016-226) Class 4, Credit 4

0511461   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 degree. Part of the economics concentration and also may be taken as an elective. Class 4, Credit 4

0511480   Economic Role of Women
Analyzes the economic role of women in today's society. Includes the economic role of women in the labor force, as owners of other factors of production and in business decision-making process. The impact of the changing role of women on GNP, labor market and other economic variables is elaborated. Through the analysis of some economic models and their application to real-world situations, it is shown that the social, political and individual equality of women depends, to a great extent, on their economic role in family and society. Class 4, Credit 4 (offered occasionally)

0511481   Environmental Economics
Examines the relationship and apparent conflict between economic growth and environmental quality, the economics of environmental issues and policy, the environment as a resource and a public good, and the ability and lack of ability of free markets and the government to deal adequately with pollution and other environmental problems. Part of the environmental studies and economics concentrations; the science, technology and environmental studies minor; and also may be taken as an elective. (0511-301) Class 4, Credit 4

Political Science

0513-211   **American Politics**
A study of the American national political system, its theoretical foundations and institutions, and the contemporary issues that confront it. Class 4, Credit 4 (offered quarterly)

0513-215   **Political Ideologies**
Examines the major political ideologies, their idea sets and accompanying action plans across the political spectrum and clarifies students' political preferences for them. Class 4, Credit 4 (offered quarterly)

0513-401   **National Security Forces I**
This course will examine the sociology aspects of officership, the military criminal justice system, and introduce national security policy. Topics of interest focus on the military as a profession, officership, air force doctrine, civilian control of the military, and a comparison of the military/civilian justice systems. (Approval of the aerospace studies department) Strictly for ROTC students. Class 4, Credit 5

0513-402   **National Security Forces II**
This course will examine the American national security policy by analysis of the evolution of the American defense strategy and policy. Topics include methods for managing conflict, international terrorism, alliances and regional security, an analysis of arms control and the threat of war, and the formulation of American defense policy and strategy. (Approval of the aerospace studies department) Strictly for ROTC students. Class 4, Credit 4

0513-440   **International Relations**
A critical analysis of the structure and principles of the international system with emphasis on the tensions between the imperatives of power politics and the requirements of law and justice. 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, 215 or equivalent) Class 4, Credit 4

0513-441   **Politics in China**
Provides students with the political dynamics of the People's Republic of China. Major emphasis is given to the historical background, major aspects of the political systems and the foreign relations of China. Part of the international relations, foreign language/culture concentrations; the international relations minor; and also may be taken as an elective. (0513-211 or 0513-215) Class 4, Credit 4

0513-442   **Government & Politics of Russia**
An analysis of the politics and governmental systems in Russia. Emphasis is on the dynamics of political, economic and social change, as well as political leadership and contemporary issues. Part of the international relations concentration; the international relations minor; and also may be taken as an elective. (0513-211, 215 or equivalent) Class 4, Credit 4

0513-443   **Foreign Policy of Russia & CIS**
A critical examination of the fundamental elements of the foreign policy of Russia from the Soviet era to the present. Special emphasis is given to the geopolitical, economic and ideological forces affecting national interests, as well as analyses of the mechanics of foreign policy formulation and its implementation with respect to the United States, Europe, China, the Third World, Middle East and the "Near Abroad." Part of the international relations concentration; the international relations minor; and also may be taken as an elective. (0513-211, 215 or equivalent) Class 4, Credit 4

0513-444   **The Cold War**
An examination of the origins and evolution of the Cold War with the major emphasis upon the Soviet-American rivalry in the post-World War II era. Part of the international relations concentration and also may be taken as an elective. (0513-211, 215 or equivalent) Class 4, Credit 4

0513-445   **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. Class 4, Credit 4

0513-450   **State & Local Politics**
A study of politics and government on the state and local levels and the relationships between these levels and the federal government. It illustrates differences in state governments by comparing other states to New York and uses the Rochester area for comparisons with local governments found elsewhere. Option for minors and concentrators in American politics. Also may be taken as a liberal arts elective. (0513-211,215 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 a liberal arts elective. (0513-211, 215 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 a liberal arts elective. (0513-211, 215 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 American politics and international relations concentrations; the international relations minor; and also may be taken as an elective. (0513-211, 215 or equivalent) Class 4, Credit 4

0513-454   **Political Parties & Voting**
Political parties are a crucial part of the democratic process. Parties serve as a critical link between citizens and their government, as parties promote policies favored by their 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 links between citizens and government. Option for minors and concentrators in American politics. Also may be taken as a liberal arts elective. (0513-211,215 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? Option for minors and concentrators in American politics. Also may be taken as a liberal arts elective. (0513-211,215 or equivalent) Class 4, Credit 4

0513-456   **The Judicial Process**
Examines the structure and function of the state and federal courts in the American political system. Option for minors and concentrators in American Politics. Also may be taken as a liberal arts elective. (0513-211, 215 or equivalent) Class 4, Credit 4

0513-457   **Constitutional Law**
Provides the student with a basic understanding of the constitutional principles frequently encountered in the criminal justice profession. Landmark court decisions relating to due process, equal protection, unlawful arrest, unreasonable search and seizure, compulsory self-incrimination, the assignment of counsel and fair trial guarantees are discussed and critically evaluated. Option for minors and concentrators in American politics. Also may be taken as a liberal arts elective. (0513-211, 215 or equivalent) Class 4, Credit 4

0513-458   **American Political Thought**
Study of the political ideas, concepts, issues and principles that taken together, compose the stream of American political thought. Examines major controversies that have marked the developing body of the literature by examining the contributions of major political thinkers. Option for minors and concentrators in American politics. Also may be taken as a liberal arts elective. (0513-211, 215 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 women's studies concentration and an option for minors and concentrators in American politics. Also may be taken as a liberal arts elective. (0513-211, 215 or equivalent) Class 4, Credit 4

0513-514   **Theories: Political Systems**

An examination of the basic questions in political theory, a survey of the major political philosophers and an inquiry into the major political ideologies. Class 4, Credit 4 (offered occasionally)

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 psychology majors. Class 1, Credit 1

0514-210   **Introduction to Psychology**

Introduction to the scope and methodology of psychology. Topics include aims and methods, sensation and perception, learning and memory, emotion and motivation, normal and abnormal personality, and social psychology. Required course for psychology majors. Class 4, Credit 4 (offered quarterly)

0514-350   **Psychological Statistics**

This course will cover descriptive and inferential statistics and will train students how to use the SPSS statistical application. 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. 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, understanding and designing experiments, and writing research papers in APA style. Required for psychology majors (0514-350) and may be taken by psychology minors (0514-210; 1016-319 or higher). Class 4, Credit 4

0514-401   **Non-experimental Methods**

This course explores non-experimental research methods and is designed to complement the experimental methods course for psychology majors (although some overlap is anticipated). As part of the course requirements, all students compose a literature review and non-experimental methods proposal in APA style. Course activities include writing text summaries and applications, lecture, class discussion of text material, laboratory (computer demonstration) activities, and oral/poster-presentation of literature review findings. Part of the psychology concentration; the psychology minor; and also may be taken as an elective. (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; the psychology minor; and also may 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. Professional elective for psychology degree 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. Professional elective for psychology degree 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 is 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 and human/technology interaction may also be treated. Part of the psychology concentration; the psychology minor; and also may be taken as an elective. (0514-210) 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; the psychology minor; and also may 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. Professional elective for psychology majors. Part of the psychology concentration; the psychology minor; and also may 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 degree majors. Part of the psychology concentration; the psychology minor; and also may 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 degree majors. Part of the psychology concentration; the psychology minor; and also may be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-448   **Industrial Psychology**

Consideration of principles as well as application of, and 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; the psychology minor; and also may 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. Professional elective for psychology majors. Part of the psychology concentration; the psychology minor; and also may be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-450   **Psychology of Altered States of Consciousness**

Covers such topics as the specialized consciousness in the two halves of the brain, dreaming, hypothesis, meditation, systematic relation and parapsychology. Combines discussion and demonstration. Not a concentration course. May 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. Professional elective for psychology degree majors. Part of the psychology concentration and also may be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4 (offered occasionally)

0514-452   **Psychology of Creativity**
A psychological investigation of the creative process and creative individuals with a focus on techniques that stimulate creativity. Not a concentration course. May be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-453   **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) Class 4, Credit 4

0514480   **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 socio-cultural 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. Class 4, Credit 4

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

0514-504   **Attitude Formation**
Focuses on current theories of attitude formation and seeks to apply them to contemporary events to achieve an understanding of how those who wish to shape or change attitudes do so. (0514-210 or equivalent) Class 4, Credit 4

0514-515   **Psychological Human Adjustment**
Students learn the skills of coping with a variety of everyday experiences. Particular attention is given to the areas of self-validation, interpersonal tactics and interpersonal relations. Professional elective for psychology degree majors as well as a liberal arts elective. (0514-210 or equivalent) Class 4, Credit 4 (offered occasionally)

0514-521   **Psychology & Politics**
Examines how political attitudes are acquired and altered, how politicians and ordinary citizens satisfy psychological needs through participation in politics and how principles of learning can illuminate processes of political leadership, persuasion and control. Professional elective for psychology degree majors as well as a liberal arts elective. (0514-210 or equivalent) Class 4, Credit 4 (offered occasionally)

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 degree majors. May be taken as an open elective, but not as a liberal arts 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 degree majors. May be taken as an open elective but not as a liberal arts 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 degree majors. May be taken as an open elective but not as a liberal arts 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 degree majors. May be taken as an open elective, but not as a liberal arts 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 psycho-physics. 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 a liberal arts elective. (0514-210, 445 or equivalent) 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 a liberal arts elective. (0514-210, 445 or equivalent) Class 4, Credit 4

0514-542   **Spatial Vision & Pattern**
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 a liberal arts elective. (0514-210, 445 or equivalent) 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 degree majors. Also may be taken as a liberal arts elective. (0514-210, 445 or equivalent) 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. Professional elective for psychology majors. Part of the psychology minor, and also may be taken as an elective. (0514-210 or equivalent) Class 4, Credit 4

0514-597   **Seminar in Psychology**
This course is about designing and completing a senior project. You must develop a research design, do a literature review, run subjects, do a statistical analysis, draw conclusions, and write up your project in APA style. This course is only for psychology majors and is a required course for psychology majors. (0514-210, 350, 400; plus psychology track course) 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)

0515-441   **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 work place, 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 social change in a technological society concentration and also may be taken as an elective. (0515-210 or 0510-210) 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 minor; and also may be taken as an elective. Also may be used as a social work minor. (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 social change in a technological society concentration and also may be taken as an elective. (0515-210 or 0510-210 or equivalent) Class 4, Credit 4

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; the sociology/anthropology minor; and also may be taken as an elective. (0515-210, 0510-210 or equivalent) Class 4, Credit 4

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 social change in a technological society concentration and the minority group relations concentration; also may be taken as an elective. 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 social change in a technological society concentration and also may be taken as an elective. (0515-210 or 0510-210) Class 4, Credit 4

0515-451   **Issues in Transfer of Technology**
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 concentration; the sociology/anthropology minor; and also may be taken as an elective. (0515-210 or 0510-210 or equivalent) Class 4, Credit 4

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 United States. 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 United States and elsewhere. Explanations for the existence of inequality are addressed at individual, group and institutional levels. 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

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. May be used as a social work minor. Class 4, Credit 4

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

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 or 0510-210) 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

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 Help Role

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 a unified learning experience where students can concentrate on the theory and practice of awareness skills. Required course for social work majors. Class 4, Credit 4 (W, S)

0516-218   Computer Literacy for Social Work

This course covers most of the computer 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 immediately in other courses. The course focuses on three broad areas of information technology applications to social work: the text-based VAX/VMS at RIT for processing e-mail, accessing text-based bibliographic information resources, and accessing the World-Wide Web (WWW) using a text-based browser; windows-based personal and professional software; and graphical interface with the WWW. Required course for social work majors. Class 3, Credit 2

0516-302   History of Social Welfare

Acquaints the student with the historical roots of our present system of social welfare, emphasizing its development in the United States 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. Also may be used as a social work minor. Class 4, Credit 4 (F, S)

0516-305   Structure & Function of Social Welfare

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. Also explores organization theory as it applies to the structure of these services, as well as major patterns and sources of funding. Required course for social work majors. Also may be used as a social work minor course. (0516-302 or concurrent) Class 4, Credit 4 (F)

0516-314   Social Worker as Advocate

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. Professional elective for social work majors. (Third-year standing) Also may be used as a social work minor course. Class 4, Credit 4 (offered on sufficient demand)

0516-321   Alcoholism: Intervention Skills & Techniques

Teaches a variety of interventive skills used by those giving care to alcohol abusers, their families and communities. Emphasis is on the method of use of these skills. Role play, videotaping and case study are included. Professional elective for social work majors. (Third-year standing) Class 4, Credit 2 or 4 (offered every other year)

0516-330   Rural Social Services

Identifies the historical development, cultural makeup, family lifestyles, and work habits of the nation's migrant population and the rural poor. Examines and critically analyzes the differences between migrants and the rural poor and compares them to the characteristics of the urban poor found in contemporary American cities. Considers governmental rural policies and service-delivery systems directed to the rural areas that reflect the economic, political and social conditions during the time they were developed. The skills of generalist social work as applied in the rural setting are compared to application in urban settings. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-340   Deafness: Fundamental Aspects

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. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered every other year)

0516-341   Psychological-Sociological Implications of Deafness

The purpose of this course is to provide the student with an indepth 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. We will also examine how the individual and these systems impact and influence each other. These systems will include family, school, service delivery systems and society. Professional elective for social work majors. Class 4, Credit 4

0516-342   Deafness: Intervention Strategies

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. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered every other year)

0516-354   **Human Behavior & Social Environment I**
A two-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. Attention is given to effects of racism, poverty and discrimination on the development of individuals in our society. Changing gender roles, sexism and sexual orientation are discussed extensively. Attention also is given to human diversity. The two courses form the foundation on which future courses in the curriculum build. Required course for social work majors. Class 4, Credit 4 (F, W)

0516-355   **Human Behavior & Social Environment II**
A two-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. Attention is given to effects of racism, poverty and discrimination on the development of individuals in our society. Changing gender roles, sexism and sexual orientation are discussed extensively. Attention also is given to human diversity. The two courses form the foundation on which future courses in the curriculum build. Required course for social work majors. Class 4, Credit 4 (F, W)

0516-357   **Mental Health/Mental Illness**
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. Required course for social work majors. (0516-354, 355, 0514-210) Class 4, Credit 4 (S)

0516-360   **Social Work with the Disabled**
An examination of the psychosocial aspects of disabilities. Emphasizes the effects of disability on the individual's development and functioning and the accompanying stress on the family and society in attempts to respond to her or his needs. Interventive strategies and critical times for intervention by the social worker are examined. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-370   **Child Protective Service**
Examines the concepts and knowledge base of child abuse and neglect. Topics include definition of abuse and neglect, a historical perspective, possible causes and effects of abuse, intervention strategies, statutes and legislation, preventive approaches, child abuse services in New York State, provision of service, role of the social workers and future concerns in this problem area. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-380   **Social Work & the Law**
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. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-405   **The Family from a Social Work Perspective**
Gives the social work student a basic understanding of the family as client. Students gain an understanding of the family dynamics and the choices and decisions about family life that are required in contemporary society. A major focus of the course is 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 that can affect the family such as divorce, single-parenthood, remarriage, AIDS, death in the family, alcoholism and family violence. Also included are the influences currently affecting contemporary American families, such as social class, racism, ethnicity, poverty and the changing status of women. Required course for social work majors. (0516-354, 355 or concurrent) Class 4, Credit 4 (W)

0516-435   **Exploratory & Descriptive Research**
Introduction to the methodology of research in behavioral and social sciences. Emphasis is on an introduction to bibliographic search procedures, becoming a practitioner/researcher, evaluation of one's own professional practice, formulation of research, the environmental contexts of research, ethics and confidentiality, research methods and design, sampling, measurement, validity, reliability, indexes, scales, instrument design and basic descriptive statistics. Instruction, practical demonstration and hands-on experience are provided in computer applications ranging from electronic communication-including submission of assignments, storage of information, text formatting, ethics and confidentiality of electronically stored information-to data processing and report writing. Required course for social work majors. (1016-301, 302, 303) Class 4, Credit 4 (S)

0516-440   **Alcohol & the Family**
Living in an alcoholic family, in which chronic alcoholism is the central theme, can have profound effects on family members, both drinkers and non-drinkers. These effects can be carried from generation to generation in complex ways. This course provides a comprehensive look at alcoholism as a family issue. Includes focusing on the progression within family systems, as well as codependency and adult children of alcoholics. Intervention, treatment and recovery of the alcoholic family also are discussed. Professional elective for social work majors. (Third-year standing) Class 4, Credit 2 or 4

0516-441   **Alcoholism & Human Sexuality**
Provides the student with a basic understanding of human sexuality and its relationship to alcohol abuse and chemical dependency. Gives the student exposure to skills needed to take a sexual history in an alcoholism treatment facility and to referral sources for the patient. Professional elective for social work majors. (Third-year standing) Class 4, Credit 2 or 4 (offered every other year)

0516-442   **Poly Addiction**
Gives students and practitioners in the various fields of addiction a view of the myriad interconnections between alcohol and substance abuse, eating disorders, post-traumatic stress disorder and mental health. This wide perspective on poly addiction also takes into consideration ACOAs and EAP and the assessment, treatment, evaluation and consequent training required of professionals in the field. Professional elective for social work majors. (Third-year standing) Class 4, Credit 2 or 4 (offered every other year)

0516-455   **Contemporary Issues in Social Work**
Offers students an opportunity to examine and discuss contemporary issues in the field of social work. Course content varies from quarter to quarter depending on current issues and student interest. Areas related to expressed student interest, faculty expertise and developments in the field are examined. Professional elective for social work majors. Also may be used as a social work minor course. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-456   **Group Theory in Social Work**
The theoretical foundations of group dynamics and group behavior within the context of social work. Such concepts as types of groups (prevention, rehabilitation), group development, composition, group processes (problem solving, decision making, affection), program, leadership, communication, structure and modes of intervention are covered. Provides the knowledge and initial experiential base for the development of practice skills in working with groups. Required course for social work majors. (Third-year standing) Class 4, Credit 4 (F, W)

0516-465   **Assessing Community Needs**
Students learn about communities and study assessment techniques for identifying the strengths and weaknesses of services provided within a community. Topics include program evaluation, quality assurance procedures and community networking. Attention is given to programs for minority groups, the disabled, the elderly, youth, persons with mental health problems and other special populations. Required course for social work majors. (0516-405, 456, third-year standing) Class 4, Credit 4 (S)

0516-475   **Interviewing & the Helping Relationship**
The first in a three-course sequence (including 0516-505, 550) dealing with generalist social work practice. All three courses emphasize the differential use of social work techniques (e.g., interviewing skills, assessment, data collection and problem solving) and interventive skills in a variety of client systems. Through lectures, discussions, reading, lab simulations and case analysis, the sequence provides the student with the knowledge, skill and self-awareness for beginning professional social work practice. The development of this knowledge, skill and awareness is seen as a progressive process underlying the three-course sequence. Required course for social work majors. (0516-405, 456) Class 4, Credit 4 (S)

0516-505   **Assessment & Problem Solving**
Required course for social work majors. See 0516-475. (0516-435, 465, 475; corequisite with 0516-506, 535, 552) Class 4, Credit 4 (F)

0516-506   **Field Instruction I**
Field Instruction I and II comprise a 20-week, 30-hour-per-week supervised field placement. Under the guidance of an instructor, 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. (0516-435, 465, 475; corequisite with 0516-505, 527, 535) Field 300, Credit 6 (F)

0516-509   **Services for Children & Families**
Gives social work students a beginning knowledge of social work services to children and their families. Specific services included are preventive services, homemakers, day care, protective services, foster care, adoption, unmarried parents, institutional care and mental health services. The development of each type of service is discussed, as well as the reasons why each service is needed and for what type of situation. The social worker's role in each area also is considered. Professional elective for social work majors. (Third-year standing) Also may be used as a social work minor course. Class 4, Credit 4 (offered every other year)

0516-512   **Advanced Intervention with Individuals**
Builds upon the knowledge base of generalist social work practice and develops students' understanding of the specific way in which these concepts and theories are applied in social intervention with individuals. Use is made of case studies and role playing to further develop the students' skills in this area. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-513   **Advanced Intervention with Families**
For students who have completed the practice sequence and field instruction and have learned the theories and concepts of generalist social work intervention. Builds on that knowledge base and develops the students' understanding of the specific ways in which these concepts and theories are applied in intervention with families. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-522   **Advanced Intervention in Community**
Examines community intervention as a social work method. The roles and functions of the community intervention practitioner and alternate methods of practice are analyzed, such as locality development, social planning and social action. Investigates specific applications of community intervention theory to political influence processes, coalition, neighborhood associations and regionalization. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-523   **Advanced Intervention with Groups**
Examines social treatment as one form of group work practice. There are different service procedures and approaches that may be applied to client groups, and each may have utility in pursuing distinct service objectives. Investigates the scope, techniques and functions of generalist social work practice in such diverse settings as social service agencies, business, correctional institutions and communities. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-525   **Grant Writing**
Provides the student with a series of readings and experiential exercises necessary for writing a grant proposal. Focus is on funding sources that provide money for social welfare programs and for research into social work. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-535   **Introduction to Practical Evaluation**
For social work majors in their first quarter of field instruction. Building on the first research course and on knowledge of statistical analysis, this course considers the integration of social work practice and research, especially in relation to the evaluation of one's own professional practice and agency programs. The continued use of the computer as a research tool is explored. Specialized analytic techniques, common to social work (e.g., quantitative: autocorrelation, one-and two-standard deviation procedures, ANOVA, t-tests for slope and level: and qualitative: field research and coding for interview data), are studied in relation to actual data collected by students in their concurrent field placements. The ethics of research and the relationship of research and populations-at-risk are also covered. Class 2, Credit 2 (F)

0516-536   **Aging & Society**
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 culture, environmental and institutional changes as they relate to an increasing population of older people. Professional elective for social work majors. (May also be taken for liberal arts elective under 0515-508) (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-537   **Social Policy & the Aging**
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 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. Professional elective for social work majors. (May also be taken for liberal arts elective credit under 0515-515) Also may be used as a social work minor course. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-538   **Family Violence**
Acquaints social work students and practitioners 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. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered every other year)

0516-539   **Services for the Aging**
Deals with the variety of existing community-based services available for the elderly. 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, and other formal and informal support systems. Professional elective for social work majors. (Third-year standing) Class 4, Credit 4 (offered on sufficient demand)

0516-540   **Evaluation of Practices & Programs**
The second of a two-course sequence is built on material learned in Advanced Social Work Research and its prerequisite. 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. Required course for social work majors. (0516-535) Class 2, Credit 2 (W)

0516-550   **Social Intervention**
Required course for social work majors. See 0516-475. (0516-505, 506, 535, 552; corequisite with 0516-551, 553) Class 4, Credit 4 (W)

0516-551   **Field Instruction II**
Required course for social work majors. See 0516-506. (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. They study the supervisory process, and topics to be analyzed include staff structure, workloads and distribution, the responsibilities of supervisor and supervisee, the ethics of supervision and professional growth. This practicum is taken concurrently with Field Instruction I, Assessment and Problem Solving and Advanced Social Work Research. It is intended to help students integrate field experiences with their prefield course content and the concurrently taken courses. Required course for social work majors. (0516-435, 465, 475; corequisite with 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' experiential and professional needs. Community service agency management issues are explored. The seminar is taken concurrently with Field Instruction n, Social Intervention and Evaluation of Practice. All three courses share common objectives as well as the study of the Social Work Competencies and 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. (0516-505, 506, 535, 552; corequisite with 0516-540, 550, 551) Class 2, Credit 2 (W)

0516-595 Policy & Planing Processes

Explores the development of social welfare services as it proceeds 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. Also may be used as a social work minor course. (Fourth-year standing) Class 4, Credit 4 (S)

0516-598 Professional Seminar

For social work students who have completed field instruction. Serves as a capstone in the student's social work education and facilitates the integration of all content areas in the curriculum. This integration is achieved through presentations by faculty, practitioners and invited experts in order to cover the interrelationships between values and ethics of the profession; human behavior and the social environment; needs assessment and research techniques; methods of intervention; and policy, planning and funding processes. This integration is demonstrated by students through a major paper, which combines these areas with the student's chosen field of application. Required course for social work majors. (0516- 550, 551, 553) 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 a study of the development of airpower from its origins to the present. This course deals with the impact of airpower upon 20th century warfare. It also traces the evolution of airpower as a factor in military and nonmilitary operations in support of U.S. foreign and domestic policy. Course strictly for ROTC students. Class 1, Credit 1 (offered annually)

0519-202 History of Airpower II

This course is a study of the development of airpower from its origins to the present. This course deals with the impact of airpower upon 20th century warfare. It also traces the evolution of airpower as a factor in military and nonmilitary operations in support of U.S. foreign and domestic policy. Course strictly for ROTC students. Class 2, Credit 2 (offered annually)

0519-203 History of Airpower III

This course is a study of the development of airpower from its origins to the present. This course deals with the impact of airpower upon 20th century warfare. It also traces the evolution of airpower as a factor in military and nonmilitary operations in support of U.S. foreign and domestic policy. Course strictly for ROTC students. Class 1, Credit 1 (offered annually)

Interdisciplinary-Liberal Arts

0520-201 Career Exploration Seminar

This seminar is designed to introduce students to the full array of degree programs offered by RIT. Although it is part of a student's exploration of career possibilities, the focus will be on fields of study necessary for particular careers rather than on the ultimate career activity itself. The presupposition is that interest in a field of study is necessary to career success, but also that any one field of study can lead to a variety of career choices. Required seminar for Career Exploration Program students. Class 1, Credit 1 (offered quarterly)

0520-501 Senior Seminar

This course enables students to sharpen and demonstrate their ability to define a research task or problem, gather and evaluate scholarly evidence and present their finding in a paper or project. While the content and focus of the seminar will change from year to year, it will always direct students' attention toward a broad issue or aspect of contemporary culture and equip them to understand that subject more fully, investigate one facet of it in depth, and provide an advanced experience of problem solving and value clarification. Class 2, Credit 2 (offered quarterly)

Professional & Technical 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 symbol-making, 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 communications studies. Required course for professional and technical communication majors course. 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 professional and technical communication majors. Class 4, Credit 4

0535-230 Written Argument

Develops in students the language and reasoning skills necessary to create responsible and effective written arguments. Required course for professional and technical communication majors. (0502-220) Class 4, Credit 4

0535-311 Rhetoric/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 professional and technical 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 professional and technical communication majors. (0535-200, 210, 221, 310, 445) Class 4, Credit 4

0535-316 Qualitative Research Methods

Examines methods of studying communication that rely on the researcher's personal observation skills. Qualitative research seeks to understand the behaviors, beliefs, values, attitudes, assumptions, rituals and symbols that guide people's understanding of their relationships and organizations. Data-gathering techniques include participant observation, naturalistic study, focus group interviewing, phenomenology and ethnography. Students engage in various qualitative data-gathering activities and prepare a research project proposal. Required course for professional and technical communication majors. (0535445) Class 4, Credit 4

0535-317   Critical Research Methods
An opportunity to design and complete a research proposal using critical research methods. Critical studies interpret and evaluate intentional symbolic communication acts situated in a social-historical context. By selecting and applying objective criteria, the critic's research generates a systematic analysis of specific relationships between source, message, media and/or audience. Messages may be composed of verbal, nonverbal or visual symbols. Typically, research tools are centered on texts, documents, archives and libraries. Required course for professional and technical communication majors. (0535-445) Class 4, Credit 4

0535-324   Interviewing
Examines dyadic communication as it occurs in the organizational, professional interviewing context. Emphasis is on the major types of interviews: informational, selective and persuasive. Students are provided with theory as well as opportunities for skills development. Professional elective for professional and technical communication majors. Class 4, Credit 4

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. All written work must be prepared on word processor. Required course for various programs. Class 4, Credit 4 (offered annually)

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 and conflict resolution. Professional elective for professional and technical communication majors. Part of communication minor. (0535-305) Class 4, Credit 4 (offered occasionally)

0535-420   Advanced Public Speaking
Blends classical and modern public address theory in an attempt to produce the speaker who is both wise and eloquent. Focuses on ideas—how to invent, arrange, stylize and deliver them. Attention is given to the creative use of language, special-occasion speeches, speaking in front of a camera and the ethics of public speaking. Professional elective for professional and technical communication majors. (0535-221) 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. Professional elective for professional and technical communication majors and part of communication minor. (0535-200, 230) Class 4, Credit 4 (offered occasionally)

0535-425   Teleconference Communication Management
Examines interactive electronic communications technologies (teleconferencing) used in a growing number of organizations. Emphasis is on the effects these technologies have on human interaction, methods of management and organizational processes. Students are required to engage in frequent interaction, perform research and manage actual conferences. The majority of this course is conducted via computer conferencing. Professional elective for professional and technical communication majors. (0602-200, 0535-310) Class 4, Credit 4 (offered occasionally)

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 professional and technical communication majors. (0535-200, 201) 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 sender and receiver orientations to 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 professional and technical communication majors and part of communication minor. (0535-200,210) Class 4, Credit 4

0535-452   Uses & Effects of Mass Media
An analysis of the "effects" and the "uses and gratifications" of mass communication research with focus on building mass communication theory. Professional elective for professional and technical communication majors and part of 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 minors and concentrators in language communication. Also may be taken as a liberal arts elective. (0535-200 or equivalent) 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 professional and technical communication majors. Option for minors and concentrators in language communication. Also may be taken as a liberal arts elective. (0502-220 or equivalent) Class 4, Credit 4

0535-482   Mass Communication
An introduction to the study of the mass media focusing on the history development, and law and regulation of the mass media in the United States. Required course for professional and technical communication majors. Part of the language concentration and also may be taken as an elective. (0535-200) Class 4, Credit 4

0535-483   Small Group Communication
Practice in analysis of a variety of small group discussion techniques focusing on phenomena such as processes of interaction, decision making, norms structure and development, membership and theory of group development. Professional elective for professional and technical communication majors. Option for minors and concentrators in language communication. Also may be taken as a liberal arts elective. (0502-220 or equivalent) Class 4, Credit 4

0535-490   Persuasion & Social Change
Reading and analysis of selected public speeches and essays advocating or opposing major issues of social change in the United States from the 18th century through contemporary advocacy. Professional elective for professional technical communication majors. Part of the peace studies concentration, the communication minor, and also may be taken as a liberal arts elective. (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 professional and technical communication majors and part of communication minor. Also may be taken as a liberal arts elective. (0502-220) Class 4, Credit 4

0535-502   Speechwriting
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. Professional elective for professional and technical communication majors, part of communication minor, and also may be taken as part of an elective. (0502-220) Class 4, Credit 4

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 a liberal arts elective. (0535-200) Class 4, Credit 4

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 semiotics, communication technologies, gender differences in communication, legal communication, rhetoric of race relations, group dynamics, and censorship and propaganda. Professional elective for professional technical communication majors and communication minors. (For junior and senior PTC students; non-PTC students must receive permission from the instructor) (0535-200) Class 4, Credit 4 (offered occasionally)

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 professional and technical communications. Option for minors. (0535-200, 230) 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. Professional elective for professional technical communication majors and part of communication minor. (0535-482) Class 4, Credit 4 (offered occasionally)

0535-580   International Media
A study of print and electronic media outside of the United States, this course explores major international theories and practice of the media, including regional media, especially in Africa, Asia, Europe and Latin America. Assignments include class-led presentations through peer teaching; papers, both practical and theoretical; and a small-group Socratic oral exam. Professional elective for professional technical communication majors and part of communication minor. Class 4, Credit 4

0535-582   Communication & National Development
Viewing society and national development from a humanistic perspective, this course deals with communication, social change, developmental ethics, social justice, oppression and liberation, plus various minor issues such as mythologies of development, sustainable development, literacy, interpersonal vs. mass communication, adult education, health care and education, and humanistic vs. humanitarian aid. Assignments include peer teaching of course material, practical and theoretical papers, and a small-group oral Socratic final exam. Class 4, Credit 4

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 professional and technical communication majors. (0535-410, 411, 445) Class 4, Credit 4

Public Policy

0508-350   Science, Technology & Global Policy
The dynamics of contemporary science and technology focusing on the social conditions and institutions of science and technology and the effects of scientific and technological knowledge upon social life. The competitive pressures shaping national and international policies for science and technology, the links between science and technology and their links to education and economy in each society and among the major societies are examined. Distinctions are made among several social institutions such as science, technology, the economy and the polity. Each is treated not so much as an institution within each national society, but as a social institution whose structures and processes span several societies and are increasingly worldwide. Class 4, Credit 4

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 explore ethical issues such as privacy, the commodifcation of data, hacking, ownership of images and Web pages, and the status of the Web as a public good or corporate creation. A wide variety of ethical issues are introduced, and students begin to learn how to fashion solutions both for private ethical problems and matters of public interest. Class 4, Credit 4

0509-350   Philosophy of Technology
Technology is a ubiquitous and defining force in our world. The course investigates 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 Technological modes of understanding, organizing and transforming the world shape our relationships with others, with ourselves and with nature of fundamental levels. We will explore how these modes have emerged and why they emerged so predominantly within a western social and intellectual context. Class 4, Credit 4

0509-351   Environmental Philosophy & Decision Making
A variety of decision procedures may be and have been used to determine what to do regarding various environmental issues. We might make the choice that has the least worst alternatives, or the best alternatives, or is approved by the majority of those who vote or of those who are affected, etc. Each alternative can determine what is reasonable and moral, and assessing them presents a theoretical problem. 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. Class 4, Credit 4

0513-459   Global Ecopolitics
A study of the emerging field of global environmental governance. In response to the degeneration of the global physical environment associated with the forces of population pressure, the globalization of a consumer-oriented economy and the ecological consequences of human military conflict, regimes are emerging in the interstices among the various political sovereignties aimed toward regulating the impact of human conduct upon the Earth's physical environment. Non-state actors, state actors, international nongovernmental organizations, the United Nations and regional international organizations all contribute to the policy mix. Progress and processes, apparent shortcomings as well as developing successes are studied. Class 4, Credit 4

0515-350   Policy Choice as Value Conflict
Strategies, choices, and priorities in the formulation of public policy. What is the relationship between the public's sentiment and government policy? Whose values are served by policy? Which segments of the population (if any) are systematically excluded? Why? How do individuals and interests get issues onto the public agenda? Class 4, Credit 4

0515-351   Social Inequality & Social Policy
The phenomenon of social inequality along a number of dimensions, such as class, race, gender, nationality, age, work status, and sexual preference. Inequality's causes and effects, the ethical considerations involved in assessing it, and strategies for reducing it. The evolution of various types of inequality over time and how U.S. policy strategies for dealing with inequality compare to those used by other countries. Class 4, Credit 4

0521-200   Public Policy I: Introduction to Public Policy
An interdisciplinary introductory course—the first of a five-course sequence required of public policy majors. 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 are introduced. Public policy issues, such as economic and budget policy, environmental policy, science and technology policy, and information and communications policy, are explored. Also open to the general student population. Class 4, Credit 4

0521-301   Values & Public Policy
Introduction to a range of ethical issues that arise in policy decision making and policy analysis focusing on the types of ethical reasoning that are utilized by focusing upon a series of case studies. Class 4, Credit 4

0521-402   Public Policy II: An Introduction to Policy Analysis
This course is the first in a three-course sequence (Public Policy II-IV) that normally will be taken in the third year of the program. The purpose of the three-course sequence is to: (1) Introduce the student to both qualitative and quantitative policy analyses and (2) Progressively integrate qualitative and quantitative dimensions of analysis into a systematic whole. Class 4, Credit 4

0521-403   Public Policy III
This course is the second in a three-course sequence (Public Policy II-IV) 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 addition, this course will introduce new analytical methods such as Baynesian analysis and queuing. Class 4, Credit 4

0521-404   Public Policy IV
This course is the third in a three-course sequence (Public Policy II-IV) that normally will be taken in the third year of the program. Utilizing a team approach, this course will provide students an opportunity to develop an analysis and proposal of a particular policy issue. The culmination of the students' work will be a written proposal and oral presentation. Class 4, Credit 4

0521-505   Public Policy V—Senior Project
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. Class 4, Credit 4

College of Science

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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.

Biology

1001-200   **Freshman Symposium**
Introduction to academic and student life in the biology department. Class 1.5, 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)

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)

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)

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)

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)

1001-230   **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)

1001-251   **Introduction to Cell Biology**
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 structures and functions that permit cells to live and grow as single, independent organisms or as the fundamental subunits of complex multicellular organisms. Lab includes exercises on the theory of experimental design, applications of this theory in classical and investigative experiments, and observations on the diversity and complexity of cellular life. (High school biology and chemistry; biology or biotechnology major; or permission of instructor). Class 3, Recitation 1, Lab 3, Credit 4 (F)

1001-252   **Introduction to Developmental Biology**
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, Recitation 1, Lab 3, Credit 4 (W)

1001-253   **General Physiology**
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, Recitation 1, Lab 3, Credit 4 (S)

1001-301   **Invertebrate Zoology**
Biology of invertebrate animals with emphasis on phylogeny and functional morphology. (1001-253 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. (1001-253 or equivalent or permission of instructor) Class 3, Lab 3, Credit 4 (W)

1001-303   **Comparative Vertebrate Anatomy**
A comparative study of the organ systems of representative members of the vertebrates with emphasis on structural changes that occur during evolution. (1001-305, 306) Class 3, Lab 6, Credit 5 (F)

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 (S)

1001-305   **Physiology & Anatomy I**
An integrated approach to the structure and function of the nervous, endocrine, integumentary, muscular and skeletal systems. Laboratory exercises include histological examination, anatomical dissections and physiology experiments with human subjects. (1001-253 or equivalent or permission of instructor for nonscience majors) Class 4, Lab 3, Credit 5 (F)

1001-306   Physiology & Anatomy II
An integrated approach to the structure and function of the gastrointestinal,
cardiovascular, immunological, respiratory, excretory and reproductive sys-
tems with an emphasis on the maintenance of homeostasis. Laboratory exer-
cises include histological examinations, anatomical dissections and physiolog-
ical experiments using human subjects. (1001-305 or permission of instructor)
Class 4, Lab 3, Credit 5 (W)

1001-310   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 and one year of
organic chemistry) Class 3, Lab 3, Credit 4 (F)

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. (1001-253 or equivalent) Class 4, Credit 4 (F)

1001-313   Sports Biology
An introduction to the human physiology and anatomy of all types of sport-
ing activities. Body systems studied include musculoskeletal, cardiovascular,
neuromuscular and pulmonary. Motion, mobility, flexibility, strength,
endurance and nutrition are other topics included in a comprehensive investi-
gation of the biology of athletic performance. Class 2, Lab 0, Credit 2 (F, S)

1001-320   Histology
Detailed microscopic studies on the structure and function of normal human
tissues. (1001-305, 306 recommended) Class 3, Lab 3, Credit 4

1001-330   Small Animal Laboratory Technique
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. (1001-253 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. (1001-253 or equivalent, 1013-233,
second- or third-year status) Class 3, Lab 3, Credit 4 (W, S)

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 1, Recitation 1, Credit 3 (F, W, S)

1001-380   Human Gross Anatomy
Exposes students to details of human anatomy through cadaver dissection.
Lecture material stresses functional and clinical correlates corresponding
to laboratory exercises. (1001-305, 306 and permission of instructor)
Class 3, Lab 6, Credit 5 (W)

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, Lab 0, Credit 4 (W)

1001-402   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,
transplantations, tumors, autoimmune diseases, immunosuppression and
tolerance. (1001-253 or equivalent) 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 procaryotes are discussed. Basic laboratory techniques,
microscopy, staining, bacterial identification and food testing. (One year of
organic chemistry) Class 3, Lab 4, Credit 5 (F)

1001-407   Microbial & Viral Genetics
The study of the molecular genetics of bacteria, bacteriophages, fungi and
eucaryotic viruses. (1001-350, 421; one biochemistry course) Class 3, Lab 3,
Credit 4 (F)

1001-415   Functional Biology of Invertebrate Animals
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
A course to bridge the gap between plant biology, agriculture, and molecular
biology. The course will address fundamental principles of plant growth and
development, photosynthesis, and plant nutrition as it relates to plant growth
and productivity. The laboratory will provide experience to help illustrate the
principles discussed in the lecture as well as provide experiences in the
manipulation of plant material in the laboratory and in the greenhouse. (1001-
253 or 1001-201, 202, 203) 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 plan 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 discus-
sion 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 3, Lab 3, 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) Class 3, Lab 3,
Credit 4

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)

1001-430   Radiation Biology
Effects of radiation—both harmful and beneficial—upon living tissue.
Morphological changes, genetic effects, and pathological changes in both
plant and animal tissues. Use of radioisotopes in plant and animal research.
(Minimum of 20 credits in biological science) Class 3, Credit 3 (W)

1001-442   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. (1001-445)
Lab 4, Credit 2 (S)

1001-445   **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 2, Lab 3, Credit 4 (W)

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 required; 1001-334 recommended) 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; 1001-305, 306 strongly recommended) 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)

1001-472   **Introduction to Oceanography**
An introduction to the study of the world ocean, with emphasis on fundamental principles, concepts and processes of biological, geological, chemical and physical oceanography. (1001-340 or permission of instructor) Class 4, Lab 0, Credit 4 (W)

1001-473   **Marine Biology**
The biology of marine life, with emphasis on the roles that marine plants and animals assume in their environmental situation and the structural and physiological adaptations necessary to fulfill those roles. (Minimum of 20 credits in biological science) Class 3, Lab 3, Credit 4 (S)

1001-480   **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)

1001-541, 542, 543   **Biology 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)

1001-599   **Independent Study: Biology**
Faculty-directed study of appropriate topics on a tutorial basis. Enables an individual to pursue studies of existing knowledge available 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 (W)

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 (S)

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 (W)

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 (S)

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 (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)

1005-475   **Marine Ecology Field Course**
A field trip to a tropical or subtropical marine station, which serves as the base of operations. Snorkeling excursions to inshore habitats include rocky shore, sea grass meadows, mangrove, sandy beach, coral reef and embayments. Emphasis is on comparison of habitats and detailed class survey of one location. (1001-473) Credit 3 (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, polymer chemistry and biochemistry majors or those interested in pursuing the major. Topics include equilibrium for polyprotic acids, electrochemistry and redox reactions, spectroscopy, potentiometiy and electrogravimetric determinations. (Corequisite 1008-266) (1008-261, 265) Lecture 4, Credit 4 (S)

1008-265   Quantitative Analysis I Laboratory
Designed for chemistry, polymer chemistry, biochemistry 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, polymer chemistry and biochemistry majors or those interested in pursuing the major. Experiments include statistics and calibration of equipment; and 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 modem 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 are 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   Advanced 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*)

*X, *extended day (after 5 p.m.)*

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*)

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 modem 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. Class 1, Lab 6, Credit 3 (F)

1009-541, 542, 543   Biochemistry Research
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, cryogens, 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. Includes topics on measurement, atomic theory, periodicity, moles and stoichiometry, solutions, titrations, redox reactions, gas laws, kinetic theory of gases and LeChatelier's principle. (Corequisite 1010-255) Class 3, Recitation 1, Credit 4 (F)

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-X*)

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)

1010-599   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   Chemistry 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   Chemistry 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 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 I
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)

1011-211   Chemistry Principles I
For science, microelectronics, and photoscience 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)

1011-212   Chemistry Principles II
Problem-solving applications of chemical principles. Topics include thermodynamics and equilibrium, oxidation-reduction and chemical kinetics. Also offered in distance-learning format. (Corequisite 1011-206) (1011-211) Class 3, Credit 3 (F, W, S, SU)

1011-213   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 spectroscopy, organometallics, polymers and biomolecules. Also offered in distance-learning format. (Corequisite 1011-207) (1011-201 or 1011-212) Class 3, Credit 3 (S, SU)

1011-215   General & Analytical Chemistry I
General chemistry for students in biology, medical technology and the life 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)

1011-216   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)

1011-217   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)

1011-227   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)

1011-241   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)

1011-242   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)

*X, *extended day (after 5 p.m.)*

1011-245 Chemistry for a Global Society Lab I
Laboratory to accompany 1011-241, with experiments emphasizing basic chemical principles often 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)

1011-246 Chemistry for a Global Society Lab 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)

1011-271 Fundamentals of Chemisty
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)

1011-272 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)

1011-273 Introduction to Chemistry of 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)

1011-276 Chemistry of Water and 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)

1011-277 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)

1011-309 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)

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)

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 Inorganic Chemistry III
Introduces the more sophisticated tools with which an inorganic chemist investigates inorganic materials. These physical methods, with the bond theories from 1012-563, are applied to inorganic reactions that exemplify the similarities and differences for the elements in each family of the periodic table. (1012-563 or permission of instructor) Class 4, Credit 4 (S)

1013-231 Organic Chemistry I
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)

1013-232 Organic Chemistry II
Mechanisms of main classes of reactions are discussed. (Corequisite 1013-236) (1011-231) Class 3, Credit 3 (W, S-X*, SU)

1013-233 Organic Chemistry III
Structure, nomenclature, reactions and properties of the important classes of bio-organic molecules (carbohydrates, lipids, amino acids, proteins and nucleic acids) are covered jn depth. Emphasis is on structure and reactivity in relation to biochemical processes. (Corequisite 1013-237) (1013-232) Class 3, Credit 3 (S, F-X*)

1013-235 Organic Chemistry I Laboratory
Laboratory work emphasizes techniques, preparations and analyses. (Corequisite 1013-231) Lab 3, Credit 1 (F, W-X*, SU)

1013-236 Organic Chemistry II Laboratory
Laboratory work emphasizes techniques, preparations, and analyses. (Corequisite 1013-232) Lab 3, Credit 1 (W, S-X*, SU)

1013-237 Organic Chemistry III Laboratory
Laboratory work emphasizes reactions and properties of biomonomers and polymers. (Corequisite 1013-233) Lab 3, Credit 1 (S, F-X*)

1013-431 Organic Chemistry I
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)

1013-432 Organic Chemistry II
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 1013436) (1013-431) Class 3, Credit 3 (F, W)

1013-433 Organic Chemistry III
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) (1013-432) Class 3, Credit 3 (S, SU)

1013-435 Preparatory Organic Chemistry I Laboratory
Designed for chemistry department majors to complement 1013-431, Organic Chemistry I. Synthesis, purification and characterization of organic compounds are conducted. (Corequisite 1013-431) (1010-252) Lab 4, Credit 1 (S, SU)

1013-436 Preparatory Organic Chemistry II Laboratory
Designed for chemistry department majors to complement 1013-432, Organic Chemistry II. Emphasis is on synthesis, functional group reactivities, separations, IR and NMR analysis and introduction to microscale synthesis. (Corequisite 1013-432) (1013-431) Lab 4, Credit 1 (F, W)

1013-437 Systematic Identification of Organic Compounds
A laboratory course utilizing synthesis, chemical and spectral (IR and GC/MS) techniques to identify and characterize organic compounds. (Should be taken concurrently with 1013-433.) (1008-319, 1013-432, 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.) (1013-433) 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*)

1014-442 Quantum Chemistry
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 1014446) (1014-441, 1016-306) Class 4, Credit 4, (W, S-X*)

*X, *extended day (after 5 p.m.)*

1014-443   **Chemical Kinetics**
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*)

1014-445   **Chemistry Thermodynamics Laboratory**
Introduction to physical chemistry laboratory; chemical thermodynamics and equilibrium. (Should be taken concurrently with 1014-441.) Lab 3, Credit 1 (F, W-X*)

1014-446   **Quantum Chemistry Laboratory**
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*)

1014-447   **Chemical Kinetics Laboratory**
Laboratory experiments in chemical dynamics. (Should be taken concurrently with 1014-443.) Lab 3, Credit 1 (S, SU-X*)

1015-520   **Environmental Chemistry**
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*)

1015-521   **Atmospheric Chemistry**
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)

1015-522   **Aquatic Toxicology & Chemistry**
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*)

1029-301   **Introduction to Polymer Chemistry**
Survey of polymer science, including terminology, synthesis, structures, properties, applications and processing techniques of commercially significant polymers. (General chemistry or equivalent, 1016-251) Class 2, Credit 2 (F)

1029-501   **Organic Chemistry of Polymers**
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*)

1029-502   **Polymer Chemistry: Chains & Solutions**
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*)

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 2000-01) (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 2000-01) (F)

Environmental Science

1031-200   **Freshman Seminar**
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 2, Credit 1 (F)

1031-201   **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 will be embedded in the scientific matrix used to present this course. (Permission of instructor) Class 2, Lab 4, Credit 4 (F)

1031-202   **Introduction to Environmental Science II**
Continuation of 1031-201. (1031-201 or permission of instructor) Class 2, Lab 4, Credit 4 (W)

1031-203   **Introduction to Environmental Science III**
Continuation of 1031-202. (1031-202 or permission of instructor) Class 2, Lab 4, Credit 4 (S)

1031-501   **Environmental Science—Great Lakes I**
First 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 embedded in the scientific matrix used to present this course. (Permission of instructor) Class 2, Lab 4, Credit 4 (F)

1031-502   **Environmental Science—Great Lakes II**
Continuation of 1031-501. (1031-501 or permission of instructor) Class 2, Lab 4, Credit 4 (W)

1031-503   **Environmental Science—Great Lakes III**
Continuation of 1031-502. (1031-502 or permission of instructor) Class 2, Lab 4, Credit 4 (S)

*X, *extended day (after 5 p.m.)*

Mathematics and 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)

1016-210   Math Seminar I
An introductory course for freshman 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 and its significance, the algebra of derivatives, chain rule, related rates, maxima and minima. (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, SU)

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 (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. (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. (1016-242 or 252) Class 6, Credit 6 (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)

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. (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. (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, 1019-420, 1016-241 or 1016-214) Class 2, 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)

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)

1016-301   Introduction to Statistical Methods I
An elementary introduction to the topics of descriptive statistics and probability. Minitab will be used as a tool for data analysis. This course is intended for non-technical programs such as, but not limited to, criminal justice, hospitality and service management, and social work. (1016-200 or equivalent) Class 3, Lab 1, Credit 4 (F,W)

1016-302   Introduction to Statistical Methods II
An elementary, concept-oriented introduction to the topics of inferential statistics and sampling methodology. SPSS will be used as a tool for data analysis. (1016-301) This course is intended for non-technical programs such as, but not limited to, criminal justice, hospitality and service management, and social work. Class 3, Lab 1, Credit 4 (W, S)

1016-303   Introduction to Statistical Methods III
An elementary introduction to the topics of analysis of variance, regression and forecasting. SPSS will be used as a tool for data analysis. This course is intended for non-technical programs such as, but not limited to, criminal justice, hospitality and service management, and social work. (1016-302) Class 3, Lab 1, Credit 4

1016-305   Calculus IV
A continuation of 1016-253 treating three-dimensional analytic geometry and vector algebra, partial derivations, multiple integrals and applications. (Credit or coregistration in 1016-253) 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 (S)

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)

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 (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 Stoke'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, null and column space of a matrix, eigenvalues and numerical linear algebra. Various applications are interspersed throughout the course. (1016-305, 306) 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. (Corequisite 1016-305) (1016-351) Class 4, Credit 4 (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 (F)

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 (W)

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)

1016-365   **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 (offered upon sufficient request)

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 (W, 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 (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)

1016-399   **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 either 1016-265 or permission of the instructor) Class 4, Credit 4 (F, W)

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. (1016411) Class 4, Credit 4 (S)

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, some programming knowledge) Class 4, Credit 4 (S)

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 (S, alternate years)

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. (1016-352) 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 (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 alternate years) (S)

1016-467   Theory of Graphs & Networks
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)

1016-469   Mathematical Simulation
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; 0601-241, 242 or 0602-208, 210) Class 4, Credit 4 (offered alternate years) (S)

1016-481   Problem Solving
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)

1016-485   Number Theory
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 (offered alternate years) (W)

1016-501   Advanced Differential Equations I
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; 331 desirable) Class 4, Credit 4 (offered upon sufficient request)

1016-502   Advanced Differential Equations II
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. (1016-338) Class 4, Credit 4 (offered upon sufficient request)

1016-511   Numerical Analysis I
Numerical techniques for the solution of nonlinear equations, interpolation, differentiation, integration, initial value problems. (1016-305, 306; some programming knowledge) Class 4, Credit 4 (F)

1016-512   Numerical Analysis II
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, some programming knowledge) Class 4, Credit 4 (W)

1016-521   Topics in Probability & Statistics
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)

1016-524   Introduction to Time Series
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)

1016-525   Stochastic Processes
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 (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 (F, W)

1016-532   Abstract Algebra II
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)

1016-541   Actuarial Mathematics I
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. (1016-432 or permission of instructor) Class 2, Credit 2 (F)

1016-542   Actuarial Mathematics II
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 (W)

1016-543   Actuarial Math III
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 (S)

1016-544   Actuarial Mathematics IV
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 (S)

1016-545   Actuarial Mathematics V
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 (S)

1016-551   Topics in Algebra
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)

1016-552   Topics in Analysis
Topics in analysis to be chosen by the instructor, either to introduce the student to topics not covered in 1016-411, 412 or to explore further the topics covered there. (1016-265, 412) Class 4, Credit 4 (offered upon sufficient request)

1016-555   Statistics Seminar I
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 (F)

1016-558   Multivariate Analysis
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, 331) Class 4, Credit 4 (offered upon sufficient request)

1016-559   Special Topics
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)

1016-561   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. (1016412 or permission of instructor) Class 4, Credit 4 (offered upon sufficient request)

1016-572   Topology II
Metric spaces, topological spaces, separation axioms, compactness, connectedness, product spaces. (1016-412 or permission of instructor) Class 4, Credit 4 (offered upon sufficient request)

1016-581   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)

1019-420   Calculus for Technologists 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. (1016-204) Class 4, Credit 4 (F, W, S)

1019-421   Calculus for Technologists II
A continuation of 1019-420. 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. (1019-420 or equivalent) Class 4, Credit 4 (F, W, S)

1019-422   Solutions to Engineering Problems
A continuation of 1019-421. 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. (1019-421 or equivalent) Class 4, Credit 4 (F, W, S)

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, Lab 2, Credit 1 (F)

1017-201 — **Physics in the Arts**
A study of topics from the world of art in which the underlying physical laws have influenced the art form and its development. A weekly laboratory allows study of the relation of an art form to basic optical, mechanical and electrical physics and, in addition, provides time for the development of student projects. NOTE: Not acceptable as science credit for College of Science majors. Class 2, Lab 2, Credit 3 (offered upon sufficient request)

1017-202 — **Physics in the Arts**
A study of topics from the world of art in which the underlying physical laws have influenced the art form and its development. A weekly laboratory will allow study of the relation of an art form to basic optical, mechanical, and electrical physics and in addition will provide time for the development of student projects. Note: not acceptable for science credit for college of science majors. Class 2, Lab 2, Credit 3 (offered upon sufficient request) (W, 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)

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)

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)

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, and the Milky Way system. (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. (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. (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)

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)

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)

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 as science credit for College of Science majors. (Competency in algebra) Class 4, Credit 4 (F, W, S)

1017-300 — **Introduction to Semiconductor Device 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. (1017-212, 213, 273; 1019-422) Class 4, Credit 4 (S)

1017-311 — **University Physics I**
An intensive course in general physics, using calculus, for majors in the sciences and engineering. Mechanics, kinematics and dynamics of particles; work and energy; momentum and impulse; gravitation. (Credit or coregistration in 1016-252) (See 1017-371 for three-hour lab, 1017-375 for two-hour lab) Class 4, Credit 4 (F, W, S)

1017-312 — **University Physics II**
Rotational motion, kinematics and dynamics of a rigid body, oscillatory motion, heat and thermodynamics, kinetic theory of gases, wave motion, sound, physical optics. (Credit or coregistration in 1016-253) (1017-311) (See 1017-372 for three-hour lab, 1017-376 for two-hour lab) Class 4, Credit 4 (F, W, S, SU)

1017-313 — **University Physics III**
Electrostatics, Gauss' law, electric field and potential, capacitance, resistance, DC circuits, magnetic field, Ampere's law, inductance. (Credit or coregistration in 1016-253) (1017-311, 312) (See 1017-373 for three-hour lab, 1017-377 for two-hour lab) Class 4, Credit 4 (F, W, S)

1017-314 — **Introduction to Modem Physics**
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; nuclear systematics; radioactivity; alpha, beta and gamma decays; Q-values; nuclear fission; nuclear fusion. (1016-305; 1017-312, 313) Class 4, Credit 4 (F, W, S)

1017-315 — **Introduction to Semiconductor Physics**
Kinetic theory of gases and transport phenomena; Drude's theory of metals; quantum mechanics of a particle in a box; atomic orbitals; band theory of metals, insulators and impurity semiconductors; Fermi-Dirac distribution; equilibrium charge-carrier densities in metals, insulators and semiconductors; operation principles of diodes, bipolar junction transistors and MOSFETs. (1017-314) Class 4, Credit 4 (S)

1017-317   Introduction to Computational Physics & Programming
An introduction to techniques of computational physics including numerical differentiation, integration, solutions of the equations of Newtonian mechanics and error propagation. Elements of programming including type, conditional, input/output statements; loops; subscripted variables; intrinsic functions; subprograms. Introduction to computational environments. (Credit or coregistration in 1017-312 and 1016-252) Class 4, Credit 4 (S)

1017-319   Electrical Processes in Solids
Introduction to statistical mechanics; Planck's formula; transport equation; electronic properties of conductors and semiconductors; characteristics of metal-metal, metal-semiconductor and pn junctions; operating principles of solid state devices; theory and application. (1017-315) Class 4, Credit 4 (offered upon sufficient request) (S)

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, either 1017-373 or 377) 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)

1017-361   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)

1017-371   University Physics I Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. (Credit or coregistration in 1017-311) (See 1017-375 for a two-hour lab) Lab 3, Credit 1 (W)

1017-372   University Physics II Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. (Credit or coregistration in 1017-312) (1017-371) (See 1017-376 for a two-hour lab) Lab 3, Credit 1 (S)

1017-373   University Physics III Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. (Credit or coregistration in 1017-313) (1017-371, 372) (See 1017-377 for a two-hour lab) Lab 3, Credit 1 (F)

1017-374   Modem 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. Students enrolled in 1017-315 may include experiments in semiconductor solid state physics. (1017-314, 1017-321) Lab 3, Credit 1 (S)

1017-375   University Physics I Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. (Credit or coregistration in 1017-311) (Recommended for all students in the University Physics lectures who are not required to take a three-hour lab) Lab 2, Credit 1 (F, W, S)

1017-376   University Physics II Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. (Credit or coregistration in 1017-312) (1017-375 or 1017-371) (Recommended for all students in the University Physics lectures who are not required to take a three-hour lab) Lab 2, Credit 1 (F, W, S)

1017-377   University Physics III Laboratory
This laboratory course includes experiments related to the principles and theories discussed in the corresponding lecture. (Credit or coregistration in 1017-313) (1017-375 or 1017-371) (Recommended for all students in the University Physics lectures who are not required to take a three-hour lab) Lab 2, Credit 1 (F, W, S)

1017-401   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)

1017-402   Intermediate Mechanics II
Translating and rotating coordinate systems, mechanics of continuous media, wave motion, Lagrangian formulation of mechanics. (Credit or coregistration in 1017-481) (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, 481) Class 4, Credit 4(F)

1017-412   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. (1017-411) (1016-306; 1017-312, 313, 480, 481) Class 4, Credit 4 (W)

1017-415   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 4 (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)

1017-422   **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: 1017-401, 411, 415, 455) Class 1, Lab S, 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)

1017-435   **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   **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, Milky Way and external galaxies. (1017-314, 1016-252) Class 4, Credit 4 (offered upon sufficient request) (F or W)

1017-455   **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   **Theoretical Physics I**
An introduction to mathematical topics necessary for a quantitative study of physical phenomena. Topics include vector analysis, including vector differentiation and integration, curvilinear coordinate systems and transformations from one orthogonal coordinate system to another, Fourier series and integral transforms. Applications of these concepts to physics are presented. (1016-306, 1017-312, 313) Class 4, Credit 4 (F)

1017-481   **Theoretical Physics II**
An application of advanced mathematical methods to physics. Topics include the solution of several ordinary differential equations and partial differential equations encountered in physics; examples taken from heat flow, diffusion, wave phenomena, electrostatic, and modern physics. (1017-480) 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   **Introduction to Quantum Mechanics**
A study of the concepts and mathematical structure of nonrelativistic quantum mechanics. Exact and approximate techniques for solving the Schrodinger equation are presented for various systems. (1017-314, 402, 480, 481) 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, 481 and 522) Class 4, Credit 4 (F)

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)

1017-541   **Physics Research**
Faculty-directed student project or research usually involving laboratory work or theoretical calculations that could be considered of an original nature. (Permission of the instructor) Class variable, Credit variable

1017-542   **Physics Research**
Faculty-directed student project or research usually involving laboratory work or theoretical calculations that could be considered of an original nature. (Permission of instructor) (1017-541) Class variable, Credit variable (offered every year)

1017-543   **Physics Research**
Faculty-directed student project or research usually involving laboratory work or theoretical calculations that could be considered of an original nature. (Permission of instructor) (1017-541, 542) Class variable, Credit variable (offered every year)

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) (For 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. Class variable, Credit variable (offered upon sufficient request)

1017-599   **Physics: Independent Study**
Faculty-directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature. Class variable, Credit variable

General Science

1018-210,211   Seminar Undeclared Science 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, develop group skills, and establish a sense of community within the group. Class 2, Credit 1 (F, W)

1018-621   Building 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)

Allied Health 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 compatability testing of various blood groups. (1001-306 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 automated chemical analyzers. (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 diagnostic evaluation. 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)

1025-310   Radiation & 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 (SU)

1025-401   Introduction to Clinical Nuclear Medicine
A combination lecture/laboratory course introducing clinical aspects of nuclear medicine. Hospital organization is presented as well as the relationship of nuclear medicine services to other hospital services. Laboratories in affiliated hospitals are correlated with lectures on nuclear medicine technology, patient care and emergency procedures. (Third year in the NMT program) Credit 2 (S)

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 Systems
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
Basic procedures utilized in nuclear medicine for the evaluation of patients with hematologic disorders. Medical indications, fundamental principles, techniques, data calculations and test interpretation are covered for each procedure discussed. (Fourth year in the NMT program) Credit 2 (S)

1025-516   Instrumentation & Computers in Nuclear Medicine
A combination lecture/practicum course covering the various nuclear instrumentation found in the 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. Collimation, tomography, quality control, computer systems and film processing are covered. (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 (W)

1025-518   Radionuclide Therapy
A study of the application of radionuclides in the treatment of disease and the study of the biological changes which occur following irradiation. (Fourth year in the NMT program) Credit 1 (W)

1025-519   Radiation Health Safety
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. (Fourth year standing in NMT program) Credit 2 (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   Allied Health 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, 1026-222 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 also are stressed. This course may not be taken by allied health 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 3, Lab 2, 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, W, S)

1026-333   Patient Care
This course is designed for students in allied health 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)

1026-351   Trends in Allied Health
A seminar series that provides students with exposure to current issues of concern to the clinical laboratory scientist. Topics include TQM in the clinical laboratory, financing health care, DRGs, CLIA '88, point-of-care testing, chemical hygiene and safety issues in the clinical laboratory, and state licensure issues. Class 1, Credit 1 (F)

1026-352   Medical Lab Management
A seminar series that provides students with exposure to basic management concepts and topics related to maintaining effective laboratory operations. Topics include hospital organization and management, laboratory organization and management, laboratory personnel management, inventory management, marketing clinical products and services, selling clinical products and services, advertising clinical products and services, and entrepreneurship. Class 1, Credit 1 (W)

1026-353   New Medical Technologies
A seminar series that provides students with exposure to the latest techniques and instruments modernizing the clinical laboratory. Topics include modern automation in microbiology, new testing in microbiology, new procedures in blood banking, modern clinical chemistry and analyzers, contemporary hematology instrumentation, new testing for the clinical chemistry lab, clinical toxicology and AIDS concerns for the laboratory worker. Class 1, Credit 1 (S)

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. (1001-305,306) 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 disease, 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 (offered alternate years)

1026-559   Special Topics: Allied Health 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: Allied Health 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. (0603-231, 232) Class 3, Lab 2, Credit 4

1027-315   **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 multi media. 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. (1001-305, 306 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 issues and social structures in contemporary Western society. (First or second year in the PA program) Credit 2 (S)

1032-201   Early Clinical Experience I

This course will provide first-year physician assistant students with interviewing skills and opportunities to practice these skills in our community. It also will provide opportunity for students to experience diverse lifestyles and to assist their maturation into clinicians. Offering socialization opportunities in the PA role, this course will serve as a motivating tool for PA students in an otherwise very strenuous didactic program, and will promote experiences in professional arenas in order to affirm their professional choice. Class 2, Credit 1 (W)

1032-202   Early Clinical Experience II

A continuation of course 1032-201, this course will provide first-year physician assistant students with opportunities to become aware of the rich diversity present in our community, in the health care team, and on campus. Fostering attitudes of respect and professionalism will promote maturation into clinicians. (1032-201) Class 2, Credit 1 (S)

1032-203   Early Clinical Experience III

A continuation of 1032-201 and 202, this course will provide students with opportunities to gain insight into areas such as addiction, substance abuse, and domestic violence—areas that many students will have had no exposure to in prior years. These experiences will aid in their maturation into insightful, competent clinicians. Ob serving from a patient's perspective, the process of becoming a patient in the hospital will provide them a greater appreciation for the need to be a calming, informative physician assistant. Bringing to fruition the community service planned in course 1032-202 will give the students a sense of pride and ownership to their profession. (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 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. (Third year in the PA program) Credit 4 (W)

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. (1032420) 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 internal medicine (in-patient and out-patient), orthopedics, emergency medicine, OB/GYN, pediatrics, general surgery and psychiatry. Students also are able to select two elective rotations. 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)

Imaging Science

1051-200   Imaging Science First Year Seminar
An introduction to academic and student life in the College of Science and the Center for Imaging Science. Topics covered will include a history of imaging science, Wallace Library and basic library skills, resources for student life, campus and laboratory safety practices, the Office of Cooperative Education and Career Services, and resume and cover letter writing. Class 1, Credit 1 (F)

1051-201   Survey of Imaging Science
Survey of Imaging Science is the first course in the curriculum. It describes the field of imaging science and introduces students to the component parts of many imaging systems. Class 2, Credit (F)

1051-202   Introduction to Imaging Science I
Students study the "building blocks" of imaging systems and examine several example systems in that context. Students select one topic, research it in more depth, and write a term paper. (1051-201 or permission of instructor) Class 3, Credit 3 (W)

1051-203   Introduction to Imaging Science II
Using the concepts and tools developed in 1051-202 (Introduction to Imaging Science I) students examine monochrome silver-halide photographic systems in detail. The system, from light source through display, is examined and evaluated. The effects of each step in the "imaging chain" on the mean-level tone reproduction are examined, leading to a graphical and computational analysis of the system characteristics. Students are introduced to additive and subtractive color systems and their basis in human color perception. (1051-202) Class 3, Lab 3, Credit 4 (S)

1051-211   Programming for Imaging Science
This course will introduce the student to the IDL environment as a data visualization tool and a programming language. The student will learn the various capabilities of the package and how they can rapidly prototype solutions to various science and engineering problems. As these solutions are developed, fundamental concepts of programming and data structures will be introduced. Problems will begin with one-dimensional examples and evolve to two-dimensional analogs. This course will emphasize the need for concrete problem definition, problem decomposition into smaller sub-problems, implementation/testing, and presentation/documentation of the algorithms and results. (Algebra and trigonometry) Class 4, Credit 4 (W)

1051-215   Imaging Science Fundamentals
An exploration of the fundamentals of imaging science and the imaging systems of the past, present and future. Imaging systems studied include the human visual system, consumer and entertainment applications (e.g., traditional and digital photography, television, digital television and HDTV, virtual reality); medical applications (e.g., X-ray, ultrasound, MRI); business/document applications (e.g., impact and non-impact printing, scanners, printers, fax machines, copiers); and defense/intelligence systems (e.g., night-vision systems, satellite-based imaging systems). The laboratory component includes experiments related to the principles and theories discussed in the corresponding lecture. Laboratory experiments give students experience with many imaging systems and exposure to the underlying scientific principles. (Competency in algebra) Class 3, Lab 2, Credit 4 (F, W)

1051-221   Survey of Imaging Science Laboratory
Survey of Imaging Science Laboratory is a companion lab for Survey of Imaging Science. Students examine the components of imaging systems and the interaction between those components and are introduced to methods for characterizing them. Lab 3, Credit 1 (F)

1051-231   Imaging Systems Laboratory I
This course is the first in a two-quarter sequence. The sequence is designed to integrate the concepts and core competency areas learned earlier in the curriculum, and to allow the direct study of systems built upon these concepts. The concept of image chain analysis is used to analyze a "real-world" imaging system. In Imaging Systems Lab I, students are presented with an imaging system made up of several subcomponents. They work in teams to analyze each component, the interactions between components, and the system's final performance. (1051-202, 1016-253, 1017-311, or permission of instructor) Class 1, Lab 3, Credit 2 (W)

1051-232   Imaging Systems Laboratory II
This course is the second in a two-quarter sequence. The sequence is designed to integrate the concepts and core competency areas learned earlier in the curriculum and to allow the direct study of systems built upon those concepts. The concept of image chain analysis is used to analyze a "real-world" imaging system. In Imaging Systems Lab II, students build on the fist course. They are presented with a more complex imaging system made up of several sub-components. They work in teams to analyze each component, the interactions between the components and the final system's performance. Each team prepares a final written report and presents results to the class. (1051-231) Class 1, Lab 3, Credit 2 (S)

1051-303   Optics for Imaging
The principles of ray and wave optics are applied to imaging systems. Reflecting and refracting surfaces, pupils and stops, optical imaging systems, diffraction and interference. Particular emphasis is placed on the fundamental limitations of the optical system on the resulting image. (1017-311 and concurrent registration in 1051-232) Class 4, Credit 4 (S)

1051-313   Interactions Between Light & Matter
The interaction of electromagnetic energy with various states of matter, including the creation, propagation and destruction of electromagnetic energy. Topics covered include the electromagnetic spectrum; reflection, absorption and transmission of energy; vibrations and simple excitations; molecular orbitals; band theory; and optical interactions. (1017-314, 1011-213) Class 4, Credit 4

1051-400   Vision & Psychophysics
This course presents an overview of the organization and function of the human visual system and some of the psychophysical techniques used to study vision. Topics include optical image formation in the eye; retinal and cortical representations; spatial, temporal, motion, depth and color coding; and eye movements. (1051-303 or permission of instructor) Class 3, Credit 3 (W)

1051-401   Radiometry
The generation, propagation, absorption and measurement of electromagnetic radiation. Sources, detectors, spectrometers and measurement devices are treated with an emphasis on approaches to quantification of electromagnetic radiation levels. (1016-306, 1017-313) Class 3, Lab 3, Credit 4

1051-402   Colorimetry
This course presents an introduction to color perception, measurement and reproduction. Building upon an understanding of the human visual system from 1051-400, this course explores in more detail the basis of color perception by the visual system and applies those principles to the study of methods of color measurement and reproduction. (1051-400) Class 3, Lab 3, Credit 4 (F)

1051-403   Tone & Color Reproduction
Builds on 1051-401 and 1051-402 to understand strategies for governing mean value input/output relationships of imaging systems. This includes tone and color reproduction in both hard copy and soft display, and 'the propagation of imaging signals through multiple components. Optical, electronic and hard copy systems will be examined. Techniques for characterizing input/output parameters and how these parameters propagate through multiple imaging steps will be a major focus. Traditional sensitometry and densitometry will be included. How fundamental chemical and physical parameters lead to input/output characteristics of systems will be studied and modeled. Laboratory experiments will include characterization of electrophotographic, electronic and chemical imaging systems. Models will be tested against measured system performance. (1051-401, 402) Class 3, Lab 3, Credit 4 (W)

1051-411   C++ Programming for Imaging Science
An introduction to the C++ programming language, associated constructs and an object-oriented approach to program implementation. The data/process definition of this approach will emphasize the domain of digital images and image-related problems. Fundamental UNIX operating system commands will be reviewed along with tools and utilities used in software development. Implementations covered in 1051-211 are revisited and implemented under a more traditional programming paradigm. The student will gain a more comprehensive knowledge of image types/formats and be exposed to more advanced features of tools used for image display and manipulation. (1051-211 or permission of instructor) Class 2, Credit 2 (W)

1051-461   Digital Image Processing I
The principles, techniques and applications of digital image processing are introduced. Formaition of digital images, sampling and quantization, image input/output devices, image statistics and descriptors (e.g., histograms). Point, neighborhood, global, and geometrical operations on digital images are considered, inclulding kernel operations and discrete convolution. Image segmentation operations for gray-scale, color, and multispectral images are described. Emphasis is placed on applications, algorithm prototyping and verification using high-level languages, and efficient computer implementation of image operations in a scientific programming language. (1016-251-253, 1016-305, programming language) Class 3, Credit 3 (F)

1051-462   Digital Image Processing II
This course contin ues the development of digital image processing that began in 1051-461. Alternate mathematical representations of digital images based on global operations are introduced, including those based on the discrete Fourier transform and the Radon transform. Geometrical operations, such as are required to co rrect image distortions, are considered. Applications to the image processing techniques are described. Emphasis is placed on applications, algorithm prototyping and verification using high-level languages and efficient computer implementation of image operations using the C++ programming lan guage. (Corequisite 1051-411 or permission of instructor) (1016-251-305, 1051-461) Class 3, Credit 3 (W)

1051-463   Digital Image Processing III
The principles, techniques and applications of signal compression are considered. Particular emphasis is placed on those techniques that are used in image compression, such as JPEG and MPEG standards. (1051462) Class 3, Credit 3 (S)

1051-499   Imaging Science Co-op
Cooperative education experience for undergraduate imaging science students. Credit 0 (offered every quarter)

1051-501   Senior Project I
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 1051) Class 3, Credit 3

1051-502, 503   Senior Project II, III
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 (F-502, W-503)

1051-511   Imaging Systems Analysis I
This course introduces the concepts of continuous and discrete convolution, Fourier transform, linear systems in both one and two dimensions and then considers applications of these concepts to the evaluation of imaging systems. 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 thro ughout the course. Finally, some examples of imaging systems, including cascaded systems are used to describe how and why the output depends on the system design parameters. (1051-313, 1051-401, 1051462 or permi ssion of instructor) Class 4, Credit 4 (F)

1051-512   Imaging Systems Analysis II
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   Image Microstructure
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   Design & Fabrication of a Solid State Camera
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

1051-553   Special Topics: Imaging Science
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   Independent Study
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

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Course numbering: RIT courses are generally referred to by their seven-digit registration number. The first turn 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)

0887-200   **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)

ASL-English Interpretation

0875-201   **American Sign Language I**
ASLI 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. This course is designed for students who have no knowledge of American Sign Language. Class 4, Credit 4 (F, W)

0875-202   **American Sign Language II**
This course expands the basic principles presented in ASL I. ASL II teaches students to use linguistic features, cultural protocols, and core vocabulary to function in basic ASL conversations that include ASL grammar for giving directions, describing, making requests, talking about family, occupations and routines, and attributing qualities to others. (0875-201) Class; 4, Credit 4 (W, S)

0875-203   **American Sign Language III**
This course builds upon ASL II foundation of skills an d knowledge. The course focuses on the ASL features of time, subject/object, classifiers, non-manual behaviors, and fingerspelling (including numbers and loan signs). In addition, ASL semantics and syntax (including conversation regulators) will be introduced. (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, equiva-lence 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 D/deaf people. The evolution of a pathological view of D/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 (W)

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 (S)

0875-301   **American Sign Language IV**
This course is the fourth in a series of six ASL course s for interpreting students. 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 is the fifth in a series of six for interpreting students. 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 is the last in a series of six for interpreting students, building upon the foundation in the previous 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 the interpreters as bicultural/bilingual mediator, at the center of communicative activity. The interpreter's communicative competence requires knowledge of what is communicatively 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 (pie-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), close 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 consecutively producing 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   **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 consecutively producing an equivalent message in the targeted 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 perceived 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 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 equivalency 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 to the simultaneous ASL to English interpreting task. Additionally, students will develop ability to apply the principles of diagnostic feedback. One special area or 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 observing 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. Additionally, practicum students will 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 problems solving. Field experience includes 100 hours. (Cumulative GPA 2.5; 0875-320, 325, 326, 330) Class 2, Credit 4 (F, W, S)

Applied Accounting Technology

0801-100   **Career Exploration: Business Technology**
Helps students collect the information necessary to make an appropriate decision regarding careers in accounting and office occupations. Students learn about the nature of accounting and office jobs, work environments, career options and program requirements through a combination of group and individual activities that include presentations by faculty members and related professionals, panel discussions, class observations and student interviews. Class 1, Credit 1 (F, W, S)

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. Lecture/Lab 6, Credit 4 (W, S)

0801-202   **Principles of Accounting II**
A continuation of Principles Accounting I for both accounting and nonaccounting 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. Spreadsheet applications are used on microcomputers. (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 and notes receivable; the valuation of receivables, inventories, and plant and equipment; as well as the voucher system of accounting. Course work includes a computerized practice set that applies accounting concepts in a simulated business situation. Spreadsheet applications are used on microcomputers. (0801-202) Class 6, 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, the statement of cash flow and the analysis of financial statements. Accounting for partnerships also is covered. (0801-203) Class 6, 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. (Applied accounting 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. (Applied accounting associate degree status, 0804-101, 0801-231) Class 3, 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. Culminates with practical application of course content through a practice set. Computer applications include spreadsheets. (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. Computer applications include spreadsheets, graphics and databases. (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. Computer applications include cost accounting, spreadsheets, graphics and databases. (0801-252) Lab 6, Credit 2 (F, W)

0801-299   **Co-op: Applied Accounting**
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 Art & Computer Graphics

0825-105   **Visual Idea Development**
Gives students the opportunity to tap a multitude of resources, including personal experience and the environment, as aids to creativity through a variety of activities, including classroom discussions, field trips, guest lectures, written journals and sketchbooks. Students learn strategies for developing concepts and organization of thought processes as well as systems to formulate solutions to design problems. The library is used for development of research skills. Required for applied art and computer graphics majors and may be taken as an introductory or elective course by students in other majors. Class 2, Credit 2 (F, W)

0825-110   **Introduction to Computer Graphics**
Introduction to the use of computer hardware and software to create, edit and produce graphics. Course content includes file formats, legal issues, health/safety issues, vocabulary, memory, file management and hands-on involvement with specific applications: word-processing, pixel-based and object-based. Required for applied art and computer graphics majors and may be taken as an introductory or elective course by students in other majors. Studio 4, Credit 2 (F, W, S)

0825-115   **Freshman Art Seminar**
Provides experience in the development of a personal career plan in art and assists with the development of college survival skills. Students explore personal interests, aptitudes, art program opportunities and college adjustment issues through presentations, field trips, discussions and research of art careers. Systematic decision making related to art careers is emphasized. Required for applied art and computer graphics majors and may be taken as an introductory course by students in other majors. Class 2, Credit 2 (F, W)

0825-201   **Studio Techniques**
Basic tools, materials and non-computer-based equipment used in the professional applied art studio for design concept development and presentation of comprehensive layouts are introduced. Emphasis is on correct technical use of various color and black-and-white imaging media, materials and equipment. The skills learned in this course will be utilized in other major courses in the program to create clean, well-crafted presentations. Studio 4, Credit 2 (F, W, S)

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. Required for applied art and computer graphics majors and may be taken as an introductory or elective course by students in other majors. Studio 4, Credit 2 (F, W)

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, use of quick sketches and sustained study, and use of the figure in composition. Students are introduced to media and materials used to draw the human form. Required for applied art and computer graphics majors and may be taken as an introductory or elective course by students in other majors. Studio 4, Credit 2 (F, W, S)

0825-208   **Drawing Composition**
Use of drawing principles learned in previous drawing courses and the Visual Idea Development course are 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, including color. (0825-204, 206) Studio 4, Credit 2 (W, S)

0825-210   **Intermediate Computer Graphics**
A continuation of the basic experience gained in Introduction to Computer Graphics. Students gain in-depth experience with computer hardware and software to create, manipulate and produce finished graphics. Course content includes hands-on black-and-white and color software experience using illustration and photo manipulation software. Also includes a continuing focus on health/safety issues, vocabulary, file formats and file management. (0825-110) Studio 4, Credit 2 (W, S)

0825-211   **Introduction to Design**
Introduction to the concepts, elements and exploration of design related to a career in the art field. Emphasis is on basic two-dimensional design concepts and 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. Required for applied art and computer graphics majors and may be taken as an introductory or elective course by students in other majors. Studio 4, Credit 2 (F, W)

0825-212   **Color in Design**
In this course, color theory is emphasized. Concepts learned in Introduction to Design are applied using color media and materials to solve basic design problems. Technical quality in presentation of design concepts continues to be discussed. (0825-201,211) Studio 4, Credit 2 (W, S)

0825-215   **Art Career Seminar**
Provides information regarding jobs, titles, roles and paths for careers in the art field. Students identify a specific art field for further personal exploration. They also are expected to arrange and conduct an interview with a professional artist. Development of college survival skills and systematic decision-making related to art careers is further emphasized. Information is presented through presentations, field trips, discussions and research of art careers. (0825-115) Class 2, Credit 2 (W, S)

0825-221   **Introduction to Typography**
Students learn type measurement/point sizes and type classification/type families. Identification of typefaces, letter spacing, word spacing, line spacing, line length and type arrangements is also emphasized. (0825-110) Studio 4, Credit 2 (F, S)

0825-230   Electronic Layout Programs
Computerized 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. (0825-110) 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 applied art and computer graphics 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 applied art and computer graphics students and students in other majors. Studio 4, Credit 2 (F, S)

0825-283   Freehand Lettering
Introduction to the basic processes of freehand lettering. Emphasis is on identification, care and use of various lettering tools such as carpenter's pencil, speedball pen and lettering brush. Use of basic methods of stroking, letterspacing, word spacing, line spacing and rendering of both serif and sans serif letter forms are taught. Elective course for both applied art and computer graphics students and students in other majors. Studio 4, Credit 2 (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 basic model making. Elective course for both applied art and computer graphics students and students in other majors. Studio 4, Credit 2 (S)

0825-285   Airbrush/Retouching
Provides basic experience with the air brush as a tool for original art, retouching and illustration. Emphasis is on care and maintenance, dyes, paints, masks, working surfaces and a variety of working techniques. (0825-208) Studio 4, Credit 2(F)

0825-299   External Co-op: Applied Art & Computer Graphics
This 10-week, full-time experience gives students matriculated in the applied art and computer graphics AOS and AAS programs 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. (0825-310, 332, 342, 0806-101) Credit 0 (F, W, S)

0825-310   Computer Illustration Methods
Provides students with advanced skills in the area of computer illustration. Students learn to use the advanced functions of black-and-white and color graphic software to create professional-quality renderings for print publication. (0825-208, 210, 212) Studio 4, Credit 2 (F, S)

0825-315   Art History I
Survey of major historical developments in the visual arts as they relate to applied art, specifically examining Western art from prehistoric times to the late Renaissance at the end of the sixteenth century. Required for applied art and computer graphics majors and may be taken as an elective by students in other majors. For non-major students Experience of Art (0880-246) is a prerequisite. Class 3, Credit 3 (F)

0825-316   Art History II
Survey of major historical developments in the visual arts as they relate to applied art, specifically examining Western art from the Baroque period of the seventeenth century to current movements in fine art. Required for applied art and computer graphics majors and may be taken as an elective by students in other majors. (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. Required for applied art and computer graphics majors and may be taken as an elective by students in other majors. (0825-316) Class 3, Credit 3 (S)

0825-321   Type in Design
Students focus on use of type as an integral part of a design, including how to choose letter, word and line spacing and line length and type arrangement. Emphasis is on selection of appropriate type to best communicate a message, working with type and grids, legibility and readability, proofreaders' marks and proofreading, working with copy to make it fit in a layout and copy specification. (0825-105, 210, 212, 221) Studio 4, Credit 2 (F, W)

0825-331   Layout for Graphics
Application of design concepts, principles and methods developed in first-year courses. Students leam how to define and research simple graphic design problems and develop and present solutions to create clear, well-executed "thumbnail" sketches, "roughs" and comprehensive layouts. Emphasis is on verbal presentation of layout ideas and group critiques. (0825-208, 210, 212, 221, 230) Studio 6, Credit 3 (F, W)

0825-332   Publication Design
Students use information learned in previous layout courses to solve more complex design problems for multipage jobs. Major emphasis is given to verbal presentation of layout ideas, group production meeting times and group critiques. (0825-331) Studio 6, Credit 3 (F, W, S)

0825-341   Introduction to Production
Students learn to use hand skills and computer skills to create and prepare simple production art for black-and-white and color reproduction. Technical vocabulary related to preparing artwork for printing is emphasized. (0825-210, 221, 230) Studio 4, Credit 2 (F, W, S)

0825-342   Production Applications
Students use computer skills to create and prepare multipage production art for black-and-white and color production. Technical vocabulary related to preparing artwork for printing is emphasized. (0825-321, 341) Studio 4, Credit 2 (F, W, S)

0825-351   Graphic Applications
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. (0825-310, 332, 342) Studio 12, Credit 6 (F, W, S)

0825-352   Graphic Applications/Portfolio Review
Applied art and computer graphics students' final professional preparation course prior to graduation. Includes practical work experience, interaction with clients and involvement with all phases of studio production, including layout, mechanicals and computer graphics. Students must submit a portfolio of artwork for final review by a jury composed of department faculty members and professional artists. (0825-299, 351) Studio 12, Credit 6 (F, W, S)

0825-381   Survey of Electronic Layout
An overview of the principles, concepts and processes involved in producing visual layouts. The course focuses on applications within an electronic/desktop publishing environment and includes hands-on experience with both traditional and electronic methods. Emphasis is on understanding the function of a layout as well as the basic methods and criteria used in making design/ layout decisions. Elective course for students not enrolled in the applied art and computer graphics program. Studio 4, Credit 2 (F, W)

0825-382   Applied Computer Illustration Techniques
Provides students with an opportunity to enhance their skills in and knowledge of computer illustration software. The course focuses on the comparison and use of some of the special functions and tools found in vector-based graphic/illustration programs, including type effects, bezier drawing tools, blends, tiles, color, word spacing and letterspacing, and the importing and exporting of files. Elective course for both applied art and computer graphics students and students in other majors. (0825-310) Studio 4, Credit 2 (F, W, S)

0825-383   Finished Lettering
Introduction to the processes, tools, equipment and methods for producing finished lettering for reproduction. Included are exercises designed to develop skills in rendering script, serif, sans serif and decorative letter forms. Elective course for both applied art and computer graphics students and students in other majors. (0825-283) Studio 4, Credit 2 (F)

0825-384   Mechanical Perspective
Students learn the use of mechanical drawing methods for visualizing three-dimensional form in perspective. Experiences include orthographic projection and one- and two-point perspective based on forms ranging from simple geometric solids to complex patterns. Emphasis is on mastery of basic methods for constructing a technically accurate drawing. Elective course for both applied art and computer graphics students and students in other majors. (0825-204) Studio 4, Credit 2 (W)

0825-385   Mechanical Drawing Methods
Introduction to mechanical processes for depicting three-dimensional forms on a flat surface. Drawing methods, such as oblique and isometric, based on simple and complex forms are included. Emphasis is on translating the three-dimensional form into a technically accurate drawing. Elective course for both applied art and computer graphics students and students in other majors. (0825-384) Studio 4, Credit 2 (S)

0825-399   Independent Study
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. Class 3, Credit 3 (F, W)

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. (0805-215) Class 2, Lab 1, Credit 3 (W, S)

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 1, Lab 3, Credit 3 (F, 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. (0805-215) Class 3, Credit 3 (F, W)

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. (0805-217) 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 focuses 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. (0805-213) Class 2, Lab 2, Credit 3 (F, 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) 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, World Wide Web (WWW) browsers, searching/researching on the Internet, creating and maintaining home pages with page/site-creation applications, multimedia on the web, and introductory level WWW programming. (0805-201, 215) Class 3, Credit 3 (W, S)

0805-252   **Internet Technologies II**
This course continues Internet Technologies I, by addressing intermediate topics for the World Wide 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). (0805-231, 251) Class 3, Credit 3 (F, S)

0805-299   **Co-op: Applied Computer Technology**
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 gramming 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. (0805-216, 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. (0805-206, 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, W)

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 IX 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. (0805-225, 0805-245, 0805-330) 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)

Architectural Technology

This program has been approved for discontinuance. No new students will be admitted. The courses listed are offered during the phase-out period only to currently matriculated students.

0808-299   Co-op: Architectural Technology
Credit 0 (SU)

Business Occupations/Business Technology/ Office 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. Lecture 3/Lab 2 (contact hours), Credit 4 (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. Lecture/Lab 5, Credit 2 (F, W, S)

0804-113   OAS—Document Production I
This course focused 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 Nonmajors
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 sequence of courses develops basic skills in current business procedures related to general office functions. Skills include the use of electronic mail, current records management systems and introduction to Paradox databases, the correct use of business machines, and the manual and automated computerized keeping of payroll records using Lotus 1-2-3 software. Students develop skills applicable to a variety of office settings. Class 5, Credit 3 (F, W)

0804-212   Payroll/Spreadsheet Applications
This course develops basic skills in current business procedures related to general office functions. Skills include the use of electronic mail; current records management systems and introduction to paradox databases; the correct use of business machines; and the manual and automated computerized keeping of payroll records using Lotus 1-2-3 software. Students develop skills applicable to a variety of office settings. Class 5, Credit 3 (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. Applied accounting and office technologies 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   **Office 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. (Office 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 various software packages. (0804-301) **Class** 3, **Credit 2 (F, W, S)**

0804-299   **Co-op: Office Practices**
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 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 repetitive letters, lists and reports. **Class 4, Credit 4 (F, W, S)**

0804-310   **Desktop Publishing for Business**
This course for students in the office technologies 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

Civil Technology

This program has been approved for discontinuance. No new students will be admitted. The courses listed are offered during the phase-out period only to currently matriculated students.

0809-299   **Co-op: Civil Technology**
Credit 0 (SU)

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)**

0813-100   **Career Exploration:**
Computer Integrated Machining Technology
Provides students with information regarding a career in computer integrated machining technology and precision machining. Activities may include field trips, hands-on experiences, career information presentations and interaction with graduates of the program and professionals in the field. These experiences help students understand work activities, conditions and settings. **Lab 3, Credit 1 (F, W, 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 1, 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   Advanced Precision Measurement
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 science and humanities requirement as noted below.

Fundamental (B level)

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) (Humanities)

0886-199   American Sign Language I
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) (Humanities)

0881-166   Sign Mime & Creative Movement
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. 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. Class 3, Credit 3 (F, W) (Humanities)

Intermediate (C level)

0886-200   American Sign Language II
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) (Humanities)

0886-201   American Sign Language III
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) (Humanities)

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) (Humanities)

0880-247   Deaf Art/Deaf Artists
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. Class 3, Credit 3 (S) (Humanities)

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 centimes. This course satisfies the Deaf Studies requirement. (0881-202 or 0882-221) Class 3, Credit 3 (S) (Performing Arts)

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) (Humanities)

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) Class 3, Credit 3 (F, W, S) (Social Science)

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. Class 3, Credit 3 (W) (Social Science)

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) Class 3, Credit 3 (W, S) (Social Science)

Bridging (D level)

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) (Humanities)

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. Class 3, Credit 3 (S) (Social Science)

0881-259   Creative Translation for Stage
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) (Performing Arts)

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 Production
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)

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)

0878-300   **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)

0878-306   **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. (0878-220, 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, 0878-235, 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 of 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   **Prepare 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 WWW, 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 monochrome 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)

0878-342   Film Assembly Techniques

This course includes the production of single- and multi-color film plates in exact registration position to imposition specifications; making specified changes and corrections; applying identification and exposure list standards; film and Dylux proof contacting techniques. (0878-250, 0878-255) Class 2, Lab 3, Credit 3 (F, S)

0878-343   Offset Duplicator Operations

This course includes the preparation and printing of single- and multi-color jobs on a variety of stock types and sizes appropriate for offset duplicator production. Students will use analog and digital plates. (0878-250, 0878-255) Class 2, Lab 3, Credit 3 (F, S)

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. (0878-310, 0878-312 or 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) Lab 4, Credit 2 (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) Lab 4, Credit 2 (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) Lab 4, Credit 2 (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 Xerox DocuTech operator. (0878-371) Class 2, Lab 3, Credit 3 (W)

0878-299   Co-op: Digital Imaging & Publishing Technology

Credit 0 (F, W, S, SU)

         Independent Study

0878-399

Credit variable (F, W, S)

Electromechanical Technology

This program has been approved for discontinuance. No new students will be admitted. The courses listed are offered during the phase-out period only to currently matriculated students.

0811-234   **Optical Systems**
Introduction to the use of optics in engineering applications. Students learn about refraction, reflection, imaging, fiber optics, light-emitting diodes, lasers and optically controlled solid-state electronic devices. (0811-369, 0885-202) Class 3, Lab 2, Credit 4(F)

0811-299   **Co-op: Electromechanical Technology**
(0811-171, 321, 368) Credit 0 (F, W, S, SU)

0811-322   **Electrical Power Systems**
Students learn how power is transmitted by electricity. Basic topics covered include generators, motors, transformers and distribution lines. Both alternating and direct current machines are covered. (0811-304, 317) Class 3, Lab 4, Credit 4 (S)

0811-324   **Transducers**
Introduction to automatic controls. Students learn about electrical, thermal, hydraulic and mechanical transducers. Emphasis is on the similar operating characteristics of all kinds of transducers. Students express results using mathematics and graphics. (0811-321, 368) Class 3, Lab 4, Credit 4 (F)

0811-325   **Control Systems**
The second course in a sequence on the topic of automatic controls. Students learn about the effects on a controlled process when different ways are used to connect the input transducer to the output transducer. The course covers open and closed loop systems. Graphic techniques are used to help students understand systems. (0811-324) Class 3, Lab 4, Credit 4 (W)

0811-327   **Microprocessor Control Systems I**
The first course in a two-quarter sequence. Introduces students to the theory of microprocessor-based control systems. Students learn about software techniques applied to electromechanical systems. This laboratory course emphasizes systems analysis and troubleshooting. (0811-171, 369) Lab 6, Credit 2 (W)

0811-328   **Microprocessor Control Systems II**
Emphasizes the construction, testing and troubleshooting of microprocessor-based systems. Students identify and solve problems and report solutions independently. This course is project based and ties together many of the concepts learned in the electromechanical technology program. (0811-327) Lab 6, Credit 2 (S)

0811-330   **Circuit Analysis**
Emphasizes the analysis of complex circuits. Students learn about Kirchoff's Laws, independent and dependent sources, power, equivalent sources and resistances, Thevinin's Theorem, Norton's Theorem, superposition theorem, mesh analysis and nodal analysis. (0811-370) Class 4, Credit 4 (W)

0811-334   **Electromechanical Systems**
Emphasizes the interface between microprocessors and electromechanical devices. Students work on projects that include circuit design, software design, breadboarding skills and troubleshooting techniques. (0811-328) Class 3, Lab 3, Credit 4 (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. (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 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. (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/R1T. (NTID Reading Test score between 125 and 143 or 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 1-4 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)

0883-250   Themes & Symbols in Literature
Students in this developmental course with experience in literary analysis apply their knowledge and ability to independently comprehend literary works in preparation for entry to RIT 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) Dass 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. At this is the last of a four-course sequence, the focus is on the female and male reproductive systems, and on 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 the student with knowledge of services rendered in ambulatory surgery centers. Student 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 ICD-O 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)

Humanities

Fundamental (Level B)

0880-180 Perspective on the Humanities
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*
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. Class 3, Credit 3 (F, W)

Intermediate (Level C)

0880-230 The American Past: An Introduction to the History of the United States
Provides an overview of United States history beginning in 1607 and continuing through the 20th century. The course introduces students to issues, ideas, and people influential in shaping our country's past. It focuses on major political, economic, and social developments, as well as contributions and perspectives of diverse cultural groups. The course increases students' knowledge of American history and prepares them for further history courses. (ACT arts/literature reading score 5-7 or 0880-180 or permission of instructor) Class 3, Credit 3 (F)

0880-231 European History: 1600 to Present
Introduces political, social, and cultural history from 1600 through the 20th century. Emphasis is placed on the major historical developments that have influenced the development of modern Europe. (ACT arts/literature reading score 5-7 or 0880-180 or permission of instructor) Class 3, Credit 3 (S)

0880-240 The Big Questions: An Introduction to Philosophy
Surveys the quest to understand humanity's place in the world and the significance of the human experience. Starting with the Greeks and sampling major contributions of the great philosophers, this course explores how and why the great questions were asked. (ACT arts/literature reading score 5-7 or 0880-180 or permission of instructor) Class 3, Credit 3 (W, S)

0880-241 The Bible as Literature: A Cultural & Historic Perspective
Provides a basic understanding of the major themes and stories of the Bible. Course focuses on the cultural and historical circumstances in which the biblical literature grew. This course does not approach the literature from any particular belief or lack thereof, so students with a variety of religious interests may enroll. (ACT arts/ literature reading score 5-7 or 0880-180 or permission of instructor) Class 3, Credit 3 (F)

0880-246 The Experience of Art
Introduces students to basic elements of art and composition, and helps them to understand the important connections between artists, their cultures, and their historical times. Additionally, this course encourages students to make connections with other courses in the humanities and liberal arts, and reinforces critical thinking skills and academic skills in general. (ACT arts/literature reading score 5-7 or 0880-180 or permission of instructor) Class 3, Credit 3 (F)

0880-247 Deaf Art/Deaf Artists*
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. Class 3, Credit 3 (S)

Bridging (Level D)

0880-280 Issues Facing Citizens of the 21st Century
Citizens of the 21st century will face problems of world-wide proportions. Examples of such problems might include "global climate change" (GCC), overpopulation, destruction of tropical rain forests or world hunger. In this course, students study such issues from the perspectives of history, philosophy, religion/ethics and aesthetics in order to understand the problems more completely. In addition, students implement within their own systems of values and beliefs and seek solutions that they can begin to implement within their own environments. (ACT arts/literature reading score 8-9 or permission of instructor) Class 3, Credit 3 (S)

0880-290 Art History I
Provides the student with an opportunity to learn about the history of art from pre-history through the 16th century A.D. Particular attention is given to the influence of historical, social and cultural backgrounds on the development of the arts (architecture, sculpture and painting). Slide-based lectures focus on the evolution of Eastern and Western cultures by tracing the following styles: Prehistoric, Egyptian, Greek, Roman, Byzantine/Early Christian, Romanesque, Gothic and Renaissance. Major political, philosophical and sociological ideas that affected each style are studied. (0880-246) Class 3, Credit 3 (F)

0880-291 Art History II
Provides the student with an opportunity to learn about the history of art from the 16th century to the mid-20th century. Particular attention is given to the influence of historical, social, and cultural backgrounds on the development of the arts (architecture, sculpture and painting). Slide-based lectures focus on the evolution of the following art historical styles and movements: Baroque, Romanticism, Realism, Impressionism, Post-Impressionism, Fauvism, Cubism and Futurism, Dada and Surrealism, Expressionism, Color Field, Pop and Op Art, Happenings, Environmental Art, and Feminist Iconography. Major political, philosophical and sociological ideas that affected each style are studied. (0880-246) Class 3, Credit 3 (W)

This course satisfies the Deaf Studies/American Sign Language requirement.

American Sign Language

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 I***
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)

Intermediate (Level C)

0886-200   **American Sign Language II***
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 III***
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)

Bridging (Level D)

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)

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)

Communication Studies

Introductory (Level A)

0880-101   **Foundations of Critical Thinking**
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. The emphasis is on the application of problem-solving strategies needed at the college level for everyday life and for mastery of academic content. Course topics include giving and analyzing directions; classifying and sequencing information; identifying multiple perspectives on an issue; analyzing arguments used to support a position; asking questions; comparing and contrasting concepts; 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. 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. Class 3, Credit 3 (F, W, S)

0880-170   **Effective Presentations**
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. Class 3, Credit 3 (F, W)

Intermediate (Level C)

0880-201   **Interpersonal Relationships**
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. Class 3, Credit 3 (F, W, S)

0880-202   **Intercultural Communication**
Provides the students with an introduction to the concepts of culture, communication, and intercultural communication as they relate to face-to-face communication. 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. Class 3, Credit 3 (F, W, S)

0880-206   **Group Dynamics & Effective Teams**
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. 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 (W, S)

* This course satisfies the Deaf Studies!American Sign Language requirement.

0880-210   **Internet Communication**
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 Internet and the World Wide Web and available services such as notes, e-mail, newsgroups, bulletin boards, distribution lists, and home pages. Applications to the 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. Class 3, Credit 3 (F, W, S)

Bridging (Level D)

0880-250   **Professional Presentations**
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. Class 3, Credit 3 (S)

Performing Arts

Fundamental (Level B)

0881-166   **Sign Mime & Creative Movement***
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. Class 3, Credit 3 (F, W)

0881-167   **Dance Performance**
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. Class 3, Credit 3 (F, W)

0881-168   **Jazz**
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. Class 3, Credit 3 (F, S)

Intermediate (Level C)

0881-202   **History of Theater***
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. Class 3, Credit 3 (W)

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)

0881-210   **Acting I**
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. Class 3, Credit 3 (F, W)

0881-217   **Stage Combat**
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. 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. Class 3, Credit 3 (S)

0881-222   **Scenic Technology I†**
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. Class 3, Credit 3 (F, W, S)

0881-223   **Scenic Technology II†**
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. (0881-222) Class 3, Credit 3 (W, S)

0881-224   **Scene Painting†**
Provides an introduction to the craft of scene painting. Techniques, communication with designers, and use of appropriate materials and tools are emphasized. Class 3, Credit 3 (W, S)

0881-231   **Costume Technology I†**
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. Class 3, Credit 3 (F, W)

0881-232   **Costume Technology II†**
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. (0881-231) Class 3, Credit 3 (W)

0881-233   **Stage Make-up**
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. Class 3, Credit 3 (F)

0881-241   **Lighting Technology I†**
Teaches the basic understanding of lighting software, equipment, and practices that are utilized in theater production. This course prepares students for supervised practicum experience. Class 3, Credit 3 (F, W, S)

0881-242   **Lighting Technology II†**
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. (0881-241 or permission of instructor) Class 3, Credit 3 (W, S)

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. Class 3, Credit 3 (F, W)

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* This course satisfies the Deaf Studies/American Sign Language requirement.
† This course satisfies the humanities requirement.

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. Class 3, Credit 3 (S)

0881-256   Script Analysis

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. 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. 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. 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. (0881-210 or 0881-256) Class 3, Credit 3 (F)

0881-260   Acting II

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. (0881-210, 0881-256 or audition with instructor) Class 3, Credit 3 (W, S)

0881-261   Audition Technique†

Emphasizes preparation for career research. Major topics include interviewing, portfolio, resume, photo selection, monologue repertoire development, and cold reading. 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. 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. (Completion of Dance History) 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 ran of the show. This is a required course for stage managing any of the college's/department's main stage shows. 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. (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

Industrial Drafting

This program has been approved for discontinuance. No new students will be admitted. The courses listed are offered during the phase-out period only to currently matriculated students.

0810-299   Co-op: Industrial Drafting

Credit 0 (SU)

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, W)

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 4, Credit 3, (F, W, S)

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, S)

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. (0884-120 or equivalent) Class 3, Lab 2, Credit 4 (F, W, S)

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)

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* This course satisfies the Deaf Studies/American Sign Language requirement.
† This course satisfies the humanities requirement.

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. (0884-170 and 0884-180 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. ""4-180 or equivalent) Class 3, Lab 2, Credit 4 (F, W, S)

Bridging (D level)

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. (0884-210 and 0884-170 or permission of department) Class 3, Lab 2, Credit 4 (F, W, S)

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 calcular is an integral feature of the course. (0884-210 or permission of department) Class 4, Credit 4 (W, S)

0884-275   Advanced Mathematics
Topics from precalculus 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. (0884-210 and 0884-185 or equivalent or permission of the department) Class 4, Credit 4 (F, W)

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)

Ophthalmic Optical Finishing Technology

0827-105   Introduction to Optical Finishing 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 Finishing 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 Finishing 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 Finishing 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 Finishing 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 I
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 leam 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 Finishing 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 Finishing 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 Finishing 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 4, Lab 6, Credit 4 (W)

0827-161   Optical Finishing 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)

0827-162   Optical Finishing Terminology II
Emphasizes the comprehension, spelling and application of terminology related to the vertometer, lensometer, pattern maker, heat treat units, and ceramic and diamond head beveling wheels. (0827-161) Class 5, Credit 3 (F, W, S)

0827-163   Optical Finishing Terminology III
Emphasizes the comprehension, spelling and application of terminology related to lens tolerances, functions, procedures, and operation and troubleshooting of selected auto edge machines. Students complete a paper describing the procedures used in making prescription eyeglasses. (0827-162) Class 5, Credit 3 (F, W, S)

0827-224   Optical Finishing Techniques IV
Emphasis is on individual fabrication of given prescriptions. Students are given a variety of single-vision and multifocal prescriptions to be completed during the quarter. Finished prescriptions are evaluated using ANSI standards. (0827-123) Class 9, Credit 5 (S)

0827-225   Optical Finishing Laboratory Simulation I
Provides practice in the total processing of actual eyeglass prescriptions from uncut stage through completion and final inspection. Students practice assembling lenses into frames and symmetrical alignment of the finished product. Students assume the duties of supervisors and rotate positions to demonstrate competence in all phases of operation. Class 9, Credit 5 (W)

0827-226   Optical Finishing Laboratory Simulation II
Teaches the techniques of rimless mounting, drilling, grooving, frame repair (soldering), lens dying and the use of the spectrometer. Students select frame and lenses for layout and processing to finished product. (0827-225) Class 9, Credit 5 (S)

0827-251   Optical Finishing Technology Seminar
Students learn how attitude, aptitude and personal/social factors contribute to successful employment. Students also receive instruction regarding such topics as the Americans with Disabilities Act (ADA), effective person-to-person interviewing, interviewing using telecommunications techniques, corporate culture, and the American Board of Opticianry Testing. Class 2, Credit 2 (W)

0827-270   Orientation to Lens Surfacing
This course is an overview of the basic concepts and procedures needed to produce prescription lenses. Students are introduced to the basic operation of the surfacing layout marker, lens blocking system, surface curve generator and fining/polishing machine(s). Students will also learn terminology and techniques to assess the quality of finished lens surfaces. Class 2, Lab 2, Credit 3 (S)

0827-280   Applications of Lens Surfacing
In this course students continue to learn and expand on skills introduced in Orientation to Lens Surfacing. Students are introduced to the process of producing lens power through the procedures of lens surfacing. Emphasis is on the advanced operation of the lens layout marker, lens blocking system, surface curve generator, and cylinder machine(s). Students will learn terminology and techniques used to assess lens surfaces. (0827-170) Class 2, Lab 4, Credit 4 (F)

0827-299   Co-op: Optical Finishing Technology
(0827-101) Credit 0 (SU)

0827-399   Independent Study
Credit variable

Prebaccalaureate Studies

0853-200   Freshman Seminar
Provides entering prebaccalaureate and baccalaureate students with opportunities to enhance academic, personal and social skills needed for success in the mainstream college environment. Students have opportunities to explore and negotiate the college environment, learn how to effectively use support services, confront questions of identity and social role, and establish relationships with faculty and students in their program. Emphasizes integration into the academic and social systems of both the NTID community and the mainstream college environment. Class 3, Credit 2 (F, W)

0853-210   Learning Strategies
This course is designed to help students evaluate their strengths and weaknesses and to improve their learning efficiency and effectiveness through appropriate training. Students have the opportunity to improve their learning skills in areas such as reading, test taking, questioning and general study habits. Activities include lectures, discussions and individual conferences. Class 2, Credit 2 (F, W, S)

0853-220   Processes of Science
This course is offered to cross-registered science and engineering students who are interested in raising their academic achievement level and to other students who wish to improve their skills and increase their knowledge in these areas. The course helps students evaluate their strengths and weaknesses in areas of thinking such as comparing, analyzing, reasoning and problem solving. With an emphasis on making thinking overt, strategies are modeled and practiced. Expansion of both background knowledge and scientific vocabulary are additional benefits. Class 3, Credit 3 (S)

0853-310   Computing Fundamentals
This pre-programming course is intended to prepare students to enter the information technology or computer science majors. The course provides a programming-language-independent study of the fundamental concepts, logical structures and algorithms inherent to computer programming. Teaching strategies emphasize learning techniques that encourage the development of critical thinking and problem-solving skills. Class 4, Credit 4 (F, W)

Science

Fundamental (Level B)

0885-151   Processes of Science: Astronomy
Covers introductory science processes using the content of astronomy as a vehicle to establish an appreciation of the scientific method, critical thinking and problem solving. The basic processes of observing, classifying, comparing, and measuring using metric units are addressed in both class and laboratory using the concepts of astronomy. Class 2, Lab 3, Credit 3 (S)

0885-152   Processes of Science: Meteorology
Covers introductory science processes using the content of meteorology as a vehicle to establish an appreciation of the scientific method, critical thinking and problem solving. The basic processes of observing, classifying, comparing, and measuring using metric units are addressed in both class and laboratory using the concepts of meteorology. Class 2, Lab 3, Credit 3 (F)

0885-153   Processes of Science: Environmental Studies
Covers introductory science processes using the content of environmental studies as a vehicle to establish an appreciation of the scientific method, critical thinking and problem solving. The basic processes of observing, classifying, comparing, and measuring using metric units are addressed in both class and laboratory using the concepts of environmental studies. Class 2, Lab 3, Credit 3 (W)

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)

0885-161   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 (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)

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. (0884-120 and 0884-170 or equivalent) Class 4, Lab 1, Credit 4 (W, S)

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 (F, 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 (F, W, 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, W, S)

0885-205   **Physics for Science & Engineering I**
Introduces students to the basic laws of motion (both linear and two-dimen-
sional), circular motion, the notion of force and force/mass interactions, and
basic materials science topics such as elasticity. In addition, the intent objec-
tives 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 basics laws of energy and the transfer and conver-
sation 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)

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 com-
mon 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, redoxtitrations, 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 evolu-
tion 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 varia-
tions, population genetics, bioengineering, and old world and new world
evolutionary theory. (Permission of instructor) Class 3, Lab 3, Credit 4 (F, S)

0885-282   **Scientific Basis of Social Responsibility**
Interactive course designed to provide students with both tools and confi-
dence to become more literate in the sciences. An interdisciplinary teaching
team of biologists, chemists and physicists challenge students to analyze con-
temporary social issues and/or problems that have a basis in science, utilizing
basic principles in each of these areas of science. Potential topics include alter-
native medicine; biogenetics; calories, life-style and exercise; euthanasia; and
organ transplants. Following analysis of the issue/problem, students formu-
late 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 inter-
actions provide hands-on opportunities to experience contemporary science
and technology. (Permission of instructor) Class 3, Lab 3, Credit 4 (F, W)

0885-283   **Physiology of Human Development & Maturation**
Introduces basic human development and maturation from a multidiscipli-
nary 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, S)

Social Science

Fundamental (Level B)

0882-150   **Making a Difference: A Social Science Perspective**
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/sciences reading score 1-4) Class 3, Credit 3 (F, W, S)

Intermediate (Level C)

0882-200   **Introduction to Social Sciences:**
Sociology, Anthropology & Psychology
Explores the understanding of human behavior and everyday life using important social science concepts. The disciplines of sociology, anthropology, and psychology are applied in the study of business art, education and the family. (ACT social studies/sciences reading score 5-7 or 0882-150 or permission of instructor) Class 3, Credit 3 (F, W, S)

0882-205   **American Family in Crisis**
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) Class 3, Credit 3 (F, W, S)

0882-206   **Issues in Parenting & Early Childhood**
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) Class 3, Credit 3 (F, W)

0882-210   **The Black Experience**
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) Class 3, Credit 3 (W, S)

0882-215   **Current Social Problems**
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) Class 3, Credit 3 (W, 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) Class 3, Credit 3 (F, W)

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. 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) Class 3, Credit 3 (W, S)

0882-230   **Introduction to Political Science & Economics**
This course guide students through American political systems and the three branches of government. It explores the relationship between political and economic system development and introduces students to basic political and economic principles that have profound implications in our everyday lives. Principles to be explored include the economic implications of SSI, public assistance in the form of welfare, grants-in-aid for college, Medicare and Medicaid. The course helps students navigate economic and political assumptions that define increases or decreases in governmental involvement in issues such as education, rehabilitation and taxation. (ACT social studies/sciences reading score 5-7 or 0882-150 or permission of instructor) Class 3, Credit 3 (F, W, S)

0882-231   **Contemporary Economic Issues**
Introduces students to general economic principles involving basic analysis of opportunity cost, microeconomics, macroeconomics, income distribution and economic justice, and global economic changes. The opportunity cost concept emphasizes the idea that in choosing one economic alternative, we must forgo other choices. The microeconomics section encourages students to answer questions involving supply/demand, consumer sovereignty, factors of production and consumerism. Students explore policy implications of the money supply, government spending on social programs such as SSI/SSDI, government subsidies of the arts, and building prisons versus rehabilitation programs. The impact of foreign trade and international markets is also explored. (0882-230) Class 3, Credit 3 (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) Class 3, Credit 3 (F, W, S)

0882-242   **Law & Society**
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.

(Bridging (Level D)

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. Class 3, Credit 3 (S)

0882-295   **Social Sciences, Humanities**
& Technology: A Capstone Seminar (AOS)
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)
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
English Composition. 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.

0860-006   Communication for a Job Interview
This course focuses on the development of job interviewing skills. Frequently
asked questions will be reviewed so that appropriate answers can be
formulated. Self-instruction opportunities will be available. Students will
have several practice interviews as part of this course.

0860-007   Video Resume Preparation
This course will focus on developing a video resume that effectively
communicates one's qualifications for employment. The student is able to
determine the most effective communication strategy of the video and to
develop an appropriate script with the assistance of a communication
instructor, their employment adviser, and a technical instructor. With the
assistance of professionals in instructional television, a professional, captioned
videotape will be produced.

0860-008   Making Formal Presentations
The purpose of this course is to provide students with the skill and experience
necessary to make formal presentations to groups. Students practice
organizing information and making presentations to an audience using
speech or simultaneous communication.

0860-009   Communication Strategies
This course focuses on techniques and strategies to enhance effective
communication. Students will work on identifying communication strengths
and difficulties to increase their success. They will have opportunities to use
strategies to prevent and repair communication misunderstandings. For
example, they will practice using and responding to requests for clarification.

0860-010   Understanding Figurative Language
In this course, students will enhance their understanding of
literal vs. extra-literal meaning by analyzing direct and indirect speech
acts, English idioms, similes, and metaphors. Students will work on both
comprehension and production of these language forms in context.

0860-011   Cultural Variations in Communication
This course will provide students an opportunity to explore how culture
influences communication. They will study how differences in sex, hearing
status, social status, education, and ethnicity affect communication.

0860-012   Speech for Telephone Communication
This course is designed to provide a student with individual speech training
to aid his or her telephone communication. This is accomplished through a
weekly one-hour class with an instructor, which can be supplemented by a
weekly one-hour assignment. This assignment, completed in the
Self-Instruction Lab, utilizes audiocassette tapes for listening, speaking, and
self-monitoring.

Interdisciplinary Courses

Index

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.

Software Engineering

3010-101   **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 ethical issues they will face at RIT and through throughout their careers. Class 1, Credit 1

3010-362   **Engineering of Software Subsystems**
Continuation of 0603-361 with a more in-depth treatment of design and redesign, resource estimation and testing of non-trivial software subsystems. Topics include process improvement; common subsystem design patterns; maintenance; testing techniques. Students engage in active participation in the software process through projects. (0603-361) Class 3, Lab 2, Credit 4

3010-420   **Formal Methods of Specification & Design**
Introduction to the use of mathematical models of sequential software systems and the refinement of these models to designs and implementations. Topics include finite state machine models and regular expressions; state machine and regular expression equivalence; language syntax and semantics; formal specification, design, implementation and verification. (0603-266, 3010-362) Class 4, Credit 4

3010-440   **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 principles of concurrent, distributed and information systems. All courses are structured around exploration of design patterns of construction, case studies and standards. Topics include structuring computation, patterns of design, graphical user interfaces, documenting design and functional design. Class lectures are reinforced by laboratory exercises and projects. (3010-362) Class 3, Lab 2, Credit 4

3010-441   **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 closely coupled systems. Topics include the basics of concurrent hardware architectures, synchronization and coordination techniques and common models of software systems. Other issues include scheduling, reliability and problem decomposition. (3010-440) Class 3, Lab 2, Credit 4

3010-442   **Principles of Distributed Software Systems**
Issues and structures common in the construction of distributed software systems. Emphasis in on fundamentals repeated in most systems of this type. Topics include the basics of data communication and networking as well as higher-level issues encountered in the design of distributed systems. (3010-440) Class 3, Lab 2, Credit 4

3010-443   **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. (3010-440) Class 3, Lab 2, Credit 4

3010-450   **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. (3010-362) Class 4, Credit 4

3010-452   **Software Verification & 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. (3010-362) Class 4, Credit 4

3010-455   **Software Requirements & Specification**
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. (3010-420, 3010-440) Class 4, Credit 4

3010-456   **Software Engineering Process**
Introduction to software engineering process and related project management issues. Topics include software maturity framework, software process assessment, software process and the software life cycle, issues in software project management and control, and measurements related to the software process. (3010-440) Class 4, Credit 4

3010-561   **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. Class time is divided among lectures on contemporary issues in software engineering, guest lectures by industry practitioners and time devoted to team-based activities. (Senior-level standing in software engineering) Class 4, Credit 4

3010-562   **Software Engineering Project II**
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. (3010-561) Class 4, Credit 4

3010-101   **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 ethical issues they will face at RIT and through throughout their careers. Class 1, Credit 1

3010-361   **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, team-based development. A term-long team-based project done in a formal lab setting is used to reinforce concepts presented in class. Oral presentations and written documentation are required. (0603-233) Class 3, Credit 4, Lab 2

3010-362   **Engineering of Software Subsystems**
Continuation of 3010-361 with a more in-depth treatment of design and redesign, resource estimation and testing of non-trivial software subsystems. Topics include process improvement; common subsystem design patterns; maintenance; testing techniques. Students engage in active participation in the software process through projects. (3010-361) Class 3, Credit 4, Lab 2

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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. There is a $4.00 charge for each copy. 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.

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 337.

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 (*RIT Institute Policies and Procedures,* Section D5.0, page 5). 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 either his or her Program Quarterly GPA or Principal Field of Study GPA (based upon at least 20 credit hours attempted) falls below 2.0* (a C average). To be removed from probation, both averages must improve to at least a 2.0.

The physician assistant program requires a 2.8 grade point average.

Academic suspension

A student will be suspended from the Institute if any of the following occurs:

1. A student on probation fails to be removed from that status within two quarters following the initial probation; or
2. While on probation, the student's Institute Cumulative GPA falls below 2.0 (the physician assistant program requires a 2.8 grade point average); or
3. After being removed from probation, a student's Institute Cumulative GPA falls below 2.0, and the student is unable to raise that average to at least a 2.0 within one quarter (the physician assistant program requires a 2.8 grade point average); or
4. A student's Program Quarterly GPA falls below 1.0; or
5. A student is allowed to return to his or her original program from suspension and then goes on probation.

Suspended students generally must wait at least a 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 60 percent for students entering at the first-year level and graduating from a four- or five-year program.

Excluding part-time and nondegree students, 84 percent of first-year, full-time day students register for their second year; and 88 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.

Counseling and Academic Services

R IT 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 Campus Ministry

The Center for Campus Ministry 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 Afro-American Nondenominational, Assembly of God, Baptist, Catholic, Episcopalian, Greek Orthodox, 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 J. 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 campus ministers.

For more information, call the coordinator of the Interfaith Center at 716-475-2135 (voice/TTY) or e-mail at ccm-cpm @rit.edu.

Center for Student Transition and Support

The center provides educational advising and offers programs and services specifically designed to promote the academic and personal development of students. The center's primary mission is to give students, particularly those who are new and those who are underrepresented, the tools they need for academic and personal success. This is accomplished through five major program areas: New Student Orientation, First-Year Enrichment courses, International Student Services, AHANA (African, Hispanic, Asian, and Native American student) Program, and the Women's Center. The Center for Student Transition and Support is located on the mezzanine

level of the Student Alumni Union and is open weekdays from 8:30 a.m. to 4:30 p.m. For more information about center programs and services, call 716-475-6943 (voice/TTY) or visit http://www.rit.edu/studenttransition on the Web.

AHANA Student Program

The AHANA program helps students manage their transition to campus by offering personal advising, advocacy, leadership development opportunities, diversity education, cultural programming, and a connection to campus and community resources plus annual programs. Currently RIT has 1,560 African American, Hispanic, Asian American, and Native American (AHANA) students. The Peer Mentor Program provides academic and social support by connecting new students in various majors with upper-class AHANA students. The Loftus Carson Book Fund lends from one to three textbooks to AHANA students who demonstrate financial need and whose GPA is 2.5 or greater.

The AHANA program disseminates information to students and families via the Web, e-mail, and quarterly newsletters about internships, scholarships, and job opportunities. In addition, collaboration with several campus units and student organizations brings nationally prominent speakers and community leaders to campus to meet with students, faculty, and staff. The program coordinators advise the Black Awareness Coordinating Committee (BACC) and work closely with other clubs serving AHANA students such as the Latin American Student Association (LASA), Caribbean Student Association (CSA), and Unity House, the special interest house in the residence halls. The Web address is http://www.rit.edu/AHANA.

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 learning, an opportunity to make connections with faculty and staff, and the chance to meet others and become involved members of the RIT community.

This two-quarter required sequential course 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, mental and social wellness, and physical well being. 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 coaches/mentors 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.

International Student Program

The International Student Program is the primary resource for approximately 1,000 hearing and deaf international students from 88 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 the 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 Friendship Council. For more information, call 716-475-6943 (voice/TTY) or visit the international student services Web site, http://www.rit .edu/internationalservices.

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; 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

Four summer orientation programs are offered in July, and one is offered in the fall before classes begin. The summer programs provide opportunities to register for classes; receive academic information; learn about support services and residential living; and meet faculty, staff, and other incoming students. During the summer programs, students are encouraged to live in a residence hall and sample on-campus living regardless of their long-range housing plans. While the summer programs are not required, students and families are strongly urged to attend either a summer or fall program to ease their transition to RIT.

All new full-time, day, matriculated, fall-entry students are charged the $60 program fee to cover program development costs, whether they choose to attend an orientation program or not.

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. Orientation is housed in the Center for Student Transition and Support. For more information, visit http://www.rit.edu/orientation.

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 716-475-7464 (voice/TTY), and e-mail may be sent to jawwom@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 2,500 RIT students involved in mandatory and optional co-op programs. Co-op gives student and employer an opportunity to look each other over. It gives the student the opportunity to try out personal and professional abilities in a real-world environment, and it enhances classroom learning.

In the Office of Cooperative Education and Career Services each student has a program coordinator who provides assistance with career counseling 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, on-line 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
- Career Counseling
- Career Walk-In Center
- Career Resource Center
- DISCOVER (a computerized guidance system)
- Developmental Programs and Groups
- Testing
- Consultation

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 716-475-2261 (voice) or 716-475-6897 (TTY) or visit the Counseling Center Web site at http://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. Individual counseling is generally limited to a maximum of 12 sessions per year.

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 resources contain 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

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 each quarter 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.

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.

Educational Technology Center

The Educational Technology Center provides service and leadership to enhance and support the educational environment at RIT. Services include media production, classroom equipment support, distance learning and the Media Resource Center, which contains videotapes, films and audio tapes placed on reserve by faculty members for student use.

ETC staff members assist faculty and students in finding and preparing media for classroom presentations, club meetings or personal use. The photo and graphic design services are useful for preparing presentations and lectures. A broad array of media technology is available for instructional support and campus events.

RIT instruction extends beyond the classroom with assistance from the Office of Distance Learning at ETC. Students are able to complete courses in a flexible time schedule during the quarter without having to attend on-campus classes. More that 15 RIT programs, including certificates, BS and MS degrees, are available through various distance learning formats. Students interact with professors and other students through e-mail and conferencing using the World Wide Web as well as through audio, video and telephone conferencing. In addition, courses include videotapes, audio tapes and print materials. ETC supports these efforts with course development, equipment and production services.

ETC offices and the Media Resource Center are located on the lower level of Wallace Library. More than 60 students work in ETC, assisting with video production, photography, graphic design and office support. The offices are open fall through spring quarters from 8 a.m. to 10 p.m., Monday through Thursday; 8 a.m. to 5 p.m., Friday and 11 a.m. to 5 p.m. on Sunday. Hours are subject to change during break weeks and summer quarter.

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 716-475-6684 (voice/TTY) or visit the Web site at http://www.rit.edu/RIT/SA/SP/ELI or e-mail lxdelc@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-l 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, but students enrolled for 12 academic credits at RIT receive a reduced rate.

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 have included 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 716-475-6684 or pick up an application at 1301 Eastman.

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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 716-175-6684.

Information and Technology Services

Computing services at RIT are provided by Information and Technology Services, which manages a large VMSCluster (networked Digital VAX and Alpha computers), several UNIX systems (Digital Alpha computers), an IBM enterprise server for administrative computing, a campus-wide network, and dial-in access. Detailed information on these systems may be obtained from the ITS HelpDesk or on the World Wide Web at http://www.rit.edu/ISC/. Popular features include electronic mail (used extensively by students, faculty and staff) and access to the Internet/World Wide Web. Many faculty have incorporated these features into their curricula, resulting in innovative and interesting courses not available elsewhere.

ITS also manages 22 computer labs and smart classrooms (in cooperation with the Educational Technology Center) containing Windows NT, Macintosh and SGI workstations and printers. Most of these facilities are available to students for general computing use and to faculty for reserved class work. Lab assistants provide first-level support to help people use the hardware and software available in the labs.

Computing system use is guided by the RIT Code of Conduct for Computer Use. Computer accounts are issued to students, staff and faculty so that they may perform activities supporting educational goals and internal RIT functions. Students can obtain an account at the HelpDesk or at the reference desk in the library by showing their RIT ID card. Forms for faculty and staff accounts may be available in your department or can be obtained by contacting the HelpDesk. ITS also provides consulting services; seminars; problem solving; general information; and advice on hardware, software, and networking to users of central systems and microcomputers (PCs and Macintosh).

How to contact the HelpDesk

Telephone: 716-475-4357 (475-HELP) or -2810 (TTY)
Electronic media:
- E-mail: services@rit.edu
- RITMenu: ASK system
- World Wide Web: http://www.rit.edu/
Location: room 1113 in the Gannett Building
Hours for fall, winter and spring quarters:
- Mon. through Thurs.—8 a.m. to 8 p.m.;
- Fri.— 8 a.m. to 5 p.m.; and
- Sun.—noon to 8 p.m.
- Saturdays—closed
Hours for summer quarter, holidays and quarter breaks:
- Mon. through Thurs.—8 a.m. to 6 p.m.
- Fri., 8 a.m. to 5 p.m.
- Weekends—closed

Modem access to the campus computer network

- Both asynchronous and DialIP remote Internet connection service (14.4 to 56 Kbps): 716-427-2000

Learning Development Center

The Learning Development Center, an academic support unit at RIT, offers students, faculty, staff and the community a variety of services. The College Program offers courses in reading, writing, math and study skills as well as a math and writing lab open on a drop-in basis. The College Restoration Program assists students who are on probation or suspension. The Academic Success in College Conference is for students entering college. For more information about these and other LDC programs, see the following descriptions.

Academic Assessment Program

The Academic Assessment Program in the Learning Development Center 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 716-475-6682.

Academic Success in College Conference

The Academic Success in College Conference is an innovative, interactive five-day conference offered each summer on campus. The ASC Conference introduces entering college freshmen to the skills, strategies, use of resources and self-knowledge necessary for academic success in college.

High school graduates headed for an RIT college or any other college or university can attend. Presentations and workshops on time management, personal organization, math study skills, memory improvement, campus technology, advocacy skills, textbook strategies and many more topics assist high school students in making a confident and successful transition to college.

The cost of the Academic Success in College conference is $520. For more information and/or registration materials, please call 716-475-6682.

Learning Support Services

Learning Support Services is committed to helping individuals recognize and access their natural learning abilities and is 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. Check-ins may be in an individual or small-group setting. In addition, students may enroll in an optional weekly seminar. 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 716-475-2215.

College Program

The College Program is the LDC unit devoted to providing academic assistance for students enrolled at RIT. It offers workshops, classes and labs for instruction in reading, writing, mathematics and study skills.

The College Program has services 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.

Reading and Writing Department: Courses and workshops include Textbook Strategies, Proofreading, Summary Writing, Documentation, Vocabulary and Spelling. The Writing Lab provides individualized instruction to improve students'

abilities to complete college writing assignments. Individual instruction in reading is available by appointment.

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. A sequence of noncredit math courses designed for returning adults also is offered.

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.

College Program services are free to RIT students. For more information concerning these services, contact the Learning Development Center at 716-475-6682 (voice/TTY).

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.

First-Year Seminar courses help inspire new students with a sense of creativity. This team of first-year mechanical engineering students used celery, licorice laces and an ice-cream cake to build an edible scale capable of accurately weighing small objects.

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 716-475-6682 (voice/TTY).

Disability Services Coordinator's Office

RIT is committed to the support of 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 seven colleges at RIT to ensure support for students with disabilities within each college. The office coordinates services with the Physical Access committee, Residence Life and Campus Safety, who supervise the mobility van to provide transportation around campus for those who are mobility impaired. For more information, call the disabilities services coordinator at 716-475-7804 (voice) or -6988 (TTY).

Academic Accommodations Office

This office provides the academic accommodations for students who have been approved for these services by the disabilities services coordinator. The most frequently used services include extended-time testing, readers, scribes, note- taking and textbook taping.

Higher Education Opportunity Program

The Higher Education Opportunity Program 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.

Throughout its 21 years on the RIT campus, HEOP has been applauded for its high graduation rate. Inquiries should be directed to 716-475-2221 (voice/TTY).

Special Services

The goal of the Office of Special 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 Office of Special Services, a federally funded program that has been hosted at RIT for more than 20 years, includes four 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 disabled student component deals with a broad range of issues faced by students with disabilities. The staff provides services related to academic and physical accessibility and works in conjunction with the Disability Services Coordinator's Office to raise the awareness of the RIT community.

The ultimate purpose of the Office of Special 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 aid, physical or learning disability and first-generation college status. Any full-time undergraduate student who is a U.S. citizen and meets one of the eligibility requirements may become a member of Special Services. For further information, contact the office at 716-475-2832 or -2833.

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.rit.edu/~nlcwww/) 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, science and math, technical program majors, speech and language, ASL 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.rit.edu/~482www/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 new Integrated Communication Lab located in the Johnson Building. The 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 workshops through the NTID Learning Center on a variety of topics related to assistive technology and communication (i.e., telecommunications, job interviews, communication strategies) as well as individual instruction on a noncredit basis in the areas of speechreading, listening and strategies to facilitate communication in social and work environments.

Professional hearing and hearing aid evaluations are available through the department's nationally accredited clinic, and hearing aids are provided at significantly reduced prices. In addition, faculty are available to discuss issues related to hearing loss, tinnitus, hearing aids and assistive technology. FM systems can be loaned to students for the academic year. Most of these services are free for all full-time RIT students and available to part-time students for modest fees.

The Hearing Aid Shop (LBJ-3130) sells hearing aid accessories and batteries and schedules appointments for hearing tests, hearing aid evaluation and other services with audiology faculty. Students using hearing aids can purchase earmolds, have their hearing aids computer analyzed and sent for repair, and borrow assistive signaling and listening devices.

The Eye and Ear Clinic provides on-site ophthalmology and otology services, color and visual field testing, educational advocacy and counseling for all full-time students. Appointments with medical doctors and visual specialists are scheduled through the Hearing Aid Shop. For more information, call 716-475-6473 (voice/TTY).

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 physically challenged students. For additional information about NTID Counseling Services, call 716-475-2876 (voice/TTY) or send a fax to 475-5934.

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.

Psychological testing and assessment are available to students whose personal/social problems affect their academic performance. Consultation often is done with faculty and staff members so that students are assisted in planning remedial programs that emphasize their academic as well as personal needs.

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 716-475-2261 (voice/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 716-475-6639 (TTY) or stop by the office suite on the first floor of Ellingson Hall.

NTID Physical Education and Athletics support team

The NTID Physical Education and Athletics support team is committed to providing quality services that maximize access for deaf and hard-of-hearing students who are engaged in wellness and physical education activity classes, intercollegiate athletics, intramurals and recreation programs. Members of the team work closely with RIT's Center for Physical Education and Recreation, Center for Intercollegiate Athletics, and Student Health Center.

The support team members teach wellness and activity classes, signing for themselves. They also provide advising and tutoring and coordinate notetaking services. Consultation/advising is available to deaf and hard-of-hearing student athletes and intercollegiate coaches. Collaboration with the NTID Admissions Department allows potential NTID student athletes the opportunity to meet with athletic coaches and visit our facilities.

Opportunity for students to develop leadership and professional skills exists through the peer educator/paraprofessional program under the direction of the PE&A 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 call 716-475-6104 (voice/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.

Veteran Enrollment Services

Active service persons, reservists, members of the National Guard, veterans and their dependents often begin their educational programs in RIT's Office of 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.

Veterans attending college usually have the added responsibility of a family, the added financial pressures of maintaining a home and often work while attending school. Because of these demands, they need several types of assistance. Our OVES staff members are veterans, too—veterans helping veterans is an important aspect of our services.

The OVES staff is composed of a director, peer counselors and VA work-study students, who are available to handle inquiries and assist veterans with VA- and college-related information. The office is located on the first floor of the Bausch & Lomb Center and is easily accessible for both day and evening students. It is open from 8 a.m. to 7 p.m., Monday through Thursday, and until 4:30 p.m. on Friday. Students may visit the office or telephone 716-475-6642 to speak with an OVES 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. Active-duty students represent the fastest growing group of benefit eligibles. Information on the Internet about RIT's distance learning opportunities is of major interest to them.

Reservists eligible for the New 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, DOD Form 2384. When received by OVES, the Notice of Basic Eligibility is forwarded to the Veterans Administration to ensure prompt payment. Payment for reservists is $208.93 for each month completed as a full-time student. Benefits at less than full-time are determined relative to the number of credit hours taken. 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 OVES or to the service member's command. Multiple benefit payment is authorized and should be encouraged.

Vocational Rehabilitation, offered to service-connected disabled veterans, is a priority program for OVES. 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. Vocational Rehabilitation, the monthly supplement and disability benefits make RIT an attractive choice for the disabled veteran.

Veterans eligible for Veterans Educational Assistance Program, Chapter 32, should bring a certified copy of the DD214 to OVES, 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 than 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 and with OVES before enrolling.

Veterans have shown significant interest in the RIT Amvets Post #1829, which has created a veterans' learning center—fully computerized with both PC and Macintosh connections to the RIT VAXs. The center is located in the lower level of the Student Alumni Union and is open daily, 8 a.m. to 11 p.m.

Veterans who are planning to attend college should consider the difference that a campus veteran service office can make. Students coming from schools unable to serve a veteran population's needs find RIT a model place to begin and continue their education.

Wallace Library

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.

Contained within the library are the Educational Technology Center; 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 Wallace'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 on-line. The Vax Internet Area provides access to graphic interface workstations, image scanning and a host of interactive CD titles.

A variety of seating options and small-group study rooms are available, which together can accommodate more than 1,000 users.

For library hours, call 716-475-2046 (voice); for Reference Desk, call -2564 (voice) or -2563 (TTY) or e-mail 610wmlref ©rit.edu; for Circulation Desk, call -2562 (voice) or -2962 (TTY).

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 10 centers that provide the programs and services that are integral to the learning process and complement the academic curriculum. The centers are: Campus Life, Campus Ministry, 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.

Student Housing

The residence halls

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 RIT's residence halls provide for much more than just a place to sleep. The antiquated term "dorm" is no longer an accurate description. The residence halls offer a living experience.

Many activities, programs and services are provided to residents by professional and paraprofessional staff members. 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 study skills, communication abilities, personal safety and avoiding drug abuse. Many other topics also are covered, each designed to better prepare students to grow and mature as complete individuals.

Serving approximately 2,800 students, the 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, non-smoking, alcohol-substance free, intensified study, over

21 years of age, 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, Community Service Clubhouse, 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.

A variety of room types also is available to the residence hall population. Entering students are assigned to double rooms, but limited-availability options for upper-class students include single rooms. 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 Institute housing.

Before arriving at RIT, all students must sign and return the Room and Board Request and Assignment Form included in their housing information mailing. First-year students are required to live in residence halls, unless they live with their families within a 30-mile radius of RIT. Campus apartments are available to upper-class students through an annual housing selection 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 board (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 a community lounge area with a television. All residence hall rooms are equipped with cable television access and a free, direct, high-speed Ethernet jack 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. Coin-operated laundry facilities are available in all residence halls.

Apartment housing

RIT's Apartment Life program is 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. Apartment housing is available to all upper-class students in the five apartment complexes owned and operated by RIT.

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 August, but residents are permitted to

leave for co-op employment and summer without penalty. All apartments are equipped with refrigerator and stove but are otherwise unfurnished, except for University Commons, which is fully furnished. Furniture, however, may be leased from local rental companies. All Institute apartments are located less than a mile from the center of campus and are serviced by RIT's shuttle bus system. A brochure describing the five complexes—Colony Manor, Perkins Green, Riverknoll, Racquet Club, and University Commons—is available from the Center for Residence Life, Grace Watson Hall, 63 Lomb Memorial Drive, Rochester, NY, 14623-5603; 716-475-2572 (voice) or 475-2113 (TTY).

The Housing Connection

A service of the Center for Residence Life, The Housing Connection is designed to meet the general housing needs of the RIT community. The center provides free referrals for students looking for on- or off-campus housing accommodations in the Rochester area. In addition, the center offers the only on-campus clearinghouse for apartment residents in need of additional roommates, providing a continual updated listing of available roommates and their specific interests.

The Housing Connection provides free maps, information pamphlets and telephones for users of this service. A trained staff member will assist students in their research for housing or roommates. For more information, call 716-475-1559 (voice/TTY).

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 90 clubs and eight major organizations and actively engages in the university's open governance system.

All full-time and part-time undergraduate and graduate students become members of the Student Government when they pay the Student Activities Fee. For more information, please call 716-475-2203 (voice/TTY).

NTID Student Congress

The NTID Student Congress (NSC) is an organization of and for deaf and hard-of-hearing students. 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 716-475-6277 (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 students who live with their parents, 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 typewriters, 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. Each of two satellite offices in Colony Manor and Racquet Club apartments offers Macintosh and PC computers, a copier and a TV lounge.

If you are interested in getting involved, stop in at the OCASA office or call 716-475-6680 (voice/TTY) for more information.

The College Activities Board (CAB)

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 716-475-2509 (voice/TTY).

The 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 716-475-5624 (voice/TTY).

Residence Halls Association (RHA)

Residence Halls Association represents all residential students and is a liaison between the student body and the administration. This association functions as the "residential 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. RHA is located in the tunnel under Baker Hall and can be contacted at 716-475-6655 (voice/TTY).

Greek Council

Greek Council is the governing body that represents all members of the Greek community. It deals with issues on their behalf in conjunction with the Panhellenic, Interfraternity and Pan-Hellenic Councils. The council is responsible for regulating rules 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/service projects, a Greek league parallel to the intramural program, social programs and national speakers. For additional information, call the Greek Council Office at 716-475-2735 or -7028 (TTY), or the Center for Residence Life at 716-475-2572 (voice/TTY) or -2113 (TTY).

Alpha Epsilon Pi	Phi Delta Theta
Alpha Kappa Alpha	Phi Kappa Psi
Alpha Phi Alpha	Phi Kappa Tau
Alpha Sigma Alpha	Phi Sigma Kappa
Alpha Sigma Theta	Sigma Alpha Mu
Alpha Xi Delta	Sigma Nu
Delta Phi Epsilon	Sigma Pi
Delta Sigma Phi	Sigma Sigma Sigma
Delta Sigma Theta	Tau Epsilon Phi
Kappa Alpha Psi	Tau Kappa Epsilon
Kappa Delta Pho	Triangle
Kappa Phi Theta	Zeta Phi Beta
Lambda Alpha Upsilon	Zeta Tau Alpha
Lambda Phi Delta	Order of Omega
Phi Beta Sigma	

Global Union

The diversity of RIT's student body warrants a medium that encourages different ethnic groups to intermingle and communicate. The Global Union was formed to satisfy this need. It promotes interaction, 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 716-475-2567.

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 34 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

For more information about the following clubs, please contact the Student Government Office at 716-475-2204 (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 1999-2000 school year:

Aero-Design
Alpha Phi Omega
Alpine Ski Team
Amateur Radio Club
American Marketing Association
American Society of Civil Engineers
Anime Club

Arabic Student Association
Asian Deaf Club
Astronomy Club
Bowling Club
Brothers and Sisters in Christ
Caribbean Students Association
Ceramics Guild
Chess Club
Chinese Student Association
Circle-K
Comix Artists' Club
Cycling Club
Ebony Club
Equestrian Club
Eta Sigma Delta
FACES
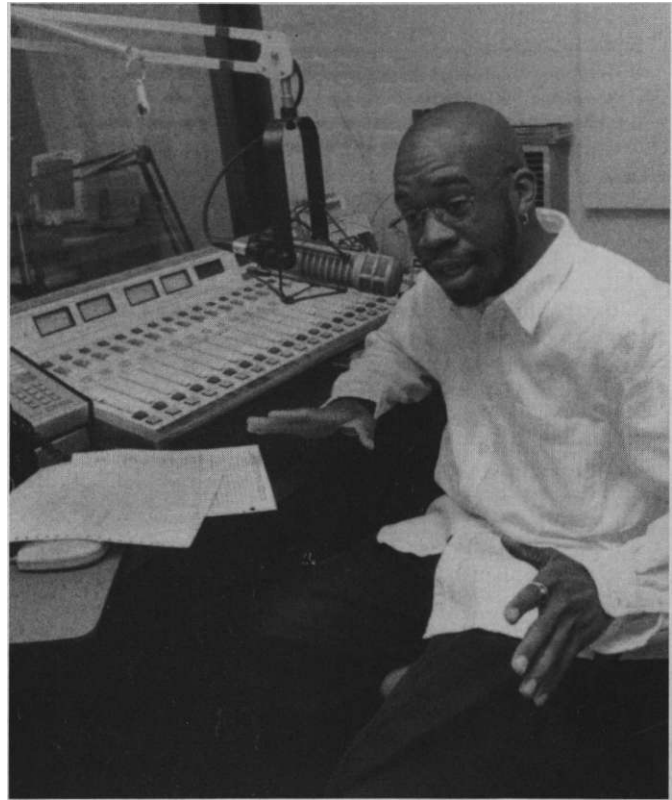
The campus radio station, WITR, has been broadcasting for more than 30 years. DJ Ryland Stephens Jr. spins R&B during his "Jaythreeoh Slow Flow Show," one of 20 specialty shows offered.

Film Video Animation Student Association
Financial Management Association
Fine Art Studio Club
Formula SAE
Friends of Veterans
Gamma Epsilon Tau
German Club
Gospel Ensemble
Graduate Management Association
Graduate Photography Student
Habitat for Humanity
Hispanic Deaf Club
Horizontal Ultimate Club
Imaging Science and Technology
Industrial Design Society of America
Information Technology Student Organization
Institute of Industrial Engineers
Interior Design Club
International Business Group
InterVarsity Christian Fellowship
Lacrosse Club (Men's)
Latin American Student Association
Life Science Club
Linux User Group
Macintosh User Group
Mini-Baja
MISST
Model Railroad Club
Muslim Student Association
National Press Photographers Association
National Society of Black Engineers
New York State Hotel Association
New York State Restaurant Association
OASIS

Outing Club
Packaging Club
Physician Assistant Student Association
Pre-Law Association
Pre-Vet Club
Quality Management Team
RIT Gay Alliance
RIT Players
RITSCI
Rochester Wargamer Association & Guild
Roller Hockey
Rugby (Men's, Women's)
Society of African American Business
Society of Hispanic Professional Engineers
Society of Manufacturing Engineers
Software Engineering Group
Student Dietetic Association
Student Glass Art Club
Student Illustration Guild
Student Interpreters Club
Student Music Association
Student Social Work Organization
Swing Dance Club
Tae Kwon Do Club
Taiwanese Student Association
Technical Photography Student Association
Ultrasound Student Association
Venezuelan Student Association
Vietnamese Student Association
Volleyball (Men's)
Water Polo Club
Women's Cross Country
Wood Club

Student professional associations

Students can also get involved with departmental and professional associations such as Alpha Chi Sigma, Delta Lambda Epsilon, Delta Sigma Pi and Sigma Pi Sigma.

A number of national technical associations have student affiliate chapters on campus. Frequently sponsored by parent chapters in Rochester, these societies play an important part in Institute life by bringing together students who have common interests in special subjects. The associations serve a professional and social purpose.

Student publications

RIT students produce some of the most professional collegiate publications in the country. *Reporter* is published by students weekly, except during examinations and holidays, and serves as the student news magazine. It includes "The CalendaRIT," a listing of campus activities. *Reporter* has consistently won state and national awards. Such publications draw their talented staffs—artists, photographers, writers, managers and printers—from the entire student body.

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, the center of cocurricular activities, features the 500-seat Ingle Auditorium; a complete game room with billiards, foosball and electronic games; performing arts rehearsal space; a music practice room; a unisex hairstyling and tanning salon; a candy counter; two separate dining areas consisting of the main cafeteria and the RITskeller; meeting rooms and lounges. Offices housed in the Union also

include the Office of Student Ombudsman, Student Affairs, Office of Student Conduct and Mediation Services, Alumni Relations, the Center for Student Transition and Support (including Orientation, First-Year Experience, International Students, 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 a dedicated student area in the Student Alumni Union. The following resources can be found in the RITreat:
• Club and organization space
• Computers/typewriters/word processors/fax machine
• Stamp machine
• Office of the Student Ombudsman
• Student Government office
• Mail folders for SG clubs and organizations
• Off-Campus and Apartment Student Association
• Study tables/lounge area
• Center for Campus Life

Social Events

Major social events on the activities calendar include major concerts, Brick City Festival, the Stonehurst Regatta and a spring festival.

Other dances, parties, speakers and events are sponsored by organizations such as the College Activities Board, the Residence Hall Association, NTID Student Congress, Greek Council, the Black Awareness Coordinating Committee, the Off-Campus and Apartment Student Association and various special-interest clubs.

Coffeehouse entertainment is provided by the Center for Campus Life on Thursday evenings from 8 p.m. to 10 p.m. in The Grind (located in the Dining Commons).

Community Service Opportunities

RIT students are known for their volunteerism, generosity and skills. Come and join us for some fun! There are many opportunities to get involved with local social service agencies. Call the Student Volunteer Center at 716-475-7058 (voice/TTY) for details.

Cultural Spotlight Series

The Cultural Spotlight Series is sponsored by the Center for Campus Life, the College Activities Board 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, Rod Blumenau Jazz Trio, the Tibetan Monks, Ladysmith Black Mambazo, the Rochester Philharmonic with Jeff Tyzik, and the Rev. Hezekiah Walker and the Love Crusade Choir.

RIT 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 716-475-6087.

The performance of Rochester's Borinquen dancers highlights the Hispanic Heritage Celebration, one of many diverse campus events.

RIT Men's Octet

Selected through auditions, this is an ensemble of eight singers. Rehearsals for both on- and off-campus appearances are adjusted to fit ensemble members' schedules. For more information, call 716-475-6087.

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 716-475-6087.

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, 716-475-6650 (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 716-475-2014 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 and jazz rock will want to check out the Jazz Ensemble. The group performs quarterly on-campus concerts. For more information, call Campus Life, 716-475-6650 (voice/TTY).

RIT Timestompers

This popular ensemble performs many times each year and is geared to serve as a spirit organization while giving its members the widest possible experience in Dixieland and dance band styles. For more information, contact Robert Mowers, 716-475-7797, or stop by the Center for Campus Life, second floor of the RITreat in the Student Alumni Union.

RIT Dance Company

The company provides an opportunity for deaf and hearing students to work together in modern dance and ballet classes. Each year students and faculty create new pieces and present them in performance. For more information, call 716-475-6250 (voice/TTY).

Panara Theatre

Main Stage—Student and faculty produce major plays and performances each year. They feature deaf and hearing actors, dancers and technical staff.

  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 716-475-6250 (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, 716-475-6250 (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 716-475-2475 (voice/TTY).

Visiting Artists & 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 leadings artists and critics are included in the program, which deals with the issues of technology in art today. For more information, call 716-475-2646 (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 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

Contact Roberta DiNoto at 716-475-5176 (voice/TTY) or rxdhcc@rit.edu.

Kids on Campus programs

Kids on Campus provides a variety of academic and recreational summer programs to students entering first grade through high school. Programs are characterized by a dynamic, project-oriented approach to learning.

- "Lil" Kids on Campus: for youngsters entering grades 1 through 4
  Full-day program offered July through August
- Kids on Campus: for youngsters entering grades 5 through 8
  Full-day program offered during July
- Kaleidoscope: for high school students
  Independent academic workshops in a variety of content areas, offered throughout the summer

Kids on Campus programs are offered to all Rochester-area students. Call for information and registration material. Contact Susan Kurtz at 716-475-5987 or sfkldc@rit.edu.

Physical Education

Physical education courses are offered during all academic quarters, including summer. More than 60 courses are available during the year. Not all courses are offered every quarter. Registration for physical education classes coincides 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 classes are offered as selections in the Center for Human Performance. The university's physical education requirements are described on page 11 of this bulletin.

Wellness options

Total Fitness, Health: Mind-Body Connection and Sports Biology

Cardiovascular and strength activities

Aerobics, Aikido, Army Conditioning Drills, Cardio Kick Boxing, Introduction to Weight Training, Jogging, Karate, Kung Fu, Yoga and Red Barn Ropes

Recreation and sports activities

Archery, Backpacking (Outdoor Experiential Education), Badminton, Ballet, Ballroom Dance, Billiards, Bowling, Canoeing, Cross Country Skiing, Dance-Performance I & II, Diving, English Horseback, Fencing, Fishing, Frisbee, Golf, Hunting, Ice Fishing, Ice Skating, In-line Skating, Jazz Dance, Juggling, Kayaking, Racquetball, Rock Climbing, Scuba Diving, Self-Defense (women), Skeet & Trap, Skiing (downhill), Snow Boarding, Swimming, Tennis, and Western Horseback

Team activities

Basketball, Softball, Volleyball

Life support and safety programs

CPR, Lifeguarding, Water Safety Instruction

Support services for deaf and hard of hearing students in physical education and athletics

NTID's Physical Education and Athletics Support Team provides educational support services for deaf and hard of hearing students on intercollegiate teams and those involved in physical education classes and intramural activities. It also provides direct instruction in physical education courses and ongoing in-service instruction, both formal and informal, to physical education teachers and athletic coaches regarding deafness and deaf/hearing interaction. Other services include tutoring and supervising notetakers for Physical Education.

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's and women's teams, in basketball, volleyball, Softball, ice hockey, flag football, soccer, tennis and golf. Also offered is a program of individual activities in racquetball, table tennis and tennis.

Recreation

RIT offers some of the finest recreational facilities available in colleges today. Indoor facilities feature four gymnasiums, an ice rink, swimming pool, saunas, elevated indoor running track, racquetball courts, physical fitness and weight training center, dance studio, recreational equipment room, wrestling room, boxing room and game room (video games, billiards). Outdoor facilities include nine lighted tennis courts, archery range, nature trails, an all-weather track and numerous athletic fields. The equipment issue room provides towels, locks and quality equipment for recreation, intramurals and physical education instruction. The Center for Human Performance also provides nutritional counseling and personal trainer services throughout the year.

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 50 percent of its contests in the past decade. Some of the men's team accomplishments have come in soccer (11 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 four ECAC titles), basketball (ECAC crown in 1992-93 and the Chase Scholarship title in 1994-95 and 1996-97), and lacrosse (seven Empire Athletic Association crowns and an ECAC title).

Women's teams also have excelled. Volleyball boasts seven

Devoted to a resurging American hobby, members of the Model Railroad Club run their trains for hours during quarterly open houses. Students help run the exhibit in the club's headquarters in the Student Alumni Union.

straight EAA crowns and third place in the 1993 NCAAs. Women's softball is a perennial state contender. Women's tennis is 162-55-1 over the last 21 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 400 athletes take part in 23 varsity sports offered at RIT. Fall competition features men'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 and 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 athletic philosophies. Known as the Tigers, RIT teams are also members of the Eastern College Athletic Conference (ECAC), and New York State Women's Collegiate Athletic Association (NYSWCAA).

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) and Darrell Leslie 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 Physical Education/Intramurals. It's purpose is to provide extramural/intercollegiate competition for recognized club sports, although some are solely for recreational or instructional purposes. Participation is open to students carrying a minimum of 12 credit hours.

The following sports are offered: badminton, outing club, bowling, lacrosse (men), rugby (women, men), alpine skiing, volleyball (men), water polo club, field hockey, equestrian, and roller hockey.

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. Hours 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 716-475-2255 (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 716-475-3333 (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 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). 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. It consists of two selling floors and is divided into 11 departments selling everything from clothing to textbooks to computers. Store hours are Monday through Thursday, 8:30 a.m. to 8 p.m.; Friday, 8:30 a.m. to 4:30 p.m.; and on Saturday, 11 a.m. to 4 p.m. Store hours may change on holidays, during quarter breaks, and during summer quarter. For current information about hours and special sales, call 716-475-6033. You can also visit the Campus Connections Web site at http://finweb.rit.edu/bookstore.

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 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 11:30 p.m. and 3 a.m. Simply call the Campus Safety Department at 716-475-2853 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 (716-475-2853 or -6654 TTY). Campus Safety will locate the student and relay your 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 hearing-impaired 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.

Vehicle registration

All vehicles operated on the RIT campus must be registered with Campus Safety, and stickers must be properly displayed on the vehicle. Institute fines are imposed for operators in violation of Institute parking and traffic regulations.

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 that are held in accordance with New York State Education Laws), safety in the work place and Environmental Health.

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 (video presentation), personal safety, alcohol awareness/DWI ("Is It Worth the Risk?") and date/acquaintance rape.

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 716-475-7799. Services are also explained on the World Wide Web at http://www.rit.edu/~206www.

Sexual Assault Information Hotline

RIT's Sexual Assault Information Hotline provides counseling services to the RIT community as well as a confidential hotline for people who need to contact a counselor. The hotline number is 716-546-2777 (voice/TTY).

RIT provides a wide variety of security services and prevention programs to everyone in the campus community. Although each individual is ultimately responsible for his or her own personal safety, learning and practicing some basic precautions could 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 on campus 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 charter buses and vans for the use of student groups, clubs, and organizations. For more information, call the Campus Safety Transportation Office at 716-475-5879 (voice) or -2074 (TTY).

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 through 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 Use. A variety of computing resources is available at RIT, ranging from application-specific microcomputers 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.

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 the RTT'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 were 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 at left.) 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.

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.

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
Possession of alcohol • in residence halls and Greek houses regardless of age • under 21 years of age • possession of bulk alcohol	First offense: Disciplinary probation Second offense: Deferred disciplinary suspension/ deferred removal and possible referral for a chemical dependency screening Third offense: Disciplinary suspension or removal from housing with appropriate conditions
Behavior that suggests the excessive consumption of alcohol	First offense: Probable deferred disciplinary suspension/ deferred removal; possible referral to alternative educational sanction program; possible referral for a chemical dependency screening Second offense: Disciplinary suspension and/or removal from housing with appropriate conditions
Serious policy violations (including serving alcohol to minors, hazing events involving alcohol or dangerous behavior as a result of alcohol)	First offense: Probable disciplinary suspension and/or removal from housing with appropriate conditions
DWI on campus	First offense: Referral to local law enforcement agency and disciplinary suspension
Student organizational violations related to alcohol	First offense: Educational and/or community related sanctions; possible disciplinary suspension of organization and/or removal of recognition

These guidelines are examples of responses that will most likely result when there have been violations of the RTT 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 Judicial Affairs for verification.

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 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.

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	First Offense: Deferred disciplinary suspension; deferred removal or removal from RIT housing; possible referral for a chemical dependency screening; possible alternative education program Second Offense: Disciplinary suspension or dismissal; drug treatment while on suspension from the Institute
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 parentsÆegal guardians contact the Office of Judicial Affairs for verification.

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 Judicial 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. Judicial and appeals processes are administered through the Office of the Vice President for Student Affairs. 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 assistant to the vice president for judicial affairs.

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 the Vice President for Student Affairs.

Postsecondary Complaint Registry

Section 494C(j) of the Higher Education Act of 1965, as amended, provides that a student, faculty member or any other person who believes he or she has been aggrieved by an institution of higher education has the right to file a written complaint.

In New York State, a complaint may be filed by any person with reason to believe that an institution has acted contrary to its published standards or that conditions at the institution appear to jeopardize the quality of the institution's instructional programs or the general welfare of its students. Any person who believes he or she has been aggrieved by an institution on or after May 4, 1994, may file a written complaint with the Department of Education within three years of the alleged incident.

Complaint resolution

Some complaints may fall within the jurisdiction of an agency or organization other than the State Education Department. These complaints will be referred to the entity with appropriate jurisdiction. When a complaint concerns a matter that falls solely within the jurisdiction of the institution of higher education, the complainant will be notified, and the department will refer the complaint to the institution in question and request that the matter receive a review and response.

Upon conclusion of the department's complaint review or upon a disposition of the complaint by referral to another agency or organization, or to the institution of higher education, the department will issue a written notice to the complainant describing the resolution of the complaint. The complainant may contact the department evaluator directly for follow-up information or for additional assistance.

Admission to Undergraduate Study

dmission 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 though 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 supporting documents by December 15 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 15 will receive admission notification by March 15. Applications received after February 15 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. 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 posteducational 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 your offer of admission.
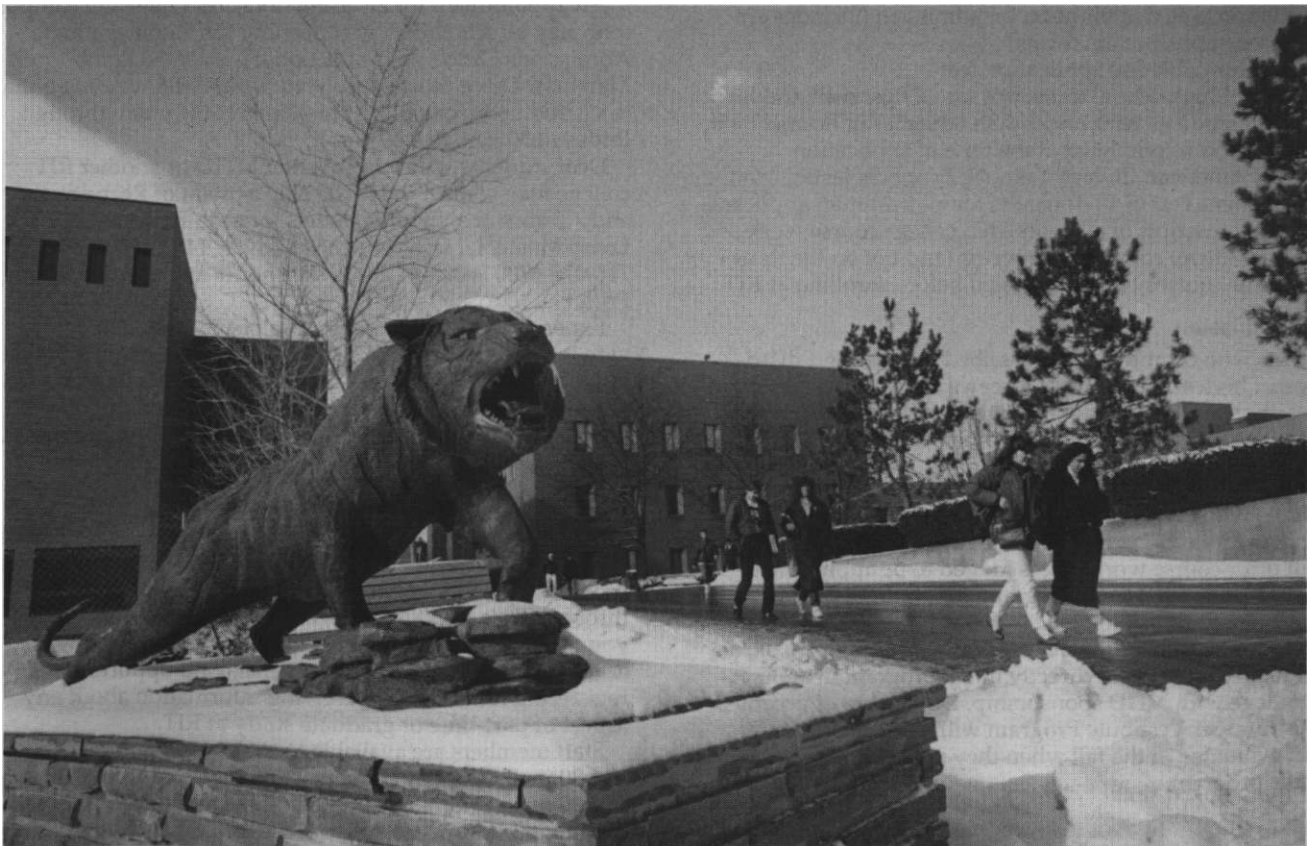
Winter on campus

Applying to NTID

All applications for admission to RIT's National Technical Institute for the Deaf are reviewed, and admissions notification is sent out two weeks after all application materials have been provided to NTID's Department of Recruitment and Admissions. There is no Early Decision Plan for admission to NTID.

NTID freshman applicants should submit their applications in the fall of the year before they wish to enroll. The date of application is the date the application for undergraduate admission has been received by NTID's Department of Recruitment and Admissions. The NTID admission year is October 1 through June 30 for applicants seeking fall quarter admission. Applications are also accepted for winter and spring quarters (see Institute calendar, inside front cover). NTID requires a $200 deposit from accepted students.

Students applying for freshman admission to RIT through NTID must complete both the standard RIT application and the NTID supplemental application forms available from NTID's Department of Recruitment and Admissions. If deaf students want to enroll directly in one of RIT's other six colleges, they still must complete all application forms as noted above. In addition to fulfilling NTID's audiological requirements, students must also fulfill requirements for admission to the selected program. Additional instructions for completing the application are included in the application packet.

Deaf international students are welcome to apply for admission to NTID. Because space is very limited, international students should plan to submit their application and all supporting documents before January 15. Specific instructions for completing the application process are included in the international student application packet. Applicants should be sure to read the instructions carefully before applying.

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 $40 application fee
3. an official high-school transcript for all freshmen 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.

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 the Early Admission Program.

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 RlT program. Usually a grade of C or better is required for a course to transfer.

Deaf 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.

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 716-475-5780 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 immunisations 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 clarifying or reexamining personal and career goals.

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 716-475-6631 (Monday through Friday, 8:30 a.m. to 4:30 p.m.).

Deaf students who wish to enter NTID or another RIT college may contact the NTID Department of Recruitment and Admissions, Lyndon Baines Johnson Building, 52 Lomb Memorial Drive, Rochester, N.Y. 14623-5604, or call 716-475-6700 (voice/TTY). Office hours are Monday through Friday, 8:30 to 4:30 p.m.

Experienced admissions counselors are available to provide information and assist students in exploring academic options. Campus visits are welcomed and encouraged. Students may choose to participate in Admissions Open House programs or arrange personal interviews and campus tours. These options are not required for admission.

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 6:30 p.m., Monday through Thursday, and from 8:30 a.m. to 4:30 p.m., Friday. We invite you to call 716-475-2229 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	**Computer Science:** Computer Science, Software Engineering	Algebra, Geometry and Trigonometry required. Biology, Chemistry **or** Physics required for Computer Science. Chemistry and Physics required for Software Engineering.
	Engineering Technology: Civil, Computer, Electrical, Electrical/Mechanical, Computer Integrated, Manufacturing, Mechanical, and Telecommunications Engineering Technology programs; Undeclared Option[2]	Algebra, Geometry, Trigonometry, and Physics or Chemistry required. Technology courses desirable.
	Environmental Management: Environmental Management and Technology, Safety Technology	Three years of Mathematics, including Trigonometry, and Chemistry or Physics.
	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 and at least one year of Science. Chemistry required for Nutrition Management program.
	Information Technology: Information Technology, New Media/Information Technology	Algebra and Geometry required. Technology courses desirable.
	Multidisciplinary Studies: Applied Arts and Science	Freshmen should apply to Career Decision Program in the College of Liberal Arts.
	Packaging Science: Management, Technical and Printing Options	Algebra and one year Science required. Technical option also requires Geometry and Trigonometry.
Business	Accounting, Finance, International Business, Management, Management Information Systems, Marketing, Photographic Marketing Management, Undeclared Business Option[2]	College preparatory program including Algebra and at least one year of Science. Courses emphasizing writing skills also desirable.
Engineering	Computer, Computer/Software, Electrical, Electrical/Computer, Industrial, Industrial/Ergonomics, Industrial/Manufacturing, Mechanical, Mechanical/Aerospace, Mechanical/Automotive, Microelectronic and Software Engineering programs; Undeclared Engineering Option[2]	Algebra, Geometry, Trigonometry, Physics and Chemistry required. Calculus desirable.
Imaging Arts and Sciences	**School of Art:** Fine Arts Studio, Illustration, Medical Illustration, Undeclared Option[2] **School of Design:** Graphic Design, Industrial Design, Interior Design, New Media/Design, Undeclared Option[2] **School for American Crafts:** Ceramics/Ceramic Sculpture, Glass/Glass Sculpture, Metals/Jewelry Design, Woodworking/Furniture Design, Undeclared Option[2]	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 Film and Animation: Film/Video/Animation	College preparatory program including two years of Mathematics and one year of Science.
	School of Photographic Arts and Sciences: Advertising Photography, Fine Art Photography, Photojournalism, Biomedical Photographic Communications, Imaging and Photographic Technology	College preparatory program including two years of Mathematics (one year for Fine Art Photography) and one year of Science. Biology required for Biomedical Photographic Communications.
	School of Printing Management and Sciences: Graphic Communications, New Media/Publishing, Newspaper Management	Algebra, Trigonometry and one year Science (Physics or Chemistry preferred).
	Printing and Applied Computer Science	Algebra, Geometry, Trigonometry; Chemistry or Physics.
Liberal Arts	Career Decision Program,[3] Criminal Justice, Economics, Professional and Technical Communication, Psychology, Social Work	College preparatory program including minimum two years Mathematics and one year Science required. Strong performance in English and Social Studies courses also expected.
NTID	Applied Accounting, Applied Art and Computer Graphics, Applied Computer Technology, Business Technology, Computer Integrated Machining Technology, Digital Imaging and Publishing Technology, Healthcare Billing and Coding Technology, Imaging Technology. Industrial Drafting Technology, Office Technology, Ophthalmic/Optical Finishing Technology, Educational Interpreting	Refer to application packet for NTID admission requirements. Deaf and hard-of-hearing students may also apply for freshman or transfer admission to other RIT colleges through NTID.
Science	Applied Mathematics, Applied Statistics, Computational Mathematics	Algebra, Geometry, Trigonometry and one year of Science.
	Biology, Biotechnology	Algebra, Geometry, Trigonometry, Biology and Chemistry.
	Biochemistry, Chemistry. Environmental Chemistry, Polymer Chemistry	Algebra, Geometry, Trigonometry and Chemistry.
	Environmental Science	Algebra, Geometry, Trigonometry, Biology and Chemistry.
	Physics	Algebra, Geometry, Trigonometry; Chemistry or Physics.
	Biomedical Computing, Diagnostic Medical Sonography (Ultrasound), Medical Technology, Nuclear Medicine Technology, Physician Assistant	Algebra, Geometry, Trigonometry and Biology required for all programs. Chemistry or Physics recommended for Biomedical Computing, Nuclear Medicine Technology and Ultrasound programs. Chemistry required for Physician Assistant program.
	Undeclared Science Option,[2] Premedical Studies Predentistry, Preveterinary, Preoptometry[4]	Algebra, Geometry, Trigonometry, Biology, Chemistry and Physics are recommended.
	Center for Imaging Science: Imaging Science	Algebra, Geometry, Trigonometry, and Chemistry 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. Students receive special advising and complete a one-credit seminar covering the full range of academic programs offered at RIT.

4 Students interested in premedicine, predentistry, preveterinary, preoptometry may select any major in the College of Science. An adviser will help you select the appropriate work and counsel you on applying to professional schools.

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	**Computer Science:** Computer Science Software Engineering	1	Fall preferred	Computer Science Engineering Science	Courses in computer science, calculus, liberal arts; calculus-based physics, chemistry or biology
	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
	Computer Integrated Manufacturing	1	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 Adminis-tration; Liberal Arts with math/science	Math through Calculus i, micro and macro economics, introductory courses in biology, chemistry and physics
	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.
	Information Technology: Information Technology New Media/Information Technology	1	Any quarter	Computer Applications, Computer Science	Courses in programming, computer applications, calculus, lab sciences, liberal arts
	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 International Business Management Marketing Photographic Marketing Management	1	Any quarter	AS degree in Business Administration or Liberal Arts	Courses in economics, liberal arts, science and mathematics
	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
"engineering	Computer Engineering Electrical Engineering Electrical/Computer Option Industrial Engineering Mechanical Engineering Mechanical/Aerospace Option Mechanical/Automotive Option Microelectronic Engineering Software Engineering	1	Fall preferred	AS degree in Engineering Science (plus computer science electives for computer engineering and software engineering applicants)	Pre-engineering courses such as calculus, calculus-based physics, chemistry and liberal arts. Computer science courses for computer engineering and software engineering applicants.
	Transfer Adjustment: Electrical Engineering only		Summer only	AAS degree in Electrical Technology with one year of engineering calculus	
Imaging Arts and Sciences	**School of Art:** Fine Arts Studio Illustration Medical Illustration **School of Design:** Graphic Design Industrial Design Interior Design New Media/Design & Imaging	4	Fall only	Related programs or studio art experience in desired disciplines. A portfolio of original artwork is required to determine admissions, 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.
	Transfer Adjustment: All Art and Design programs		Summer only	Summer courses can lead to third-year status in most programs.	
	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.

[1] *Cooperative Education: 1-required, 2-optional, 3-internship or practicum required, 4-no specific requirement*

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 of Film and Animation:** Film/Video/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	4	Fall preferred	Applied Photography. Portfolio required for photo credit.	**Courses in liberal arts, photography, design and art history. Portfolio required for photo credit.**
	Transfer adjustment: Available in all photography programs		Summer only	Transfer adjustment leading to second- or third-year status In most programs	
	School of Printing Management and Sciences: Graphic Communications New Media/Publishing Newspaper Operations Management	1	No summer entry	Transfer from associate degree programs considered on an individual basis.	Courses in liberal arts, college math, physics and chemistry, business management and graphic arts
	Printing and Applied Computer Science	1	No summer entry	Computer Science; transfer from other associate degree programs considered.	Courses in chemistry, physics, calculus, computer science and liberal arts
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
	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.
	Social Work	3	Any quarter	Human Services or Liberal Arts with Human Services minor.	Courses in liberal arts, math and science.
NTID*	Applied Accounting, Applied Art and Computer Graphics, Applied Computer Technology, Business Technology, Computer Integrated Machining Technology, Digital Imaging and Publishing Technology, Healthcare Billing and Coding Technology, Imaging Technology Office Technology, Ophthalmic/Optical Finishing Technology, Educational Interpreting			Transfer requirements vary by program. Please contact NTID Department of Recruitment and Admissions, 716-475-6700 (voice/TTY)	Transfer requirements vary by program.
Science[3]	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.
	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.
	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.
	Physics	2	Fall preferred	Liberal Arts with math/science option	Liberal arts, physics, math, chemistry.
	Medical Technology	3	Fall preferred	Medical Laboratory Technology; Liberal Arts with biology option	Courses in liberal arts, sciences and math.
	Nuclear Medicine Technology Diagnostic Medical Sonography	3	Fall preferred	Liberal Arts with science option; Allied Health; Radiologic Technology	Courses in liberal arts, sciences, and math.
	Physician Assistant	3	Fall only	Liberal Arts with science option; Allied Health areas	Courses In liberal arts, sciences and math.
	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 Recruitment and Admissions, 716-475-6700 (voicefTTY).
³ Students interested in premedicine, predentistiy 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. Payment sent by mail should be made by check, payable to Rochester Institute of Technology. Due dates for the 2000-01 school year are as follows:

Fall quarter	August 23, 2000
Winter quarter	November 22, 2000
Spring quarter	February 28, 2001
Summer quarter	May 23, 2001

Students who have not participated in the early registration process for the quarter will be expected to make payment or the appropriate payment arrangements of the quarterly charges (tuition, fees, room and board) at the time of registration. Students may pay the quarterly charges in a single payment at registration or by the partial payment plan. Partial payments are due twice per quarter: 50 percent (plus a $25 processing fee) at registration and the remainder by the end of the fourth week of classes.

Students whose college costs are paid by the G.I. Benefit Plan or their employer are required to submit the properly authorized deferment form. Quarterly bills will be mailed to the student's permanent address.

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 plan and company deferred payment plan.

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; 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.

Other fees

In addition to the fees specified below, certain groups of students may incur other fees, as follows:

Orientation fee	$60
(one-time charge for new students)	
Quarterly photo facilities fee	$98

(charged to all full-time photo students; $49 per quarter charged to all part-time photo students)

FEE SCHEDULE 2000-01 (MATRICULATED DAY COLLEGE STUDENTS EXCEPT NTID) *

	Per Quarter	Per Year— 3 Quarters
Tuition		
Full-time Undergraduate (12-18 Credit Hrs.)	$5,978	$17,934
Part-time Undergraduate (Less than 12 Credit Hrs.)	429/Cr. Hr.	429/Cr.Hr.
Student Activities Fee (Mandatory Charge)		
Full-time Undergraduate	51	153
Part-time Undergraduate	24	72
Student Health Fee (Mandatory Charge)		
Full-time Undergraduate	55	165
Residence Hall Room Charges †		
Double Occupancy	1,306	3,918
Single Occupancy	1,503	4,509
Board/Meal Plans ‡		
20-Meal Plan(Debit account optional)	1,056	3,168
Any 14 Plus (Includes $60 debit per qtr.)	1,026	3,078
Any 12 Plus (Includes $100 debit per qtr.)	1,026	3,078
Any 10 Plus (Includes $140 debit per qtr.)	1,026	3,078
Any 7/3 Plus (Includes $140 debit per qtr.)	1,026	3,078

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* *See pages 137,138.*
† *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 RTT Food Service upon request.

Costs for books and supplies

These costs vary widely 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 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 sickness insurance plan

All full-time day college undergraduate students are automatically enrolled in the RIT-offered student insurance plan each year. The insurance charge appears on student accounts as soon as they reach full-time status each academic year (co-op is considered full time). A prorated charge appears if full-time status is first achieved in winter, spring or summer quarters. Students may waive enrollment if they are covered by another medical insurance plan.

Monthly payment plan

For the 2000-01 academic year, RIT will offer a monthly payment plan. This combines the elements of a prepayment and deferred payment plan. For further information, contact the Bursar's Office at 716-475-6186.

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 716-475-2080 (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. 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. Registration and billing procedures are published each quarter in the "Schedule of Courses." Due dates for the 2000-01 school year are as follows:

Fall quarter	**August 23, 2000**
Winter quarter	**November 22, 2000**
Spring quarter	**February 28, 2001**
Summer quarter	**May 23, 2001**

FEE SCHEDULE (Matriculated Evening Division students)

Tuition—Undergraduate

Upper level   **$283/Credit Hour**
(Courses in 400, 500, 600 series)
Lower level   **$258/Credit Hour**
(Courses in 100, 200, 300 series)

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:

During official drop/add period (first six days of classes)—100 percent tuition reduction

From the end of the official drop/add period through the end of the second week of classes—70 percent tuition reduction

During the third week of classes—60 percent tuition reduction

During the fourth week of classes—50 percent tuition reduction

During the fifth week of classes—25 percent tuition reduction

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 B. Schonblom, bursar.

Room and board*

To complete a withdrawal from RIT, a resident student or a nonresident student on a meal plan must check out with the Center for Residence Life and 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

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.

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.

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 1999-2000, approximately 70 percent of our full-time undergraduate students received financial aid awards from RIT. These students qualified for over $100 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 four-year 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 and the ability to demonstrate financial need.

Financial need is the difference between the cost of an education and the amount that a student and his or her family can afford to pay toward meeting that cost. Financial aid programs are designed to supplement family contributions. Attending college with assistance does not limit the student to a less expensive school that might not offer a program reflecting his or her educational interests.

A student's financial need is determined by analysis of the Free Application for Federal Student Aid (FAFSA). The FAFSA is available through high school guidance offices or college financial aid offices. Continuing students may obtain the required form from the Office of Financial Aid.

The process of applying for aid should begin during the month of January in the the year the student wishes to enroll. In order to receive full consideration, it is important that freshman applicants file the FAFSA by March 1, RIT's priority deadline. The priority deadline for the FAFSA for transfer applicants is March 15. The priority deadline for continuing students to file both the FAFSA and the RIT aid

application (required for continuing students only) is April 1. Applications filed after these dates will receive consideration as long as funds remain available.

To be awarded financial aid, individuals must be admitted as matriculated students. Most financial aid programs require at least half-time enrollment. Students must reapply for aid each year by completing the FAFSA. Every effort is made to continue financial assistance to students each year, provided they remain in good academic standing and maintain satisfactory progress, file the required applications by the recommended deadline and demonstrate continued financial need.

First-year and transfer students may expect notification of financial aid awards beginning in March; returning upperclass students may expect award notification beginning in June.

Students are encouraged to apply for financial aid. Students and their families should not try to decide by themselves if they qualify; that decision should be left to the Office of Financial Aid and other agencies to which students have applied. Denial of aid from one or more sources does not necessarily mean that students will be denied aid by all sources. Students are urged to pursue all available sources of financial aid.

Types of aid

At RIT there are five general categories of financial aid: scholarships, grants, entitlements, 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 and financial need. 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. Presidential scholarships and Quality Cup awards are made 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. 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 $100 to $13,000 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 Assistance Program (TAP) are additional examples of grants. Many other states offer state grants, as well.

- Entitlements are a special type of grant. They are funded by state and federal governments. Eligibility for entitlements can be based on special characteristics of a recipient. Examples of entitlements based on special student qualifications are the G.I. Bill and vocational rehabilitation benefits. Entitlements need not be repaid.

- 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 colleges 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 this 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 some special loan programs to assist families in meeting educational expenses. RIT loan plans 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 4,000 students are employed on campus each year. The Student Employment Office also helped 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 deaf 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.

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 with no interest or finance charges. Participating families make their first payment by July 1 preceding the academic year in which it would be utilized. Fixed costs include: tuition, fees, residence hall charges and RIT meal plans. Dormitory residents must contract for a meal plan. Rental charges incurred for RIT apartments or with private landlords cannot be financed through the plan. 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 four years (12 academic quarters) of undergraduate education. Cost for the plan is established each year but is generally less than four years of 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 716-475-2080 (voice/TTY) or 716-475-5489 (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 341 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 341, TAP recipients must:

Complete 6 credits per quarter to receive TAP payments 2 to 4

Complete 9 credits per quarter to receive TAP payments 5 to 7

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. Accordingly, waivers are normally granted for the reasons listed below. 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 also may 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 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 every three academic quarters as detailed below:

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 below 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 2000-01 chart 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.

Academic Progress Requirements for RIT Financial Aid

Full-time students receiving RIT-sponsored grants and scholarships are expected to complete a sufficient number of academic credits during each quarter of enrollment to complete their baccalaureate degree requirements within a maximum of 14 academic quarters. The 14-quarter limit may be appealed. Quarters in which a student is enrolled in cooperative education and not receiving RIT-funded grants and scholarships are not counted towards the 14-academic-quarter limit.

Eligibility for RIT-sponsored grants and scholarships also requires that a student maintain a satisfactory cumulative grade point average. The minimum cumulative grade point averages used for RIT grant and scholarship eligibility are the same as those used for federal aid programs. Academic progress is reviewed at the end of spring quarter each year.

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

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 May 2000*

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 (18 academic quarters maximum) and RIT-sponsored awards (14 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 calculates 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 90 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:

Scholarship		*Percent*	*Returned*	*Remaining*
Scholarship Plus	*=*	*to Scholarship*	*X*	*Credit*
Student		*Program*		*Balance*
Payments				

UNDERGRADUATE FINANCIAL AID PROGRAMS 2000-01*

RIT FINANCIAL AID	WHO IS ELIGIBLE ?	CRITERIA FOR SELECTION	HOW MUCH? [+]	HOW AND WHEN TO APPLY
RIT Alumni Scholarships and RIT Grants	Full-time students who demonstrate financial need	Awards based on academic record and financial need.	Amounts vary depending on student's financial need.	File Federal FAFSA by priority deadline. ‡
Presidential Scholarships Quality Cup 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 $8,000 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, Hispanic 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 Federal 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.	**$2,000 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 Federal FAFSA by priority deadline.
RIT Nathaniel Rochester Society (NRS) Scholarships	Awarded to RIT upperclassmen with high academic achievement.	Winners selected from second-year students enrolled full-time who have completed minimum 60 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.	Contact NRS Scholarship Committee through Dean's Office in each RIT college. 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. Renewable.	Provide all required admissions credentials by: March 1 for summer/fall entry; October 1 for winter entry; January 1 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 Federal FAFSA by priority deadline.
RIT-N.Y. 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 716-475-2221.	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 full-tuition three- or four-year scholarships prior to enrollment.	Award amount may be affected by Pell Grant and other scholarships.	Varies up to value of a double room and standard meal plan.	File Federal FAFSA by priority deadline.
RIT/ROTC Grant Subsidy	Holders of certain Air Force or Army scholarships. Awarded prior to enrollment.	Air Force ROTC Type II or cadets normally qualify.	Normally $5,000. Type VlII or Army Tier I	File Federal 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 or nonmatriculated students registered for 1-11 credits each term in an undergraduate program.	Need considered, but no fixed income maximum.	Amounts vary.	File Federal FAFSA by priority deadline.
Aid for Part-time Studies (N.Y. 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.

*   *Information is correct as of May 2000*
†   *Scholarship amounts indicated are based on RIT tuition rates. Awards may be prorated for NTID-sponsored students.*
‡   *Priority deadline is March 1 for entering freshmen, March 15 for entering transfer students, and April 1 for continuing 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 $3,300, depending on the cost of attendance and the amount of money appropriated in the federal budget.	Must file the Free Application for Federal Student Aid. 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.	Must file the Free Application for Federal Student Aid (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)	File the Free Application for Federal Student Aid (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 $5.42/hour.	File the Free Application for Federal Student Aid (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, but accumulate interest during periods of enrollment.	An expected family contribution that qualifies the student for an award, as determined by a system approved 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.	Must file the Free Application for Federal Student Aid form 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. FAFSA is not required.	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, 716-475-2881; Air Force ROTC, 716-475-5196; Navy ROTC, 716-275-4275.
Veterans Administration	Eligible veterans and children of deceased veterans or service-connected disabled veterans.	Contact any regional Veterans Administration Office for information, details and forms.	Varies.	Contact any regional 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.

STATE OF NEW YORK FINANCIAL AID PROGRAMS	WHO IS ELIGIBLE ?	CRITERIA FOR SELECTION	HOW MUCH ?	HOW AND WHEN TO APPLY
Tuition Assistance Program (TAP) (Income levels and award amounts listed apply to 2000-01 first-time recipients only. TAP award amounts are dependent upon action in the 2000-01 State Budget.)	U.S. citizen or permanent resident and also N.Y. State resident enrolled (matriculated) for 12 credits or more in degree program; cannot be in default on any guaranteed education loan. Must attend N.Y. State college or school.	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 $275 to $5,000 per year for dependent undergraduates or independent students with dependents. Single independent students' (without dependents) awards range from $425-$3,025.	In addition to the FAFSA, you must file a N.Y. 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
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 (N.Y State Div. 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 1,2001, deadline for 2000-01.
Memorial Scholarships for Children and Spouses of Deceased Police Officers and Firefighters	Child or spouse of person who died in service.	Must meet eligibility requirements. Must submit documentation supporting eligibility as noted in special supplement.	Award amounts are based on tuition and nontuition costs of attendance. In combination with certain other state and federal grants, may equal the average cost of attendance at the State University of N.Y.	Same as TAP above. In addition, file the appropriate award supplement, available on request from NYSHESC. May 1,2001, deadline for 2000-01 awards.
Aid to Native Americans	Member on the official tribal roll of a N.Y. State tribe or child of a member.	Must provide documentation.	Up to $775 per year for a maximum of four years or five years in certain programs.	Contact: Native American Indian Education Unit, N. Y. State Education Dept., Education Building 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 filling for TAP and Pell grants may receive up to maximum minus any TAP awarded.	Awards are $2,000 per year for full-time study or $1,000 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 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. N.Y. State Education Dept., Education Bldg. Annex, Rm. 1071, Albany, NY 12234,518486-1319.
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: N.Y. 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 for the first academic year only. 310 awards statewide (10 to each of 31 Congressional Districts).	Contact: Bureau of HEOP/VATEA Scholarships. N.Y. State Education Dept., Education Bldg. Annex, Rm. 1071, Albany, NY 12234,518-486-1319.

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
Max Adler Scholarship
Agfa Creative Alliance
Alcom Printing Scholarship
George Alden Scholarship Fund
Mary R. Alexander Scholarship
Fanny Knapp Allen Scholarship
Ailing & Cory Scholarship
Altier & Sons Scholarship
Amzalek Ames Scholarship
Avis Mason Andrews Graduate Scholarship
Robert Anderson Scholarship
Betsy L. Andrews Scholarship
Clara L. Andrews Scholarship
Ezra R. Andrews Scholarship
Kate Rider Andrews Scholarship
Randall Andrews Scholarship
Howard Applegate Scholarship
Lee Augustine Memorial Scholarship
Avanti-Case Hoyt
Ralph Avery Scholarship
David Baldwin Scholarship
Thomas Ward Ball Scholarship
George & Theresa Barlow Endowed Scholarship
Bausch & Lomb Scholarship
John Bausch Scholarship
Clarence & Birdice Beal Scholarship
Alice Beardsley Scholarship
Bennett Award
Ruth L. Bernhardt Scholarship
Fanny R. Bigelow Scholarship
Roscoe Bills Scholarship
Helen & Frederick Blaessig Memorial Scholarship
Harriet Blickwede Scholarship
Bogen Corporation Scholarship
Bonadio/Insero Corporation Scholarship
Austin Bonis Scholarship
Boston Litho Club Scholarship
Donald Boyce Scholarship
Farid Bozorgi Scholarship
Braverman Scholarship
Joseph Briggs Endowed Scholarship
Chester W. Brink Scholarship
Stephen Briody Scholarship
Harold Brodie Scholarship
Brooks Printing Scholarship
Steffan Brown Scholarship
Nettie Bullis Scholarship
Business Alumni Scholarship
Orilla Butts Scholarship

Harold Cadmus Memorial Scholarship
Deborah Cahn Memorial Scholarship
Caldwell Manufacturing Scholarship
Richard Capilla Scholarship
Chester Carlson Scholarship
Howard F. Carver Scholarship
Melbert Cary Scholarship
Howard T. Case Scholarship
Theodore Chapman Scholarship
John and Ruth Christie Scholarship
Citi Corp Citibank Scholarship
Adele Hathaway Clark Scholarship
Florence Clark Scholarship
H. E. Clark Scholarship
Class of '69 Scholarship
Albert G. Coenen Scholarship
Eugene Colby Scholarship
Wells Coleman Scholarship
Coleman Corporation Scholarship
Ward D. Collister Scholarship
Computer Consoles Scholarship
Comstock Foundation Scholarship
Consolidated Paper Award
Continental Corporation Scholarship
Continental Insurance Co. Scholarship
Lillian Cowin Scholarship
Cray Foundation Scholarship
Walter Crighton Scholarship
Alvin Cronig Scholarship
Bryon Culver Scholarship
Curtice Burns Scholarship
Alfred L. Davis International Student Scholarship
Alfred L. & Ruby C. Davis Continuing Education Scholarship
Alfred L. & Ruby C. Davis Leadership Award
Nancy J. Davis Scholarship
De Ridder Corporation Scholarship
Ronald Dodge Engineering Scholarship
Ronald Dodge NTID Scholarship
Joseph Dyer Scholarship
ECI Systems and Engineering
Eberly Family Scholarship
Eisenhart Memorial Scholarship
Ellingson Foundation Scholarship
Isabel & Benjamin Emerson Scholarship
Fred Emerson Foundation Scholarship
Raymond Englert Scholarship
Engineering Women of Rochester Scholarship
Gerald Ephraim Scholarship
Eyer Foundation Scholarship
Max Factor Scholarship
John Doane Fay Scholarship
Rose and George Feigenbaum Scholarship
William & Mildred Feinbloom Scholarship
Ruth H. Fenyvessy Scholarship
Fisons Corporation Scholarship
Flora J. Foley Scholarship
Food/Hotel/Tourism Hospitality Foundation Scholarship
Maurice & Maxine Forman Scholarship
Ron Francis Scholarship
Freedom Forum Scholarship

R. T. French Scholarship
Richard A. Freund Scholarship
Dr. Robert Frisina Award
Karl Fuchs Scholarship
Fuji Corporation Scholarship
Garlinghouse Scholarship
Gegeheimer/McClure Scholarship
Frank Geist Scholarship
General Motors Scholarship
Sarah Margaret Gillam Scholarship
Jean Gillings Scholarship
Gitner Family Scholarship
E. B. Gleason Scholarship
Kate Gleason Scholarship
Arthur King Goldsmith Scholarship
Good Samaritan Association Scholarship
Allen and Gloria Gopen Scholarship
Isaac Gordon Scholarship
Gould Pumps Inc. Award
Graflex Scholarship
Phillip L. Graham Scholarship
Graphic Arts Technical Foundation
Graphic Controls Scholarship
Gravure Foundation Scholarship
Hakes Assoc. Scholarship
Edward Hableib Scholarship
Ezra Hale Scholarship
William B. Hale Scholarship
Mildred F. Hall Scholarship
Sil Hall Scholarship
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 R. Hearst Scholarship
Heidelberg/Harris "Printers Hall of Fame"
Sol Heumann Scholarship
John & Catherine Hill Scholarship
Laura Church Hillman Scholarship
Hiroo Sato Memorial Scholarship
Hoffend Scholarship Fund
Hogadone & Larwood Scholarship
Charles C. Horn Scholarship
Frank Horton Scholarships
F. R. Huberlie Memorial Scholarship
Jerry Hughes Scholarship
Arthur Ingle Scholarship
Louis & Sylvia Jackson Scholarship
Jack Jenkins Endowment Scholarship Fund
Lucille R. Jennings Scholarship
Jephson Trust Scholarship
Leo Joachim Scholarship
Helen Lucille Jones Memorial Scholarship
John Wiley Jones International Scholarship
Michael Jones Memorial Scholarship
Abraham & Teresa Katz Scholarship
Henry & Mary Kearse Memorial Fund
Stephen J. Kersting Memorial Scholarship
Paul Kessler Printing Award
Katherine Keyes Scholarship
Drew and Francis King Scholarship

David Klieman Scholarship
Koberl Design Excellence Award
Lowell Koenig Scholarship
E. M. Kohler Scholarship
Jack Kronenbert Scholarship
Sara L. Kuhnert Scholarship
Lancer Graphics Scholarship
Francis Lang Scholarship
Lawyer's Cooperative Publishing
    Scholarship
Lehigh Press Scholarship
Chester H. Lehmann Scholarship
Abe Lincoln Scholarship
Milton Loder Memorial
Lomb Citizen Soldier Scholarship
Lomb People Scholarship
Los Angeles Times Mirror Scholarship
Eugene M. Lowenthal Jr. Memorial
    Scholarship
Max Lowenthal Memorial Scholarship
Patrick T. Lynch Memorial Scholarship
Mack Printing Scholarship
Lois C. Macy Scholarship
Magazine Publishers Scholarship
Jack & Judy Maltby Scholarship
Donald Margolis Scholarship
William Mariner Scholarship
Clara Martin Scholarship
John Mclntee Scholarship
Mcintosh Education Fund
Dean McWhirter Memorial Scholarship
M/E Engineering Scholarship
Alice Melnyk Scholarship
Bernadette Merkel Memorial
    Scholarship
Mengel, Metzger & Barr Scholarship
Manufacturers Hanover Scholarship
Marine Midland Fellowship
Norman Miles Scholarship
Barbara Milliman Scholarship
Abraham & Sadie Milstein Scholarship
Mobil Corporation Scholarship
Bernice Skinner Morecock Scholarship
Earl Morecock Scholarship
Clifford Waite Morgan Scholarship
Catherine Morse Scholarship
Moscom Corporation 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 Architect/Tech Award
NTID Business Careers Scholarship
NTID Endowed Scholarship
NTID Performing Arts Scholarship
NTID Printing Production Scholarship
NTID Science/Engineering Scholarship
NTID Visual Communication
    Scholarship
Northern New Jersey Printing House
    Craftsmen
Florence Ohringer Art Scholarship
Milton & Ray Ohringer NTID
    Scholarship

John Olowosoyo Scholarship
Robert Panara Scholarship
Barbara Paul Memorial Scholarship
William Farley Peck Scholarship
Martha Perry Scholarship
David J. Phelan Scholarship
Philips ECG Inc. Scholarship
Edward A. Pike Scholarship
A. C. Powers Memorial Scholarship
Praxis Biologies Scholarship
David Presco Scholarship
Pulver Endowed NTID Scholarship
Queens Group Scholarship
Radisson Scholarship
Redcom Scholarship
Bill Reedy Memorial Scholarship
Russell Reilly Scholarship
R. Bruce Reinecker Scholarship
Jack Renfro Scholarship
Rexham Scholarship
Edward J. Ries Memorial Scholarship
RIT Greek Organization Scholarship
RIT International Student Association
RIT Women's Club Scholarship
RIT Women's Council NTID
    Scholarship
Frank Ritter Memorial Scholarship
Robbins & Meyers Scholarship
Archibald & Mary Robinson
    Scholarship
Rochester Community Savings Bank
    Scholarship
Rochester Sales & Marketing Executives
    Scholarship
Rochester Telephone Scholarship
Rock-Tenn Packaging Scholarship
Albert F. Rogers Scholarship
Roosevelt Paper Scholarship
Robert Root Award
Willis Jennings Rose Scholarship
Rebecca Rosenberg Scholarship
Laura Bradford Russell Scholarship
David & Fannie Rutty Memorial
    Scholarship
Stuart L. Saikkonen Memorial
    Scholarship
Sakurai USA Scholarship
Esther G. Sanders Scholarship
Nelson & Celeste Sanford Memorial
    Scholarship
Elizabeth Sargent Scholarship
Ryoichi Sasakawa Scholarship
Paul & Katherine Schmidt Scholarship
Charles W. Schmitt Scholarship
Kilian & Caroline Schmitt International
    Scholarship
William J. Schmitt Memorial
    Scholarship
Ruth S. Schumacher Fund
Marlene E. Scott Memorial Scholarship
Scripps-Howard Scholarships
Wilfrid and Isabel Searjeant Scholarship
Eric Senna Scholarship
Sarah Shelton Scholarship
Igor Shot Scholarship
F. Ritter Shumway Scholarship
S. Richard Silverman International
    Scholarship
Fred Simmons Scholarship
Louis & Nellie Skalny Scholarship

Steven Skrynski Scholarship
Susan Smigel International Student
    Scholarship
Harry Speck Scholarship
Karl Sperber Scholarship
Sprint Company Scholarship
Alfred L. Stern Fund
Stouffer Corporation Scholarship
Hattie M. Strong Scholarship
Pearl Hewlett Stutz Scholarship
William Swart Award
Michael Swartzman Memorial
    Scholarship
Southwest Printing Management Fund
Sullivan Communications Scholarship
George Tanzer Memorial Scholarship
Tenneco Scholarship
Eloise Thornberry Scholarship
TAG and LABEL Manufacturers
    Scholarship
James Tennant Memorial Scholarship
Hollis Todd Scholarship
Keith and Barbara Tornvall
Kate Louise Trahey Scholarship
Clarence Tuites Scholarship
Turri & Brown Scholarship
Clifford & Ruth Ulp Memorial
    Scholarship
James Ventimiglia Scholarship
Frank Vereka Scholarship
Joseph Waldinsperger Scholarship
Dewitt Wallace Scholarship
A. Stephen Walls Scholarship
Walls, Olsen Memorial Scholarship
Wall Street Journal Scholarship
Waste Management Scholarship
J. Watumul Indian Scholarship
Louis A. Wehle Scholarship
David Weinstein Scholarship
Harold J. Weisburg Scholarship
Mark & Beulah Welch Scholarship
Cy Welcher Scholarship
Edwin Welter Fund
Weyerhaeuser Fellowship
Nelson Whitaker Scholarship
Ron & Joann White Scholarship
Eloise Wilkin Memorial Scholarship
Becky Wills Scholarship
Thomas B. Wilson Scholarship
Wallace & Paula Wilson Scholarship
John J. Wittman II Scholarship
Joseph & Loretta F. Wolf Scholarship
Louis Wolk Scholarship
William D. Wright Scholarship
Xerox Scholarship
Young Printing Executives Club
    Scholarship
Donald Zrebiec Scholarship
Jeffrey W. Zielasko Scholarship

Distinguished Professorships

College of Applied Science and Technology

Russell C. McCarthy Professorship in Engineering Technology
Established: 1979
Held by: S. Manian 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: Open

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. Wayne Walter

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. Raghuveer Rao
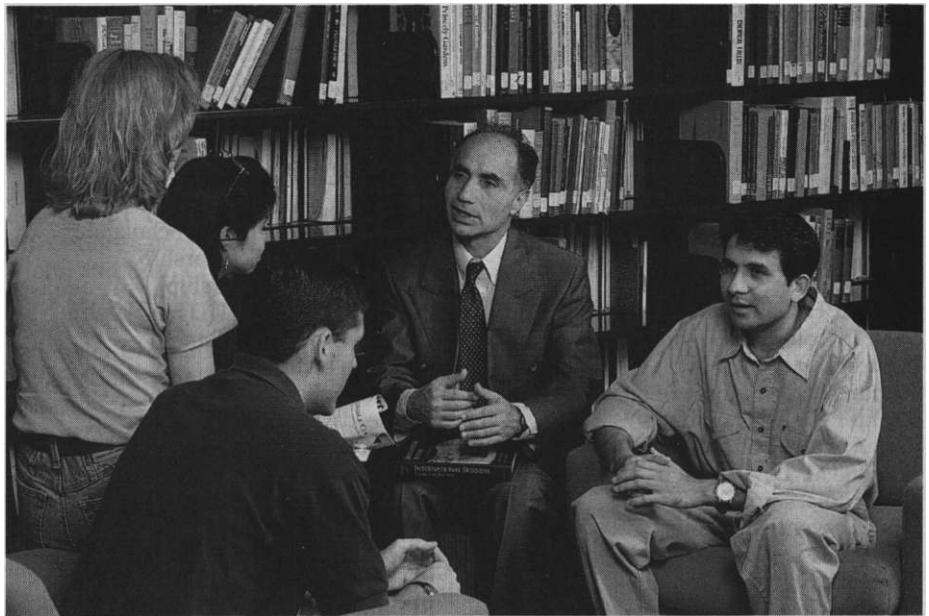
With a growing emphasis on international trade, business faculty bring a global perspective to class discussions.

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

Motorola Professor of Software Engineering
Established: 1997
Donor: Motorola, Inc.
Purpose: To support a professorship for the department head of the software engineering program
Held by: Michael J. Lutz

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

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: Open

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 memor-
            ial for Mr. Cary as a former pres-
            ident of the American Institute
            of Graphic Arts and to perpetu-
            ate his interest in the field
Held by: Open

**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: Dr. Milton L. Cofield

**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 to perpetuate his
            interest in good management
            practices in the newspaper
            industry
Held by: Professor Owen Smith

**Roger K. Fawcett Distinguished
Professorship in Publications Color
Management**
Established: 1991
Donor: World Color Press, Fawcett fam-
            ily 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: Dr. Lee Quinby

**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 recog-
            nition of the importance of good
            teaching in economics and by
            facilitating research into public
            policy questions
Held by: Dr. Amit Batabyal

**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 memo-
            rial 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 Pro-
            fessor teaches courses in color
            imaging systems, mentors gradu-
            ate 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. Noboru Ohta

Divison of Academic Affairs

**Eastman Kodak Professorship of Industrial
and Manufacturing Engineering**
Established: 1990
Purpose: To support RIT's Center for
            Integrated Manufacturing
            Studies (CIMS) initiative by
            bringing together interdiscipli-
            nary teams of faculty and indus-
            try experts to address issues that
            face small and medium-sized
            manufacturing companies
            seeking growth
Held by: William J. Sheeran, Ph.D.

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

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National Technical Institute for the
Deaf
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President/Dean, American College
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College of Imaging Arts and Sciences

College of Applied Science and Technology

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Dean, Associate Professor
Janet Graham, BS, MS—Assistant
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Massachusetts Institute of
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University of New York at Albany;
MS, Rochester Institute of
Technology—Assistant Professor
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of Osnabriick—Assistant Professor
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University of Amsterdam—Assistant
Professor

Trudy Howels, BT, MS, Rochester
Institute of Technology—Assistant
Professor
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Mary College; MS, Pittsburgh State
University; Ph.D., Kansas State
University—Associate Professor
Andrew Kitchen, MA, University of
Edinburgh; MS, Rochester Institute
of Technology; Ph.D., University of
Rochester—Professor
Stanislaw Radziszowski, MS, Ph.D.,
University of Warsaw—Professor
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Rochester Institute of Technology—
Professor
Margaret Reek, BT, MS, Rochester
Institute of Technology—Professor
Nan Schaller, BS, University of
North Carolina; MS, Union College—
Professor
Paul Tymann, BS, MS, Syracuse
University—Assistant Professor

James Vallino, BE, Cooper Union,
MS, Wisconsin; Ph.D., University of
Rochester—Assistant Professor

Information Technology

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Rochester Institute of Technology—
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Assistant Professor
John A. Biles, BA, MS, University of
Kansas—Undergraduate Program
Coordinator; Professor
Dianne P. Bills, BA, University of
Rochester; MS, Rochester Institute of
Technology—Assistant Professor
Nancy Doubleday, BS, MS,
Rochester Institute of Technology—
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Sharon P. Getschmann, BS, Ithaca
College, MS, Rochester Institute of
Technology—Instructor
Gordon Goodman, BS, State
University of New York Binghamton;
MS, Rochester Institute of
Technology—Associate Professor
Bruce H. Hartpence, BS, MS,
Rochester Institute of Technology—
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Lawrence Hill, BS, MS, Rochester
Institute of Technology—Assistant
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Technology—Assistant Professor
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Technology—Associate Professor
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of New York; MS, University of
Minnesota—Professor
Elizabeth Lane Lawley, AB, MLS,
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Professor
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Engineering Technology

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William C. Larsen, BS, MSCE,
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Rensselaer Polytechnic Institute;
MSCE, Syracuse University; PE—
Professor Emeritus
Mark Piterman, MCE, Odessa
Marine Engineers Institute—
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Maureen S. Valentine, BSCE,
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Professor
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Electrical, Computer and Telecommunications Engineering Technology
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Edward B. Stockham, AB, Ph.D., University of Pennsylvania—Professor

Clinton J. Wallington, Ph.D., University of Southern California—Professor

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Packaging Science

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Environmental Management

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Center for Multidisciplinary Studies

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Reserve Officer Training Corps

Army ROTC

Lt. Col. Daniel Stafford, BS, University of Rhode Island; MBA, Long Island University—Professor of Military Science

Lt. Col. Paul Hansen, AAS, Monroe Community College; BS, State University of New York Albany; MS, State University of New York College at Brockport—Assistant Professor of Military Science

Major Jon Home, BA, Colorado State University; MA, University of Phoenix—Assistant Professor of Military Science

CPT Donald Powell, BA, State University of New York College at Geneseo—Personnel Administrator

Master Sergeant Lloyd Giles, AS (pending), Central Texas College—Senior Enlisted Instructor

1SG David Giver, BA, St. Meinrad College; BS, State University of New York College at Brockport—Senior Army Instructor
SSG James K. Tibbit, AS, Columbia College—Logistics Manager

Air Force ROTC

Col. Thomas Burgie, BS, Air Force Academy; MS, Air Force Institute of Technology—Professor
Captain Christopher E. Cost, BS, University of Maryland; MS, Troy State University—Assistant Professor
Captain Bruce McLean, BS, University of Maine; MS, Lesley College—Assistant Professor
Captain Andrew Taliercio, BS, Wayland Baptist University—Assistant Professor

Air Force ROTC

Master Sergeant Gene Longwell, NCOIC, Information Management
Staff Sergeant Marcy Monroe, NCOIC, Cadet Personnel

College of Business

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Patricia Sorce, BA, Kent State University; MS, Ph.D., University of Massachusetts—Associate Dean
Martha J. Burns, BA, Western Michigan University, MBA, Rochester Institute of Technology—Assistant Dean for Student Services and Marketing
Richard N. Rosett, BA, Columbia University; MA, PH.D., Yale University—Director of Quality Cup Programs

Accounting Program

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Finance Program

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Management and International Business Programs

Robert J. Barbato, BA, LeMoyne College; Ph.D., Michigan State University—Associate Professor
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Management Information Systems Program

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Marketing Program

Eugene H. Fram, BS, ML, University of Pittsburgh; Ed.D., State University of New York at Buffalo—Professor
Philip R. Tyler, BS, Rochester Institute of Technology; MBA, DBA, Michigan State University—Associate Professor
Stanley M. Widrick, BS, Clarkson College; MBA, State University of New York at Buffalo; Ph.D., Syracuse University—Professor; Interim Director, Center for International Business and Economic Growth
Julian E. Yudelson, BS, University of Pennsylvania; MBA, Emory University; Ph.D., Northwestern University—Associate Professor

Decision Sciences Program

John E. Ettlie, BS, MS, Ph.D., Northwestern University—Professor
George A. Johnson, BS, University of Rochester; MBA, DBA, Indiana University—Professor

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Kate Gleason College of Engineering

Harvey J. Palmer, BS, University of Rochester; Ph.D., University of Washington—Dean
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Computer Engineering Department

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Andreas E. Savakis, BS, MS, Old Dominion University; Ph.D., North Carolina State University—Associate Professor
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Software Engineering

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Electrical Engineering Department

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Athimoottil V. Mathew, BEE, Jadavpur University, India; M. Tech., Indian Institute of Technology; Ph.D., Queens University, Canada—Professor

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Foundation Studies

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Heinz Klinkon, BFA, MFA, Rochester Institute of Technology—Associate Professor

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School for American Crafts

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Max L. Lenderman, BS, MS, Indiana State; MFA, University of Kansas— 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 332 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 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 on-line computer services such as electronic blackboards, picture phones and electronic 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 RTT 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 365.

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 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 349 and 356 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 orientation programs—One- to two-day events scheduled during the summer 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 register for courses are some of the many activities offered.

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 332). 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 assistant to the vice president for Student Affairs/Judicial Affairs.

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.

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Social Work)
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College of Applied Science & Technology:
Hospitality & Service Management
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Center for Multidisciplinary Studies
English Language Center
Learning Development Center
NTID Social Work Support Dept.
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6 **Liberal Arts Building**
College of Liberal Arts:
Career Decision Program
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Economics
Humanities
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7A **Iames E. Booth Building**
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College of Imaging Arts & Sciences:
Bevier Gallery
School of Art,
School of Design,
School for American Crafts
NTID:
Applied Art & Computer Graphics
Electronic Publishing & Printing Technology
Imaging Arts & Sciences Support Dept
Webb Auditorium

Administrative:
Systems Development

7B **Frank E. Gannett Building**
Academic:
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School of Film & Animation
School of Photographic Arts & Sciences
SPAS Photo Gallery
School of Printing Management & Sciences
Administrative:
ISC HelpDesk, Client Support Services;
ITS Distributed Support Services

University Commons

U

10

14

**Riverknoll
20 Apartments**

18

12

10

Bus

8

13

S

KIMBALL DRIVE

Bus

23A

16

4

15

5

23

3

1

6

9

17

70

78

2

1

7A

Tennis

7B

Athletic Fields

11

77

76

D

V

E

F

Bus

J

T

ANDREWS DRIVE

Athletic Fields

LOMB MEMORIAL DRIVE

G

H

EAST RIVER ROAD

WARD ROAD

GENESEE RIVER

SCOTTSVILLE ROAD ROUTE 303

**Main
Entrance**

► **Greater Rochester International Airport**

JEFFERSON ROAD   ROUTE 252

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8 Gosnell Building
College of Science:
    Allied Health Sciences
    Biological Sciences, Chemistry,
    Mathematics & Statistics, Physics,
    Center for Materials Science & Engineering
    Van Peursen Auditorium
NTID Science Support Dept.

9 James E. Gleason Building
Kate Gleason College of Engineering:
    Electrical Engineering
    Mechanical Engineering
    Software Engineering (Eng./CAST)
NTID Engineering Support Dept.

10 Lewis P. Ross Building
Academic:
Computer Science
Information Technology (CAST)
Administrative:
ISC Data Center Operations

11 Information Center

12 Max Lowenthal Building
College of Business:
    Accounting,
    Finance,
    International Business,
    Management,
    Management Information Systems,
    Marketing
    Photo Marketing Mgmt.
NTID Business & Computer Science Support uept

13 Gosnell Annex

14 Hugh L. Carey Building
)ohn D. Hromi Center for
    Quality & Applied Statistics
NTID:
    Baccalaureate & Graduate Programs,
    Business Occupations & Applied
        Computer Technologies Programs,
    Department of Interpreting Services

15 Campus Connections Bookstore

16 Kilian |. & Caroline F. Schmitt Interfaith Center
Campus Ministry

**17 Center for Microelectronic &
Computer Engineering**

18 Link Building

**23 Hale-Andrews Student Life Center
Gordon Administration & Activity Wing,,
Bruce Proper Fitness Room,
Center for Physical Education & Recreation,
Robert James Spinney Gymnasium**

23A August Center
**Sylvio O. Conte Counseling Center:
    Counseling Center
    Higher Ed. Opportunity Program (HEOP)
Student Health Center**

25 Grace Watson Hall
Campus Safety, Center for Residence Life,
Residence Dining Hall (Gracie's),
U.S. Post Office

55 Hettie L. Shumway Commons
International Center for Hearing &
Speech Research,
Residence Dining Hall (The Commons)

**60 Lyndon Baines |ohnson Building
Academic:
National Technical Institute for the Deaf (NTID):
    Technical, Humanities,
    Social Sciences Programs
Administrative:
NTID Administration,
NTID Admissions Office
Panara Theatre,
Research Programs,
Switzer Gallery**

70 College of Applied Science & Tech. **(CAST):
    Civil Engineering Technology
    Computer Engineering Technology
    Electrical Engineering Technology
    Information Technology
    Mechanical & Manufacturing Eng. Tech.
    Telecommunications Engineering Tech.**

**76 Chester F. Carlson
Center for Imaging Science**

77 Bausch & Lomb Center
Undergraduate **Admissions, Part-time &**
Enrollment Services, **Cooperative Education**
& Career Services, Financial Aid, Office of
Vice President for **Enrollment Management**
and Career Services, **Graduate Enrollment**
Services, Government **and Community**
Affairs, Nathaniel **Rochester Society,**
Secretary of the **Institute, Senior Counselor**
to the President

**78 Center for Integrated
Manufacturing Studies**
Associate **Provost for Outreach Programs,**
Corporate **Education & Training, Industrial**
& Manufacturing **Engineering, Packaging**
Science, Manufacturing **Technology,**
Remanufacturing **4 Resource Recovery**

99 Physical Plant
Campus Safety Transportation, Design &
Construction, Mail & Reprographic Services,
Operations Center, Purchasing, Receiving,
Shipping, Telecommunications