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ROCHESTER INSTITUTE OF TECHNOLOGY 1993-94

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Undergraduate Bulletin
Rochester Institute of Technology**

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ABOUT THIS BULLETIN

Undergraduate Bulletin - 1994-1995

The academic programs, course curricula, policies, and standards described in this *Undergraduate Bulletin* are in effect for students admitted to RIT during the 1994-95 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 the *Graduate Studies Bulletin*, published biennially and available through the Office of Admissions.

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.

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For more information concerning undergraduate study at RIT, write or phone

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INSTITUTE CALENDAR

1994-95

FALL QUARTER (941)

August 28	Move-In Day for New Residents
August 29	Move-In Day for Returning Students
August 30	Open Registration
August 31	Evening Classes (5 P.M. or later) Begin
August 31	Daytime Classes Begin
September 3	Saturday Classes Begin
September 5	Labor Day--No Classes
September 8	Last Date to Drop/Add Courses
October 21	Last Day to Withdraw with a Grade of 'W'
November 9	Last Daytime Class
November 10	Reading Day (No Day Classes)
November 11, 12, 14, 15	Final Exams--Day Classes
November 12	Last Saturday Class
November 16	Last Evening Class
November 17-29	Fall/Winter Break

WINTER QUARTER (942)

November 30	Evening Classes Begin
November 30	Day Classes Begin
December 3	Saturday Classes Begin
December 7	Last Date to Drop/Add Courses
December 20	Last Date of Classes Before Break
January 2, 1995	Evening Classes (5 p.m. or later) Resume
January 3, 1995	Daytime Classes Resume
February 3	Last Day to Withdraw with a Grade of 'W'
February 20	Last Daytime Class
February 21	Reading Day (No Day Classes)
February 22, 23, 24, 25	Final Exams--Day Classes
February 24	Last Evening Class
February 25	Last Saturday Class
February 27-March 3	Winter/Spring Break

SPRING QUARTER (943)

March 4	Saturday Classes Begin
March 6	Daytime Classes Begin
March 6	Evening Classes (5 p.m. or later) Begin
March 13	Last Date to Drop/Add Courses
April 28	Last Day to Withdraw with a Grade of 'W'
May 12	Last Daytime Class
May 13	Last Saturday Class
May 15, 16, 17, 18	Final Exams--Day Classes
May 19	Last Evening Class
May 20	COMMENCEMENT
May 21-June 4	Spring/Summer Break

SUMMER QUARTER (944)

June 5	Daytime Classes Begin
June 5	Evening Classes (5 p.m. or later) Begin
June 10	Saturday Classes Begin
June 12	Last Date to Drop/Add for Summer Quarter Courses
July 4	HOLIDAY (No Classes)
July 28	Last Date to Withdraw with a Grade of 'W'
August 11	Last Daytime Class
August 14, 15, 16	Final Exams--Day Classes
August 18	Last Evening Class

GENERAL INFORMATION

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 engineering, imaging science, computer graphics, film/video, 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 8,000 full-time undergraduate students, including 1,100 deaf students, 3,000 part-time undergraduate students, and 1,900 graduate students attend RIT. More than 70,000 RIT alumni, including 2,600 deaf graduates, can be found around the globe

More than one-third of our undergraduates are transfer students from two-year colleges or other four-year institutions. About one-third are women, and adult students comprise a significant proportion of the total enrollment. Deaf and hearing students often share the same dormitories and sometimes room together.

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* as one of the nation's leading universities and the number one comprehensive university in the East for its science and technology programs

RIT's co-op program is the fourth oldest and one of the largest in the world. We place more than 2,600 students in co-op positions with approximately 1,300 employers every year. Each year, too, approximately 4,500 positions are listed with our Cooperative Education and Placement Office, and more than 400 companies visit RIT to conduct over 6,000 on-campus interviews

Few universities provide RIT's variety of career-oriented studies. Its eight colleges offer outstanding programs in business, engineering, art and design, science and mathematics, liberal arts, photography, hotel management, computer science, and 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's encouragement of the appreciation of diversity is evidenced in 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 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 separate colleges, each of which offers several academic programs. The paragraphs that follow provide an overview of each of the eight colleges and their programs.

The College of Applied Science and Technology (pages 15-44) includes the School of Computer Science and Information Technology; School of Engineering Technology; School of Food, Hotel, and Travel Management; and Department of Packaging Science. All students participate in RIT's cooperative education program. The computer science program continues to be recognized as one of the best in the nation, and the manufacturing engineering technology program has been recognized as one of the top five in the nation in a survey sponsored by the Society of Manufacturing Engineers. Many new students enter this college as transfers from two-year schools to the college's BS degree programs. The associate, bachelor's and master's degrees are awarded.

The College of Business (pages 45-52) offers programs in accounting, finance, information systems, international business, management, marketing, and photographic marketing management. Its commitment to total quality management has been recognized with national awards. It is one of few business colleges to offer a cooperative education program. The college awards the BS and MBA degrees and has earned accreditation from the American Assembly of Collegiate Schools of Business (AACSB).

The College of Continuing Education (pages 53-66) awards undergraduate and graduate degrees, diplomas, and certificates for courses and programs that are offered during the day, at night, on Saturdays, and via telecourses in the home. Its School of Professional Studies develops unique and innovative degree programs—including Environmental Management—for full-time students. Other college programs focus on the needs of the adult student who is looking for convenience, quality, and practicality.

The College of Engineering (pages 67-76) offers BS degree programs in electrical, computer, industrial, mechanical, mechanical/aerospace, and microelectronic engineering. A recent survey by the Semiconductor Research Corporation named RIT's microelectronic engineering program as the top program of its kind in the U.S. Starting in their third year, students in all programs participate in the 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.

The College of Imaging Arts and Sciences (pages 77-96) includes the School of Art and Design, School for American Crafts, School of Photographic Arts and Sciences, School of Printing Management and Sciences, and the Center for Imaging Science. 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 science, master of science, bachelor of fine arts, master of science for teachers, master of fine arts, and the nation's only doctoral program (Ph.D.) in imaging science.

The College of Liberal Arts (pages 95-102) provides a comprehensive program of liberal education that is the foundation for all RIT students' educational experience. The college also offers bachelor of science degrees in social work, criminal justice, economics, and professional and technical communication, as well as a master of science degree in school psychology. A one-year technical and liberal studies option is for students who are undecided about which RIT program to pursue.

The College of Science (pages 103-118) 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, and allied health sciences, including a new physician assistant program. In addition, the 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 U.S. The college awards AS, BS, and MS degrees.

The National Technical Institute for the Deaf (pages 119-147) provides technical and professional programs for more than 1,100 deaf students. NTID also provides extensive educational access services for deaf students who are taking courses in RIT's seven other

colleges. Within NTID, students can choose from more than 30 programs, including applied accounting, applied art and computer graphics, applied computer technology, business occupations, electronic publishing and imaging, engineering technologies, ophthalmic optical finishing technology, and photo/media technologies. Students can earn a certificate, 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 on Higher Education of the Middle States Association for Colleges and Schools. 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.

Research Activities

Sponsored research is a vital and integral component of RIT's research activity. Faculty undertake research for a variety of important reasons—to advance others' 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 U.S.

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 provides convenient local transportation from campus.

Within walking distance of one another 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, and the Strong Museum's collection of 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 a suburb 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 academic computing, and students work with state-of-the-art computer equipment regardless of their major. RIT provides computing services on VAX/VMS and VAX/ULTRIX (UNIX) systems and various microcomputers. Central computer systems can be accessed via telephone or terminals in six computing centers on campus.

Wallace Library is a multimedia resource center with a collection of more than 700,000 items. Resource materials include 4,700 journal subscriptions; 380,000 microforms; 2,300 audio cassettes and recordings; 4,800 film and video titles; special collections on deafness and graphic arts; and more than 350,000 books.

Services include CD-ROM resources, interlibrary loans, and computerized searching of commercial databases. An on-line catalog, Infonet, includes the library's holdings as well as access to materials in other collections. Individual carrels and small group rooms provide study spaces to more than 1,000 students.

A smaller library within Wallace Library--the Cary Library--contains more than 14,000 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.

During the year student art and photography is exhibited in display gallery areas. Outstanding student work is purchased and on permanent display.

RIT students also have access to a laser optics laboratory, an observatory, an animal care facility, more than 190 color and black-and-white darkrooms, computerized typesetting 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 U.S.

Housing and Recreational Facilities

Serving approximately 3,500 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, co-educational, wellness, non-smoking, quiet study, over 21 years of age, upper-class, deaf, and mainstream (hearing and deaf 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, International House, Photo House, and Unity House.

RIT's Apartment Life program features one of the nation's largest university-operated apartment systems, with approximately 2,800 students residing in nearly 1,000 individual townhouse and apartment units. Apartment housing is available to students in four apartment complexes

A new Student Life Center opened its doors in 1992, providing recreational facilities that include a new gym, 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, practicums, 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 bachelors 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 bachelors degree with fewer than 180 cumulative earned hours (90 hours for associate degrees)

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

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

ROCHESTER INSTITUTE OF TECHNOLOGY

The general education curriculum in the humanities and social sciences that all RIT students pursue may be best understood by examining the chart opposite. Students in associate and baccalaureate degree programs complete the entire liberal arts curriculum, or a modification of it, as a component of their particular degree programs. Academic advisers in the College of Liberal Arts and in other colleges help students interpret the liberal arts curriculum as it applies to their degree programs.

The basic curriculum consists of 14 courses (54 quarter credits) arranged in five groups:

1. English Composition
2. A core curriculum of six foundation courses in the humanities and social sciences (200- and 300-course numbers)
3. A disciplinary or interdisciplinary concentration of three advanced courses (400-course numbers)
4. Three advanced electives (400- and 500-course numbers)
5. The Liberal Arts Senior Seminar and Project

Specific required core curriculum courses are listed below (six must be selected):

Literature: one course required

Fine Arts: one required from Visual Arts, Musical Arts, Film Arts, or Theatre Arts

History: one required from either Modern American or Modern European history

Philosophy: one required from Ethics, Critical Thinking, or Selected Issues or one required from Science, Technology, and Values

Social Sciences: two required from Principles of Economics I, American Politics or Political Decision Making, Introduction to Psychology, Foundations of Sociology, or Cultural Anthropology

Concentration

A concentration is a group of closely related advanced courses from which a student will choose three.

A concentration is pursued in the third, fourth, or fifth year of the baccalaureate programs and can take either of the following forms:

1. Disciplinary Concentration--three related courses in a single discipline leading to in-depth knowledge of the methods, problems, and achievements of that mode of inquiry
2. Interdisciplinary Concentration--three related courses from different disciplines, each one of which speaks to some aspect of a common area, subject, or topic

Senior seminar and project

The purposes of the Senior Seminar and Project are:

1. to give seniors the opportunity to prepare papers or projects that call for analysis and synthesis and for the application of their liberal arts experience to major issues that may affect their professional careers,
2. to provide seminars for all senior students on a general theme, and
3. to provide an advanced experience of problem solving and value clarification

The Senior Seminar is designed and implemented each year by a faculty committee. The seminar topic may change from one year to another.

Academic advising

ROCHESTER INSTITUTE OF TECHNOLOGY

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 also provides a course description handbook with specific information about all liberal arts courses and academic worksheets for each degree program to help students maintain records.

English Composition

4 credits

Core Requirements

6 foundation courses; 4 credits each

(200- and 300-course numbers)

HUMANITIES REQUIREMENTS

(4 courses)

Philosophy or Science, Technology and Values

History

Literature

Fine Arts

SOCIAL SCIENCES REQUIREMENTS

(Each student will choose 2 of the 4 courses)

Psychology

Economics

Political Science

Sociology/Anthropology

3-course concentration with prerequisites, 4 credits each

(400-course numbers)

concentration

concentration

concentration

The concentration may be in a disciplinary or interdisciplinary area

3 electives, 4 credits each

(400- and 500-course numbers)

elective

elective

elective

Senior Seminar and Project

2 credits

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

Plan A: Balanced (Minimum 22 credits)

1. Mathematics--three mathematics courses amounting to a minimum of 10 credits
2. Science--three science/lecture courses with associated laboratories amounting to a minimum of 12 credits

Plan B: Emphasis on Science (Minimum 20 credits)

1. Mathematics--two mathematics courses amounting to a minimum of 6 credits

2. Science--two science/lecture courses with associated laboratories and two science electives for a minimum of 14 credits

Plan C: Emphasis on Mathematics (Minimum 22 credits)

1. Mathematics--four mathematics courses amounting to a minimum of 14 credits
 2. Science--two science/lecture courses with associated laboratories amounting to a minimum of 8 credits
- * The RIT Mathematics and Science General Education Curriculum requirement applies to all students pursuing the bachelor of science degree beginning with the entering class of 1993. Students in bachelor of fine arts programs need not complete this requirement

Physical Education Requirements

RIT recognizes the need for physical fitness and recreation in today's society. To meet this demand, 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 PE requirement is built on the premise that the attainment of good health and fitness are basic elements in the pursuit of excellence in many aspects of life. The learning experiences provided through the physical education curriculum are an integral part of the total educational experience at RIT.

Baccalaureate degree

All candidates for the baccalaureate degree entering as first- or second-year students must successfully complete six quarters, or the equivalent of two years, of physical education. This requirement is normally met during the first and second years at RIT, but may be completed at any time during succeeding academic years

Those entering as third- or fourth-year students must successfully complete three quarters of physical education unless they have completed the equivalent or earned a baccalaureate degree at another institution.

Associate degree

All candidates for the associate degree are required to successfully complete three quarters, or the equivalent of one year, of physical education. This requirement is normally met during the first year at RIT but may be completed at any time during succeeding academic quarters

Transferred activity

In general, physical education courses taken at other schools will be accepted in transfer at RIT. One semester of a PE course equals one quarter of PE at RIT; two semesters equal three quarters at RIT. Other forms of physical education experience may be evaluated by the Department of Physical Education 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 physical education program. This will be granted only by RIT's Student Health Services. One copy of the medical excuse should be filed with the Physical Education Department and the other copy taken to the student's academic department. Medical excuses from a family physician will not be accepted

Intercollegiate athletics

Students participating in the Institute's intercollegiate athletic programs will be granted physical education credit for the season(s) of participation

Veterans

Students who have completed six months or more of active military duty are not required to participate in the physical 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 physical education requirements but may enroll in any courses on a space-available basis

Part-time status

Students enrolled in part-time or extended-day academic programs are exempt from the physical 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 have no co-op requirements. Cooperative education involves alternating quarters of classroom study and paid employment in a position related to the student's academic program. Requirements are outlined under each program listing 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 1994/95 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 aid awards

Academic Programs of Study

Introduction

Undergraduate Programs	College	Degree and HEGIS							Eve. Option	Page
		Cert	Dipl	AOS	AS	AAS	BFA	BS		
Accounting	Bus., Cont.Ed.					5002		0502	Y	47
Applied Accounting	NTID					5002		5002		128
Applied Art & Computer Graphics	NTID					5012				139
Applied Arts & Science	Cont. Ed.		5699			5699		4999	Y	55
Applied Computer Technology	NTID	5101	5101			5101				131
Architectural Drafting	NTID		5304							134
Architectural Technology	NTID					5304				135
Biology	Science				5604			0401		105
Biotechnology	Science				†			0499		106
Business Administration	Cont.Ed.					5001			Y	59
Business Occupations	NTID	5005								129
Business Technology	NTID			5004						129
Ceramics & Ceramic Sculpture	Imaging Arts & Sc.					5610	1009			80
Chemistry	Science				5619			1905	Y	107
Civil Technology	NTID					5309				135
Communication, Technical										
Basic	Cont.Ed.	5008							Y	62
Advanced	Cont.Ed.	5008							Y	62
Communication, Tech. & Professional	Lib. Arts							0601		101
Communications										
Biomedical Photographic	Imaging Arts & Sciences					5299		1217		82
Communications, Public Relations										
Advanced	Cont.Ed.	5008							Y	61
Graphic Communication	Cont.Ed.	5008							Y	62
Professional Writing	Cont.Ed.	5008							Y	62
Computer Science *	Appli. Sc. & Tech.				5101	5101		0701	Y	16
Computing, Biomedical	Science							1217		114
Craft Major, Double	Imaging Arts & Sc.						1009			80
Criminal Justice	Liberal Arts							2105		96
Deaf Studies	Cont.Ed.	5506							Y	63
Design										
Graphic	Imaging Arts & Sc.					5012	1009			77
Industrial and Interior	Imaging Arts & Sc.					5012	1009			77
Diag. Med. Sonography (Ultrasound)	Science	5299				†		1299		117
Economics	Lib. Arts							2204		100
Educational Interpreting	NTID					5506				133
Electromechanical Technology	NTID					5311				136
Electronic Publishing & Printing Tech	NTID	5009	5009	5009		5009				144
Emergency Management	Cont.Ed.	5508								60
Engineering										
Computer Engineering *	Engineering								0999	68
Electrical Engineering *	Engineering								0909	69
Industrial Engineering	Engineering								0913	71
Mechanical Engineering *	Engineering								0910	72
Microelectronic Engineering	Engineering								0999	74
Engineering Science	Engineering				5609				Y	66
Engineering Technology										
Civil Engineering Technology	Appl Sc & Tech							0925		21
Computer Engineering Tech .	Appl Sc & Tech					5399		0925	Y	25

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Electrical Engineering Tech .	Appl Sc & Tech				0925	Y	23
Electrical Tech .	Appl Sc & Tech			5310		Y	24
Electromechanical Tech.	Appl Sc & Tech			5311		Y	29
Electrical/Mechanical Tech .	Appl Sc & Tech				0925	Y	20
Manufacturing Eng . Tech.	Appl Sc & Tech				0925	Y	31
Manufacturing Tech.	Appl Sc & Tech			5399		Y	32
Mechanical Eng .Tech.	Appl Sc & Tech				0925	Y	29
Mechanical Tech .	Appl Sc & Tech			5315		Y	29
Telecommunications Eng .Tech.	Appl Sc & Tech				0925		27
Environmental Management	CCE/Prof St				0420		64
Film/Video	Imaging Arts						
	& Sciences			5008			83
Finance	Bus., Cont.Ed				0504	Y	48
Fine & Applied Arts	Cont Ed	5012				Y	63
Food Management	Appl Sc &						
	Tech			5404			34
Food Marketing & Distribution	Appl Sc &						
	Tech				1307		35
General Education (AA Degree)	Cont. Ed.			5699		Y	61
General Management	Cont. Ed.			5004		Y	59
Glass	Imaging Arts						
	& Sciences			5012	1009		80
Health Systems Administration	Cont.Ed.	5299				Y	57
Hotel and Resort Management	Applied Sc &						
	Tech			5010	0508		36
Illustration	Imaging Arts						
	& Sciences			5610	1002		
Imaging Science	Imaging Arts						
	& Sciences				1011		88
Imaging & Photographic Tech	Imaging Arts						
	& Sciences			5007	1011		84
Industrial Drafting	NTID	5303					136
Industrial Drafting Tech	NTID		5303	5303			137
Information Systems	Business				0599		49
Information Tech	Applied Science						
	& Technology			5101	0699	Y	18
International Business	Business				0513		51
Logistics & Transportation Mgmt.	Cont. Ed.			5004		Y	59
Management	Business				0506	Y	50
Basic Quality	Cont. Ed.	5399				Y	57
Quality Implementation	Cont. Ed	5399				Y	57
Management Development	Cont. Ed.	5004	5004			Y	58
Manufacturing Processes Tech	NTID	5312	5312				138
Marketing	Bus, Cont Ed			5004	0509	Y	50
Mathematics							
Applied Mathematics *	Science			5617			111
Computational Mathematics *	Science				1703		112
Medical Illustration	Imaging Arts						
	& Sciences				1299		77
Medical Laboratory Tech	NTID			5205			124
Medical Tech	Science		†		1223		115
Metalcrafts & Jewelry	Imaging Arts						
	& Sciences			5012	1009		80
Newspaper Operations							
Management	Imaging Arts &						
	Sciences				0699		92
Nuclear Medicine Tech	Science	5299		†	1299		118
Nutrition Management	Applied Science						
	& Tech			5404	1306		37
Office Technologies	NTID	5005		5005			130
Ophthalmic Optical Finishing							
Technology	NTID	5212	5212	5212	5212		125
Packaging Science	Applied Science						
	& Technology				4999		39
Painting, Printmaking	Imaging Arts						
	& Sciences			5610	1002		77
Personnel Administration	Cont. Ed.			5004		Y	59
Photo/Media Technologies	NTID	5007	5007	5007			141
Photographic Illustration,							
Professional	Imaging Arts						
	& Sciences			5007	1011		86
Photographic Marketing							
Management	Business				0509		52
Photographic Systems							
Management	Imaging Arts						

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	& Sciences		0599		85
Physician Assistant	Science				115
Physics	Science	5619	1902		113
Polymer Chemistry	Science		1907		109
Printing	Imaging Arts & Sciences				
		5009	0699		89
Printing & Applied Computer Science	Imaging Arts & Sciences		0699		93
Printing Systems	Imaging Arts & Sciences		0699		91
Production Management	Continuing Education	5004		Y	59
Professional Photography	Imaging Arts & Sciences	5007	1011	Y	86
Real Estate**	Continuing Education			Y	59
Social Work	Liberal Arts		2104		98
Statistics, Applied *	Science		1702		111
Techn Marketing & Distribution	Applied Science & Technology		0599		41
Travel Management	Applied Science & Technology	5011	0510		36
Weaving & Textile Design	Imaging Arts & Sciences	5012	1009		80
Woodworking & Furniture Design	Imaging Arts & Sciences	5317	5012 1009		80

COLLEGE OF APPLIED SCIENCE AND TECHNOLOGY

Wiley R. McKinzie, Dean

The College of Applied Science and Technology (CAST) provides programs that stress the development, integration, and implementation of technology in areas ranging from the manufacturing environment to a global service economy. Modern technology is a focal point in each CAST program. This technology is used to provide the productive manufacture and distribution of durable and consumable goods and the proper flow of many forms of information worldwide and to enhance customer satisfaction in the service sector

The college units are the School of Engineering Technology; the School of Computer Science and Information Technology; the School of Food, Hotel, and Travel Management; and the Department of Packaging Science. The college has programs at the associate, baccalaureate, and master's degree levels. The Department of Military Science and the Department of Aerospace Studies, 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 maintain laboratories that contain state-of-the-art equipment. Engineering technology programs share facilities with the College of Engineering with additional laboratories in CAD/CAM systems, robotics, controls, soils, and telecommunications. CAD laboratories based on workstations support a number of courses. Extensive computer facilities are dedicated to academic support of undergraduate and graduate computer science and their related programs. The packaging science laboratories have some of the most advanced and sophisticated packaging testing equipment in the country.

Food product development laboratories allow students to create menu items designed to serve the growing foodservice industry. Information laboratories provide data that enables students to assess the supply and demand for food commodities throughout the world

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, including the required co-op experience. Students with a less appropriate academic background may have to complete additional coursework.

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. All are committed to rigor and academic excellence. 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

Program planning

Each student in CAST is considered individually when his or her program is planned. The variety of subject backgrounds from the two-year colleges necessitates an almost tailor-made pattern of courses and knowledge to assure that associate degrees retain the integrity they deserve and guaranteeing, as far as possible, that previously studied material will not be repeated

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 Placement assigns each co-op student an adviser, who assists in the placement process. With a pre-arranged 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

SCHOOL OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

William J. Stratton, Director, School of Computer Science and Information Technology

Walter A. Wolf, Chair, Department of Computer Science

Peter H. Lutz, Chair, Department of Information Technology

The School of Computer Science and Information Technology offers programs leading to the bachelor's and master's degrees in two fields.

The school's nationally accredited BS degree in computer science is designed to meet continuing demands for computer science in industry, government, and education. The BS degree in information technology is a premier program nationally that prepares computing professionals skilled in designing and developing highly interactive multimedia systems. At the undergraduate level, both programs are offered to high school and two-year college graduates, as first-year and upper-division students, respectively, and 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 both the Computer Science and Information Technology programs. First, each requires that the student successfully complete a well-defined cooperative education experience. Second, each program requires the student to complete an extensive set of 'hands-on' laboratory experiences. The laboratories that support these experiences are unique to each program and are carefully crafted to meet the students particular and varied academic needs.

Ten facilities dedicated exclusively to the support of undergraduate computer science (in addition to those provided by Information Services and Computing, listed in the Student Services section of this catalog) include:

- **Three teaching laboratories** , each with 15 SUN workstations and two file servers to support formal, closed laboratory instruction, emphasized in the first two years of the curriculum.
- **Open computing laboratory** with 30 SUN workstations with three file servers to support open computing and occasional formal, closed laboratory instruction for large groups
- **Computer graphics laboratory** , which provides a state-of-the-art environment for the study of computer graphic techniques using eight SUN color workstations and a file server
- **Networking and distributed systems laboratory** focusing on the study of data communications and networking strategies utilizing seven SUN workstations and a file server as networking tools.
- **Digital logic laboratory** offering a hands-on opportunity for students to appreciate and understand the computer equipment they work with throughout the program. This lab is designed for non-electrical engineering students
- **CS learning laboratory**, an area in the computer science laboratory space for students and faculty to meet informally for help sessions 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

Three facilities available to undergraduate information technology students include:

- **The information technology lab** , with 15 Macintosh II computers and 14 IBM PC/386 class computers, all connected to the campus-wide computing network. This laboratory is the principal computing lab for the program and includes animation and digitizing equipment
- **The InfoTech instructional lab** , with 10 additional color Macintosh II computers, used in classroom situations to impart skills and techniques to students in the program. This lab is

scheduled by instructors to provide a hands-on component to their classes as they deem appropriate. The computers in this lab are also connected to the campus-wide computing network.

- **The information technology computer-integrated laboratory** , with six terminals, an IBM PS/2, and an IBM RS-6000, plus various manufacturing equipment on a rotating basis. The computers in this lab are also connected to the campus-wide computing network

All computer science and information technology facilities are connected by a high-speed Ethernet network through which students also access off-campus networks such as NYSERNET, USENET, and BITNET. There are 77 dial-in modem connections, more than 20 printers, and Apple Macintosh microcomputers available for student use

COMPUTER SCIENCE

Walter A. Wolf, Chair

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. 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 backed up by significant coursework in mathematics and science

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, programming languages, computing theory, computer graphics, artificial intelligence, and information systems. It is important to note that programming is an important 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, which 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 nine 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 a second 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

Evening programs

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

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

Computer Science, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
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

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English Composition 0502-220	4
Liberal Arts* [1]	12-20
Physical Education Electives†	0

Second Year

Computer Science 4 0603-334	4
Software Engineering 0603-361	4
Intro. to Digital Design 0603-351	3
Computer Organization 0603-352	3
Professional Communication for CS and SE 0603341	4
University Physics III &Lab 1017-313, 377 or	
Organic Chemistry &Lab 1011-213, 207 or	4-12
General Biology and Lab 1001-201, 202, 203, 205, 206, 207	
Discrete Mathematics I, II 1016-265, 266	4
Probability & Statistics 1016-351	4
Liberal Arts* [3]	0-8
Free Elective	4
Physical Education Electives†	0

Third, Fourth, Fifth Years

Introduction to Computer Science Theory 0603-380	4
Operating Systems 0603-440	4
Data Communication Systems 0603-420	4
Programming Language Concepts 0601-450	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
<i>Total Quarter Credit Hours</i>	193-196 credits

[1]Students electing physics or chemistry should take 12 credits of liberal arts the first year and 8 the second. Those choosing biology should take 20 credits of liberal arts the first year and none the second year.

[2] The computer science concentration consists of one of the following course sequences:

Software Engineering
 Software Specification and Design 0603-510
 Software Testing and Quality Assurance 0603-511
 Software Engineering Project Laboratory 0603-555
 Networking and Distributed Systems
 Operating Systems Laboratory 0603-540
 Introduction to Computer Networks 0603-541
 Distributed Systems Laboratory 0603-542
 Parallel Computing
 Introduction to Parallel Computing 0603-531
 Parallel Algorithms and Program Design 0603-532
 Computer Graphics
 Introduction to Computer Graphics 0603-570
 Computer Graphics Laboratory 0603-571
 Artificial Intelligence
 Artificial Intelligence 0603-455
 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
 Formal Languages 0603-480

ROCHESTER INSTITUTE OF TECHNOLOGY

Analysis of Algorithms 0603-515
Systems Software
Computer Architecture 0603-520
Operating Systems Laboratory 0603-540
Language Processors 0603-580
Computer Information Systems
Systems Specification, Design, and Implementation 0603-435
Database Concepts 0603-485
Programming Systems Workshop 0601-488

[3]Computer science courses may be taken as computer science electives except as noted in the Course Descriptions portion of this bulletin

[4]A non-CS concentration consists of a set of coherent courses giving the student significant expertise in an area other than computer science. Typical concentrations include mathematics, engineering technology, and business

[5]Any course open to computer science majors may be taken as a free elective

*See page 10 for Liberal Arts requirements

See page 11 for policy on Physical Education

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

<i>COMPUTER SCIENCE</i>	<i>Quarter Credit Hours</i>
Survey of Computer Science 0602-200	4
Computer Science 1, 2, 3, 4 0603-231, 232, 233, 334	16
Software Engineering 0603-361	4
Intro. to Digital Design 0603-351	3
Computer Organization 0603-352	3
<i>MATHEMATICS & SCIENCE</i>	
Calculus I, II, III 1016-251, 252, 253	12
Probability 1016-351 or Statistics 1016-314	4
Discrete Mathematics 1016-265, 266	8
Physics I, II, III 1017-311, 312, 313, 375, 376, 377	15
or	
Chemistry I, II, III 1011-211, 212, 213, 205, 206, 207	12
or	
Biology I, II, III 1001-201, 202, 203, 205, 206, 207	12
<i>LIBERAL ARTS</i>	
Communications 0236-220	4
Introduction to Literature 0236-260	4
Humanities Electives	12
Social Science Electives	8
<i>Total Quarter Credit Hours</i>	94-97

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

<i>COMPUTER SCIENCE</i>	<i>Quarter Credit Hours</i>
Computer Science 1, 2, 3, 4 0603-231, 232, 233, 334	16
Software Engineering 0603-361	4
Intro. to Digital Design 0603-351	3
Computer Organization 0603-352	3
Intro. to CS Theory 0603-380	4
Programming Language Concepts 0601-450	4
Data Communications 0603-420	4
Operating Systems 0603-440	4
Computer Science Concentration	8-12
Computer Science Electives	12-16

LIBERAL ARTS

ROCHESTER INSTITUTE OF TECHNOLOGY

Communications 0236-220	4
Introduction to Literature 0235-260	4
Humanities Electives	12
Social Science Electives	8
Liberal Arts Electives*	12
Liberal Arts Concentration*	12
Senior Seminar*	2

MATHEMATICS & SCIENCE

Calculus I, II, III 1016-251, 252, 253	12
Probability 1016-351 or Statistic 1016-314	4
Discrete Mathematics 1016-265, 266	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

Professional Communication for CS and SE 0603-341	4
Free Electives	8
Non-CS Concentration	16
Co-op Work Experience (4 quarters)	Co-op
<i>Total Quarter Credit Hours</i>	193-196

**See page 10 for Liberal Arts requirements.*

INFORMATION TECHNOLOGY

Peter H. Lutz, Chair

We are in the Information Age, but the supply of technically competent professionals is not currently meeting the demand. In addition, strong computing skills for all individuals are increasingly important. Individuals are devoting more time to familiarizing themselves with the wide variety of computing hardware and software available in today's marketplace. As a result, they spend less time working in application areas and more time developing computing environments—a frustrating experience for both the individual and the corporation.

To effectively address this situation, a new professional has emerged—the information technologist, whose primary responsibility is to 'fit' the right computing needs to the environments within an enterprise. The objective of the information technology baccalaureate program is to provide the foundations for a well-educated professional in this field.

Students study a wide variety of computing areas, from elementary programming to data communications to electronic imaging. Through courses in communication, technology transfer, and needs assessment, the student acquires the interpersonal communication skills necessary to confer with less technical professionals in order to assess and facilitate their needs. A cooperative education requirement enhances the academic requirements with real-world experiences.

Program overview

The program of study in information technology consists of a core of computing courses, followed by advanced study in a concentration area chosen by the student. The concentration is intended to give the student education in the area in which he or she intends to work. For example, a student who wants to work in the graphic arts industry might take a sequence of courses from the College of Imaging Arts and Sciences, whereas a student interested in manufacturing could take a sequence of courses in computer integrated manufacturing. A number of concentration areas have been identified, but individually constructed concentrations are also possible.

All of the components in 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 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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0602-201	1
Computing Tools & Env. 0602-202	4
Algebra 1016-204	4
Software Scripting 0602-203	4
Calculus I, II 1019-420, 421	8
Electronic Imaging 0602-320	4
General Education Electives	12
Liberal Arts*	12
 <i>Second Year</i>	
Intro. to Programming 0602-208	4
Computer Concepts & Software Systems 0602-410	4
Statistics 1016-309	4
Program Design & Validation 0602-210	4
Data Communications 0602-411	4
Abstractions in Programming 0602-212	4
Database Management 0602-483	4
Liberal Arts*	20
 <i>Third Year</i>	
Local Area Networks 0609-476	4
Human Factors 0602-425	4
Interface Design 0602-310	4
Technology Transfer 0602-350	4
Liberal Arts*	8
Science Electives	8
Cooperative Education	Co-op
 <i>Fourth Year</i>	
A1 Expert Systems 0602-420	4
Senior Seminar 0602-595	1
Needs Assessment 0602-455	4
Concentration Courses†	12
Professional Electives	16
Liberal Arts*	14
Cooperative Education (3 quarters required after year 2)	Co-op
<i>Total Quarter Credit Hours</i>	180

* See page 10 for Liberal Arts requirements

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Concentrations are available in telecommunications, training and human performance, interactive media design, microcomputer application development, system integration, or an individual concentration may be designed with the guidance of an adviser.

Computer Systems, AAS degree

Information Technology, AAS degree

<i>COMPUTERSCIENCE</i>	<i>Quarter Credit Hours</i>
Software Tools 0602-202	4
Software Scripting 0602-203	4
Introduction to Programming 0602-28	4
Program Design and Validation 0602-210	4
Interface Design 0602-310	4
Electronic Imaging 0602-320	4
Technology Transfer 0602-350	4
Computer Concepts 0602-410	4
Data Communication 0602-411	4
Human Factors 0602-425	4
Applied Database Management 0602-483	4

MATHEMATICS

Algebra and Trigonometry 1016-204	4
Calculus for Technologists I 1019-420	4
Calculus for Technologists II 1019-421	4
Science Elective	4
Science Elective	4

*LIBERAL ARTS**

Communications 0602-411	4
Literature 0602-425	4
Social Science Electives	8
Fine Arts 0505	4
History 0507	4
Philosophy 0508/0509	4

<i>Total Quarter Credit Hours</i>	92
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** See page 10 for Liberal Arts requirements.*

SCHOOL OF ENGINEERING TECHNOLOGY

W. David Baker, Director

Engineering technology is a relatively new field in higher education, and RIT was a pioneer in the development of such programs. Originally conceived as associate-degree-level educational programs, engineering technology curricula were designed to prepare people to work with engineers and scientists as technicians. This educational role is now carried out primarily in two-year community colleges and technical institutes.

More recently, RIT has been a leader in the development of baccalaureate programs in engineering technology. The bachelor's degree in engineering technology meets the growing need of business and industry for engineering technologists at the baccalaureate level

Degree programs

The School of Engineering Technology offers five-year cooperative education programs leading to the bachelor of science (BS) degree in:

- Civil Engineering Technology
- Computer Engineering Technology
- Electrical Engineering Technology
- Mechanical Engineering Technology
- Manufacturing 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

Students in the computer engineering technology program have the option of receiving an associate in applied science (AAS) degree after two years of study

Upper-division evening programs

The following upper-division (junior-senior) programs are offered during the evening hours for part-time students:

- Electrical Engineering Technology
- Manufacturing Engineering Technology
- Mechanical Engineering Technology
- Telecommunications Engineering Technology
- Electrical/Mechanical Technology

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

With the exception of the cooperative education and physical education requirements, requirements for the evening program and graduation are the same as for the full-time day program.

Lower-division evening programs

The School of Engineering Technology offers the following lower-division evening programs:

- Electrical Technology
- Electromechanical Technology
- Mechanical Technology
- Manufacturing 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 award certificates to students who complete a sequence of courses in a single discipline and who do not desire to complete a degree. Further details on these certificates can be found in the RIT Part-time Studies catalog

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 School of Engineering Technology at 716-475-5190

Accreditation

The following baccalaureate programs are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET): Civil Engineering Technology, Computer Engineering Technology, Electrical Engineering Technology, Manufacturing Engineering Technology, Mechanical Engineering Technology, and Telecommunications Engineering Technology. The School of Engineering Technology is a member institution of the American Society for Engineering Education and the Council of Engineering Technology in New York State.

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.

ROCHESTER INSTITUTE OF TECHNOLOGY

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 School of Engineering Technology program is on-the-job experience through the school's cooperative education plan. This involves alternate periods of study and related industrial employment

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

Co-op can provide a suitable trial ground

Co-op can also provide a significant income during work periods, which helps defray a major portion of one's educational expenses.

Each student is helped to find work related to specific career goals. However, as is the case in any employment situation, the major impetus must come from the individual. The typical co-op schedule for engineering technology students is shown in the chart below

Cooperative Education Plan -School of 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	-

**Students in Computer Engineering Technology will co-op in the fall quarter and attend classes in Winter Quarter in Year 4.*

UNDECLARED ENGINEERING TECHNOLOGY OPTION

James F. Scudder, Coordinator

Students interested in engineering technology but who have difficulty 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 will take basic technical skills courses in both electrical and mechanical disciplines. They will also participate in an Engineering Technology Seminar in which they will explore the unique characteristics of each discipline offered within the school. After the first quarter, students will be expected to select a specific major or to focus on either the electrical (computer, electrical, telecommunications) or mechanical (civil, manufacturing, mechanical) disciplines. During the Spring Quarter, they will be required to select a specific major. In their first two years, students will 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 will be able to start their junior year on track with other students in the same program

Undeclared Engineering Technology, freshman year course sequence

<i>Fall Quarter</i>	<i>Quarter Credit Hours</i>
English Composition 0502-220	4
Engineering Graphics 0608-210	4
Electrical Fabrication Techniques 0618-220	2
Schematic Capture 0618-225	2
College Algebra and Trigonometry 1016-204	4

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Engineering Technology Seminar 0606-101 2

Winter Quarter

Electrical Students

Literature 0504-332 4

College Physics I 1017-211, 271 4

Introduction to Programming 0602-208 4

DC Circuits 0609-201 4

Mechanical Students

Literature 0504-332 4

College Physics I 1018-211, 271 4

Introduction to CAD 0617-260 4

Computer Programming Elective 4

Spring Quarter

Electrical Students

Introduction to Statics 0610-302 4

AC Circuits 0609-202 4

Digital Fundamentals 0618-301 4

Calculus for Technologists I 1019-420 4

Mechanical Students

Introduction to Statics 0610-302 4

Analytic Geometry 1016-288 4

College Physics II 1017-212, 272 4

Liberal Arts (Core)* 4

Total Quarter Credit Hours 50

**See page 10 for Liberal Arts requirements.*

ELECTRICAL/MECHANICAL TECHNOLOGY

James F. Scudder, Coordinator

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 Technology Program are able to effectively bridge the gap between coworkers with more specialized backgrounds.

Objectives of the program

This part-time, upper-division evening program is designed primarily for the adult student who needs to expand his/her knowledge of basic engineering technology principles. The program is designed with the maximum amount of flexibility to allow students with various backgrounds and interests to obtain appropriate technical degrees, and to qualify for professional positions

Curriculum

The program's requirements are based on an entire baccalaureate degree. Approximately half of the courses are in mathematics, physics, chemistry, communications, and liberal arts. In addition to these general studies requirements, the core of the program consists of 67 credits of specified technical courses. These courses cover the disciplines of electricity, electronics, microprocessors, computer programming, mechanics, materials, thermal science, engineering graphics, manufacturing processes, and economic analysis. Once a student completes the core, he/she may select a group of three courses in a particular discipline. The student may use this concentration to tailor the degree to meet specific employment objectives. The remaining 25 credits must be appropriate technical, mathematics, or science courses. This portion of the curriculum accommodates the diverse backgrounds of students entering the program

Transfer admission

Admission is open to students who possess associate degrees in engineering technology or engineering science. Students with baccalaureate degrees in non-technical fields may also take this program, but will need additional technical coursework to meet the overall degree requirements. The minimum expected preparation for admission includes mathematics through introductory calculus, college physics, English composition, and computer programming. Transfer credit is evaluated on a course-by-course basis, i.e., each course taken as part of a previous degree is compared to a specific program requirement. Any course that does not match a specific requirement is applied to either the general education or technical elective requirement. Transfer credit will not be awarded for courses that could increase the number of elective credits beyond the program maximums.

Additional requirements

The following courses are required in addition to those in the accompanying 'typical sequence' listing. If a student has not completed equivalent courses, he/she will need to take these

College Algebra & Trigonometry
 College Physics I, II
 Engineering Graphics
 Manufacturing Processes
 Pneumatics & Hydraulics
 Computer Programming (BASIC, FORTRAN, or C)
 English Composition
 Three courses in humanities and/or social science
 24 credits in technical electives

Sample technical concentrations

After completing the core, a student will select, 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
 Electrical & Optical Devices
 Advanced Circuit Theory
 Advanced Electronics
 Control Systems

Mechanical Design

Dynamics of Machinery
 Machine Design I
 Machine Design II

Manufacturing Management

Production Control
 Statistical Process Control
 Special Topics in Computer Integrated Manufacturing

Electrical/Mechanical Technology, BS degree, upper division evening program, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Calculus for Technologists I 1019-420	4
Liberal Arts (Core)*	4
Calculus for Technologists II 1019-421	4
Electrical Principles for Design I 0609-411†	4
Solution of Engineering Problems 1019-422	4
Electrical Principles for Design II 0609-412†	4
 <i>Second Year</i>	
Applied Mechanics I 0610-408†	4
Engineering Economics 0617-436	4

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Machines and Transformers 0609-337	4
Liberal Arts (Core)*	4
Applied Mechanics II 0610-410	4
Applied Microprocessors 0609-413†	4

Third Year

Data Communications & Computer Networks 0602-411	4
MET Lab I 0610-407	2
Computers in MET 0610-432	2
Effective Technical Communications 0535-403	4
Basic Chemistry I 1011-271	3
Chemistry Lab 1011-205	1
Basic Chemistry II 1011-273	3
Chemistry Lab 1011-277	1
Metallurgy and Materials Testing 0610-211, 304	4

Fourth Year

Controls for Industrial Automation 0617-470	3
Liberal Arts (Concentration)*	4
Elementary Statistics 1016-309	4
Liberal Arts (Concentration)*	4
Materials Technology 0610-416	4
MET Lab II 0610-409	2

Fifth Year

Technical Concentration	4
Liberal Arts (Concentration)*	4
Technical Concentration	4
Senior Seminar 0520-501 *	2
Value Analysis 0617-437	3
Thermodynamics and Heat Transfer 0610-441	4

Sixth Year

Technical Concentration	4
<i>Total Quarter Credit Hours (including transfer credit)</i>	192

**See page 10 for Liberal Arts requirements.*

These courses present materials normally covered in associate degree programs, depending on the specific major. Students should consult an adviser to determine which of these courses should be taken, and which lower-division courses should also be taken.

CIVIL ENGINEERING TECHNOLOGY

Robert H. Easton, Chair, Civil Engineering Technology Baccalaureate Program

Background

The civil engineering profession requires the services of many individuals with a wide range of backgrounds and interests: technicians, technologists, and engineers

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 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 (TAC/ABET) and is operated as a cooperative education program

Transfer admission

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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

Plan surveying

Route surveying

Statics (mechanics)

Strength of material

Methods and materials of construction

Students lacking these courses will still be admitted but will be 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; 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 working in the construction field typically work a wide range of duties from craft supervision to assisting project superintendents, doing 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's degree graduates are employed by consulting engineers, construction companies, and industries and by federal, state, and local government agencies. They are scattered from coast to coast and from New England to Texas. Their initial job titles range from assistant project superintendent, assistant project manager, structural designer, or junior engineer to construction inspector and environmentalist. Several graduates have completed master's degrees, and a large number have gained registration in several states as professional engineers

Technical electives

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

Water Resources

	<i>Quarter Credit Hours</i>
Hydrology 0608-482	4
Hydraulic Structures 0608-485	4
Groundwater Hydraulics 0608-480	4

Environmental Controls

Design of Water Treatment Facilities 0608-510	2
Land Planning 0608-514	4
Design of Wastewater Treatment Facilities 0608-520	4
Hazardous Waste 0608-525	4

Construction Management

Labor Relations 0608-500	2
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Cost Estimating 0608-509	2
Construction Project Management I 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	4
Construction Practices 0608-550	4
Construction Safety 0608-505	2
Pavement Design 0608-535	4
Mechanical Equipment 0608-444	2

Other Electives

Elementary Statistics 1016-309	4
Applied Thermodynamics 0610-440	4
Applied Dynamics 0610-405	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. The RIT College of Continuing Education offers evening courses, 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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Introduction to CET, Freshman 0608-198	1
College Algebra & Trigonometry 1016-204	4
Engineering Graphics 0608-210	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
English Composition 0502-220	4
Introduction to CAD 0617-261	4
Introduction to Statics 0610-302	4
College Physics II & Lab 1017-212, 272	4
Civil Engineering Graphics 0608-220	4
Literature 0504-322	4
Physical Education*	0
<i>Second Year</i>	
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

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General Ed. Elective	4
Liberal Arts (Core)†	8
Physical Education*	0
(Or completion of an appropriate associate degree or equivalent)	

Third Year

Calculus for Technologists II 1019-421	4
Introduction to CET, Transfer 0608-199	1
Hydraulics & Lab (or Technical Elective) 0608-420, 421	4
Effective Technical Communication 0535-403	4
Computer Techniques 0602-205	4
Solution of Engineering Problems 1019-422	4
Applied Mechanics of Materials 0608-404	4
Computer Techniques in CET 0608-513	2
Basic Chemistry I 1011-271	3
Chemistry I Lab 1011-205	1
Liberal Arts (Core)†	4
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
Liberal Arts (Core)†	4
Principles of Treatment of Water & Sewage 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)†	4
Cooperative Education (2 quarters)	Co-op

Fifth Year

Transportation Engineering 0608-530	4
Elements of Building Construction 0608-422	4
Technical Elective	4
Technical Elective	2
Basic Electrical Principles 0609-414	4
Engineering Economics 0617-436	4
Intro. to Dynamics in CET 0608-570	4
Liberal Arts (Concentration)†	8
Liberal Arts (Senior Seminar)†	2
Cooperative Education (1 quarter)	Co-op
<i>Total Quarter Credit Hours</i>	201

**See page 11 for policy on Physical Education.*

See page 10 for Liberal Arts requirements.

ELECTRICAL ENGINEERING TECHNOLOGY

Carol Richardson, Chair

Charles L. Swain, Coordinator, Electrical Engineering Technology Baccalaureate Program

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 over a year of cooperative work experience for full-time students. The program also accepts transfer students (see **Transfer admission**, below). 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 (TAC/ABET).

A typical BS program is shown in the chart on the next page. The first two years provide basic courses in electricity, 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, transformed circuits, 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, digital computer design, and microelectronics. Several electives also are available from other technical disciplines, and the students 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

Digital Computer Design II 0618-539

Digital Computer Design III 0618-540

Power Systems

Power Systems I 0609-550

Protective Relaying 0609-551

Power Systems II 0609-552

Electronic Communications

Analog Communications 0609-534

Telecommunications Systems 0609-535

Microwave Systems 0609-524

Digital Processing of Signals 0609-547

Microelectronics

Microelectronics I 0609-560

Microelectronics II 0609-561

Other Electives

Electrostatic and Magnetic Fields 0609-520

Electronic Optic Devices 0609-554

Senior Project 0609-580

Statistical Quality Control 0617-424

Robots in Manufacturing 0617-485

Value Analysis 0617-437

Robust Design 0610-570

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 a TAC/ABET-accredited

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baccalaureate degree. 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 and microprocessors.

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

<i>First Year</i>	<i>Quarter Credit Hours</i>
DC Circuits 0609 201	4
Electronic Fabrication Techniques 0618-220	2
Schematic Capture 0618-225	2
College Algebra & Trigonometry 1016-204	4
First Year Orientation 0609-207	1
Liberal Arts (Core)*	12
AC Circuits 0609-202	4
C Programming 0602-207	4
Calculus for Technologists I, II 1019-420 & 421	8
Electronics I 0609-203	4
Digital Fundamentals 0618-301	4
Physical Education*	0
<i>Second Year</i>	
College Physics I 017-211, 271	4
College Physics II 1017-212, 272	4
College Physics III 017-213, 273	4
Electronics II, III 0609-361, 362	8
Solution of Engineering Problems 1019-422	4
Liberal Arts (Core)*	8
Machines & Transformers 0609-337	4
Electronics IV 0609-363	4
Microcomputers 0618-303	4
Principles of Electronic Design Automation 0618-320	4
Physical Education*	0
(Or completion of an appropriate associate degree or equivalent)	
<i>Third Year</i>	
Digital Systems Design I 0618-438	4
Technical Electives	8
Liberal Arts (Core)*	4
Co-op Preparation 0606-099	0
Linear Math for Engineering Technology 1019-423	4
Liberal Arts (Concentration)*	4
Microcontrollers 0609-439	4
Effective Technical Communications 0535-403	4
Cooperative Education (2 quarters)	Co-op
<i>Fourth Year</i>	
Statistics 1016-309	4

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Technical Electives	8
Liberal Arts (Concentration)*	4
Advanced Circuit Theory 0609-403	4
Applied Mechanics I 0610-408	4
Advanced Electronics 0609-442	4
Engineering Economics 0617-436	4
Cooperative Education (2 quarters)	Co-op

Fifth Year

Control Systems 0609-404	4
Transmission Lines 0609-408	4
Senior Seminar	2
Professional Electives	8
Technical Elective	4
General Education Elective	4
Liberal Arts (Concentration)*	4
Cooperative Education (1 quarter)	Co-op
<i>Total Quarter Credit Hours</i>	191

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

**See page 10 for Liberal Arts requirements.*

See page 11 for policy on Physical Education.

Electrical Engineering Technology, BS degree, typical evening course sequence, upper division only

<i>First Year</i>	<i>Quarter Credit Hours</i>
Calculus for Technologists II 1019-421*	4
Liberal Arts (Core)†	4
Solution of Engineering Problems 1019-422*	4
Schematic Capture 0618-225	2
Machines & Transformers 0609-337	4
Advanced Circuit Theory 0609-403	4
Principles of Electrical Design Automation 0618-320	4

Second Year

Introduction to Strength of Materials 0610-408 or	
General Education Elective	4
Liberal Arts (Core)†	4
Advanced Electronics 0609-442	4
Effective Technical Communication 0535-403	4
Control Systems I 0609-404	4
Linear Math for Technologists 1019-423	4

Third Year

Transmission Lines 0609-408	4
General Education Elective	4
Digital Systems Design I 0618-438	4
Statistics 1016-309	4
Microcontrollers 0618-439	4
C Programming 0602-207	4

Fourth Year

Liberal Arts (Concentration)†	4
Engineering Economics 0617-436	4
Liberal Arts (Concentration)†	4

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Technical Elective	8
Thermodynamics & Heat Transfer 0610-441 or General Education Elective	4
<i>Fifth Year</i>	
Liberal Arts (Concentration)†	4
Senior Seminar†	2
<i>Total Quarter Credit Hours</i>	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.*

See page 10 for Liberal Arts requirements.

Electrical Technology, AAS degree, typical evening sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
College Algebra & Trigonometry 1016-204*	4
Liberal Arts (Core)†	8
DC Circuits 0609-201	4
Calculus for Technologists I 1019-420*	4
AC Circuits 0609-202	4
<i>Second Year</i>	
Physics I & Lab 1017-211, 271	4
Electronics I 0609-203	4
Physics II & Lab 1017-212, 272	4
Schematic Capture 0618-225	2
Electronic Fabrication Techniques 0618-220	2
Physics III & Lab 1017-213, 273	4
General Education*	4
<i>Third Year</i>	
C Programming 0602-207	4
Effective Technical Communication 0535-403	4
Electronics II 0609-361	4
Calculus for Technologists II 1019-421	4
Electronics III 0609-362	4
Technical Elective	4
<i>Fourth Year</i>	
Electronics IV 0609-363	4
Digital Fundamentals 0618-301	4
Machines & Transformers 0609-337	4
Introduction to Microprocessors 0618-303	4
General Education*	4
Principles of Electronic Design Auto. 0618-320	4
<i>Total Quarter Credit Hours</i>	96

**Alternate sequence based on pretest is 1016-201, 1016-202, and 1019-420.*

See page 10 for Liberal Arts requirements.

**General education requirements are : 1 social science (sociology, psychology, economics, political science); 1 humanities (literature, history, fine arts, philosophy)*

COMPUTER ENGINEERING TECHNOLOGY

Thomas J. Dingman, Coordinator

ROCHESTER INSTITUTE OF TECHNOLOGY

There is an increasing need for graduates possessing both computer programming skills and a sound knowledge of computer (digital) electronic hardware. This is true for both technicians with an AAS degree and for technologists with the bachelor of science degree

Based on a foundation in physics and applied mathematics, the computer engineering technology program is designed to develop hardware and software skills necessary for the design and development of systems involving computers. The upper division of the program includes a required co-op work/study component, giving the student valid work experience before graduation

Students completing the first two years of the program will be eligible to receive the AAS degree and enter the employment field as computer technicians

Computer-aided design plays a significant role in the curriculum. Students learn to work in a design automation environment on computer workstations running state-of-the-art design software. The skills developed both in system operation and design creativity enhance preparation for both co-op and permanent job opportunities.

Electives are available in the upper division and may be taken from computer science or electrical engineering technology courses. Other courses are available on approval by an adviser

The program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET)

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 will be evaluated on a course-by-course basis and will be 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.

Technical electives

- A Programming Language Concepts 0601-450
 Language Processors 0603-580
- B Systems Programming Fundamentals 0601-306
 Operating Systems Lab 0603-540
- C Introduction to Computer Networks 0603-541
 Introduction to Computer Graphics 0603-570
- D Electrostatic & Magnetic Fields 0609-520
 Analog Communications 0609-534
 Telecommunications Systems 0609-535
- E Microelectronics I 0609-560
 Microelectronics II 0609-561

Other electives might be:

Engineering Economics 0617-436
Digital Processing of Signals 0609-547
Telecommunications Fundamentals 0609-271

Computer Engineering Technology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0618-101	1
College Algebra & Trigonometry 1016- 204	4
Calculus for Technologists I, II 1019-420, 421	8
Introduction to Programming 0602-208	4

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DC Circuits 0609-201	4
AC Circuits 0609-202	4
Electronics I 0609-203	4
Electronic Fabrication 0618-220	2
Schematic Capture 0618-225	2
Digital Fundamentals 0618-301	4
Liberal Arts*	12

Second Year

College Physics I, II, III & Lab 1017-211, 271, 212, 272, 213, 273	12
Electronics II, III 0609-361, 362	8
Program Design & Validation 0602-210	4
Abstractions in Programming 0602-212	4
Microcomputers 0618-303	4
Principles of Electronic Design Automation 0618-320	4
Effective Technical Communication 0535-403	4
Liberal Arts*	8
(Or completion of an appropriate associate degree or equivalent)	

Third Year

Solutions of Engineering Problems 1019-422	4
Co-op Preparation 0606-099	0
Linear Math for Technicians 1019-423	4
Fundamentals of Computer Science 0601-360	4
Data Organization and Management 0603-325	4
Digital Systems Design I 0618-438	4
Advanced Circuit Theory 0618-403	4
Liberal Arts*	8
Cooperative Education (2 quarters)	Co-op

Fourth Year

Discrete Math I, II 1016-265, 266	8
Operating Systems 0603-440	4
'C' Programming Seminar 0601-309	1
Digital Systems Design II 0618-539	4
Advanced Electronics 0618-429	4
Control Theory 0609-404	4
Liberal Arts*	8
Cooperative Education (2 quarters)	Co-op

Fifth Year

Math/Science Elective	4
Data Communications 0603-420	4
Digital Systems Design III 0618-540	4
Topics in Computer Engineering Technology 0618-571	4
Technical Electives	8
Semiconductor Device Physics 1017-300	4
Liberal Arts (Senior Seminar)*	2
Cooperative Education (1 quarter)	Co-op
<i>Total Quarter Credit Hours</i>	192

*See page 10 for Liberal Arts requirements.

TELECOMMUNICATIONS ENGINEERING TECHNOLOGY

Carol A. Richardson, Coordinator

This new program is designed to meet the ever increasing need of the telecommunications industry for state-of-the-art principles, applications, equipment, and regulatory policies. Telephone companies, 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 management perspective. The five-year BS program in telecommunications engineering technology includes over 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 six courses, allowing students to choose after they have been introduced to the fundamentals of telecommunications, electronics, mathematics, science, and the liberal arts

The Technical Option emphasizes the applications and equipment used on specific job sites. Technical electives are available in telecommunications and other areas of electrical and computer engineering technology.

The Management Option emphasizes resource management of an overall telecommunications installation. Business courses in accounting, finance, marketing, and organizational behavior are included.

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 assigned to each student

The program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET)

Transfer admission

Transfer admission is open to graduates of two-year associate degree programs on a course-by-course evaluation. Students from closely related programs, such as telecommunications technology or electrical/electronics technology, can normally expect to graduate in three years, which includes seven academic quarters and four 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.

Technical electives

Microcontrollers 0609-439
 Digital Systems Design I, II, III 0618-438, 539, 540
 Principles of Electronic Design Automation 0618-320
 Advanced Circuit Theory 0609-403
 Advanced Electronics 0609-442
 Control Systems 0609-404
 Digital Processing of Signals 0609-547
 Local Area Network Administration 0609-476
 Analog Communications 0609-534

Evening program

The upper division of this program may be taken evenings. 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

<i>First Year</i>	<i>Quarter Credit Hours</i>
DC Circuits 0609-201	4
Electronic Fabrication Techniques 0618-220	2
Schematic Capture 0610-225	2
College Algebra & Trigonometry 1016-204	4
First Year Orientation--Telecommunications 0609-209	1
Liberal Arts (Core)*	12
AC Circuits 0609-202	4
Telecommunications Fundamentals 0609-271	4
Calculus for Technologists I, II 1019-420, 421	8
Electronics I 0609-203	4
Digital Fundamentals 0618-301	4

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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 II, III, IV 0609-361, 362, 363	12
Solution of Engineering Problems 1019-422	4
Introduction to Programming 0602-208	4
Program Design & Validation 0602-210	4
Liberal Arts (Core)*	12
Physical Education*	0
(Or completion of an appropriate associate degree or equivalent)	

Technical Option, upper division

Third Year

Telecommunications Concepts 0609-472	4
Microcomputers 0618-303	4
Statistics 1016-309	4
Co-op Preparation ITES-099	0
Linear Math 1019-423	4
Voice Communications 0609-474	4
Technical Electives	8
Effective Technical Communications 0535-403	4
Cooperative Education (2 quarters)	Co-op

Fourth Year

Networking Technologies 0609-477	4
Liberal Arts (Concentration)*	4
Transmission Systems 0609-473	4
Applied Database Management 0602-483	4
Technical Elective	4
Math/Science Elective	4
Switching Technologies 0609-475	4
Telecommunications Policy 0609-480	4
Cooperative Education (2 quarters)	Co-op

Fifth Year

Network Engineering 0609-571	4
Network Management 0609-572	4
Liberal Arts (Concentration)*	8
Senior Seminar	2
Technical Electives	8
Engineering Economics 0617-436	4
Network Planning & Design 0609-574	4
Cooperative Education (1 quarter)	Co-op
<i>Total Quarter Credit Hours</i>	195

*See page 10 for Liberal Arts requirements.

See page 11 for policy on Physical Education.

Management Option, upper division

Third Year

Telecommunications Concepts 0609-472	4
Financial Accounting 0101-301	4
General Education Elective	4
Statistics 1016-309	4
Co-op Preparation Course	0
Math/Science Elective	4

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Voice Communications 0609-472	4
Managerial Accounting 0101-302	4
Effective Technical Communication 0535-403	4

Fourth Year

Networking Technologies 0609-477	4
Applied Database Management 0602-483	4
Transmission Systems 0609-473	4
Principles of Economics I GSEE-301	4
Principles of Marketing 0105-463	4
Organizational Behavior 0102-430	4
Switching Technologies 0609-475	4
Telecommunications Policy 0609-480	4

Fifth Year

Network Engineering 0609-571	4
Network Management 0609-572	4
Technical Elective	4
Liberal Arts (Concentration)*	12
Senior Seminar	2
Corporate Finance 0102-441	4
Network Planning & Design 0609-574	4
<i>Total Quarter Credit Hours</i>	98

**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*

Telecommunications Fundamentals 0609-271	4
Calculus for Technologists I 1019-420	4
Calculus for Technologists II 1019-421	4
Telecommunications Concepts 0609-472	4
Solutions of Engineering Problems 1019-422	4
Voice Communications 0609-474	4

Second Year

Networking Technologies 0609-477	4
Financial Accounting 0201-201	4
Effective Technical Communications 0535-403	4
Managerial Accounting 0201-203	4
Principles of Economics I 0237-221	4
Technical Elective	4

Third Year

Transmission Systems 0609-473	4
Principles of Marketing 0105-463	4
Network Engineering 0609-571	4
Statistics 1016-309	4
Liberal Arts (Core)*	4
Switching Technologies 0609-475	4

Fourth Year

Intro. to Telecommunications Policy 0609-480	4
Liberal Arts (Concentration)*	4
Organizational Behavior 0102-430	4
Network Management 0609-572	4
Corporate Finance 0104-441	4
Network Planning & Design 0609-574	4

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Fifth Year

Math/Science Elective	4
Liberal Arts (Concentration)*	8
Applied Database Management 0602-483	4
Senior Seminar*	2
Total Quarter Credit Hours	114

**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*

Telecommunications Fundamentals 0609-271	4
Calculus for Technologists I 1019-420	4
Calculus for Technologists II 1019-421	4
Telecommunications Concepts 0609-472	4
Solutions of Engineering Problems 1019-422	4
Voice Communications 0609-474	4

Second Year

Networking Technologies 0609-477	4
Liberal Arts (Core)*	4
Effective Technical Communication 0535-403	4
Technical Elective	4
Linear Math for Technology 1019-423	4
Liberal Arts (Core)*	4

Third Year

Transmission Lines 0609-473	4
Applied Database Management 0602-483	4
Network Engineering 0609-571	4
Statistics 1016-309	4
Switching Technologies 0609-475	4
Math/Science Elective	4

Fourth Year

Intro. to Telecommunications Policy 0609-480	4
Liberal Arts (Concentration)*	8
Network Management 0609-572	4
Engineering Economics 0617-436	4
Network Planning & Design 0609-574	4

Fifth Year

Technical Electives	12
Liberal Arts (Concentration)*	4
Senior Seminar*	2
Total Quarter Credit Hours	106-114

**See page 10 for Liberal Arts requirements.*

MECHANICAL ENGINEERING TECHNOLOGY

Robert Merrill, 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 and CAD and how to make

parts and use computers. 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 assigned design projects.

The program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET) and is operated on the cooperative education plan

Program objectives

The program objectives are to prepare graduates to hold professional positions in machine design; manufacturing; test engineering; field service engineering; technical sales; thermal analysis; product design; utilities operations; heating, ventilating, and air conditioning; and 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 programs will have provided the student with background in the following:

Mathematics through Introductory Calculus
Physics
Mechanical Drafting
Computer Drafting
Manufacturing Processes
Statics and Elementary Strength of Materials
Computer Use
Metallurgy
Electric Circuits

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; 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 TAC/ABET-accredited baccalaureate degree.

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

Students also may elect certain courses from the 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

Electromechanical Technology, associate program

This part-time evening program is designed to prepare technicians for employment in electromechanical positions where a knowledge of mechanical and electrical disciplines is required. It also prepares graduates to continue their studies toward a baccalaureate degree in engineering technology. The program begins with courses in mathematics, physics, mechanical drafting, and basic electricity. The advanced portion covers topics in electronics, mechanics, hydraulics, electrical power, and microprocessors. A final design course ties all of the disciplines together. Courses in composition, communication, social science, and humanities round out the program

Mechanical Engineering Technology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0610-101	1
College Algebra & Trigonometry 1016-204	4
English Composition 0502-220	4
Intro. to Graphics 0608-210	4
Manufacturing Processes I 0617-220	4
Analytic Geometry 1016-228	4
College Physics I and Lab 1017-211, 271	4
Mechanical Design Drawing 0610-220	4
Introduction to Materials Technology 0610-211	3
Materials Testing 0610-304	1
College Physics II and Lab 1017-212, 272	4
Introduction to CAD 0617-260	4
Introduction to Statics 0610-302	4
Liberal Arts (Core)*	4
Physical Education*	0
<i>Second Year</i>	
College Physics III and Lab 1017-213, 273	4
Metrology 0610-212	2
Strength of Materials 0610-303	4
Report Writing 0236-315	2
Literature 0504-332	4
Electrical Principles for Design I 0610-411	4
Principles of Mechanical Design I 0610-315	4
Liberal Arts (Core)*	4
Sophomore Seminar 0610-102	1
Technical Electives*	8
Pneumatic and Hydraulic Systems 0610-305	4
Computational Methods 0610-330	4
Calculus for Technologists I 1019-420	4
Physical Education*	0
Or completion of an appropriate associate degree or equivalent	
<i>Third Year</i>	<i>Quarter Credit Hours</i>
Calculus for Technologists II 1019-421	4
Computers in MET 0610-432	2
Applied Mechanics of Materials 0610-404	4
Basic Chemistry I 1011-271	3
Chemistry I Lab 1011-205	1
Effective Technical Communication 0535-403	4
Co-op Preparation ITES-099	0

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Solutions of Engineering Problems 1019-422	4
Applied Dynamics 0610-405	4
MET Lab I 0610-407	2
Basic Chemistry II and Lab 011-273, 277	4
Liberal Arts (Core)*	4
Cooperative Education (2 quarters)	Co-op

Fourth Year

Materials Technology 0610-416	4
MET Laboratory II 0610-409	2
Applied Thermodynamics 0610-440	4
Data Analysis 1016-319	4
Liberal Arts (Core)*	4
Applied Fluid Mechanics 0610-460	4
Machine Design I 0610-506	4
Technical Elective*	4
Liberal Arts (Concentration)	4
Cooperative Education (2 quarters)	Co-op

Fifth Year

Thermofluid Lab 0610-465	3
Electrical Elective	4
Technical Elective*	8
Liberal Arts (Concentration)*	8
General Education Elective	4
Liberal Arts (Senior Seminar)*	2
Cooperative Education (1 quarter)	Co-op
<i>Total Quarter Credit Hours</i>	197

**See page 10 for Liberal Arts requirements.*

See page 11 for policy on Physical Education.

**Technical electives must be approved by student's adviser.*

Mechanical Engineering Technology, BS degree, upperdivision, evening program, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Liberal Arts (Core)*	8
Effective Technical Communication 0535-403	4
Calculus for Technologists II 1019-421	4
Applied Mechanics of Materials 0610-404	4
Solutions of Engineering Problems 1019-422	4
 <i>Second Year</i>	
Applied Dynamics 0610-405	4
MET Lab I 0610-407	2
Computers in MET 0610-432	2
Basic Chemistry I and Lab 1011-271, 205	4
Basic Chemistry II and Lab 1011-273, 277	3
Applied Thermodynamics 0610-508	4
Liberal Arts (Concentration)*	4
 <i>Third Year</i>	
Electrical Elective	4
Liberal Arts (Concentration)*	8
Applied Fluid Mechanics 0610-460	4
Data Analysis 016-319	4
Materials Technology 0610-416	4
MET Lab II 0610-409	2

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Senior Seminar*	2
<i>Fourth Year</i>	
Machine Design I 0610-506	4
Liberal Arts (Concentration)*	4
Technical Elective†	12
Thermofluid Laboratory 0610-465	3
<i>Fifth Year</i>	
General Education Elective	4
Total Quarter Credit Hours	99

*See page 10 for Liberal Arts requirements.

Technical Electives must be approved by student's adviser.

Mechanical Technology, AAS degree, evening program typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
College Algebra & Trigonometry 1016-204	4
Communications 0236-220	4
Manufacturing Processes I 0617-220	4
Introduction to Engineering Graphics 0608-210	4
Mechanical Design Drawing 0610-220	4
Analytic Geometry 1016-228	4
<i>Second Year</i>	
Introduction to CAD 0617-260	4
Physics I and Lab 1017-211, 271	4
Physics II and Lab 1017-212, 272	4
Report Writing 0236-315	2
Metrology 0610-212	2
Physics III and Lab 1017-213, 273	4
Literature 0504-332	4
<i>Third Year</i>	
Introduction to Statics 0610-302	4
Calculus for Technologists I 1019-420	4
Strength of Materials 0610-303	4
Liberal Arts (Core)*	4
Introduction to Materials Technology 0610-211	3
Materials Testing 0610-304	1
Pneumatic & Hydraulic Systems 0610-305	4
<i>Fourth Year</i>	
Computational Methods 0610-330	4
Principles of Mechanical Design I 0610-315	4
Technical Elective†	4
Liberal Arts (Core)*	4
Electrical Principles for Design I 0609-411	4
Technical Elective†	4
Total Quarter Credit Hours	96

*See page 10 for Liberal Arts requirements.

Technical Electives must be approved by student's adviser.

Electromechanical Technology, AAS degree, evening program, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
College Algebra & Trigonometry 1016-204	4

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Introduction to Engineering Graphics 0608-210	4
Liberal Arts*	4
DC Circuits 0609-201	4
AC Circuits 0609-202	4
Analytic Geometry 1016-228	4
<i>Second Year</i>	
Physics I & Lab 1017-211, 271	4
Electronic Devices 0609-203	4
Physics II & Lab 1017-212, 272	4
Report Writing 0236-315	2
Schematic Capture 0618-225	2
Communication 0236-220	4
Physics III & Lab 1017-213, 273	4
<i>Third Year</i>	
Introduction to Statics 0610-302	4
Computer Techniques--Pascal 0602-208	4
Strength of Materials 0610-303	4
Calculus for Technologists I 1019-420	4
Pneumatic & Hydraulic Systems 0610-305	4
General Education	4
<i>Fourth Year</i>	
Programmable Controllers 0617-331	4
Digital Fundamentals 0618-301	4
Introduction to Microprocessors 0618-303	4
Machines & Transformers 0609-337	4
Literature 0504-332	4
Electromechanical Design 0610-351	4
<i>Total Quarter Credit Hours</i>	96

*See page 10 for Liberal Arts requirements.

MANUFACTURING ENGINEERING TECHNOLOGY

V. Raju, Chair

Leaders in the manufacturing engineering profession estimate that the present shortage of qualified manufacturing engineers and technologists is between 50,000-100,000 people-and the need is increasing. They also estimate that between 20,000-30,000 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, which 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 insure product *manufacturability*.

Efforts to improve productivity have led to the rapid introduction of new processes, equipment, and 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, and computer-integrated manufacturing

The manufacturing engineering technology program is designed to meet industry demands. The program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET) and is operated on the cooperative education plan

Program objectives

The primary objective of the manufacturing engineering technology program is to prepare individuals for professional employment in the manufacturing field. This program is designed to provide the academic skills necessary for applying both today's and tomorrow's manufacturing technologies. These academic 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 non-traditional manufacturing processes, fundamentals of electronics and microprocessors, computer-aided design, computer numerical control, robotics, group technology, computer-aided process planning, materials requirements planning, 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, 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 a TAC/ABET-accredited baccalaureate degree

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

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

Manufacturing Technology, associate program

This part-time evening program is designed to prepare technicians for employment in the manufacturing field. It also prepares graduates for continuing their studies toward a baccalaureate degree in engineering technology. The program begins with courses in mathematics, physics, mechanical drafting, CAD, and manufacturing processes. The latter portion of the technical program covers topics in mechanics, materials, tool design, CNC, and computer integrated manufacturing. Courses in composition, communication, social science, and humanities round out the program.

Manufacturing Engineering Technology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0617-101	1
College Algebra & Trigonometry 1016-204	4
English Composition 0502-220	4
Introduction to Engineering Graphics 0608-210	4
Manufacturing Processes I 0617-220	4
Analytic Geometry 1016-228	4
College Physics I/Lab 1017-211, 271	4
Mechanical Design Drawing 0610-220	4
Introduction to Materials Technology 0610-211	3
Materials Testing 0610-304	1
Calculus for Technologists I 1019-420	4
College Physics II & Lab 1017-212, 272	4
Introduction to CAD 0617-260	4
Introduction to Statics 0610-302	4

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Physical Education*	0
<i>Second Year</i>	
Calculus for Technologists II 1019-421	4
College Physics III & Lab 1017-213, 273	4
Strength of Materials 0610-303	4
Metrology 0610-212	2
Solutions of Engineering Problems 1019-422	4
Computer Techniques--BASIC 0602-206	4
Technical Elective	8
Statistics 1016-309	4
Liberal Arts (Core)*	8
Physical Education*	0
(Or completion of an appropriate associate degree or equivalent)	
<i>Third Year</i>	
Co-op Preparation 0606-099	0
Effective Communication 0535-403	4
Computer Aided Design 0617-460	4
Electrical Principles for Design I 0609-411	4
Non-traditional Manufacturing Processes 0617-502	4
Computer Numerical Control 0617-471	3
Applied Microprocessors 0609-413	4
Computers in Manufacturing 0617-410	3
Liberal Arts (Core)*	8
Cooperative Education (2 quarters)	Co-op
<i>Fourth Year</i>	
Controls for Mfg. Automation 0617-470	3
Statistical Quality Control 0617-425	3
Basic Chemistry I 1011-271	3
Chemistry I Lab 1011-205	1
Tool Engineering 0617-472	3
Robots in Manufacturing 0617-485	4
Value Analysis 0617-437	3
Liberal Arts (Concentration)*	8
Technical Electives	7
Cooperative Education (2 quarters)	Co-op
<i>Fifth Year</i>	
Computer Aided Manufacturing 0617-475	4
Technical Elective	3
Engineering Economics 0617-436	4
Process Design 0617-510	3
Technical Electives	10
Liberal Arts*	4
Liberal Arts (Concentration)*	4
Liberal Arts (Senior Seminar)*	2
Cooperative Education (1 quarter)	Co-op
<i>Total Quarter Credit Hours</i>	193

*See page 10 for Liberal Arts requirements.

See page 11 for policy on Physical Education.

Manufacturing Engineering Technology, BS degree, upper division, evening program, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Nontraditional Manufacturing Processes 0617-502	3
Calculus for Technologists II 1019-421	4

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Effective Technical Communications 0535-403	4
Solutions of Engineering Problems 1019-422	4
Computer-Aided Design 0617-460	4
Statistics 1016-309	4

Second Year

Liberal Arts (Core)*	8
Computer Numerical Control 0617-471	4
Electrical Principles for Design I 0609-411	4
Applied Microprocessors 0609-413	4
Computers in Manufacturing Eng. Tech. 0617-410	3

Third Year

Basic Chemistry I 1011-271	3
Chemistry I Lab 1011-205	1
Controls for Mfg. Automation 0617-470	3
Statistical Quality Control II 0617-425	3
Value Analysis 0617-437	3
Engineering Economics 0617-436	4

Fourth Year

Robots in Manufacturing 0617-485	4
General Studies Elective	4
Liberal Arts (Core)*	4
Computer-Aided Manufacturing 0617-475	4

Fifth Year

Liberal Arts (Concentration)*	8
Tool Engineering 0617-472	3
Liberal Arts (Concentration)*	4
Liberal Arts (Senior Seminar)*	2
Process Design 0617-510	4
<i>Total Quarter Credit Hours</i>	100

**See page 10 for Liberal Arts requirements*

Manufacturing Technology, AAS degree, evening program, typical course sequence

First Year *Quarter Credit Hours*

College Algebra & Trigonometry 1016-204	4
Manufacturing Processes 0617-220	4
Introduction to Engineering Graphics 0608-210	4
Mechanical Design Drafting 0610-220	4
Analytic Geometry 1016-228	4

Second Year

Introduction to CAD 0617-260	4
Communications 0236-220	4
Physics I & Lab 1017-211, 271	4
Physics II & Lab 1017-212, 272	4
Report Writing 0236-315	2
Metrology 0610-212	2
Basic Chemistry I 1011-271	3
Chemistry I Lab 1011-205	1
Technical Elective	4

Third Year

Introduction to Statics 0610-302	4
Computer Techniques--BASIC 0602-206	4
Strength of Materials 0610-303	4
Calculus for Technologists I 1019-420	4

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Introduction to CAM 0617-375	4
CAD Applications to Tool Design 0617-372	4
<i>Fourth Year</i>	
Introduction to Materials Technology 0610-211	3
Materials Testing 0610-304	1
Introduction to Literature 0235-260	4
Introduction to CIM 0617-330	4
Technical Elective	8
General Education	4
<i>Total Quarter Credit Hours</i>	96

SCHOOL OF FOOD, HOTEL, AND TRAVEL MANAGEMENT

Francis M. Domoy, Director

RIT's School of Food, Hotel, and Travel Management offers five programs:

- o Hotel And Resort Management
- o Travel And Tourism Management
- o Food Management
- o Nutrition Management
- o Food Marketing And Distribution

The school prepares students for a wide variety of career choices that include, but are not limited to, food management; hotel/resort management; health care; travel consulting; 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 school programs provide a broadly based view of 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 components 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, leadership, and excellence. The schools first priority is to equip students with these skills and qualities.

Now in its 102nd year, RIT's School of Food, Hotel, and Travel Management is one of the nation's leading hospitality-travel management programs and has been recognized for its programs by *Forbes*, *Travel Weekly*, *Nation's Restaurant News*, and *Corporate Travel* magazines.

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

The goal of the school 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

Undeclared Food, Hotel, and Travel Management Option

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.

Objectives

It is the mission of the school to prepare students to excel in their chosen profession by developing:

1. Theoretical and technical knowledge essential to successful attainment of professional, executive-level management

2. The ability to apply knowledge and original thinking to solving management problems
3. The skills and techniques of leadership
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

The School of Food, Hotel, and Travel Management requires 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 Council

National industry leaders comprise the National Advisory Board, contributing professional and technical expertise to the school's undergraduate programs and strengthening the development of the school.

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 85-90 quarter credit hours with an earned minimum grade point average of 2.0 and two quarters of approved cooperative education assignments.

Transfer students with less than two years of college or from other educational backgrounds can also 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 coordinated dietetics

RIT makes every effort to facilitate transfer credit. Due to specific areas of study required by the American Dietetic Association and RIT, transfer students applying for admission to the professional phase of the coordinated program in dietetics must meet course prerequisites listed in the preprofessional phase.

The following areas of study must be completed:

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Food and Nutrition Principles
General and Organic Chemistry
Biochemistry I
Physiology
Management Courses: Mathematics, Accounting, and Statistics
Economics
TOTAL of 24 credit hours of liberal arts (including Introduction to Sociology)

Applicants are required to have a minimum grade point average of 2.5 from two years of basic professional courses before they are considered for admission in the coordinated program

Students who are not accepted in the coordinated program may be admitted to the traditional program in general dietetics. Due to the special professional requirements of the American Dietetic Association, 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.

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 testing equipment

Information management is a critical element within food, hospitality, and travel industries. The school is fortunate to have for instruction the American Airlines SABRE computerized reservation and accounting systems in the live mode. The AT&T computer laboratory and the training studio allow students to prepare for the technology they will encounter on the job. Data base, spreadsheet, and various other software applications are used in conjunction with classroom activities. PRONET, a real time, worldwide agricultural commodities network, and other market information networks are also available for use

Spanish proficiency

Prior to graduation from RIT, students must demonstrate proficiency in communicating in the Spanish language with a specialization in terminologies common to their field of study; i.e., hotel, travel, food management; food marketing and distribution; or nutrition management. This proficiency can be met through high school or previous college education, residence abroad, or enrollment in Spanish language courses at RIT. This demonstrated proficiency must be jointly approved by the student's adviser and the school director.

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 by lab experience in Henry's, the school's full-service, 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,

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including accounting, computer science, statistics, leadership and executive development, personnel and labor management, and organizational behavior. These professional and business courses are balanced by a strong component of liberal arts and science

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

Food Management, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Career Seminar 0621-220	2
Hotel Operations 0622-200	4
Introduction to Foodservice Management 0621-222	4
Contemporary Nutrition 0620-213	4
Hospitality Industry Real Estate 0622-205	4
Algebra for Management Sciences 1016-225	4
Decision Making in Foodservice Management 0621-224	4
Principles of Food Production 0621-225	4
Orientation to Computers in Hospitality 0622-221 & Lab	2
Liberal Arts (Core)*	16
Physical Education*	0
Cooperative Education 0621-499	Co-op
<i>Second Year</i>	
Financial Accounting 0101-301	4
Quantity Food Production 0621-330	4
Statistics Methods I & Lab 1016-301, 311	4
Statistics Methods II & Lab 1016-302, 312	4
Statistics Methods III & Lab 1016-303, 313	4
Hotel Marketing & Sales 0622-210	4
Menu Planning & Merchandising 0621-321	2
Managerial Accounting 0101-302	4
Travel Distribution Systems 0623-206	4
Restaurant Operations 0621-331	6
Liberal Arts (Core)*	12
Physical Education*	0
Cooperative Education 0621-499	Co-op
<i>Third Year</i>	
Food & Labor Cost Control 0621-424	4
Science Elective with Lab	8
Principles of Economics I 0511-301	4
FHTMElectives	10
Principles of Marketing 0105-363	4
Personnel & Training 0622-480	4
Financial Mgmt. for Hospitality Industry 0622-355	4
Liberal Arts (Concentration)*	12
Cooperative Education 0621-499	Co-op
<i>Fourth Year</i>	
Product Development 0621-416	6
Free Electives	8
Leadership & Executive Development 0622-470	4
Liberal Arts (Senior Seminar)*	2
Liberal Arts (Upper Division Electives)*	12
Cooperative Education 0621-499	Co-op
<i>Total Quarter Credit Hours</i>	182

*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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Introduction to Foodservice Management 0621-222	4
Algebra for Management Science 1016-225	4
Travel Distribution System 0623-206	4
Career Seminar 0621-220	2
Hospitality Industry Real Estate 0622-205	4
Decision Making in Foodservice Management 0621-224	4
Principles of Packaging 0607-201	3
Orientation to Computers in Hospitality 0622-221	2
Quantity Food Production 0621-330	4
Liberal Arts (Core)*	16
Physical Education†	0
Cooperative Education 0621-499	Co-op
<i>Second Year</i>	
Financial Accounting 0101-301	4
Statistics Methods I & Lab 1016-301, 311	4
Statistics Methods II & Lab 1016-302, 312	4
Statistics Methods III & Lab 1016-303, 313	4
Science Elective with Lab	8
Managerial Accounting 0101-302	4
Restaurant Operations 0621-331	6
Principles of Economics I 0511-301	4
Liberal Arts (Core)*	12
Physical Education†	0
Cooperative Education 0621-499	Co-op
<i>Third Year</i>	
Commodity Market Analysis 0621-310	4
Packaging for Distribution 0607-432	4
FHTM Electives	14
Product Development 0621-416	6
Food Service Marketing 0621-315	4
Packaging for Marketing 0607-433	4
Personnel & Training 0622-480	4
Liberal Arts (Concentration)*	12
Cooperative Education 0621-499	Co-op
<i>Fourth Year</i>	
Food Processing/Quality Assurance 0621-410	4
FHTM Elective	8
Leadership & Executive Development 0622-470	4
Free Elective	4
Liberal Arts (Senior Seminar)*	2
Liberal Arts (Upper-Division Elective)*	12

Cooperative Education 0621-499
Total Quarter Credit Hours

Co-op
183

**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 data analysis, hotel engineering and maintenance, hotel marketing and sales, personnel and executive development, and negotiation and conflict management. Industry professionals regularly offer their expertise in all of the program courses

Students develop communication skills through participation in the student chapter of the Hotel Sales and Marketing International Association (HSMIA), and seniors are encouraged to attend the annual International Hotel/Motel and Restaurant show in New York City

Hotel and Resort Management, BS degree, typical course sequence

First Year *Quarter Credit Hours*

Hotel Operations 0621-200	4
Introduction to Foodservice Management 0621-222	4
Career Seminar 0621-220	2
Hospitality Industry Real Estate 0622-205	4
Hotel Marketing & Sales 0622-210	4
Algebra for Management Science 1016-225	4
Travel Distribution Systems 0623-206	4
Decision Making in Foodservice Management 0621-224	4
Orientation to Computers in Hospitality 0622-221	2
Liberal Arts (Core)*	16
Physical Education*	0
Cooperative Education 0621-499	Co-op

Second Year

Resort Development & Management 0622-310	4
Quantity Food Production 0621-330	4
Principles of Economics I 0511-301	4
Statistics Methods I & Lab 1016-301, 311	4
Statistics Methods II & Lab 1016-302, 312	4
In Statistics Methods III & Lab 1016-303, 313	4
Hotel Engineering & Maintenance 0622-315	4
Science Elective with Lab	4
Financial Management for Hospitality Industry 0622-355	4
Liberal Arts (Core)*	12
Physical Education†	0
Cooperative Education 0621-499	Co-op

Third Year

Principles of Marketing 0105-363	4
Food & Labor Cost Control 0621-424	4
Financial Accounting 0101-301	4
Science Elective with Lab	4
Managerial Accounting 0101-302	4
Liberal Arts (Concentration & Upper Division Electives)*	16

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FHTM Electives	10
Personnel & Training 0622-480	4
Cooperative Education 0621-499	Co-op

Fourth Year

Restaurant Operations 0621-331	6
Leadership & Executive Development 0622-470	4
FHTM Electives	12
Liberal Arts (Concentration & Upper Division Electives)*	8
Liberal Arts (Senior Seminar)*	2
Free Elective	4
Cooperative Education 0621-499	Co-op
<i>Total Quarter Credit Hours</i>	182

**See page 10 for Liberal Arts requirements.*

†See page 11 for policy on Physical Education.

TRAVEL AND TOURISM MANAGEMENT

The growth of modern travel has created many technical problems for the traveling public 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, and travel and transportation 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 airlines, hotels, resorts, retail travel agencies, and other businesses

American Airlines SABRE Systems

Available to students in the School of Food, Hotel, and Travel Management 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 SABRE's special file designed for the frequent business traveler. Known as STARS (Special Travelers Account Record System), the file contains not only addresses and telephone numbers, but individual preferences in flight times, aircraft, seating, menus, etc. It will also automatically 'remember' the traveler's customary requests with regard to hotel reservations, car rentals, and billing procedures

**Travel and Tourism Management, BS degree,
typical course sequence**

	<i>Quarter Credit Hours</i>
<i>First Year</i>	
Career Seminar 0621-220	2
Introduction to AA SABRE 0623-210	4
Hotel Operations 0622-200	4
Hospitality Industry Real Estate 0622-205	4
Algebra for Management Science 1016-225	4
Travel Distribution Systems 0623-206	4
Orientation to Computers in Hospitality 0622-221	2
Liberal Arts (Core)*	24
Physical Education†	0
Cooperative Education 0621-499	Co-op
<i>Second Year</i>	
Resort Development & Management 0622-310	4
Introduction to Foodservice Management 0621-222	4
Travel Reservation Procedures 0623-312	2
Principles of Economics I 0511-301	4
In Statistics Methods I & Lab 1016-301, 311	4
In Statistics Methods II & Lab 1016-302, 312	4
In Statistics Methods III & Lab 1016-303, 313	4
Decision Making in Foodservice Mgt. 0621-224	4
Salesmanship Techniques in Travel 0623-314	2
Hotel Marketing & Sales Mgt. 0622-210	4
Science Elective with Lab	4
Liberal Arts (Core)*	4
Liberal Arts (Concentration)*	8
Physical Education†	0
Cooperative Education 0621-499	Co-op
<i>Third Year</i>	
Principles of Marketing 0105-363	4
Financial Accounting 0101-301	4
Corporate Travel Marketing & Sales 0623-413	4
Corporate Travel Planning 0623-420	4
Managerial Accounting 0101-302	4
FHTM Electives	6
Financial Mgmt. for Hospitality Industry 0622-355	4
Meeting Management 0623-410	4
Science Elective with Lab	4
Liberal Arts (Concentration or upper div. elect.)*	12
Cooperative Education 0621-499	Co-op
<i>Fourth Year</i>	
Liberal Arts (Senior Seminar)*	2
Personnel & Training 0622-480	4
Free Elective	4
FHTM Electives	14
Leadership & Executive Development 0622-470	4
Liberal Arts (Upper-division elective)*	4
Cooperative Education 0621-499	Co-op
<i>Total Quarter Credit Hours</i>	182

*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 RIT nutrition management students are enrolled in the traditional 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 dietetics program. 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 in traditional dietetics leading to a BS degree meets the education requirements of the American Dietetic Association. Four-year students must complete three quarters of approved cooperative work experience. To become credentialed as a registered dietitian (RD), students also need to complete an approved, supervised practice and pass the National Registration Examination of the American Dietetic Association

Coordinated program option

This option combines the undergraduate curriculum and planned supervised practice to meet the academic and performance requirements established by the American Dietetic Association for eligibility as a registered dietitian (RD)

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 clinical instructors, each contributing his or her expertise in the profession

Co-op is not required of students in the coordinated program because 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.

Nutrition Management, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Career Seminar 0621-220	2
Survey of General Chemistry & Lab 1011-201, 205	4
Contemporary Nutrition 0620-213	4
Introduction to Foodservice Management 0621-222	4
Survey of Organic Chemistry & Lab 1011-202, 207	4
Algebra for Management Science 1016-225	4
Decision Making in Foodservice Management 0621-224	4
Principles of Food Production 0621-225	4
Orientation to Computers in Hospitality 0622-221	2
Biochemistry I 1011-203	4

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Liberal Arts (Core)*	12
Physical Education†	0

Second Year

Microbiology 1004-210	4
Biochemistry II 1011-204	4
Principles of Economics I 0511-301	4
Menu Planning & Merchandising 0621-321	2
Statistics I and Lab 1016-301, 311	4
Human Biology I & Lab 1004-211, 231	4
Human Biology II & Lab 1004-212, 232	4
Financial Accounting 0101-301	4
Liberal Arts (Core)*	16
Liberal Arts (Concentration)*	4
Physical Education*	0
Cooperative Education 0621-499	Co-op

Didactic Program Option

Third Year

Quantity Foods Production 0621-330	4
Product Development 0621-416	6
Free Elective	4
Food & Labor Cost Control 0621-424	4
Design & Layout of Food Operations 0621-512	2
Nutrition in Life Cycle 0620-554	5
Liberal Arts (Concentration)*	8
Cooperative Education (2 quarters) 0621-499	Co-op

Fourth Year

Advanced Nutrition/Diet Therapy I 0620-525	5
Leadership & Executive Development 0622-470	4
Personnel & Training 0622-480	4
Advanced Nutrition/Diet Therapy II 0620-526	8
Free Electives	4
Principles & Methods Diet. Education 0602-519	4
Community Nutrition 0620-550	8
Liberal Arts (Upper division elective)*	12
Liberal Arts (Senior Seminar)*	2
Total Quarter Credit Hours	182

*See page 10 for Liberal Arts requirements.

See page 11 for policy on Physical Education.

Coordinated Program Option

Third Year

Quarter Credit Hours

Dietetic Environment 0620-402	4
Quantity Foods Production 0621-330	4
Product Development 0621-416	6
Liberal Arts (Concentration)*	8
Design and Layout of Food Operations 0620-512	2
Nutrition in Life Cycle 0620-554	5
Food & Labor Cost Control 0621-424	4
Principles & Methods of Dietetic Education 0602-519	4
Food Systems Management II 0620-551	8
Personnel & Training 0622-480	4

Fourth Year

Clinical Dietetics I 0620-560	4
Clinical Dietetics II 0620-561	4

Leadership & Executive Development 0622-470	4
Liberal Arts (Upper division elect.)*	12
Liberal Arts (Senior Seminar)*	2
Clinical Dietetics III 0620-562	4
Clinical Dietetics IV 0620-563	8
Community Nutrition 0620-550	8

PACKAGING SCIENCE

Daniel L. Goodwin, 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.

The program was developed because of a close and long-established relationship between the packaging industry and RIT. The multi-billion-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 the Rochester Area Packaging Association, 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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Principles of Packaging 0607-201	4

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Engineering Design Graphics 0607-301	3
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
Introduction to Printing 2081-254	3
Financial Accounting 0101-301	4
Liberal Arts (Foundation)*	16
Physical Education*	0
Cooperative Education	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
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	Co-op

Fourth Year

Packaging Regulations 0607-462	3
Professional (Packaging) Electives	12
Liberal Arts (Electives & Senior Seminar)*	14
Management Electives	8
Free Electives	8
<i>Total Quarter Credit Hours</i>	<i>192</i>

**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

	<i>Quarter Credit Hours</i>
Principles of Packaging 0607-201	4
Engineering Design Graphics 0607-301	3
Packaging Materials I 0607-311	4
Modern Algebra 1016-204	4
Introduction to Calculus 1016-214, 215	6
College Chemistry 1011-208, 209	8
Effective Speaking 0502-501	4

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Liberal Arts (Foundation)*	16
Physical Education*	0
<i>Second Year</i>	
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
Organic Chemistry 1013-231, 232	6
Organic Chemistry Lab 1013-235, 236	2
Liberal Arts (Foundation)*	12
Free Electives	6
Physical Education*	0
Cooperative Education	Co-op
<i>Third Year</i>	
Career Seminar 0607-401	1
Technical Communication 0607-420	4
Packaging Production Systems 0607-431	4
Packaging for Distribution 0607-432	4
Packaging for Marketing 0607-433	4
Shock and Vibration 0607-485	4
College Physics 1017-211, 212, 213	6
College Physics Lab 1017-271, 272, 273	3
Foundations of Scientific Thinking 1017-341	2
Introduction to Printing 2081-254	3
Liberal Arts (Concentration)*	12
Cooperative Education	Co-op
<i>Fourth Year</i>	
Packaging Regulations 0607-462	3
Professional (Packaging) Electives	12
Principles of Marketing 0105-363	4
Organizational Behavior 0102-430	4
Liberal Arts (Electives and Senior Seminar)*	14
Free Electives	7
<i>Total Quarter Credit Hours</i>	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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Principles of Packaging 0607-201	4
Engineering Design Graphics 0607-301	3
Packaging Materials I IPGK-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
<i>Second Year</i>	
Methods of Evaluation 0607-313	3
Rigid Containers 0607-321	4

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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
Introduction to Printing 2081-254	3
Principles of Copy Preparation 2081-256	3
Gravure Process 2081-386	3
Properties of Paper 2081-378	3
Liberal Arts (Foundation)*	12
Physical Education*	0
Cooperative Education	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	Co-op

Fourth Year

Professional (Packaging) Electives	12
Effective Speaking 0502-501	4
Image Capture and Conversion 2081-401	3
Liberal Arts (Electives & Senior Seminar)*	14
Free Electives	9
<i>Total Quarter Credit Hours</i>	192

**See page 10 for Liberal Arts requirements.*

See page 11 for policy on Physical Education.

TECHNOLOGY MARKETING AND DISTRIBUTION

Ray Chapman, Program Coordinator

The Technology Marketing and Distribution Program (TM&D) is a full-time bachelor of science degree program. This new offering was approved by the New York State Education Department in 1992.

TM&D offers professional study in business and technology that prepares graduates for careers in marketing technical products and commodities. This is 'big business'--40,000 businesses serve this market, employing five million people sharing an annual payroll of \$140 billion

Students will learn how to apply technology to solve customers inquiries in such diverse fields as high-tech synthetic materials, robotics, or even genetically engineered biological products-while at the same time studying economics, business, and quality dynamics. TM&D is an ideal program for entrepreneurial and people-oriented individuals seeking careers that require skill in both the technical and business fields.

The TM&D program offers students the opportunity to integrate classroom study with practical field experience. This is accomplished by alternating periods of study with periods of employment in a wide variety of manufacturing and industrial settings. Students can work directly for a manufacturer or in a sales/marketing firm that independently distributes a manufacturers products. With appropriate experience, a graduate could become a self-employed entrepreneur in a technical sales area.

Technology Marketing and Distribution, BS degree, typical course sequence

First Year *Quarter Credit Hours*

Liberal Arts (Core)*	12
First-Year Seminar 0607-200	1
College Algebra & Trigonometry 1016-204	4
Engineering Graphics 0608-210	4
Financial Accounting 0101-301	4
Calculus for Technologists I 1019-420	4
College Physics I 1017-211	3
College Physics Lab I 1017-271	1
Management Accounting 0101-302	4
Calculus for Technologists II 1019-421	4
College Physics II 1017-212	3
College Physics Lab II 1017-272	1
TM&D Skills Seminar 0607-210	2
Physical Education*	0

Second Year

Liberal Arts (Core)*	8
Elementary Statistics 1016-309	4
Principles of Economics I 0511-301	4
Principles of Economics II 0511-302	4
Survey of General Chemistry 1011-201	3
Chemistry Lab 1011-221	1
Survey of Organic Chemistry 1011-202	3
Organic Chemistry Lab 1011-222	1
OR	
General Biology 1001-201	3
Biology Lab 1001-205	1
General Biology 1001-202	3
Biology Lab 1001-206	1
Electrical Principles for Design I 0609-411	4
Effective Technical Communications 0535-403	4
Electrical Principles for Design II 0609-412	4
Introduction to Strength of Materials 0610-408	4
Materials in Manufacturing 0617-405	4
Physical Education*	0

Third Year

Liberal Arts (Core)*	4
Liberal Arts (Elective)*	4
Organizational Behavior 0102-430	4
Corporate Finance 0104-441	4
Manufacturing Processes II 0617-420	4
Computer Application 0607-341	4
Principles of Marketing 0105-363	4
Minor/Free Elective	4
Cooperative Education (2 quarters)	Co-op

Fourth Year

Liberal Arts Electives*	12
Sales Management 0105-553	4
Minor/Free Electives	16
Cooperative Education (2 quarters)	Co-op

Fifth Year

Liberal Arts (Elective)*	12
Liberal Arts (Senior Seminar)*	2
Business Marketing 0105-570	4
Quality Control & Improvement 0106-406	4

**See page 10 for Liberal Arts requirements.*

See page 11 for Physical Education requirements.

DEPARTMENT OF MILITARY SCIENCE -ARMY RESERVE OFFICERS' TRAINING CORPS (ROTC)

MAJ Jerry D. Zayas, Professor of Military Science

RIT offers full-time students from all degree fields the opportunity to enroll in the Army ROTC program. Participation in the program includes classroom instruction and leadership, physical, and tactical training.

Those who join the Reserve Officers' Training Corps become cadets in a dynamic and challenging program. Army cadets participate in the fall student orientation, demonstrations of military training throughout the academic year, special events geared toward fostering community relations, and fund raising for worthy charities. Army ROTC extracurricular activities include color guard, pistol/rifle team, rappelling, Ranger Challenge Competition, and numerous field events throughout the year. Annual social events include a formal Dining-In in the Winter Quarter and a Spring Quarter Military Ball.

The Department of Military Science and Army ROTC offer an educational experience unavailable from any other source. Students receive hands-on training with Army weapons and equipment. Additionally, they gain practical on-campus leadership experience and may choose further leadership development at Army posts statewide and overseas, in preparation for leading the men and women of today's Army.

The program is divided into two parts: the basic course (freshman and sophomore years) and the advanced course (junior and senior years)

Scholarship opportunities

Our program offers students the opportunity to compete for two- and three-year scholarships during the freshman and sophomore years. These scholarships pay 80 percent of tuition, \$450 per year for books, and approximately \$900 yearly cash stipend. They are based on academic achievement and leadership potential. Both enrolled cadets and non-enrolled students may apply for a scholarship. Enrolled and non-enrolled sophomores can attend summer basic camp, where they may compete for additional scholarship opportunities

Financial benefits

A subsistence allowance of \$100 per month is provided, tax free, directly to each contracted ROTC cadet throughout the school year. This, plus pay for Advanced Camp attendance, amounts to over \$2,500 for the last two years of college.

RIT provides room scholarships and tuition supplement to cadets who are recipients of 4-year or 3-year advance ROTC scholarships. To receive RIT's room scholarship and tuition supplement, students must file a Financial Aid Form by March 1. Contact the Financial Aid Office for further information.

Basic course

During the basic course, non-scholarship students have absolutely no military service obligation. The flexible curriculum develops self-confidence and leadership abilities and tests responsibility. Freshmen and sophomores participate approximately three hours per week. A student may sample ROTC at any time within his or her first two years. Cadets enrolled in military science study basic military organization, tactics, and history and take a master student course on college preparation. Completion of the basic course qualifies a cadet for enrollment in the advanced course, scholarships, airborne training, air assault training, and many other opportunities to gain valuable on-the-job experiences.

Summer camp program

A two-year program is offered to all qualified students with two academic years remaining who did not previously participate in the Basic Course. Students in this program attend the six-week Basic Summer Camp between their sophomore and junior years. Upon successful completion of the camp, the student may be enrolled in the Advanced Course for the last two years. It should be noted that two-year scholarships are available on a competitive basis during the Basic Summer Camp. Interested students should begin processing applications for this program early in the Winter Quarter of their sophomore year.

Veterans

Students with prior military service and members of the Army National Guard and Army Reserve are eligible for entry into the Advanced Course once they have completed one year of college

Advanced course

The Advanced Course is conducted during the last two years (three years if you co-op) and includes attendance at the ROTC Advanced Camp, normally between your junior and senior years. Military Science Department classes during the Advanced Course serve as a prelude to subsequent instruction at specific Army Service Schools. Advanced Course ROTC cadets perform in leadership positions with a cadet company and may participate in and/or lead various training activities.

The program includes an annual trip to Fort Drum, N.Y. Usually scheduled during September, this exercise is conducted in preparation for the Advanced Camp at Fort Bragg, N.C., which trains and evaluates thousands of cadets annually from all schools on the eastern seaboard. The six-week Advanced Camp gives each participant an opportunity to plan, organize, and lead his or her peers through a vigorous and challenging training program. Attendees are paid travel expenses and a salary for this intellectually and physically rewarding experience

After Advanced Camp, selected cadets have the opportunity to participate in the Cadet Troop Leader Training Program for an additional two or three weeks in active Army units in leadership positions through the U.S. and overseas

Airborne (parachute) and air assault (helicopter) training also are available on a competitive basis to cadets in the upper division of ROTC. RIT cadets may earn their badges as parachutists or air assaultists and become fully qualified to be assigned duties in these activities after commissioning

Professional military education

In addition to the Military Science curriculum and the Fort Bragg Advanced Camp, each cadet must complete a course in the following fields of study:

1. Written communication
2. Military history
3. Human behavior
4. Computer literacy
5. Math reasoning
6. Foreign language (scholarship cadets only)

Graduate school opportunities

Commissioned officers may have an opportunity to pursue graduate work in their chosen discipline. Normally the cost of a graduate degree or attendance at a professional school is at the individual's expense. Certain specialties may be paid for by the U.S. Army

Technological enrichment program

Students who plan to pursue graduate studies in high-technology areas can compete for a full graduate school scholarship through the Army in their senior year

For additional information

To learn more about broadening your career options through Army ROTC, visit or call the Department of Military Science on the third floor of the George Eastman Building (475-2881 or -2882).

Department of Military Science Four-Year Program, typical course sequence

ROCHESTER INSTITUTE OF TECHNOLOGY

<i>First Year, MS I</i>	<i>Quarter Credit Hours</i>
Introduction to Military Science 0701-201*	2
Applied Military Dynamics 0701-202*	2
Military Heritage 0701-203*	2
 <i>Second Year, MS II</i>	
Military Geography 0701-301†	2
Psychology and Leadership 0701-302†	2
The Military and American Society 0701-303†	2
 <i>Third Year, MS III</i>	
Military Tactics 0701-401†	3
Military Communications 0701-402†	3
Military Operations 0701-403†	3
 <i>Fourth Year, MS IV</i>	
Combined Arms Operations 0701-501†	3
Military Administration and Logistic Management 0701-502†	3
Military Ethos 0701-503†	3
<i>Total Quarter Credit Hours</i>	30

* Completion meets physical education requirements.

A Leadership Lab, which is conducted on a weekly basis for one hour, 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/Adv. Placement/Summer Compression, typical course sequence

<i>Third Year, MS III</i>	<i>Quarter Credit Hours</i>
Military Tactics 0701-401†	3
Military Communications 0701-402†	3
Military Operations 0701-403†	3
 <i>Fourth Year, MS IV</i>	
Combined Arms Operations 0701-501†	3
Military Administration and Logistic Management 0701-502†	3
Military Ethics 0701-503†	3
<i>Total Quarter Credit Hours</i>	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)

Lt. Col. Steven L. Slough, 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. Cadets entering this curriculum incur no military commitment. 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 General Military Course (GMC) material and leadership laboratories are obviously not taught, but instead cadets receive all GMC curriculum and laboratory experience in a six-week summer field training exercise, usually conducted between their sophomore and junior years. Successful completion of the summer camp qualifies cadets for entry into the Professional Officer Course (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 graduation requirements can be satisfied by completion of the Department of Aerospace Studies Leadership Laboratories. Students must be enrolled in Air Force ROTC (the two- or four-year program) to enroll in the leadership laboratories

Qualifications and selection procedure

To become a member of the Air Force ROTC requires 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 non-taxable allowance of \$100 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 \$100 monthly allowance. RIT offers room scholarships and tuition supplement to cadets who are recipients of four-year and three-year, Type I and Type II ROTC scholarships through the College Scholarship Program. In order to receive RIT's room scholarship and tuition supplement, students must file a Free Application for Federal Student Aid form by March 1. Contact the Financial Aid Office for further information. In addition, during field training, transportation and room and board are paid, and a salary of \$16 per day 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
6. Complete one year of a foreign language (scholarship recipients only). Two years of a foreign language in high school fulfills this requirement

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*

<i>First Year</i>	<i>Quarter Credit Hours</i>
Air Force Today I, II, III 0650-210, 211, 212	3
Leadership Lab I 0650-201, 202, 203	3
 <i>Second Year</i>	
History of Air Power I, II, III 0519-201, 202, 203	4
Leadership Lab II 0650-301, 302, 303	3
 <i>Third Year</i>	
Air Force Leadership & Mgmt. I, II 0102-310, 311	10
Leadership Lab III 0650-401, 402, 403	3
 <i>Fourth Year</i>	
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

Richard N. Rosett, Dean

In an era of increasing global competitiveness, and an emphasis on quality management, the environment that graduates of the College of Business will enter is both complex and rapidly changing. A well-educated and prepared manager must have a broad foundation of knowledge not only in business but also in the social sciences, humanities, and science in order to be professionally competitive. In addition, specialization is necessary if one hopes to make immediate contributions to an organization following graduation

Plan of education

To achieve the educational aims described above, the College of Business has prepared a program that has four components: the liberal arts, the business core, the major, and the cooperative work experience.

The liberal arts component of the business students program is found in 16 courses (nearly one-third of the total program) in the humanities, science, and social sciences. Within this component, the student is expected to display proficiency in both oral and written forms of communication and to choose a humanities or social science concentration. 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 such as global competitiveness, 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

General Accounting Option

Finance

Information Systems

International Business

(Dual major offered daytime only)

Management

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.

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 workplace

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 may vary depending on major*

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 not only practical experience that can be related to course work but also an opportunity to observe and perform work directly related to the student's major. 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 following the completion of the sophomore year. While RIT and the College of Business cannot guarantee anyone cooperative employment, RIT's Office of Cooperative Education and Placement 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 are also 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 advising.

Transfer programs

The College of Business has, for many years, integrated transfer students into its baccalaureate degree programs. All transfer students, upon entry, are offered a course that introduces them to the concepts of Total Quality Management. Typically, 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, marketing, finance, and management. These upper-level programs are designed for students who have earned an associate degree.

RIT's College of Continuing Education 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, information systems, international business, marketing, management, and photographic marketing management.

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 also has a state-of-the-art IBM personal computer lab that serves as an instructional lab and as a lab for student use.

Business students especially benefit from RIT's 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 American Assembly of Collegiate Schools of Business (AACSB), a professional accreditation held by approximately 270 of the 1,200 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 contribute to the quality of the college's programs.

Graduate programs

The College of Business offers both a part-time and full-time master's degree program in business administration. The program is professional in nature and prepares the student in all aspects of business management as well as offering a concentration in a field of specialization.

Undergraduate business students may want to consider the 4:1 program, which allows completion of both a BS and MBA in five years. Details are contained in the Graduate Bulletin, available from the Admissions Office.

Revised curriculum approval

The curriculum requirements and program outlines listed in this publication reflect changes approved by RIT's College of Business faculty during the 1992-93 academic year. This information is provided to ensure that students receive up-to-date information about their academic programs, although RIT's final approval of the revised curriculum is not anticipated until fall of the 1994-95 academic year.

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 the skills specific to functional competencies in accounting, finance, and marketing and serve as a foundation for advanced study in a specific area of interest.

Business core courses*

Quality Concepts I, II
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
Legal Environment of Business
Data Analysis/Statistics
Management Science

ROCHESTER INSTITUTE OF TECHNOLOGY

Survey of International Business
Principles of Marketing
Organizational Behavior
Corporate Finance
Operations Management
Business, Government, and Society
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
3 upper-division liberal arts electives
3 upper-division liberal arts concentration courses

Senior Seminar

2 quarters cooperative education

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, which means that 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 general accounting option allows more flexibility in choice of courses. This flexibility permits students to tailor their program to meet the diverse industrial, commercial, and municipal opportunities for accounting graduates. Of particular interest to both students and employers in the current environment is the opportunity to take advanced courses in computer and information sciences. Students should consult with an adviser before choosing electives in this option

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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0102-011	0
Quality Concepts I, II 0102-230, 231	4
Quality Applications I 0102-232	2
Principles of Economics I, II 0511-301, 302	8
Calculus for Management Science 1016-226	4
Data Analysis I 1016-319	4
Legal Environment of Business 0101-319	4
Liberal Arts (lower level core)†	16
Laboratory Science	8
Physical Education*	0
<i>Second Year</i>	
Quality Applications II 0102-233	2
Data Analysis II 1016-320	4
Data Analysis II Lab 1016-280	2
Financial Accounting 0101-301	4
Business Law 0101-320	4
Business Computer Applications 0106-320	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 div. concentration & elective)†	8

ROCHESTER INSTITUTE OF TECHNOLOGY

Physical Education* 0
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
Valuation of Real & Financial Assets 0104-451 4
Managing Corporate Assets & Liabilities 0104-452 4
Operations Management 0106-401 4
Quality Concepts for Transfers 0102-235 2
Liberal Arts (upper div. concentration or elective)† 12
Cooperative Education (2 quarters required; must complete within third and fourth years)

Fourth Year

Strategy & Policy 0102-551 4
Auditing 0101-530 4
Accounting for Complex Organizations 0101-539 2
Analytical Skills in Accounting 0101-541 2
Financial Accounting & Reporting Issues 0101-550 4
Not-for-Profit & Government Accounting 0101-560 2
Free Electives§ 6
Liberal Arts (upper div. concentration or elective)† 4
Liberal Arts (Senior Seminar)† 2
Total Quarter Credit Hours 180-182

* Pending state approval

See page 10 for Liberal Arts requirements.

* See page 11 for policy on Physical Education.

§ 4 credits of free electives must be taken in the College of Liberal Arts or the College of Science

Accounting Core

Financial Reporting & Analysis I & II
Cost and Managerial Accounting
Business Law
Accounting for Complex Organizations
Analytical Skills in Accounting
Financial Accounting and Reporting Issues
Valuation of Real & Financial Assets
Managing Corporate Assets & Liabilities

CMA Option

Taxes for Decision Making
Advanced Cost Accounting
Free Electives, 16 credits

CPA Option

Tax Accounting I, II
Auditing
Not-for-Profit & Government Accounting
Free Electives, 6 credits

FINANCE

ROCHESTER INSTITUTE OF TECHNOLOGY

The finance major will prepare students for financial 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 major graduates would pursue management positions in commercial, industrial, or governmental organizations. The finance student interested in security analysis will usually find positions in asset and securities management with financial institutions such as banks, brokerage houses, insurance companies, or real estate firms

Finance, BS degree, typical course sequence*

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0102-011	0
Quality Concepts I, II 0102-230, 231	4
Quality Applications I 0102-232	2
Principles of Economics I & II 0511-301, 302	8
Calculus for Management Science 1016-226	4
Data Analysis I 1016-319	4
Legal Environment of Business 0101-319	4
Liberal Arts (lower level core)†	16
Laboratory Science	8
Physical Education*	0
 <i>Second Year</i>	
Quality Applications II 0102-233	2
Data Analysis II 1016-320	4
Data Analysis IILab 1016-280	2
Financial Accounting, Managerial Accounting 0101-301, 302	8
Business Computer Applications 0106-320	4
Survey of International Business 0102-360	4
Principles of Marketing 0105-363	4
Liberal Arts (lower division core)†	12
Liberal Arts (upper div. concentration or elective)†	8
Physical Education*	0
Completion of College Writing Competency Requirement	
 <i>Third Year</i>	
Organizational Behavior 0102-430	4
Valuation of Real & Financial Assets 0104-451	4
Managing Corporate Assets & Liabilities 0104-452	4
Intermediate Investment 0104-453	4
Finance Elective§	4
Operations Management 0106-401	4
Quality Concepts for Transfers 0102-235	2
Liberal Arts (upper div. concentration or elective)†	8
Free Electives§	12
Cooperative Education (2 quarters required; must complete within third and fourth years)	
 <i>Fourth Year</i>	
Business Elective	4
Strategy and Policy 0102-551	4
Finance Electives	8
Free Electives§	12
Liberal Arts (upper div. concentration or elective)†	8
Liberal Arts (Senior Seminar)†	2
Total Quarter Credit Hours	180-182

**Pending state approval*

See page 10 for Liberal Arts requirements.

* See page 11 for policy on Physical Education.

§ 4 credits of free electives must be taken in the College of Liberal Arts or the College of Science

Finance Electives (minimum 2 of 3 must be 0104 courses)

International Finance 0104-504
 Advanced Corporate Financial Planning & Analysis 0104-505
 Management of Financial Institutions 0104-510
 Seminar in Finance 0104-554
 Financial Reporting & Analysis I 0101-408
 Cost and Managerial Accounting 0101-431
 Managerial Economics 0103-451
 Macroeconomics for Managers 0103-452

INFORMATION SYSTEMS

The information systems major will prepare students for careers involving the development and management of information systems. The curriculum provides students with a thorough understanding of data processing fundamentals, including the ability to write properly documented programs. Students 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 will satisfy an organization's needs. Major career directions for graduates of this program include applications programming, systems analysis, and information systems management

Information Systems, BS degree, typical course sequence*

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0102-011	0
Quality Concepts I, II 0102-230, 231	4
Quality Applications I 0102-232	2
Principles of Economics I & II 0511-301, 302	8
Business Computer Applications 0106-320	4
Algebra, Calculus for Management Science 1016-225, 226	4
Introduction to Programming 0602-208	4
Program Design and Validation 0602-210	4
Liberal Arts (lower level core†)	12
Laboratory Science	8
Physical Education*	0
<i>Second Year</i>	
Quality Applications II 0102-233	2
Business Applications Using COBOL 0602-300	4
Management Science 0106-334	4
Advanced Business Applications 0602-303	4
Financial & Managerial Accounting 0101-301, 302	8
Survey of International Business 0102-360	4
Systems Analysis & Design I 0106-363	4
Data Analysis I 1016-319	4
Data Analysis I Lab 1016-379	2
Liberal Arts (lower division core)†	16
Physical Education*	0
Completion of College Writing Competency Requirement	
<i>Third Year</i>	
Applied Database Management 0602-483	4
Systems Analysis & Design II 0106-464	4
Organizational Behavior 0102-430	4
Principles of Marketing 0105-363	4
Corporate Finance 0104-441	4

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Operations Management 0106-401	4
Quality Concepts for Transfers 0102-235	2
Liberal Arts (upper div. concentration or elective)†	16
Free Electives§	8
Cooperative Education (2 quarters required; complete within third and fourth years)	

Fourth Year

Microcomputer Hardware & Applications 0106-540	4
Information Systems Management 0106-553 OR	4
Seminar: Networking 0106-554	
Business, Government & Society 0102-507	4
Strategy and Policy 0102-551	4
Liberal Arts (upper div. concentration or elective)†	8
Liberal Arts (Senior Seminar)†	2
Total Quarter Credit Hours	180-182

**Pending state approval*

See page 10 for Liberal Arts requirements.

** See page 11 for policy on Physical Education.*

§ 4 credits of free electives must be taken in the College of Liberal Arts or the College of Science

MANAGEMENT

The management major is designed for students who wish to pursue management positions in a business organization. Careers may develop in areas as diverse as sales or production or various levels of management, including the potential to rise to the executive level

This major emphasizes Total Quality Management and customer satisfaction. It also provides knowledge on relevant aspects of the Malcolm Baldrige Award for Quality

Management, BS degree, typical course sequence*

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0102-011 0	
Quality Concepts I, II 0102-230, 231	4
Quality Applications I 0102-232	2
Principles of Economics I & II 0511-301, 302	8
Algebra, Calculus for Management Science 1016-225, 226	8
Data Analysis I 1016-319	4
Liberal Arts (lower division core)†	16
Laboratory Science	8
Physical Education*	0

Second Year

Quality Applications II 0102-233	2
Data Analysis I Lab 1016-379	2
Financial & Managerial Accounting 0101-301, 302	8
Business Computer Applications 0106-320	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 div. concentration or elective)†	8
Physical Education*	0
Completion of College Writing Competency Requirement	

Third Year

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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 Total Quality Management 0102-520	4
Quality Concepts for Transfers 0102-235	2
Management Electives	8
Free Electives§	16
Cooperative Education (2 quarters required; must complete within third and fourth years)	
<i>Fourth Year</i>	
Free Electives§	8
Business, Government & Society 0102-507	4
Strategy and Policy 0102-551	4
Liberal Arts (upper div. concentration or elective)†	16
Liberal Arts (Senior Seminar)†	2
<i>Total Quarter Credit Hours</i>	180-182

**Pending state approval*

See page 10 for Liberal Arts requirements.

** See page 11 for policy on Physical Education.*

§ 4 credits of free electives must be taken in the College of Liberal Arts or the College of Science

MARKETING

The marketing major prepares students for entry-level marketing management positions. As marketing majors, students acquire knowledge of markets, marketing, and consumer behavior through a combination of academic education and cooperative field education. The combination provides an understanding of problems related to a number of marketing areas: e.g., advertising, sales management, retailing, marketing research, and product planning

For the student interested in a business career with an objective to explore, experience, and experiment, the marketing major is an ideal option. With a marketing background, the student will find a wide variety of employment opportunities that center on customer satisfaction and customer understanding and analysis, 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*

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0102-011 0	
Quality Concepts I, II 0102-230, 231	4
Quality Applications I 0102-232	2
Principles of Economics I & II 0511-301, 302	8
Algebra, Calculus for Management Science 1016-225, 226	8
Data Analysis I 1016-319	4
Liberal Arts (lower division core)†	16
Laboratory Science	8
Physical Education*	0
<i>Second Year</i>	
Quality Applications II 0102-233	2
Data Analysis I Lab 1016-379	2
Financial Accounting, Managerial Accounting 0101-301, 302	8
Business Computer Applications 0106-320	4
Survey of International Business 0102-360	4

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Principles of Marketing 0105-363	4
Management Science 0106-334	4
Liberal Arts (lower division core)†	12
Liberal Arts (upper div. concentration or elective)†	8
Free Elective§	4
Physical Education*	0
Completion of College Writing Competency Requirement	

Third Year

Organizational Behavior 0102-430	4
Buyer Behavior and Satisfaction 0105-505	4
Operations Management 0106-401	4
Corporate Finance 0104-441	4
Professional Selling 0105-559	4
Quality Concepts for Transfers 0102-235	2
Marketing Electives	8
Liberal Arts (upper div. concentration or elective)†	16
Free Electives§	4
Cooperative Education (2 quarters required; must complete within third and fourth years)	

Fourth Year

Business, Government & Society 0102-507	4
Strategy and Policy 0102-551	4
Marketing Research 0105-551	4
Marketing Management Problems 0105-550	4
Free Electives§#	12
Liberal Arts (Senior Seminar)†	2
<i>Total Quarter Credit Hours</i>	180-182

**Pending state approval*

See page 10 for Liberal Arts requirements.

** See page 11 for policy on Physical Education.*

§ 4 credits of free electives must be taken in the College of Liberal Arts or the College of Science

#Students interested in direct marketing may want to take the following courses offered by the College of Imaging Arts and Sciences: Introduction to Printing, Typography I, Layout & Printing Design, Copy Preparation, Materials & Processes of Photography (10-week summer course).

INTERNATIONAL BUSINESS

The international business major is offered by the College of Business in cooperation with the College of Liberal Arts. Designed to meet the growing interest of American business in global markets, the international business major has an adjunct major in finance, marketing, management, accounting, or information systems

Students in international business develop the business and liberal arts foundations necessary to understand business, 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 of one chosen language. Students with proficiency at the college level may start the 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

Upon graduation, international business students are prepared to step into entry-level positions in several aspects of international trade. They can assume positions such as assistant international

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product managers, assistant export-import managers, international financial analysts, sales representatives, or regional analysts

International Business, BSdegree, typical course sequence*

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0102-011 0	
Quality Concepts I, II 0102-230, 231	4
Quality Applications I 0102-232	2
Principles of Economics I, II 0511-301, 302	8
Algebra, Calculus for Management Science 1016-225, 226	8
Data Analysis I 1016-319	4
Liberal Arts (lower division core)†	8
Laboratory Science	8
Language Levels I, II, III*	12
Physical Education*	0
 <i>Second Year</i>	
Quality Applications II 0102-233	2
Data Analysis I Lab 1016-379	2
Financial Accounting, Managerial Accounting 0101-301, 302	8
Business Computer Applications 0106-320	4
Survey of International Business 0102-360	4
Management Science 0106-334	4
Legal Environment of Business 0101-319	4
Liberal Arts (lower division core)†	12
Language Levels IV, V, VI	12
Physical Education*	0
Completion of College Writing Competency Requirement	
 <i>Third Year</i>	
Organizational Behavior 0102-430	4
Principles of Marketing 0105-363	4
Operations Management 0106-401	4
Corporate Finance 0104-441 OR	
Valuation of Real & Financial Assets 0104-451#	4
Quality Concepts for Transfers 0102-235	2
International Business Co-Major	8
Functional Business Area	8
Liberal Arts (lower division core)†	8
Liberal Arts (upper div. concentration or elective)†	4
Cooperative Education (2 quarters required; must fall within third and fourth years)	
 <i>Fourth Year</i>	
Strategy and Policy 0102-551	4
International Business Co-Major	8
Functional Business Area	8
Liberal Arts (upper div. concentration or elective)†	8
Liberal Arts (Senior Seminar)†	2
Total Quarter Credit Hours	180-182

**Pending state approval*

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.

#0104-451 is required for accounting and finance functional areas.

International Business Co-Major

(Choose 3)

International Marketing

International Finance

International Management

International Accounting

(Choose 1)

Multinational Business Operations & Strategy

International Seminar

Functional Business Area

Four required courses in one of the following areas:

Marketing, Management, Finance, Accounting, or Information Systems

Language Courses through Level VI

Foreign language courses offered by College of Liberal Arts

PHOTOGRAPHIC MARKETING MANAGEMENT

The photographic marketing management major is a joint degree program offered by the College of Business and the School of Photographic Arts and Sciences. This program is designed to provide students with a thorough knowledge of the photographic process and a solid background in business administration and marketing management. The combination of course work in these two disciplines prepares students for management careers in the photographic industry. Opportunities for positions include those in customer service aspects of photofinishing and professional color laboratories and management positions with photographic manufacturers and retailers

Photographic Marketing Management, BS degree, typical course sequence*

First Year

Quarter Credit Hours

Freshman Seminar 0102-011	0
Quality Concepts I, II 0102-230, 231	4
Quality Applications I 0102-232	2
Principles of Economics I & II 0511-301, 302	8
Algebra, Calculus for Management Science 1016-225, 226	8
Data Analysis I 1016-319	4
Liberal Arts (lower division core)†	16
Laboratory Science	8
Physical Education*	0

Second Year

Quality Applications II 0102-233	2
Data Analysis Lab I 1016-379	2
Financial Accounting, Managerial Accounting 0101-301, 302	8
Business Computer Applications 0106-320	4
Survey of International Business 0102-360	4
Principles of Marketing 0105-363	4
Management Science 0106-334	4
Basic Photography Lab I-III 0905-441, 442, 443	12
Liberal Arts (lower division core)†	12
Physical Education*	0
Completion of College Writing Competency Requirement	

Third Year

Materials & Processes of Photography 0920-211, 212, 213	9
Organizational Behavior 0102-430	4
Buyer Behavior and Satisfaction 0105-505	4
Professional Selling 0105-559	4
Operations Management 0106-401	4
Corporate Finance 0104-441	4
Quality Concepts for Transfers 0102-235	2

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Liberal Arts (upper div. concentration or elective)†	20
Special Topics 0905-551	3
Cooperative Education (2 quarters required; must fall 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
Marketing/Management Elective	4
Liberal Arts (upper div. concentration or elective)†	4
Liberal Arts (Senior Seminar)†	2
<i>Total Quarter Credit Hours</i>	180-182

**Pending state approval*

See page 10 for Liberal Arts requirements.

** See page 11 for policy on Physical Education.*

COLLEGE OF CONTINUING EDUCATION

Dr. Raymond Santirocco, Acting Dean

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 in non-credit workshops and seminars; for the traditional college student who wants a non-traditional degree, the College of Continuing Education (CCE) may be the answer. Students can earn degrees, diplomas, and certificates through a number of CCE programs in a variety of ways

CCE courses and programs are offered during the day, at night, on Saturdays, through Weekend College, and even via distance learning courses that students can take at home

CCE is on the forefront of developing new degree programs such as environmental management. Its precollegiate programs help underserved and other young adults decide what they want to study and what they want to do, as well as master the skills necessary to do them. CCE also offers diverse non-credit courses in areas ranging from total quality management and computing to printing and the graphic arts.

The **CCE Academic Division** offers numerous options in areas such as management, fine and applied arts, technical communication, business administration, health systems administration, emergency management, and public relations

The popular applied arts and science degree is now available through distance learning technologies to students who cannot attend classes at RIT. For more information call 716-475-5027.

The **School of Professional Studies (SPS)** develops and delivers innovative and interdisciplinary bachelor's degrees for new and emerging careers. The SPS bachelor of science in environmental management provides in-depth knowledge of solid waste management science and technology, plus training in related disciplines, including politics and policy, economics, budgeting and finance, environmental regulatory law, public relations, and communications. It is the first program of its kind and has attracted the attention of students and employers both locally and across the country. For more information, call 716-475-7213

CCE's **Division of Human Resources** brings together two graduate programs covering the spectrum of human resource development, instructional design and development, and performance technology. The Career and Human Resource Development (CHRD) Program offers a master of science degree for the fields of human resource development and human resource management. The Instructional Technology Program offers a master of science degree for instructional design and training development. Both programs are rooted in the behavioral sciences and train students in techniques that will improve the work-related performance of organizations and individuals. They are open to full and part-time students. The accelerated summer Executive Leader programs enable experienced professionals to complete a degree with minimum residence requirements. Call 716-475-5069 for additional information about CHRD; 716-475-2893 for information about Instructional Technology.

As part of its dedication to the local community, CCE is committed to developing new programs for minority and other underserved populations. Its **University Program** is designed to enable students to build the qualifications for admission to an RIT degree program. The **Center for Science Communication and Technology** is a summer program of career exploration. CCE is also the home of the **School Science, Challenger Center Project**. Call 716-475-7056 for further information.

CCE's **Division of Training and Professional Development** serves business, industrial, and community audiences with seminars, workshops, and custom training programs. TPD offers non-credit programming in Total Quality Management, manufacturing and engineering, computer software and applications, food and hospitality, and real estate-to name a few. TPD's **Training**

Center of the Graphic Arts provides training and research for all aspects of the graphic arts industry. For information on non-credit programs, call 716-475-5000

CCE's **open enrollment policy** allows a student to take any course or pursue any part-time degree for which he or she has sufficient background. Many courses have prerequisites that students are expected to have met 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 CCE 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 Dynamic Communication II(0236-205) and Communication 220 (0236-220) 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 CCEBS degree program must satisfy CCEs communication competency requirement. Information about this requirement and the various methods for satisfying it is available at the CCE office; it may also be obtained from a CCE adviser or from the Communication chair, 716-475-4936

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

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 that can cut tuition costs by as much as 50 percent. 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

For more information on any of the programs offered by CCE, call 716-475-2234

Academic advising

The CCE Office of Student Services provides academic advising regarding educational and career goals. This service is available at no charge to all undergraduate students who are matriculated in CCE degree, diploma, and certificate programs and to all students who are enrolled in CCE courses. In addition, CCE is the designated service college for the RIT non-matriculated student body.

Advisers are experienced and trained across academic disciplines. An adviser 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 475-2078 to schedule an advising session. The office is in room 2200, Eastman Building

Transfer credit

Degree programs in CCE 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 may also be awarded for courses included in the New York State Education Department Publication, *Guide to Educational Programs in Non-Collegiate Organizations*. Call 716-475-2218 for more information

Faculty

Most credit and non-credit courses in the College of Continuing Education 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

In addition to our weekly evening and Saturday schedules, we also offer courses in distance learning and Weekend College formats

Distance Learning offers quality programming that students can take at home. Courses combine video-tape 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 appointment. These electronic delivery systems allow students to learn at times and places convenient to them. For more information, call 716-475-5089; for advising, call 716-475-2078

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 Joyce Clayton at 716-475-5511.

ACADEMIC DIVISION

Lynda Rummel, Associate Dean and Director

Nancy Kunkler, Barbara Warth, Karen Montesano, Academic Program Assistants

The **Academic Division** of CCE provides credit-bearing courses and programs specifically designed with the adult, part-time student in mind. Each program of study is designed to meet the interests of students and Rochester's expanding business, artistic, and industrial complex

The Academic Division also houses the **School of Professional Studies**, through which new full-time bachelor's degrees are developed and launched. The school currently offers a BS program in environmental management

The Academic Division 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

- Certificates of achievement in:

PC Applications Software

Small Business Management

International Business and Culture

Customer and Consumer Service

Environmental Management with options in solid wastemanagement science, technology, and implementation

Business and Career Communication

- Certificates for the following New York State Education Department registered programs:

Quality Management--Basic Quality and Quality Implementation

Health Systems Administration

Emergency Management

Management Development

Technical Communication--Basic and Advanced

Public Relations Communications--Professional Writing and Graphic Communication

Deaf Studies

- Diplomas in:

Management Development, with concentrations in seven areas

Fine and Applied Arts, with crafts and design options

- Associate degrees in:

AAS degrees in accounting, business administration, marketing, personnel administration, production/ industrial management, and logistics and transportation

AA degree in General Education (with career options)

- Diploma, AAS, and BS degrees in Applied Arts and Science (individualized multi-disciplinary study)

- Bachelor of science degree in Environmental Management (through the School of Professional Studies)

APPLIED ARTS AND SCIENCE DEGREES

Lynda Rummel, Chairperson

Adult students returning to college on a part-time basis need high-quality degree programs in a variety of fields that are both flexible and recognize an adults prior college-level learning. The College of Continuing Education offers the opportunity to tailor an individualized program of technical and professional study through its Applied Arts and Science program. 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 1-2 areas of concentration

Bachelor of Science (BS) degree

90 core credits in general education plus 90 credits in 24 areas of concentration

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, management, applied computing, telecommunications, emergency management, and solid waste 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 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 an interdisciplinary 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

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

Phase 1 & 2 AAS 90 Hrs. Total

Qtr

Qtr

Qtr.

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Math/Computer/ Science Math	Cr	Liberal Arts	Cr	Concentration(s) *1 or 2	Cr.
Technical Mathematics 0240-201, 202		Communication† 0236-220		To be developed by student with adviser	38
or	4				
Math for Business 0208-201, 202		Literature 0504-332	4		
or		Communication Elective	4		
Math Thought/Processes 0240-205 and		Humanities Electives	8		
Modern Math Methods 0240-206		Behavioral Science Electives	8		
Computer	4				
Intro to Computers/Prog. 0250-200					
or					
Intro to Computer Science 0602-270					
or					
Data Processing 0203-321					
Science	12				
College Physics/Lab 1017-211 212, 213 or 271, 272, 273					
or					
Contemporary Science 0246-221, 222, 223, 224, 289 (3 of 5 courses)					
Phase 3 & 4-BS 180 Hrs Total 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).

The communication courses require pretest; call 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

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 may 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. For information, contact Bette Anne Winston, coordinator, at 716-475-2218.

BUSINESS AND MANAGEMENT STUDIES

Daniel Smialek, Chairperson

Approximately 50 credit-bearing courses in business and management subjects are available through CCE. 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, accounting, marketing, personnel administration, production management, and traffic and transportation.

For those interested in a short-term concentration in one of these fields, CCE also offers a Management Development Program leading to a management certificate and management diploma, a Small Business Management Program, and a program in Customer and Consumer Service. 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

Daniel Smialek, Chairperson

The certificate of achievement 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 do not have to be taken in sequence. Students must achieve a program GPA of at least 2.0 in order to be certified.

Like most courses in CCE, Small Business Management courses may be taken on an audit basis (non-credit, without exams), at a reduced rate. For more information, call Daniel Smialek at 716-475-5023.

Courses

Quarter Credit Hours

New Venture Development, 0205-221	4
Small Business Management & Finance, 0205-222	4
Small Business Marketing & Planning, 0205-223	4
<i>Certificate Total</i>	<i>12</i>

INTERNATIONAL BUSINESS

Linda Tolan, Chairperson

Rochester area export sales in 1993 totaled approximately \$11 billion, and 59 percent of the local firms responding to a Chamber of Commerce survey increased exports in 1993. Companies in the upstate New York area are actively pursuing opportunities in the expanding global marketplace. Any firm that does business internationally needs knowledgeable employees throughout the company--those involved both directly and indirectly in international projects--who know and understand the issues, challenges, and processes of international business. CCE's International Business certificate of achievement can help prepare employees to be a part of this exciting field and is an excellent complement to a wide variety of career fields.

Developed in association with the International Business Council of the Greater Rochester Metro Chamber of Commerce and other prominent international business leaders from upstate New York, the courses in this program focus on the knowledge and skills required for transacting business and trade across international borders. They are taught by faculty who are not only academically qualified, but who also work on a daily basis in the international business community. They bring a wealth of direct international business experience to the classroom. Designed to provide a keen understanding of the values, structures, and systems of the international marketplace, the certificate or courses can enhance your credentials in a wide range of positions.

The flexible curriculum allows students to customize the requirements to their needs and interests. General courses provide fundamental information on business practices, cultural differences, and international economic factors. The specialty courses allow students to focus on specific content areas and geographic regions. Credit may be applied to professional concentrations in the applied arts and sciences degree or taken individually for professional development. Students must

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achieve a program GPA of 2.0 or higher in order to be certified. For further information contact Linda Tolan at 716-475-5078.

General Courses (select one; 4 cr. hrs. req.)	<i>Credit Hours</i>
Doing Business in International Markets 0218-410	4
Communicating Across Cultures 0218-430	4
International Economic Policies & Principles 0218-450	4
General Electives (select two; 8 cr. hrs. req.)	
International Trade: Importing & Exporting 0218-452	4
International Advertising & Public Relations 0218-454	4
International Manufacturing for a Worldwide Economy 0218-456	4
Doing Business in the European Economic Community 0218-411	4
Doing Business in Mexico & Latin America 0218-412	4
Doing Business in Japan & the Pacific Rim 0218-413	4
Doing Business in Russia & Eastern Europe 0218-414	4
Select one additional 4-credit general or specialty course	4
<i>Certificate Total</i>	16

CUSTOMER AND CONSUMER SERVICE

Daniel Smialek, Chairperson

In today's competitive and growing service economy, the key to success is customer satisfaction, which comes from delivering quality products and services that are strongly shaped by thorough attention to customer needs.

The Customer and Consumer Certificate of Achievement Program focuses on customer satisfaction as the sustainable competitive advantage for both manufacturing and service industries (e.g., health care, communications, banking and finance, transportation, retailing). Special attention is paid to developing an orientation toward customer satisfaction throughout organizations and to the relationship between customer satisfaction and customer service. This program is designed for:

- managers and potential managers who want to implement customer satisfaction principles and practices throughout their organizations

- current and future managers, supervisors, and personnel in sales, customer service, customer relations, quality management, and human resource management

The program consists of 16 credits--10 in required core courses and an additional six selected from an array of specialized electives. Individual courses and/or the certificate may be applied to appropriate undergraduate degree programs. Students must achieve a program GPA of at least 2.0 in order to be certified. The program may also be acquired as a post-baccalaureate credential. For more details, call 716-475-5023.

Core Courses	<i>Quarter Credit Hours</i>
The New Service Economy 0237-227	2
Introduction to Quality 0220-230	4
Customer Service Technology 0205-306	4
Electives (select any 6 credits)	
Marketing Practices for the Service Economy 0207-362	2
Recruiting, Training, & Supervising Service Industry Personnel 0209-225	2
Leadership Skills for Quality 0220-330	4
Interpersonal Communication for Customer Service 0236-340	4
<i>Certificate Total</i>	16

QUALITY MANAGEMENT

Daniel Smialek, Chairperson

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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

CCE'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	<i>Quarter Credit Hours</i>
Introduction to Quality 0220-230	4
Basic SQC Techniques 0220-231	4
Leadership Skills for Quality 0220-330	4
<i>Certificate Total</i>	12

Certificate in Quality Implementation	
Statistics for Total Quality 0220-340	4
Costing for Quality 0220-410	4
Implementing Total Quality 0220-430	4
<i>Certificate Total</i>	12

HEALTH SYSTEMS ADMINISTRATION

William Walence, Chairperson

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.

CCE'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 may also 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)

Adult students take advantage of CCE's flexible degree options, including part-time study and courses offered through distance-learning technology

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

Courses	<i>Quarter Credit Hours</i>
Survey of Health Care Systems 0206-310	4
Health Care Administration 0206-320	4

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Health Care Economics and Finance 0206-351	4
Legal Aspects of Health Care Administration 0206-421	4
Health Care Quality Assurance 0206-431	4
Health Planning and Program Development 0206-441	4
<i>Certificate Total</i>	24

THE MANAGEMENT DEVELOPMENT PROGRAM

Danial Smialek, Chairperson

The Management Development Program has two components: the Management Certificate and the Management Diploma. By successfully completing the Management Process (0205-200, 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 seven 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 and Diploma 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

Daniel Smialek, Chairperson

The Management Certificate is earned by successfully completing CCEs 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	<i>Quarter Credit Hours</i>
Management Process I 0205-200	4
Management Process II 0205-201	4
Management Process III 0205-202	4
<i>Certificate Total</i>	12

MANAGEMENT DIPLOMA

Daniel Smialek, Chairperson

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In the Management Diploma Program, students concentrate their studies in one of seven specific areas of business and management (such as accounting or marketing) 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 core courses and one elective course from the Customer and Consumer Service Certificate Program

-three foundation courses (Organization and Management 0205-203; Communication, 0236-204 or 205 or 220; and one additional business elective)

-or approved equivalents

Courses applied toward a Management Diploma may also be counted as professional courses in appropriate degree programs. Students must achieve a program GPA of at least 2.0 in order to be certified. For further information, call Daniel Smialek at 716-475-5023

Accounting	<i>Quarter Credit Hours</i>
Mgmt. Process or approved alternative 0205-200, 201, 202	12
Financial Accounting 0201-201	4
Managerial Accounting 0201-203	4
Intermediate Accounting I 0201-308	4
Intermediate Accounting II 0201-309	4
<i>Diploma Total</i>	28

General Management	<i>Quarter Credit Hours</i>
Mgmt. Process or approved alternative 0205-200, 201, 202	12
Financial Accounting 0201-201	4
Managerial Accounting 0201-203	4
Data Processing Principles 0203-321	4
Marketing 0207-361	4
OR	
Business Elective	
<i>Diploma Total</i>	28

Marketing	<i>Quarter Credit Hours</i>
Mgmt. Process or approved alternative 0205-200, 201, 202	12
Marketing 0207-361	4
Effective Selling 0207-210	4
Advertising Principles 0207-213	4
Business Elective	4
<i>Diploma Total</i>	28

Personnel Administration	<i>Quarter Credit Hours</i>
Mgmt. Process or approved alternative 0205-200, 201, 202	12
Personnel Administration 0209-229	4
Interviewing Techniques 0209-224	4
Business Law I 0202-301	4
Business Elective	4
<i>Diploma Total</i>	28

Production/Industrial Management	<i>Quarter Credit Hours</i>
Mgmt. Process or approved alternative 0205-200, 201, 202	12
Production Management 0210-209	4
Fundamentals of Industrial Engineering 0210-305	4
Industrial Engineering Economy 0210-306	4

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Data Processing Principles 0203-321	4
<i>Diploma Total</i>	28

Logistics & Transportation

Management	<i>Quarter Credit Hours</i>
Mgmt. Process or approved alternative 0205-200, 201, 202	12
Intro. to Logistics & Transportation 0212-234	4
Traffic & Transportation Law, Rates, Accounting, & Control, 0212-239	4
International Logistics & Transportation 0212-241	4
Marketing 0207-361	4
<i>Diploma Total</i>	28

Real Estate Management

	<i>Quarter Credit Hours</i>
Mgmt. Process or approved alternative 0205-200, 201, 202	12
Basic Real Estate Principles,* 0213-201	4
Advanced Real Estate Principles,* 0213-202	4
Real Estate Investment & Finance, 0213-203	4
Business Elective	4
<i>Diploma Total</i>	28

- * These courses provide an excellent foundation for a real estate career and are approved by the New York State Division of Licenses as preparation for the salesperson's and broker's license examinations in real estate.

BUSINESS AND MANAGEMENT AAS DEGREE PROGRAMS

Daniel Smialek, Chairperson

Programs leading to an AAS degree in business administration are available in accounting and business administration. These programs 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, personnel 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, data processing, 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

Accounting	<i>Quarter Credit Hours</i>
Intermediate Accounting I 0201-308	4
Intermediate Accounting II 0201-309	4
Business Law I 0202-301	4
Business Law II 0202-302	4
History or Fine Arts Elective	4
<i>Concentration Total</i>	20

Business Administration

	<i>Quarter Credit Hours</i>
History or Fine Arts Elective	4
Legal Environment of Business 0202-310	4
3 Business Electives	12
<i>Concentration Total</i>	20

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Marketing

Effective Selling 0207-210	Quarter Credit Hours	4
Advertising Principles 0207-213		4
Business Law I 0202-301		4
2 Business Electives		8
<i>Concentration Total</i>		20

Personnel Administration

Personnel Administration 0209-229	Quarter Credit Hours	4
Interviewing Techniques 0209-224		4
Business Law I 0202-301		4
2 Business Electives		8
<i>Concentration Total</i>		20

Production/Industrial Management

Production Management 0210-209	Quarter Credit Hours	4
Fundamentals of Industrial Engineering 0210-305		4
Industrial Engineering Economy 0210-306		4
Business Law I 0202-301		4
Elective		4
<i>Concentration Total</i>		20

Logistics & Transportation Management

Intro. to Logistics & Transportation 0212-234	Quarter Credit Hours	4
Traffic & Transportation Law, Rates, Accounting, & Control 0212-239		4
International Logistics & Transportation 0212-241		4
Business Law I 0202-301		4
Elective		4
<i>Concentration Total</i>		20

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

Required Courses

92 Credits

Professional Courses	Qtr. Cr.	General Education	Qtr. Cr.	Math, Statistics & Science	Qtr. Cr.
Financial Accounting 0201-201	4	Communication* 0236-220		Science Electives†	8
Managerial Accounting 0201-203	4	and		Math for Business 0208-201, 202	8
Organization & Mgmt. (1) 0205-203	4	Literature 0504-332	8	Statistics 0208-351, 352	8
Data Proc. Principles 0203-321	4	or		or	
Principles of Marketing 0207-361	4	Dyn. Comm. I* 0236-204			
Management Science 0205-353	4	Dyn. Comm II 0236-205	8		
Professional Concentration Courses (see above)	20	Economics 0511-301, 302	8		
		Psychology 0514-210	4		
		Sociology 0515-210	4		
Total	44	Total	24	Total	24

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

(1) The Management Process (0205-200, 201, 202) may be substituted for the following:

	Qtr. Cr.
<i>Dynamic Communication I 0236-204</i>	4
<i>Organization & Management 0205-203</i>	4
<i>1 Business elective</i>	4

* These communication courses require pretest; call 475-2234 for information

Students who take 0236-204 should also take 0236-205. Students who take 0236-220 should also take 0504-332.

Science electives may include any of the following:

Contemporary Science/Biology 0246-221

Contemporary Science/Chemistry 0246-222

Contemporary Science/Physics 0246-223

Contemporary Science/Oceanus 0246-224

Contemporary Science/Mechanical Universe 0246-289

College Physics 1017-211, 212, 213

EMERGENCY MANAGEMENT

John Morelli, Chairperson

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. CCEs certificate in Emergency Management is intended to upgrade the skills of existing emergency managers in police, fire, and ambulance work; public safety planners; and emergency officials in industry and to provide a strong foundation for emergency response personnel desiring to develop a new career specialty. Possession of this certificate is expected to bear significantly on graduates' ability to qualify for national accreditation.

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 demonstrable training or experience in lieu of the Emergency Operations course

Courses are scheduled so that the certificate may be completed in as little as one year. The courses may also 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

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 John Morelli, 716-475-7213

Emergency Management	<i>Quarter Credit Hours</i>
Earth Science for the Emergency Manager 0285-201	4
Man-made Hazards 0285-202	4
Emergency Preparedness Laws & Regulations 0285-301	4
Emergency Planning & Methodology 0285-302	4
Emergency Operations 0285-381	4
<i>Certificate Total</i>	20

SOLID WASTE MANAGEMENT

John Morelli, Chairperson

The increased cost of waste disposal and concern over related liability have forced both municipal governments and industry to create positions of professional responsibility for waste management. Since no comprehensive solid waste management education existed before Fall 1991, solid waste managers typically have had little or no formal training in the core topics of their solid waste responsibilities. As related technical and regulatory issues have become more and more complex, the demand for employees with environmental training has increased dramatically. To respond to these inquiries and provide the information and skills to keep pace in this rapidly expanding field, CCE has established a certificate package in solid waste management consisting of three

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programs. Since courses are typically scheduled in the late afternoon, and some are available through distance learning, students may pursue these programs on a part-time basis

Solid Waste Management

Science Certificate	<i>Quarter Credit Hours</i>
Environmental Monitoring & Measurement 0286-360, 362	4
Environmental Geology 0286-371, 372	4
Intro. to Hydrology 0286-381, 382	4
<i>Certificate Total</i>	12

Solid Waste Management

Technology Certificate	<i>Quarter Credit Hours</i>
Principles of Municipal Solid Waste Management 0286-201	4
Recycling 0286-301	4
Waste Reduction 0286-311	4
Land Disposal & Treatment 0286-401	4
Energy Recovery 0286-411	4
Special & Hazardous Wastes 0286-475	
<i>Certificate Total</i>	24

Solid Waste Management

Implementation Certificate	<i>Quarter Credit Hours</i>
Intro. to Public Relations 0236-360	2
Engineering Economics 0617-436	4
Environmental Accounting & Finance 0286-452	4
Environmental Regulatory Law I 0286-480	4
Senior Project Planning 0286-509	4
Senior Project Paper 0286-511	4
<i>Certificate Total</i>	22

All the courses offered under these certificate programs can be applied to professional concentrations in the BS degree in applied arts and science. Part-time tuition rates are charged for students who are matriculated in the Applied Arts and Science Program. Courses may also be applied toward the bachelor of science in environmental management by students who matriculate in that full-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 2.0 in order to be certified.

THE LIBERAL ARTS DEGREE PROGRAM

Linda Tolan, Chairperson

The associate in arts (AA) is the only liberal arts degree program offered by the College of Continuing Education. Students will sample literature, arts, philosophy, history, and the other disciplines that have traditionally been at the core of a college education. At the same time, they will consider the relationship of these studies to 20th century technology and business

After fulfilling the basic course requirements, students finish the degree by choosing one of two options: to deepen understanding of the liberal arts by adding courses in the humanities, communication, and social sciences; or to take advantage of RIT's extensive opportunities in career training by including 20 credits of study in a specific career skill

Students must achieve a program GPA of at least 2.0 in order to be certified. Areas of career study include:

Accounting
Advertising Design
Communication
Deaf Studies
Fine Arts
General Management and Supervision
Industrial Management
Marketing

Personnel Management
Public Relations Communications
Real Estate
Small Business Management
Technical Communication

For more information in the career skills option, contact Linda Tolan, 716-475-5078

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. CCE 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 for non-artists) focuses on understanding the components of the advertising process, the use of effective design principles in the preparation of layouts, and the combining of creative and technical skills to achieve design success.

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

Course requirements, General Education, AA Degree

Required Courses

92 Credits

	Qtr. Cr		Qtr. Cr.
Humanities 0235-201, 202, 203	12	Economics 0511-301	4
Introduction to Literature 0504-332	4	Psychology 0514-210	4
Fine Arts: Visual Arts 0505-213	4	Philosophy 0509-210	4
Fine Arts: Musical Arts 0505-214	4	Electives*	20
History: Modern European 0507-302		Career Skills Area	20
or	4		
History: Modern American 0507-301			
Political Decision Making 0513-215	4		
Contemporary Science Elective	4		
Science, Technology & Humanity Elective	4		

* Students may petition the chairperson of Liberal Arts to apply courses outside the area generally regarded as general education electives. This must be a written request

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 716-475-4936.

Core Courses

Quarter Credit Hours

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Introduction to Public Relations 0236-360	2
Psychology of Persuasion 0237-320	2
Advertising Evaluation & Techniques 0207-214	4
Managing the Project 0236-332	2
<i>Core Total</i>	10

Professional Writing	<i>Quarter Credit Hours</i>
Core Courses	10
Writing for the Organization I 0236-365	2
Writing for the Organization II 0236-366	2
Promotional Writing 0236-331	2
Scripting for AV & Video Presentations 0236-368	2
Speechwriting 0236-369	2
<i>Certificate Total</i>	20

Graphic Communication	<i>Quarter Credit Hours</i>
Core Courses	10
Graphic Communication for the Non-Artist I 0223-270	3
Graphic Communication for the Non-Artist II 0223-271	3
Art for Reproduction 0223-220	3
<i>Certificate Total</i>	19

Technical Communication

In this age of rapidly expanding technologies, technical communication is an essential, challenging, and lucrative 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 non-profit 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, and videos, among others-is a highly valued asset in the workplace today.

The following sequence of courses, designed to be completed in two consecutive 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	<i>Quarter Credit Hours</i>
Phase I	
Technical Writing &Editing 0236-323	4
Research Techniques 0236-324	2
Phase II	
Instructional Design Principles 0236-325	2
Document Design Principles 0236-326	2
Practicum: Designing Manuals 0236-327	2
<i>Certificate Total</i>	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 two quarters of study, is offered

Advanced Technical Communication	<i>Quarter Credit Hours</i>
Phase I	

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Oral Skills for Technical Communication 0236-329	2
Writing Software User Documentation 0236-330	2
Promotional Writing 0236-331	2

Phase II

Writing in the Sciences 0236-328	2
Managing the Project 0236-332	2
Managing Media Presentations 0236-333	2
<i>Certificate Total</i>	12

Up to four credits may be awarded by examination or for courses taken at another college. (With chairperson's permission, up to four credits from a list of approved courses may be substituted for courses in the above sequence.) Prerequisite for the Advanced sequence is completion of the Basic sequence or the equivalent. 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

Business and Career Communication

Business leaders say that a key to success is the ability to communicate successfully. A CCE certificate of achievement in business and career communication may be earned by completing three four-credit courses designed to provide competency in those written and oral skills demanded in business and industry. Courses may be taken separately and may be used as elective or professional concentration courses in appropriate CCE degrees. Students must achieve a program GPA of at least 2.0 in order to be certified

Courses	<i>Quarter Credit Hours</i>
Professional Presentations 0236-301	4
Discussion Skills & Leadership 0236-302	4
Communicating in Business 0236-307	4
<i>Certificate Total</i>	12

For advising or further information about this program, call 716-475-4936

DEAF STUDIES

William Walence, Chairperson

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, 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 will 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 will not generally be permitted, students will be 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	<i>Quarter Credit Hours</i>
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Sign Language & Manual	
Communication Systems I, II, III, 0234-211, 212, 213	6
American Sign Language I, II 0234-311, 312	4
Aspects & Issues of Deafness I, II 0234-241, 242	6
<i>Certificate Total</i>	16

For advising or further information about this program, call William Walence at 716-475-4986

FINE AND APPLIED ARTS AND CRAFTS

Eric Bellmann, Chairperson

Fine and applied arts courses are designed to contribute to the students 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 to provide students with a basic exploration of the creative process and to help them 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 a CCE adviser to plan their course of study and to clarify goals. The chairperson 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 Eric Bellmann at 716-475-4977.

Core Requirements	<i>Quarter Credit Hours</i>
Basic Drawing and Media 0224-201, 202, 203	6
Basic Design 0223-201, 202, 203	6
Fine Arts: Visual Arts 0505-213	4
<i>Core Total</i>	16

Program Requirements:

Craft	<i>Quarter Credit Hours</i>
Core requirements*	16
Major craft courses	18
Minor craft courses	6
Third craft choice	2
Electives with adviser's approval	6
<i>Diploma Total</i>	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) 0224-306	6
Basic Figure Drawing 0224-207	2
Figure Drawing (2 quarter credit) 0224-307	4
Electives with adviser's approval	20
<i>Diploma Total</i>	48

Advertising Design

Core requirements*	16
Display Design 0223-211, 212, 213	6
Advanced Design & Typography 0223-261, 262, 263	6
Graphic Design 0223-311, 312, 313	6
Advertising Design 0223-315, 316, 317	6
Basic Figure Drawing 0224-207	2
Electives with adviser's approval	6
<i>Diploma Total</i>	48

Interior Design

Core requirements*	16
Display Design 0223-211, 212, 213	6
Marketing 0207-361	4
Interior Design 0223-224, 225	4
History of Interior Design 0223-226	2
Environmental Design, 0223-251, 252, 253	6
Electives with adviser's approval	10
<i>Diploma Total</i>	48

**Core requirements are prerequisite for all diploma programs.*

SCHOOL OF PROFESSIONAL STUDIES

Through its School of Professional Studies, the Academic Division develops and launches new bachelor's degree programs for full-time students. These programs are designed to meet the educational needs and professional work requirements of the 21st century and typically focus on emerging professions that are multidisciplinary in nature. The curricula are intended to provide a balance of breadth and depth in several fields. This balance equips graduates with a range of knowledge and skills that will allow them to work and advance in a wide variety of professional occupations and settings. Because these curricula typically bring several specialties together, the Academic Division works closely with other RIT colleges to develop and sponsor them.

ENVIRONMENTAL MANAGEMENT

John Morelli, Chairperson

Most professionals working in the environmental disciplines feel good about themselves and the contributions they make. Even better, the demand for environmental managers is growing and employment projections are good—in spite of a depressed economy.

Designed under the guidance of an advisory committee of environmental leaders from government and industry, RIT's environmental management curriculum integrates an ideal mix of science, technology, and social science courses to prepare students to become successful environmental managers in both private and public sectors. Graduates will have both in-depth knowledge in their area of scientific and technical expertise and a strong working knowledge of a broad range of essential nontechnical fields such as environmental law, finance, policy, communications, and public relations.

Environmental management students are proud of their commitment and have a strong sense of camaraderie. During the freshman and sophomore years, course sections are scheduled so that they can take many of their classes together. This provides better opportunities for our students to meet, get to know one another, and form study groups that will help them succeed during their years at RIT and lasting friendships that will benefit them throughout their careers.

Electives

The ample allowance for electives in the curriculum permits students to pursue various competency areas in greater depth and facilitates the acceptance of transfer credits from other institutions.

Cooperative Work Study

As noted in a recent handbook on environmental careers, 'Hands-on training is practically a must.' RIT's cooperative work experience program is one of the best in the country. Beginning in the spring of the third year, environmental management students alternate between full-time employment and academic study. Our graduates leave with a full year of professional employment under their belts—and on their resumes. Co-op job descriptions and locations range from field research to office work and from government agencies to industrial manufacturing plants. Typically they're located in the Rochester area or in the hometown of the students' family (to simplify living accommodations), but some of our more adventurous individuals seek jobs across the continent or overseas.

BS Degree in Environmental Management

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First Year

Quarter Credit Hours

Chemistry Principles I/Lab 1011-211/205 or	
Survey of General Chemistry 1011-201/221	4
Chemistry Principles II/Lab 1011-212/206	4
Algebra & Trigonometry 1016-204 or	
Algebra for Mgmt. Science 1016-225*	4
General Biology/Lab 1001-201/205	4
Environmental Mgmt. Seminar 0286-200	1
Software Tools 0602-202 or	
Survey of Computer Science 0602-200*	4
Intro. to Organic Chemistry/Lab 1011-213/207	4
Elementary Statistics 1016-309 or Data Analysis 1016-319	4
Writing for the Organization 0236-365	2
Introduction to Public Relations 0236-360	2
Liberal Arts Core*	16
Physical Education*	0

Second Year

Data Analysis II 1016-320	4
Applied Microbiology 1004-210	4
Communications Elective (with dept. approval)	4
Writing for the Organization II 0236-366	2
Environmental Engineering Science 0286-220	4
Principles of MSW Management 0286-201	4
Environmental Geology/Lab 0286-371/372	4
Engineering Economics 0617-436	4
Liberal Arts Core*	20
Physical Education*	0

Third Year

Environmental Health & Safety 0286-450	4
Waste Reduction 0286-311	4
Intro. to Hydrology/Lab 0286-381/382	4
Recycling 0286-301	4
Business, Public Policy, & the Environment 0286-455	4
Environmental Monitoring & Measurement/Lab 0286-360/362	4
Professional Electives	8
Cooperative Education (1 quarter)	Co-op

Fourth Year

Environmental Law I, II 0286-480, 481	8
Land Disposal & Treatment 0286-401	4
Energy Recovery 0286-411	4
Special & Hazardous Waste 0286-475	4
Project Management 0286-490	4
Professional Elective	4
Liberal Arts Elective*	4
Cooperative Education (2 quarter)	Co-op

Fifth Year

Senior Project Planning 0286-509	1
Environmental Accounting & Finance 0286-452	4
Senior Project 0286-511	4
General Elective	4
Liberal Arts Senior Seminar* 0520-501	2
Liberal Arts Elective*	12
Cooperative Education (1 quarter)	Co-op
<i>Total Quarter Credit Hours</i>	191

*See page 10 for Liberal Arts requirements

See page 11 for policy on Physical Education

*With approval of adviser

COLLEGE OF ENGINEERING

Paul E. Petersen, Dean

The programs offered by the College of Engineering prepare students for careers in industry or for graduate study in specialized 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

Resources

The departments of Electrical, Industrial and Manufacturing, and Mechanical Engineering maintain extensive laboratory facilities in the James E. Gleason Building for both undergraduate and graduate instruction and research by faculty and graduate students. The departments of Computer Engineering and Microelectronic Engineering operate laboratories in the Center for Microelectronic and Computer Engineering, which has over 10,000 square feet of clean-room laboratory space for the fabrication of integrated circuits and a 15-station HP/Mentor Graphics VLSI Design Center. The Institute's extensive computer facilities are augmented for students and faculty in the College of Engineering by the Gleason User Center and the Center for Electronic Design Analysis. Desktop and personal computers are readily available in all offices and most labs. Laboratory instruction is a vital part of the college's five undergraduate curricula, and the faculty pride themselves on having integrated both the computer and real-life laboratory work in the academic program. Laboratory experience helps prepare engineering students for their cooperative work experience and, ultimately, their industrial work assignments

Five-year programs

The college offers five five-year cooperative education programs leading to the bachelor of science degree with majors in electrical, computer, industrial and manufacturing, mechanical, and microelectronic engineering.

Transfer programs

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

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

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

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B	Co-op	RIT	Co-op	RIT
5				
A	RIT	Co-op	RIT	-
B	Co-op	RIT	RIT	-

Academic advising

Upon entry into the college, each student is assigned an advisor. The advisor is available for both academic advising and career counseling

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 industry. In addition, an engineering education can provide a foundation for continued study in business, law, medicine, etc. Increasing numbers of graduates continue their education for the master of science or the doctor of philosophy degrees

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

All applicants are required to take entrance examinations as described in the admission section of this bulletin.

Accreditation

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

Graduate degrees

Programs leading to the master of science degree are offered in the computer, electrical, mechanical engineering, and the applied and mathematical statistics departments. 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, mechanical, engineering management, microelectronic manufacturing engineering, and systems engineering. The program is unique in that it extends the undergraduate cooperative concept to the graduate level in an industrial internship for which academic credit is granted

Designed as a full-time program, the master of engineering degree may also 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

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 College of Continuing Education. 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 at RIT. All upper-division electrical engineering courses are offered in the late afternoon or evening. However, mechanical engineering majors 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 Dean's Office at 716-475-2145.

Engineering Science, AS degree, typical course work*

<i>General Education</i>	<i>Quarter Credit Hours</i>
Dynamic Comm. I, II 0236-204, 205	4
or	
Communications 0236-220	4
Literature 0504-332	
Two of Four Social Sciences Choices:	8
Introduction to Psychology 0514-210	
Principles of Economics I 0511-301	
American Politics 0513-211	
or	
Political Decision Making 0513-215	
Foundations of Sociology 0511-210	
or	
Cultural Anthropology 0510-210	
One Humanities Course: i.e., History; Fine Arts; Philosophy; Science, Technology, and Society	4
 <i>Math and Science, Electrical Option</i>	
Calculus I, II, III 1016-251, 252, 253	12
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Matrix Algebra 1016-331	4
College Chemistry 1011-208	4
 <i>Math and Science, Mechanical Option</i>	
Calculus I, II, III 1016-251, 252, 253	12
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Boundary Value Problems 1016-318	4
Chemical Principles I 1011-211	3
Chemistry I Lab 1011-205	1
Basic Chemistry II 1011-273	3
Basic Chemistry III Lab 1011-277	1
 <i>Physics, Electrical Option</i>	
Physics I, II, III 1017-311, 312, 313	12
Physics Lab I, II, III 1017-375, 376, 377	3
Modern Physics 1017-314	4
 <i>Physics, Mechanical Option</i>	

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Physics I, II, III 1017-311, 312, 313	12
Physics Lab I, II, III 1017-375, 376, 377	3
Science Elective	4
<i>Professional, Electrical Option</i>	
Statics 0304-336	4
Dynamics 0304-359	5
Introduction to Digital Systems 0301-240	4
Numerical Methods 0301-310	3
C Programming 0301-345	4
Introduction to Micro Computers 0301-365	4
Circuit Analysis 0301-351	4
Electrical Engineering Lab I 0301-380	1
<i>Professional, Mechanical Option</i>	
Statics 0304-336	4
Dynamics 0305-359	5
Introduction to Graphics 0304-211	3
Problem Solving with Computers 0304-342	3
Mechanics of Materials 0304-347	4
Mechanics of Materials Laboratory 0304-348	1
Circuit Analysis 0301-351	4
Electrical Engineering Lab I 0301-380	1
<i>Total Quarter Credit Hours</i>	96

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

UNDECLARED ENGINEERING

The Undeclared Engineering Program is a one-year 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 electrical, industrial and manufacturing, mechanical, and microelectronic engineering programs without any loss of time toward graduation. Students changing to computer engineering may need to spend the following summer quarter in school to make up the programming requirements

During the fall quarter, undeclared engineering students are required to take a one-credit course, Introduction to Engineering, which provides an overview of all five programs, the chance to learn about the course of study in each program, and an introduction to the faculty of each program

Typical first-year schedule

Fall

Calculus I
Chemical Principles I
Chemical Principles Lab I
CProgramming
Introduction to Engineering
Liberal Arts

Winter

Calculus II
Chemical Principles II
Chemical Principles Lab II
University Physics I
University Physics Lab I
Liberal Arts

Spring

Calculus III

Calculus IV
University Physics II
University Physics Lab II
Liberal Arts

COMPUTER ENGINEERING

Roy S. Czernikowski, 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, cost, reliability, and maintainability. The goal of the computer engineer is to build computer systems or computer-integrated systems to meet application requirements with attention to the hardware/software interaction and all the aspects just mentioned

The program prepares graduates to design and implement various engineering products with embedded computers and to undertake graduate study, where sophisticated computer system design can be addressed.

It strives to interweave and span the topics from formal specifications to heuristic algorithm development, from system architecture to computer design, from interface electronics to real-time applications, and from interprocess communications management to VLSI implementation

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

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

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) complement 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 School 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

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Introduction to Computer Engineering 0306-200	1
Programming I Algorithmic Structures 0601-241	4
Programming II Data Structures 0601-242	4
Assembly Language Programming 0306-250	4
College Chemistry I 1011-208	4
Calculus I, II, III 1016-251, 252, 253	12
Calculus IV 1016-305	4
University Physics I, II 1017-311, 312	8
University Physics Lab I, II 1017-375, 376	2
Liberal Arts†	8
Physical Education*	0

Second Year

Intro. to Digital Systems for Computer Engineers 0306-341	4
Modeling of Linear Systems 0306-361	4
Circuit Analysis I 0301-351	4
Electrical Engineering Lab I 0301-380	1
Elements of Statics 0304-335	2
Elements of Dynamics 0304-349	3
Programming III Design & Implementation 0601-243	4
Scientific Applications Programming 0601-319	4
Data Organization & Management 0603-325	4
Foundations of Discrete Math 1016-265	4
Differential Equations 1016-306	4
University Physics III 1017-313	4
University Physics Lab III 1017-377	1
Modern Physics 1017-314	4
Liberal Arts†	4
Physical Education	0

Third Year

Computer Organization 0306-550	4
Digital Systems Design for Computer Engineers 0306-561	4
Circuit Analysis II 0301-352	3
Electronics I, II 0301-441, 442	6
Electrical Engineering Lab II, III 0301-390, 395	2
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
Intro. to VLSI Design 0306-630	4
Programming Language Concepts 0601-450	4
Probability & Statistics I 1016-351	4
Liberal Arts†	8
Cooperative Education (2 quarters)	Co-op

Fifth Year

Computer Architecture 0306-551	4
Projects in Computer Engineering 0306-655	4
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
<i>Total Quarter Credit Hours</i>	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 must have a 25 percent engineering design component.

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 affected modern living tremendously.

RIT has one of the finest electrical engineering programs around, combining the rigor of theory with the flexibility of engineering practice. Electrical engineering has the most comprehensive curriculum of all engineering programs—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. Undoubtedly, electrical engineering holds the key to a challenging and most fulfilling career in this decade and the coming century.

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 student knowledge acquired in the classroom and the laboratory. The exposure and experience gained by the student in industry make him or her 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.

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 free electives do not have that restriction.

Electrical Engineering, BS Degree, typical course sequence*

<i>First Year</i>	<i>Quarter Credit Hours</i>
EE Freshman Seminar 0301-203	1
Intro. to Digital Systems 0301-240	4

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Intro. to Microcomputers 0301-365	4
College Chemistry I 1011-208	4
Calculus I, II, III 1016-251, 252, 253	12
University Physics I, II 1017-311, 312	8
Univ. Phys. Lab. I, II 1017-375, 376	2
Liberal Arts (Core)†	16
Physical Education Elective§	0

Second Year

Numerical Methods 0301-310	3
Circuit Analysis I 0301-351	4
Electrical Engr. Lab I 0301-380	1
Elements of Statics 0304-335	2
Elements of Dynamics 0304-349	3
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Matrix Algebra 1016-331	4
University Physics III 1017-313	4
University Physics Lab III 1017-377	1
Modern Physics I 1017-314	4
C-Programming for Engineers 0301-345	4
Liberal Arts (Core)†	8
Physical Education Elective*	0

Third Year

Circuit Analysis II 0301-352	3
Electronics I, II 0301-441, 442	6
Electrical Engineering Lab II, III 0301-390, 395	2
Linear Systems I 0301-453	4
Electromagnetic Fields I 0301-471	4
Vector Calculus 1016-324	3
Probability 1016-351	4
Complex Variables 1016-420	4
Cooperative Education (2 quarters)	Co-op

Fourth Year

Intro. to Automatic Controls 0301-513	4
Intro. to Communication System 0301-534	4
Introduction to Photonics 0301-521	4
Semiconductor Electronics 0301-544	4
Digital Electronics 0301-545	4
Linear Systems II 0301-554	4
Electromagnetic Fields 0301-472	4
Liberal Arts (Concentration)	4
Cooperative Education (2 quarters)	Co-op

Fifth Year

Energy Conversion 0301-531	4
Professional Electives	16
Free Elective	4
Liberal Arts (Concentration)	8
Liberal Arts (Senior Seminar)	2
Cooperative Education (1 quarter)	Co-op
<i>Total Quarter Credit Hours</i>	193

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

See page 10 for Liberal Arts requirements.

**See page 11 for policy on Physical Education.*

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Each of the listed professional electives includes significant design emphasis. Students must enroll in 0301-650, Design of Digital Systems, as a design elective and three of the following courses. 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 & Systems	0301-672
Fiber Optics: Theory & Applications 0301-674	
Electro-Optics 0301-776	

Control Systems

Design of Digital Control Systems	0301-614
Robotic Vision 0301-605	
Special Semiconductor Devices	0301-645
Design of Digital Systems	0301-650
Microcomputer-Based System Design 0301-665	

Communications

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

Signal Processing

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

Computers

Design of Digital Systems	0301-650
ASIC Design 0301-651	
Microcomputer-Based System Design 0301-665	
32-Bit Microcomputers	0301-666

Microelectronics

Introduction to Microelectronics	0301-670
Design of Digital Systems	0301-650
Analog Electronic Design	0301-610
Semiconductor Physics	0301-723
Analog IC Circuits	0301-726
Senior Design Project	0301-699
(may be undertaken in an interest area)	

Extended day schedule (for part-time evening students)

In order to permit a person working full time in industry to earn a BS degree in electrical engineering (accredited by the Accreditation Board of Engineering and Technology), courses also are scheduled in the late afternoons and evenings. These courses are offered and taught by the faculty of the Department of Electrical Engineering and meet the same standards as those taught during regular hours. Students entering these programs must be employed full time in a technical position. Applicants to the extended day schedule will be evaluated in the same manner as those transferring to the full-time day schedule of the program. A student must plan to take two courses in each academic 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 third year, providing that a minimum grade point average of 3.4 has been obtained at the end of the previous (first) quarter. Although admission requirements are stricter for this program, overall requirements for graduation remain the same (a minimum GPA of 2.0 for BSEE and 3.0 for MSEE). The work period between the second and third years is credited as co-op for BS/MS students

Transfer students are also considered for admission to this program after completion of two quarters at RIT with a grade point average of 3.4. All other requirements are the same

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*

<i>First Year</i>	<i>Quarter Credit Hours</i>
Same as BSEE	51
 <i>Second Year</i>	
Same as BSEE	50
 <i>Third Year</i>	
Same as BSEE	30
 <i>Fourth Year</i>	
Device Physics 0301-544	4
Energy Conversion 0301-531	4
E & M Fields II 0301-472	4
Liberal Arts†	8
Intro. to Communications 0301-534	4
Analytical Techniques II 0301-554	4
Linear Systems II 0301-554	4
Intro. to Controls 0301-513	4
Photonics 0301-521	4
Digital Electronics 0301-545	4
Graduate Course	4
Thesis	1
 <i>Fifth Year</i>	
Analytical Techniques III 0301-765	4
Graduate Courses	20
Professional Electives	16
Liberal Arts†	4
Thesis	8
Senior Seminar	2
<i>Total Quarter Credit Hours</i>	230

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.

**See page 11 for policy on Physical Education.*

INDUSTRIAL AND MANUFACTURING ENGINEERING

Jasper E. Shealy, 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 IME 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 new specific 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. A joint program exists between the IME Department and the Center for Quality and Applied Statistics (CQAS) that allows for a combined BSIE/MS degree in safety and reliability in five years plus one additional academic quarter. For more information on the options or the combined BSIE/MS, contact the IME Department at 475-2598.

The industrial engineering curriculum covers the principal concepts of human performance, mathematical modeling, computer programming and applications, management systems, and manufacturing processes. The curriculum stresses the application of computers in solving the engineering problems of today. For example:

1. The undergraduate industrial engineering student at RIT uses computer graphics to design the layout of manufacturing plants and to develop dynamic, animated computer simulation models.
2. He or she also uses computers 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

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, 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:

1. Hospitals
 - a. improve efficiency of a patient therapy department
 - b. design optimal patient scheduling for physicians
 - c. establish outpatient clinic staffing levels
2. Manufacturing industries
 - a. perform product life studies
 - b. lay out new and 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
3. Service industries
- a. evaluate the ergonomics of work station 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

Industrial Engineering, BS degree, typical course sequence*

<i>First Year</i>	<i>Quarter Credit Hours</i>
Introduction to Industrial Engineering 0303-201	4
Computing for Industrial Engineers 0303-202	4
Freshman Seminar 0303-203	1
Chemistry I, II 1011-208, 273	8
Chemistry Lab 1011-277	1
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 (Core)†	12
Physical Education Electives*	0
 <i>Second Year</i>	
Mechanics I 0304-331	4
Mechanics II 0304-332	4
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Engineering Mathematics 1016-331	4
University Physics III 1017-313	4
University Physics Lab III 1017-377	1
Materials Processing 0304-343	4
Materials Science 0304-344	4
Computer Tools for Increased Productivity 0303-301	2
Science Elective	4
Liberal Arts (Core)†	12
Physical Education Electives*	0

Third Year

Work Measurement & Analysis I 0303-420	4
Engineering Economics 0303-520	4
Introduction to Operations Research I 0303-401	4
Probability 1016-351	4
Applied Statistics I 1016-352	4
Human Factors 0303-415	4
Management Theory & Practice 0303-481	4
Systems & Facilities Planning 0303-422	4
Cooperative Education (2 quarters)	Co-op

Fourth Year

Applied Statistics I, II 0303-510, 511	8
Introduction to Operations Research II 0303-402	4
Simulation 0303-503	4
Human Factors II 0303-516	4
Computer-Aided Manufacturing 0303-630	4
Engineering Design 0303-530	4
Liberal Arts (Concentration)	4
Cooperative Education (2quarters)	Co-op

Fifth Year

Project Design 0303-560	4
Professional Electives**	16
Liberal Arts (Concentration)	8
Free Elective	3
Liberal Arts (Senior Seminar)	2
Cooperative Education (1 quarter)	Co-op
<i>Total Quarter Credit Hours</i>	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.*

****Partial List of Professional Electives**

Applied Human Factors	
Design of Experiments	0303-450
Production Control I, II	0303-482, 483
Operations Research III	0303-504
Simulation Modeling Techniques	0303-505
Reliability 0303-512	
Operations Research III	0303-540
Mathematical Techniques of Systems Engineering	0303-545
Safety Engineering	0303-550
Concepts in Manufacturing	0303-625
Seminar in Computer-Integrated Manufacturing	0303-690

MECHANICAL ENGINEERING

Charles W. Haines, Head

Mechanical engineering is perhaps the most comprehensive of the engineering disciplines, and the mechanical engineer's interests encompass the design of such diverse systems as missiles, power plants, robots, and machine tools. 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 in the areas of production and economics, mechanical engineers are often called upon to assume management positions

The Mechanical Engineering Department is staffed to offer professional courses in the areas of thermal systems, applied mechanics, manufacturing, materials science, environmental air quality, systems analysis, computer-aided graphics and design, robotics, 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, a sting balance for measuring drag and lift, dynamic system simulators, a spectrum analyzer, a modal analysis system, and a stereolithography machine for rapidly building prototype models of computer-aided designs.

Students have an opportunity to participate in the design of a solar-powered car, which is entered in regional and national competitions. They are also encouraged to participate in the student chapters of professional societies such as ASME, SWE, and SAE

The 197-quarter-credit program provides students with a broad base of academic and practical experience. Students devote the first two years to the study of mathematics, physics, chemistry, and mechanics, while the third and fourth years emphasize engineering science fundamentals in solid body mechanics, thermal fluid sciences, and electrical engineering. A student may then specialize by choosing technical and free electives in his or her area of interest. Each of the listed technical electives includes one significant design project

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. Building on the fundamental courses completed by all mechanical engineering students, a balanced exposure to the aerospace area is gained through a sequence of five specialized courses in four broad areas: 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, capstone design courses taken by all mechanical engineering students in the fifth year of study.

Environmental air quality option

The Mechanical Engineering Department offers an environmental air quality option for students majoring in mechanical engineering. This option is intended to increase the opportunities for students to enter the growing air quality analysis and control industry

The option builds upon course work all mechanical engineering students take in fluid dynamics, thermodynamics, numerical modeling, and mechanics by offering a series of specialized technical and free elective courses during the third, fourth, and fifth program years. These specialized courses provide a broad introduction to the major areas related to air quality analysis and control. The sequence starts in the third year with an introductory course acquainting the student with the general field of environmental engineering. This is followed in the fourth and fifth years with advanced technical electives in internal combustion engine emissions and control, stationary source emissions and control, and air pollutant dispersion modeling. In addition, all students choosing this concentration are expected to work on an environmentally related design project in the Senior Design I and II capstone design courses in the fifth year of the program

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 his or her sophomore 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

Writing competency

The writing policy of the Mechanical Engineering Department requires that during the third year all students take the Test of Standard Written English (TSWE). Those receiving a scaled score of 50 or above will be certified as having satisfied the program's writing competency requirements. Those whose score is below 50 must take and pass the College of Liberal Arts course, College Writing I (0502-302), in order to satisfy competency requirements. This course is defined as an overload.

Mechanical Engineering, BS degree, typical course sequence*

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0304-203	2
Calculus I, II, III 1016-251, 252, 253	12
Chemistry I, II 1011-208, 273	7
Chemistry Lab 1011-277	1
Intro. to Graphics 0304-211	3
Materials Processing 0304-343	4
University Physics I 1017-311	4
University Physics Lab I 1017-375	1
Statics 0304-336	4
Problem Solving with Computers 0304-342	3
Liberal Arts (Core) 1, 2†	8
Physical Education Electives*	0
 <i>Second Year</i>	
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Matrices & Boundary Value Problems 1016-318	4
University Physics II, III 1017-312, 313	8
University Physics Lab II, III 1017-376, 377	2
Statistics 1016-314	4
Mechanics of Materials 0304-347	4
Mechanics of Materials Lab 0304-348	1
Materials Science 0304-344	4
Computer-Aided Design 0304-311	3
Dynamics 0304-359	5
Liberal Arts (Core) 3, 4†	8
Physical Education Electives*	0
 <i>Third Year</i>	
Machine Design 0304-437	4
Numerical Methods 0304-440	4
Thermodynamics 0304-413	4
Science Elective	4
Fluid Mechanics 0304-415	4
Thermal Fluid Sci. & Energy Lab I 0304-416	1
Adv. Computational Techniques 0304-518	4
Intro. to Electrical Engineering 0301-362	4
Liberal Arts (Core) 5†	4
Cooperative Education (2 quarters)	Co-op
 <i>Fourth Year</i>	
Heat Transfer 0304-514	4
Systems Dynamics 0304-543	4
Systems Dynamics Lab 0304-545	1
Transport Phenomena 0304-550	4
Liberal Arts (Core) 6	4
Thermal Fluid Sci. & Energy Lab II 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 Project I 0304-630	4
Senior Design Project II 0304-631	4
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.*

See page 10 for Liberal Arts requirements.

**See page 11 for policy on Physical Education.*

Technical Elective Courses

Solid Body Mechanics Courses

Dynamics of Machinery	0304-672
Stress Analysis	0304-694
Engineering Vibrations	0304-658
Robotics 0304-615	
Optimal Design	0304-620
Control Systems	0304-643
Computer-Aided Engineering 0304-618	

Thermal Fluid Science Courses

Heat Transfer II	0304-635
Turbomachinery	0304-652
Refrigeration & Air Conditioning 0304-660	
Applications in Fluid Mechanics 0304-605	

Aerospace Courses

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

Environmental Courses

Internal Combustion Engines and Air Quality	0304-640
Stationary Source Emissions and Controls	0304-641
Air Pollution Dispersion Modeling 0304-642	

Free Elective Courses

Laser Engineering	0304-637
Advanced Strength of Materials 0304-685	
Engineering Economy	0304-687

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 the 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 microelectronic 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 processing 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 nationwide shortage of microelectronic engineers increases, 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.

Microelectronic Engineering, BS degree, typical course sequence*

<i>First Year</i>	<i>Quarter Credit Hours</i>
Intro. to Microelectronics 0305-201	4
Intro. to Microlithography 0305-221	4
Chemical Principles I, II 1011-211, 212	6
Chem. Principles I, II Lab 1011-205, 206	2
Calculus I, II, III 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 Electives* 0	
<i>Second Year</i>	
Circuit Analysis I 0301-351	4
Electrical Engineering Lab I 0301-380	1
Intro. 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
Statistics 1016-314	4
University Physics III 1017-313	4
Physics Lab III 1017-377	1
Modern Physics 1017-314	4
Liberal Arts (Core)†	8
Physical Education Electives* 0	
<i>Third Year</i>	
Circuit Analysis II 0301-352	3
Electronics I, II 0301-441, 442	6
Electrical Engineering Lab II, III 0301-390, 395	2
Linear Systems 0301-455	4
Semiconductor Devices I 0305-460	4
EM Fields I, II 0305-530, 540	8
Liberal Arts (Core)†	4
Cooperative Education (2 quarters)	Co-op
<i>Fourth Year</i>	
Design of Experiments 0305-514	4
VLSI Design 0305-520	4
Semiconductor Devices II 0305-560	4
Microlithography I 0305-563	3
Microelectronic Engineering 0305-632	4
Microlithography I Lab 0305-573	1
Thin Film Processes 0305-643	4
Optics for Microelectronics 2051-525	4

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Liberal Arts (Concentration)†	4
Cooperative Education (2 quarters)	Co-op
<i>Fifth Year</i>	
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
<i>Total Quarter Credit Hours</i>	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.*

COLLEGE OF IMAGING ARTS AND SCIENCES

Margaret O. Lucas, Ph.D., Dean

The College of Imaging Arts and Sciences encompasses the School of Art and Design, the School for American Crafts, the School of Photographic Arts and Sciences, the School of Printing Management and Sciences, and the Center for Imaging Science. Students from nearly every state and many foreign countries are enrolled in the five schools

Visits to the campus and the college are encouraged. Please contact the Admissions Office

THE SCHOOL OF ART AND DESIGN

The School of Art and Design enrolls approximately 1,000 students in programs leading to the following degrees.

Associate (AAS): graphic design, illustration, interior design, painting, printmaking, industrial design

Bachelor of Fine Arts (BFA): graphic design, illustration, industrial design, interior design, medical illustration, painting, printmaking

Master of Science for Teachers (MST): art education, graphic design, industrial design, interior design, painting, printmaking

Master of Fine Arts (MFA): computer graphics design, graphic design, industrial design, interior design, medical illustration, painting, printmaking

THE SCHOOL FOR AMERICAN CRAFTS

The School for American Crafts offers to select students crafts programs leading to the following degrees.

Associate (AAS): ceramics and ceramic sculpture, glass, metalcrafts and jewelry, weaving and textile design, woodworking and furniture design

Associate in Occupational Studies (AOS): woodworking and furniture design

Bachelor of Fine Arts (BFA): ceramics and ceramic sculpture, glass, metalcrafts and jewelry, weaving and textile design, woodworking and furniture design

Master of Science for Teachers (MST): ceramics and ceramic sculpture, glass, metalcrafts and jewelry, weaving and textile design, woodworking and furniture design

Master of Fine Arts (MFA): ceramics and ceramic sculpture, glass, metalcrafts and jewelry, weaving and textile design, woodworking and furniture design

THE SCHOOL OF PHOTOGRAPHIC ARTS AND SCIENCES

More than 800 students are enrolled in the School of Photographic Arts and Sciences, which offers programs leading to the following degrees

Bachelor of Science (BS): biomedical photographic communications, film/video, imaging systems management, imaging and photographic technology, photographic marketing management (joint program with the College of Business)

Bachelor of Fine Arts (BFA): professional photographic illustration with major options in advertising photography, photojournalism, and fine art photography

Master of Fine Arts (MFA): imaging arts with concentrations in photography, computer animation, and museum studies

THE SCHOOL OF PRINTING MANAGEMENT AND SCIENCES

ROCHESTER INSTITUTE OF TECHNOLOGY

The School of Printing Management and Sciences has approximately 400 students, enrolled in the following degree programs.

Bachelor of Science (BS): printing, newspaper operations management, printing systems, printing and applied computer science

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

THE CENTER FOR IMAGING SCIENCE

RIT offers the only imaging science program in the country. Students learn the application of physics, computer science, chemistry, and mathematics to the formation, recording, manipulation, and perception of images. Degrees offered include the following

Bachelor of Science (BS): imaging science

Master of Science (MS): imaging science, color science

Doctor of Philosophy (Ph.D.): imaging science

Resources

The college's specialized laboratories, studios, advanced computer facilities, and wide range of equipment make it the most complete of any degree-granting institution in the fields of photography, printing, imaging science, art and design, and craftsmanship

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 15 laboratories
- New \$8.5 million imaging science building, which houses research facilities and laboratories for photographic chemistry, digital imaging, holography, emulsion coating, optics, remote sensing, and color science
- Wallace Library, rich in photography; graphic arts publications; and contemporary periodicals in design, arts, and crafts for study and research
- 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 14,000 volumes of rare books illustrating fine printing and other materials detailing the history of printing, book design and illustrations, papermaking, binding, and other aspects of the graphic art
- Free student membership at the Rochester Memorial Art Gallery
- Graphic design archives

Cooperative education

Many students in the college 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 students major.

Co-op is required in the School of Printing Management and Sciences and is encouraged in the School of Photographic Arts and Sciences and the Center for Imaging Science. Students are responsible for finding their co-op positions and for performing productively. 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 and Design and the School for American Crafts are accredited by the National Association of Schools of Art and Design

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

Portfolio guidelines

Acceptance into the School of Art and Design and School for American Crafts requires a combination of academic and artistic skills. Both schools require the submission of a portfolio. Faculty will review the work to gauge general artistic skill and preparation as well as potential for likely success in the major of choice. The following guidelines should be used in submitting freshman and undergraduate transfer portfolios:

1. Portfolio work is normally submitted as 35 mm slides. Original work will be reviewed at Open Houses and select Portfolio Days. For dates and locations, contact the secretary to the chairs at 716-475-6114.
2. Submit 10-20 slides of your best work in an 8 1/2 ' x 11' pocketed protector page. There should be a minimum of five samples of drawings made from direct observations (not 'fantasy' and not copied from photographs or comics). Other work could include painting, photography, computer images, sculpture, two-dimensional design, and models or mechanical drawings.
3. Portfolios will be evaluated on the basis of drawing and design ability, original ideas, and craftsmanship. The clarity of the slide images is of utmost importance
4. *Medical illustration* applicants should include at least six samples of natural forms, such as shells, figures, or animals rendered in a single medium
5. School for American Crafts applicants are encouraged, where possible, to include samples of work done in the medium of their intended major
6. *Transfer students* should clearly represent their basic foundation training, as well as any more advanced or 'applied' work. Students considering transfer should notify RIT at the earliest possible moment. Contact the associate director at 716-475-2634 to discuss our curriculum and possible transfer credits
7. Each slide should be numbered in order on a separate 8 1/2 ' x 11' page. These numbers should correspond to a clear description of each slide: title, size, media, assignment/theme, if any, and any exhibition/award notations. All slides and documents should be clearly labeled.
8. Slides can be returned only if proper postage is included with the application

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9. While every precaution is taken to ensure proper handling, the Institute assumes no responsibility for loss of or damage to slides
10. Personal interviews and tours of the school are encouraged. Occasionally portfolio reviews will be granted, as well. Contact the secretary for the chairperson at 716-475-6614

Send portfolio and application to:

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

SCHOOL OF ART AND DESIGN

The mission of the School of Art and Design, through its nationally recognized programs, is to educate students to be artists and designers who contribute to their professions, communicate effectively within their disciplines, have a life-long attitude of inquiry, and make a positive impact on society. To this end, we promote an innovative educational community that balances expression, imaginative problem- solving, aesthetic understanding, and creativity

The educational objectives of the School of Art and Design are to encourage imagination, creative ability, and a sense of artistic discrimination; to develop the skills essential to professional competence; to relate the various arts and to help students find the means to enjoy them; and to cooperate with the College of Liberal Arts in helping all RIT students grow culturally and socially and inspiring them to make their maximum contributions as creative artists and citizens. Aesthetic and applied concepts are brought together.

Programs

Major concentrations are offered in graphic design, industrial design, interior design, painting, printmaking, illustration, and medical illustration. Electives may be pursued, beginning in the second year, in painting, printmaking, illustration, scientific illustration, 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.

Graphic design deals with systematic thinking, strong visual fundamentals, aesthetic/informational requirements, problem solving, and methodology. New communication technologies such as computer graphics are utilized

The **industrial design** program prepares students for careers in the expanding product design fields. Artistic talent and analytic thought are applied to the design process

Interior design students study three-dimensional concepts as they relate to space, function, and aesthetic resolution. Practical design projects develop aesthetic understanding, technical abilities, sensitivity to human needs, and awareness of the social consequences of the designer's effort.

Painting and printmaking serve the student who is interested in careers in the fine arts. These two majors are complemented by fine arts course work in drawing, electronic imaging, and sculpture.

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 79)

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.

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Medical illustration students will be taught Human Gross Anatomy through the University of Rochester during the Winter and Spring quarters of the junior year. A tuition surcharge will be in effect those quarters.

The credit requirements for students admitted in September 1994 in the School of Art and Design (Painting, Printmaking, Illustration, Graphic Design, Industrial Design, and Interior Design) programs are as follows:

	<i>Quarter Credit Hours</i>
Required Major	87
Required Professional Electives	18
Open Electives	9
Liberal Arts	50
Art History	18
Creative Sources	6
<i>Total Quarter Credit Hours</i>	188

Freshman Kit for art and design students is approximately \$260. There is an additional cost for supplies.

Electives

Graphic Design	2010-411, 412, 413
Illustration Electives	2019-411, 412, 413
Graphic Visualization	2035-320
Industrial Design Elective	2035-411, 412, 413
Color	2021-320
Painting Elective	2021-411, 412, 413
Printmaking Elective	2022-411, 412, 413
Drawing Problems	2021-450
Sculpture	2021-411, 412, 413
Ceramics Elective	2040-251, 252, 253
Glass Elective	2041-251, 252, 253
Metalcrafts Elective	2042-251, 252, 253
Textiles Elective	2043-251, 252, 253
Business Practices for Crafts	2043-520
Woodworking Elective	2044-251, 252, 253
Introduction to Filmmaking	2065-243, 244
Still Photography I, II, III	2060-257, 258, 259
Typographical	2081-202, 203
Composition	

Art History (select two)

History of Design	2039-300
History of Crafts	2039-310
History of Art Criticism	2039-320
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
Native American Art	2039-390
American Art	2039-420
Dada and Surrealism	2039-430
Conceptual Art	2039-440
Pop Art and Pop Culture	2039-450
Media, Advertising, & Consciousness	2039-460

Senior painting and illustration students got an unusual opportunity for their work to be seen—creating paintings for public-service billboards. Jerry Miller's work, VOTE, wound up as a 14 x 18-foot billboard in downtown Rochester.

**Graphic Design, Painting, Printmaking, Industrial Design, Interior Design, or Illustration,
BFA degree, typical course sequences**

<i>First Year</i>	<i>Quarter Credit Hours</i>
Two-Dimensional Design 2013-231, 232, 233	9
Three-Dimensional Design 2013-241, 242, 243	9
Creative Sources 2013-205, 206, 207	6
Drawing 2013-211, 212, 213	12
Liberal Arts*	12
Physical Education Elective†	0

<i>Second Year*</i>	
Art and Civilization 2039-225, 226, 227	9
Liberal Arts*	12
Physical Education Elective†	0
Electives (must have two studios each quarter—one of which must be the core in which you are going to major)§	
Introduction to Graphic Design 2010-301, 302, 303#	12

Industrial Design majors must take each of these courses to complete sophomore year:

Layout Systems 2035-305	3
Technical Drawing 2035-306	3
Graphic Visualization 2035-307	3
Soft Model Making 2035-308	1
Hard Model Making 2035-309	1
Computer Aided Design Application 2035-310	1

Interior Design majors must take each of these courses to complete sophomore year:

Architectural Drafting 2015-305	3
Perspective Rendering 2015-306	3
Introduction to Interior Design 2015-307	3
Computer Aided Design Applications 2015-308	1
Interior Design Model Building 2015-309	1
Human Dimension Applications 2015-310	1

Fine Arts majors must take each of these courses to complete sophomore year:

Introduction to Painting 2021-305	3
Introduction to Printmaking 2021-307	3
Introduction to Sculpture 2021-309	3
Fine Arts Drawing 2021-306, 308, 310	3

Illustration majors must take each of these courses to complete sophomore year:

Anatomical Figure Drawing 2019-304	3
Heads, Hands, Facial Expression 2019-306	3
The Figure in the Environment 2019-308	3
Desktop Illustration I 2019-305	1
Reference Photography 2019-307	1
Desktop Illustration II 2019-309	1

<i>Third Year</i>	
Contemporary Art 2039-380 (one quarter required; offered every quarter)	3
Art History Electives (select two)	6
Liberal Arts*	12
Major (one)	

Illustration majors must take each of these courses to complete junior year:

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The Figure in Advertising 2019-405	3
The Graphic Elements of Illustration 2019-406	3
Illustration Source:Creating the Scene 2019-407	3
Publishing Your Illustrations 2019-408	3
Symbolism in Editorial Illustration 2019-409	3
The Illustrator and the Editorial Statement 2019-410	3
Printmaking 2022-401, 402, 403	18

Graphic Design majors must take each of these courses to complete junior year):

Typography in Graphic Design 2010-401	3
Imagery in Graphic Design 2010-402	3
Symbols in Graphic Design 2010-403	3
Graphic Design for Publications 2010 404	3
Information Graphics 2010-405	3
Packaging & Environmental Graphics 2010-406	3
Painting II 2021-401, 402, 403	18

Industrial Design majors must take each of these courses to complete junior year:

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

Interior Design majors must take each of these courses to complete junior year:

Hospitality Design 2015-404	3
Applications of Color and Light 2015-405	3
Retail Design 2015-406	3
Materials &Processes for Interior Design 2015-407	3
Office Design &Planning 2015-408	3
Interior Specifications 2015-409	3
Art Electives (one per quarter)	9

Fourth Year

Liberal Arts*	14
Major (one)	

Illustration majors must take each of these courses to complete senior year:

The Illustrator as Journalist 2019-501	3
A Contemporary History of Illustration 2019-505	3
Beginning Computer Techniques for Illustration 2019-506	3
Illustration for Books 2019-507	3
Illustration as a Promotional Tool 2019-508	3
Computer Illustration 2019-509	3
Personal Focus in Illustration 2019-510	3
Alternative Materials &Media 2019-511	3
Contemporary Computer Issues 2019-512	3
Printmaking III 2022-501, 502, 503	27

Graphic Design majors must take each of these five senior-level courses

Career Skills & Professional Practices 2010-501	3
Corporate Design 2010-502	3
Design Applications 2010-510	3
Graphic Systems 2010-504	3
Senior Project 2010-513	3

All **Graphic Design** seniors must select four courses from the following:

Advertising Design 2010-505	3
Concept & Symbolism 2010-506	3

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Design History 2010-503	3
Design Marketing Relationships 2010-507	3
Photography in Graphic Design 2010-508	3
Design Specifications 2010-509	3
Advanced Information Graphics 2010-511	3
Communication Design 2010-512	3
Painting 2021-501, 502, 503	27

Industrial Design majors must take each of these courses to complete senior year:

20th Century Designers 2035-505	3
Design Collaborative 2035-506	3
Advanced Product Design 2035-507	3
Furniture Design 2035-508	3
Furniture Research & Development 2035-509	3
Professional Practice 2035-510	3
Product Development 2035-511	3
Advanced Product Design 2035-512	3
Professional Practice II 2035-513	3

Interior Design majors must take each of these courses to complete senior year:

Multi-purpose, Multi-storage Design 2015-504	3
Codes & Regulations 2015-505	3
Environmental Control Applications 2015-506	3
Health Care Design 2015-507	3
Interior Design Business Practices 2015-508	3
Career Planning 2015-509	3
Working Drawings 2015-510	3
Special Projects 2015-511	3
20th Century Interior Design 2015-512	3
Open Electives (one per quarter)§	9

Total Quarter Credit Hours 188-191

* See page 10 for Liberal Arts requirements

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

Core--introductory courses that are prerequisite to the respective third-year major. 2010-301, 302, 303 required for entrance into Graphic Design major; 2021-301, 302, 303 for printmaking and painting majors; 2019-301, 302, 303 for illustration majors. However, all three Core Electives are available as elective choices.

Art Electives listed on previous page

**Total of 18 quarter credits of Art History: Art and Civilization and Contemporary Art required

Medical Illustration option, BFA degree, typical course sequence

First Year

Quarter Credit Hours

(Art and Design portfolio and additional six drawings of natural forms, to be presented as slides, are required for admission.)

Two-Dimensional Design 2013-231, 232, 233	9
Three-Dimensional Design 2013-241, 242, 243	9
Creative Sources 2013-205, 206, 207	6
Drawing 2013-211, 212, 213	12
Liberal Arts*	12

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Physical Education Elective† 0

*Second Year**

Art & Civilization 2039-225, 226, 227 9

Liberal Arts* 12

Physical Education Elective† 0

Medical Illustration majors must take each of these courses to complete sophomore year

Anatomical Figure Drawing 2019-304 3

Heads, Hands, Facial Expression 2019-306 3

The Figure in the Environment 2019-308 3

Desktop Illustration I 2019-305 1

Reference Photography 2019-307 1

Desktop Illustration II 2019-309 1

General Biology 1001-205 4

Human Biology 1001-231, 232 8

Art Elective (one per quarter)# 9

Third Year

Liberal Arts* 12

Medical Illustration majors must take each of these courses to complete junior year

Medical Illustration Application 2020-401 3

Anatomic Drawing I 2020-405 3

Anatomic Illustration:Wet Media 2020-406 3

Computer Applications in Anatomic Illustration 2020-407 2

Anatomic Drawing II 2020-408 2

Medical Illustration:Mixed Media 2020-409 3

Scientific Illustration 2020-551-01 3

Computer Applications in Scientific Illustration 2020-551-02 2

Gross Anatomy (U of R)§ 7

Art Electives# 6

Fourth Year

Liberal Arts* 14

Medical Illustration majors must take each of these courses to complete senior year

Advanced Medical Illustration 2020-501 3

Computer Animation for Medical Instruction 2020-506 3

Marketing & Business Practices in Med. Illus. 2020-507-01 3

Medical Illustration Portfolio 2020-508-01 3

Surgical Drawing & Illustration 2020-551-03 6

Open Elective (one per quarter)# 9

Total Quarter Credit Hours 189

*See page 10 for Liberal Arts requirements

See page 11 for policy on Physical Education

§A tuition surcharge will be applied in this quarter

#Art Electives listed on page 77.

SCHOOL FOR AMERICAN CRAFTS

As an internationally recognized school that merges art with craft, the mission of the School for American Crafts is to educate, inspire, and motivate students while preparing them for professions in the creative and technical understanding of wood, metal, fiber, clay, and glass. Through a balance of aesthetic and technical education, the School for American Crafts provides diverse experiences to promote the development of innovative self-expression and problem solving in the creation and appreciation of sculpture and functional objects

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, and the AAS and BFA programs cooperate with the College of Liberal Arts in assisting students to develop personally and socially.

Student responsibilities

Students are responsible for the care and cleanliness of their shops and for the care and maintenance of the tools and machines with which they work. No student may use any machine until instruction in its proper use has been given, and responsibility for observing safety precautions is assumed by each student upon entering the school. Some unique supplies are provided for convenience and choice, but financial obligations must be met for successful completion of courses. Fees for kiln firings, supplies, and furnace use are student responsibilities

Programs of study

The School for American Crafts offers a full-time program of study with opportunity for concentration in one of five craft fields: ceramics and ceramic sculpture, metalcrafts and jewelry, weaving and textile design, woodworking and furniture design, and glass. After satisfactory completion of two years of study, the associate in applied science is granted. Those with the aptitude and interest for further study may continue for two additional years. After successful completion of the four-year program, the bachelor of fine arts is awarded

A double crafts major will study two years in each of two craft areas. A bachelor of fine arts is awarded after four years of study.

	<i>Quarter Credit Hours</i>
Required Craft Major	96
Required Professional Electives	12
Open Electives	6
Liberal Arts	50
Art History	18
Creative Sources	6
<i>Total Quarter Credit Hours</i>	188

Double crafts credit requirements are:

	<i>Quarter Credit Hours</i>
Required Crafts (2) Major	93
Required Professional Electives	12
Open Electives	6
Liberal Arts	50
Art History	18
Creative Sources	6
<i>Total Quarter Credit Hours</i>	185

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

Woodworking and Furniture Design, AOS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Materials and Processes 2044-220	15
Creative Sources 2013-205, 206, 207	6
Crafts Drawing 2013-261, 262, 263	9
Two-Dimensional Design 2013-231, 232, 233	9
Technical Drawing 2044-231, 232, 233	9
Physical Education Elective*	0
<i>Second Year</i>	
Materials and Processes 2044-320	21

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Three-Dimensional Design 2013-241, 242, 243	9
Furniture History 2044-331, 332, 333	9
Wood Professional Practices 2044-341, 342, 343	8
<i>Total Quarter Credit Hours</i>	90

**See page 11 for policy on Physical Education.*

Course descriptions

For a complete outline of courses offered at RIT, please refer to the course description section of this bulletin.

Craft Majors, Double Crafts Majors,* BFA degree, typical course sequence

First Year *Quarter Credit Hours*

Two-Dimensional Design 2013-231, 232, 233	9
Creative Sources 2013-205, 206, 207	6
Drawing Crafts 2013-261, 262, 263	9
Liberal Arts†	12
Materials and Processes (one):	
Ceramics & Ceramic Sculpture 2040-200	15
Glass 2041-200	15
Metalcrafts & Jewelry 2042-200	15
Weaving & Textile Design 2043-200	15
Woodworking & Furniture Design 2044-200	15
Physical Education Elective*	0

Second Year§

Art & Civilization 2039-225, 226, 227	9
Three-Dimensional Design 2013-241, 242, 243	9
Liberal Arts†	12
Materials and Processes (one):	
Ceramics & Ceramic Sculpture 2040-300	15
Glass 2041-300	15
Metalcrafts & Jewelry 2042-300	15
Weaving & Textile Design 2043-300	15
2044-300 Woodworking & Furniture Design	15
Physical Education Elective*	0

Third Year

Contemporary Art 2039-380	
(one quarter required; offered every quarter)	3
Art History Electives (select two)#	6
Liberal Arts†	12
Materials & Processes (one):	
Ceramics & Ceramic Sculpture 2040-400	15
Glass 2041-400	15
Metalcrafts & Jewelry 2042-400	15
Weaving & Textile Design 2043-400	15
Woodworking & Furniture Design 2044-400	15
Electives (one per quarter)	9

Fourth Year

Liberal Arts†	14
Techniques & Thesis (one)	
Ceramics & Ceramic Sculpture 2040-500	24
Glass 2041-500	24
Metalcrafts & Jewelry 2042-500	24
Weaving & Textile Design 2043-500	24
Woodworking & Furniture Design 2044-500	24
Electives (one per quarter)	9
<i>Total Quarter Credit Hours</i>	188

*Double Crafts Major: The first two years are the same as a crafts major: third year 204-300 (5 cr.), 204-400 (5 cr.); fourth year 204-400 (5 cr.), 204-500 (8 cr.)

See page 10 for Liberal Arts requirements

*See page 11 for policy on Physical Education

§Upon successful completion of the second year, the associate in applied science degree is awarded.

#Total of 18 quarter credits of Art History: Art and Civilization and Contemporary Art are required

Additional intercollege studio courses are available by recommendation of the academic adviser and administrator. Electives are registered on a space available basis and are subject to change without prior notice. Consult the adviser when planning programs. Craft students elect in studio other than their major concentrations

SCHOOL OF PHOTOGRAPHIC ARTS AND SCIENCES

Elaine O'Neil, Director

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 schools 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

Department of Applied Photography: BFA degree in professional photographic illustration (advertising photography and photojournalism)--Nancy Stuart, chair

Department of Biomedical Photographic Communications: BS degree in biomedical photographic communications--Michael Peres, chair

Department of Film/Video: BS degree in film/video--Howard Lester, chair (It is expected that the department's BS degree will become a BFA degree beginning in academic year 1994/95.)

Department of Fine Art Photography: BFA degree in professional photographic illustration, fine art photography option; MFA degree in imaging arts--E. Kenly White, chair

Department of Imaging and Photographic Technology: BS degree in imaging and photographic technology--Andrew Davidhazy, chair

Department of Imaging/Photo Systems Management -BS degree in imaging systems management--William DuBois, chair

Graduate programs

The School of Photographic Arts and Sciences offers the MFA in imaging arts with two areas of concentration: photography and computer animation. 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 Admissions Office

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 associate director of the school.

Internet address

Additional information can be requested through Internet. Use the word 'info' in the Subject line and send to the following address: RITPHOTO@RIT.EDU

Memberships

The school maintains memberships in a number of professional organizations: American Management Association, American Society of Training and Development, Association of Professional Color Laboratories, College Art Association, Biological Photographic Association, National Microfilm Association, Ophthalmic Photographic Society, Professional Photographers of America, Society of Motion Picture and Television Engineers, Society of Photographic Scientists and Engineers, Society for Photographic Education, University Film 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 Admissions.)

Articulation agreements, which specify the number of transfer credits that are acceptable from another institution, are in effect with approximately 20 colleges and universities

Writing Policy

The School of Photographic Arts and Sciences has a minimum requirement within each of its degree programs. A copy of the schools official writing competency policy may be obtained from the director's office 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 are indicated below

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 coursework: at least one year of mathematics, including an introductory calculus course; at least four liberal arts courses; and three 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 may also be accepted for transfer to upper years. This includes college physics, liberal arts, technical writing, computer programming, chemistry, and additional mathematics.

Transfer with other than background suggested above is possible in exceptional circumstances

Biomedical Photographic Communications --Normally a minimum of 32 credit hours in which there are 12 credit hours of liberal arts, 8 of science, and 12 of photography. Students must also 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, Creative Problems, and Introduction to Color Photography.

Third-year transfer credit requirements

Imaging/Photo Systems Management --to enter the program as a junior, the student must have 60 semester credits or 90 quarter credits, including math, science, English composition, and computer literacy and 20 semester (15 quarter) credits in liberal arts lower core courses. Applicants from other than a business or photography program should consider entering the summer transfer program which consists of 18 credit hours in Basic Photo Lab Operations, and Materials and Processes of 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.

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 must also complete the 10-week intensive summer course, BFAPhotography, 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 RIT Office of Admissions, Bausch & Lomb Center, 60 Lomb Memorial Drive, Rochester, N.Y., 14623-5604

BIOMEDICAL PHOTOGRAPHIC COMMUNICATIONS

Michael Peres, Chair

The program prepares students for a photographic career in hospitals and other medical settings such as ophthalmic clinics and veterinary or research centers as well as in other life science situations. The biomedical photographer can be involved in all areas of still imagery-electronic and silver--as well as film and video.

The first-year courses introduce basic principles and theories plus practical experience with photographic equipment and processes. Medical and 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 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 internship in a medical or scientific facility. Completion of the internship is required for the associate degree in biomedical photography.

The junior and senior years include electives in advanced photomacrography, ophthalmic photography, and 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 Biological Photographic 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.

Biomedical Photographic Communications, BSdegree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 2061-001	0
Biomedical Photography I 2061-201, 202, 203	18
Materials & Processes of Photography 2076-211, 212, 213	9
Survey of Biomedical Photography 2061-213	1
Human Biology 1004-211, 212	8
Survey of Computer Science 0602-200	4
Liberal Arts (Core)*	12
Physical Education*	0
<i>Second Year</i>	
Biomedical Photography II 2061-301, 302, 303	15
Color Photography/Design 2076-311	4
Color Printing/Theory 2076-312	4
Preparation of Biomedical Visuals 2061-312, 313	6
Medical Terminology 1026-301	3
Liberal Arts (Core)*	16
Physical Education*	0
<i>Summer Quarter Internship (10 weeks in a medical setting)*</i>	
<i>Third Year</i>	
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
Summer Internship (Optional)	
Mathematics	8
<i>Fourth Year</i>	
Photographic Concentration 2061-501, 502, 503	12
Business Electives	8
Professional Electives §	9-12
Liberal Arts (Elective) *	12
Liberal Arts (Senior Seminar)*	2
<i>Total Quarter Credit Hours</i>	188-197

**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 recommended professional electives:

Ophthalmic Photography

Portable Video

Holography

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Electives will be made with the chair's permission. Selected professional courses may be substituted for 4, 8, or 12 credits with written permission of adviser.

#Options include:

Electron Microscopy

Medical Terminology

Computer courses

Advanced courses in the biological sciences

FILM/VIDEO

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 to empower all our graduates to 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 inter-relationship between the technologies of film, video, animation, and computers. Other RIT students with a basic knowledge of photography may enroll with the permission of the instructor

Students typically produce several short films or 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 often designed by individual students, a wide variety of styles and intentions are expressed in the department's work.

Film/Video, BSdegree, typical course sequence

Please note: The Department of Film and Video is revising its curriculum. Many of the courses listed here will be changed, rescheduled, or replaced for the 1994/95 academic year. Final information was unavailable at the time of this catalog's printing. For up-to-date listings, please check with the department chair at 716-475-2779

First Year

Film/Video Freshman Seminar 2065-101	2
Film/Video Production I, II, III 2065-201, 202, 203	15
Materials and Processes of the Moving Image 2065-221	2
Film Language 2065-222	2
Creative Processes 2065-223	2
Writing for Film/Video I 2065-342	3
Liberal Arts (Core)*	16
Physical Education*	0

Second Year

Video Tools & Technology 2065-311	
or	
Intro. to 16mm Sync. Sound 2065-431	5
Film/Video History and Aesthetics*	3-4
Introduction to Animation 2065-331	4

Production Emphasis

Film/Video Production Workshop**	4
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Writing for Film/Video II 2065-343	3
Film/Video Elective+	3-4

Animation Emphasis

Film/Video Elective+	3-4
Advanced Animation Tools 2065-332	4
Animation Production	4
Liberal Arts Core*	12
Physical Education*	0

Third Year

Film/Video Elective+	3-4
Film/Video History and Aesthetics*	3-4
Senior Project Seminar 2065-413	1

Production Emphasis

Video Tools and Technology 2065-311	
or	
Intro. to 16mm Sync. Sound 2065-431	5
Film/Video Production Workshop*	8

Animation Emphasis

Intro. to Computer Animation 2065-427	5
Advanced Animation Workshop I 2065-437	
or	
Experimental Animation Workshop 2065-447	4
Advanced Animation Workshop II 2065-438	4
Liberal Arts (Concentration)*	12

Fourth Year

Senior Production I 2065-501	6
Senior Production II 2065-502	6
Senior Production III 2065-503	4
Film/Video Election+	6-8
Liberal Arts (Electives)*	12
Liberal Arts Seminar*	2
Total Quarter Credit Hours	181-187

*See page 10 for Liberal Arts requirements

See page 11 for policy on Physical Education

*Recommended Science Electives (each 4 credits)

0602-200 Survey of Computer Science
0601-208 Introduction to Programming
0601-210 Program Design and Validation
1004-289 Contemporary Science--Biology (F, W, S)
1004-201, 202, 203 General Biology
1011-289 Contemporary Science--Chemistry (F, W, S)
1017-289 Contemporary Science--Physics (F, W, S)

IMAGING AND PHOTOGRAPHIC TECHNOLOGY

Andrew Davidhazy, Chair

The curriculum blends a traditional professional photography program with specialized education in technical, industrial, and scientific imaging applications

It prepares students for entry into any of a variety of picture-making and non-picture-making positions by providing them with a broad background adaptable to a variety of fields. Students' technical skills are complemented by traditional 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 courses in any one of several available areas of concentration.

The picture-making aspects of photography are included in all four years of the program, with a transition from a comprehensive course in black-and-white photography through color photography and color printing, audiovisual presentations, and television production. 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, Digital Image Processing, Architectural Photography, Nature Photography, and Photoinstrumentation Applications.

In their last two years, students may choose a field of concentration (see 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 photographic technology backgrounds. 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.

The Technical Photography Student Association promotes professionalism among students and interaction with the imaging and photographic technology industry. The association regularly invites professionals to RIT 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 program chair, Andrew Davidhazy, at 716-475-2592.

Concentration electives (third and fourth years, Imaging and Photographic Technology)

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; and desktop publishing. Other concentration areas also may be designed by a student 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 area are suggested to constitute a major concentration area.

Imaging & Photographic Technology, BS degree, typical course sequence

Please note: The Department of Imaging and Photographic Technology is revising its curriculum. Many of the courses listed here will be changed, rescheduled, or replaced for the 1994/95 academic year. Final information was unavailable at the time of this catalog's printing. For up-to-date listing, please check with the department chair at 716-475-2592.

First Year

Photographic Technology I

Photography I 2076-201, 202, 203	21
Materials & Processes of Photography 2076-211, 212, 213	9
Survey of Imaging & Photographic Technology 2076-220, 221	1
College Algebra 1016-204 *	4
Introductory Calculus 1016-214, 215 †	6
Liberal Arts (Core)*	12
Physical Education§	0

Quarter Credit Hours

Second Year

Photographic Technology II

Photographic Sensitometry 2076-301	3
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Technical Photographic Chemistry 2076-302	3
Photographic Optics 2076-303	3

Color Photographic Systems

Color Photo/Design 2076-311	4
Color Printing Theory 2076-312	4
Color Measurement 2076-313	4
Applied Computing for Tech. Photography 2076-321	3
College Physics 1017-211, 212, 213#	9
College Physics Lab 1017-271, 272, 273	1
Liberal Arts (Core)*	12
Physical Education §	0
Cooperative Education (Summer)	Co-op

Third Year

Concentration Electives**	12
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Photographic Technology III

System Design for Graphic Presentations 2076-401	3
Producing Audiovisual Presentations 2061-401	4
M & P of the Moving Image II 2065-321	2
Intro. to Portable Video 2065-243	4
Introduction to Programming 0602-208	4
Technical Writing	3-4
Liberal Arts*	12
Cooperative Education (Summer)	Co-op

Fourth Year

Concentration Electives**	12
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Photographic Technology IV

High-Speed/Time-Lapse 2076-511	3
Introduction to Research 2076-501	1
Senior Project 2076-502	3
Survey of Nonconventional Imaging 2076-503	3
Organizational Behavior 0102-430	4
Business Elective or Statistical Process Control	3-4
Liberal Arts (Concentration/Elective)*	16
Liberal Arts (Senior Seminar)*	2
Total Quarter Credit Hours	194

*Waiver (with credit) by examination. Exemption (without credit) on recommendation of instructor. Successful completion of one engineering calculus course by itself is sufficient to meet mathematics requirements of program. Consult adviser

Can substitute Engineering Calculus

*See page 10 for Liberal Arts requirements

§See page 11 for policy on Physical Education

#Students may substitute University Physics for College Physics. Consult adviser

Co-op experiences may be scheduled during the school year as well, but this may disrupt normal course schedule.

**Concentration course credits may vary from 3 to 5, but should total approximately 24. A minimum of 194 quarter credit hours are required for the BS degree

Note: Some courses are offered more than once during the school year

Photographic Marketing Management

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Offered jointly by the College of Business and the College of Imaging Arts and Sciences, RITs program in photographic marketing is the only one of its kind in the country

This rigorous program is designed to provide students with a thorough knowledge of the photographic process and a solid background in business administration with courses in economic, finance, and marketing principles. The combination of work in these two disciplines prepares students for a multifaceted management-level career in the photographic business. Employment opportunities include customer service positions in photofinishing and professional color laboratories and management training opportunities with photographic manufacturers and retailers. For further information, including transfer requirements, contact the College of Business or the College of Imaging Arts and Sciences

Photographic Marketing Management, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0102-011	0
Algebra and Calculus for Management Science 1016-225, 226	8
Introduction to Data Analysis I 0106-330	4
Survey of Computer Science 0602-200	4
Economics I & II 0511-301, 302	8
Contemporary Science	8
Liberal Arts*	16
Physical Education†	0
Career Seminar 0102-312	2
 <i>Second Year</i>	
Basic Photo Lab Operations III 2068-401, 402, 403	12
Financial & Managerial Accounting 0101-301, 302	8
Legal Environment of Business 0101-319	4
Organizational Behavior 0102-430	4
Principles of Marketing 0105-463	4
Management Science 0106-334	4
Liberal Arts*	12
Physical Education†	0
Completion of College Writing Competency Requirement	
 <i>Third Year</i>	
Materials & Processes of Photography 2076-211, 212, 213	9
Corporate Finance 0104-441	4
Buyer Behavior 0105-505	4
Marketing Research 0105-551	4
Operations Management 0106-401	4
Liberal Arts*	20
Special Topics 2068-551	3
Cooperative Education (two quarters required; must fall within third and fourth years)*	
 <i>Fourth Year</i>	
Business Environment 0102-507	4
Strategy & Policy 0102-551	4
Marketing Management Problems 0105-550	4
Information Systems 0106-505	4
Marketing/Management Electives	8
Liberal Arts*	2
Liberal Arts *	4
Total Quarter Credit Hours	184

*See page 10 for Liberal Arts requirements

See page 11 for policy on Physical Education

*Students are expected to complete co-op requirements during the junior and senior years in accordance with specific requirements for their major. General co-op guidelines for the College of Business are discussed on page 45.

IMAGING/PHOTO SYSTEMS MANAGEMENT

William W. DuBois, Chair

The purpose of this curriculum is to teach students how to get the most out of the sensitized photographic products, equipment, chemicals, and people available to them in a business environment. While a significant amount of theory is presented, the emphasis is on optimizing the results of less-than-perfect situations in a rapidly changing industry.

Students will have the opportunity to study in the program's fully equipped photo laboratory and experience the problems of, and work out solutions to, supervision and training situations that arise. Product costing, inventory, and manpower control are integral parts of the curriculum.

Emphasis is also given to pollution abatement, minimum effluent, and recycling procedures. Laboratory organization provides the opportunity for the student to learn both the theory behind the various types of equipment and the strengths and weaknesses of each type in a production situation.

Graduates learn an appreciation of the changes that are taking place and will continue to occur in the world of imaging. The need to carefully analyze developments and the application of reason and logic to the analysis is emphasized.

A 10-week internship in the photo industry is a requirement for all students.

The program objective is to provide the industry with individuals who possess technical knowledge of the photographic process, understand the basic principles of electronic imaging, are trained in business skills, and are capable of understanding what is required of management in the photo lab industry.

Imaging/Photo Systems Management, BS degree, typical course sequence

*Third Year**

Basic Photo Lab Oper. I, II, III 2068-401, 402, 403	12
Electronics I, II 0609-310, 311	8
Technical Writing 2080-312, 313	4
Financial Accounting 0101-301	4
Managerial Accounting 0101-302	4
Principles of Marketing 0105-463	5
OR	
Materials & Processes of Photography 2076-211, 212, 213	(9)
Liberal Arts (Concentration)†	12
Professional Electives	4
Internship (Summer)	

Fourth Year

Advanced Photo Lab Oper. I, II 2068-501, 502	8
Photo Lab Materials 2068-511	2
Statistical Quality Control 2068-423	3
Organizational Behavior 0102-430	8
Photo Process Control 2068-421	4
Finishing and Lab Operations Management 2068-513	4
Professional Electives	8
Liberal Arts (Electives)†	12
Liberal Arts (Senior Seminar)†	2
Total Quarter Credit Hours	180

See page 10 for Liberal Arts requirements.

NOTE: This program is designed for the transfer student. Applicants should have 60 semester credit hours or 90 quarter credit hours prior to starting the third year. A summer transfer program is

available and is recommended for those students without previous photographic or business courses. For those students who desire a four-year program, the first two years of the Imaging and Photographic Technology Program are an excellent foundation. For further information, contact the chairperson.

APPLIED PHOTOGRAPHY

Nancy Stuart, Chair

Advertising Photography

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, RIT 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.

Professional Photographic Illustration, BFA Degree, Advertising Photography Option, BFA degree, typical course sequence

Please Note: The curriculum for the first and second years is being revised. Some of the courses listed will be changed. Final information was unavailable at the time of this printing. Please call the department chair for updated information, 716-475-2762.

<i>First Year</i>	<i>Quarter Credit Hours</i>
Applied Photo I 2067-201, 202	10
Creative Problems 2067-206, 207	6
Intro. to Color 2067-208	5
2-D Design 2013-231, 232, 233	9
Liberal Arts (Core)*	12
Survey of Computer Science 0602-200	4
Physical Education*	0
 <i>Second Year</i>	
Applied Photo II 2067-301, 302	10
Intro. to Electronic Imaging	4
History & Aesthetics of Photo 2060-301, 302, 303	9
Materials & Processes of Photography 2076-211, 212, 213	9
Colloquia 2067-311	1
Liberal Arts (Core)*	12
Physical Education*	0
 <i>Third Year</i>	
Advertising Photography 2067-411	5
Advertising Core	10
Photo Electives	10
Spring Option 2067	4/5
Prof. Operations Management 2067-422	4
Art & Civilization 2039-225, 226, 227	9
Liberal Arts (Concentration)*	12
 <i>Fourth Year</i>	
Advertising Core	10
Spring Option 2067	4-5
Photo Electives*	10
Liberal Arts (Electives)*	12
Liberal Arts (Senior Seminar)*	2
Total Quarter Credit Hours	183-185

**See page 10 for Liberal Arts requirements.*

See page 11 for policy on Physical Education.

**18 total photo elective credits required; may be any CIAS course (photo, art, printing, etc.).*

Photojournalism

World events today are often etched not by words, but by photographs. RITs photojournalism program, which leads to a bachelor of fine arts degree in professional photographic illustration, provides the education in both photographic techniques and the artistry of capturing events on film for magazines, newspapers, and independent projects. RIT graduates of this program are well-respected: alumni have won eight Pulitzer Prizes in photojournalism since 1980. Students have the opportunity to explore related disciplines, such as electronic printing and newspaper production, and other related topics within the College of Imaging Arts and Sciences

Professional Photographic Illustration, BFA degree, Photojournalism Option, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Applied Photo I 2067-201, 202	10
Spring Option 2067	4-5
Creative Problems 2067-206, 207	6
Intro. to Color 2067-208	5
2-D Design 2013-231, 232, 233	9
Survey of Computer Science 0602-200	4
Liberal Arts (Core)*	12
Physical Education*	0
 <i>Second Year</i>	
Applied Photo II 2067-301, 302	10
Spring Option 2067	4-5
History & Aesthetics of Photo 2060-301, 302, 303	9
Design for Photo II 2013-321, 322, 323	6
Materials & Processes of Photography 2076-211, 212, 213	9
Colloquia 2067-311	1
Liberal Arts (Core)*	12
Physical Education*	0
 <i>Third Year</i>	
Photojournalism I 2067-401, 402	10
Spring Option 2067	4-5
Photo Electives*	10
Prof. Operations Management 2067-422	4
Art & Civilization 2039-225, 226, 227	9
Liberal Arts (Concentration)*	12
 <i>Fourth Year</i>	
Photojournalism II 2067-501, 502	10
Spring Option 2067	4-5
Photo Electives*	10
Liberal Arts (Electives)*	12
Liberal Arts (Senior Seminar)*	2
Total Quarter Credit Hours	184-186

**See page 10 for Liberal Arts requirements.*

See page 11 for policy on Physical Education.

**Minimum of 18 total Photo Elective credits required; may be any CIAS course (photo, art, printing, etc.).*

FINE ART PHOTOGRAPHY

Ken White, 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, Ken White, at 716-475-2616.

Professional Photographic Illustration, BFA Degree, Fine Art Photography Option, typical course sequence

Please Note: The Fine Art Photography Department is implementing a curriculum revision for the first and second years. Some of the courses listed will be changed. Final information was unavailable at the time of this printing. Please call the department for updated information, 716-475-2616.

<i>First Year</i>	<i>Quarter Credit Hours</i>
Applied Photo I 2067-201, 202	10
Creative Problems 2067-206, 207	6
Intro. to Color 2067-208	5
2-D Design 2013-231, 232, 233	9
Liberal Arts (Core)*	12
Survey of Computer Science 0602-200	4
Physical Education†	0
 <i>Second Year</i>	
Introduction to Fine Art Photography 2060-311, 312, 313	12
History & Aesthetics of Photography 2060-301, 302, 303	9
Photo Media Survey 2060-324	3
Computer Imaging 2060-334	4
Visual Imaging Electives* (or Materials & Processes)	9-11
Liberal Arts (Core)*	12
Physical Education*	0
 <i>Third Year</i>	
Photography as a Fine Art I 2060-401, 402, 403	12
Art & Civilization 2039-225, 226, 227	9
Contemporary Issues 2060-411, 412, 413	6
Visual Imaging Electives*	9-12
Liberal Arts (Concentration)*	12
 <i>Fourth Year</i>	
Photography as a Fine Art II 2060-501, 502, 503	16
Contemporary Art 2039-380	3
Visual Imaging Electives*	11-12

Liberal Arts (Electives)*	12
Liberal Arts (Senior Seminar)*	2
<i>Total Quarter Credit Hours</i>	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.).*

CENTER FOR IMAGING SCIENCE

Edwin Przybylowicz, Director

Students in RIT's Imaging Science Program 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 application of those systems to a broad range of careers in industry, business, and government are all part of the imaging science curriculum. Concentrations include digital image processing, remote sensing, photographic chemistry, and optics. In addition a concentration in color science is offered in the Munsell Color Science Laboratory within the Center for Imaging Science. Both theoretical studies and practical application of technologies are integral parts of the program

Imaging science is grounded in the physical and mathematical sciences. Built on this background are advanced studies in imaging principles, chemistry, optics and optical instrumentation, color science and technology, photometry and radiometry, image microstructure, analysis and evaluation of imaging systems, 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, marketing, and technical representation

The imaging science faculty are deeply committed professionals who divide their time between teaching and the pursuit of scientific advances

The center provides research support and performs contract work for industry and government. This research ensures that students are exposed to the latest developments in a rapidly expanding field.

The Center for Imaging Science offers four programs leading to both undergraduate and graduate degrees: a four-year bachelor of science degree and two master of science programs for students with a bachelor's degree in science or engineering. In addition to the MS degree in imaging science, the center also offers an MS degree in color science and a Ph.D. in imaging science

A transfer program is available for the BS program in imaging science. Students with satisfactory credits in mathematics, chemistry, and physics may transfer into the program beginning with the second year by taking an optional transfer program during Summer Quarter

Second-year entry transfer credit requirements

Normally a minimum of 42 quarter credit hours are required to transfer into the imaging science BS program at this level. These should include: 8 credits of general chemistry (including lab), 4 credits of introductory organic chemistry, 12 credits in differential and integral calculus, 6 credits in physics, and 12 credits in liberal arts. The student may be advised to complete a summer course, Principles of Imaging Science, 2051-200, with a grade of C or better

Four-year program: Bachelor of Science in Imaging Science

The course content in this program is typical of science and engineering programs. The first two years contain fundamental courses in mathematics, chemistry, and physics. The student simultaneously applies these fundamentals to studies in imaging science. The imaging science core program then continues with courses in radiometry; the structure of images, color, and vision; and methods for analyzing imaging systems. Third- and fourth-year students select professional elective courses, and in the fourth year a research project is required

Imaging Science, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Survey of Imaging Science 2051-201	3
Intro. to Imaging Systems 2051-202	2
Introduction to Imaging Science 2051-203	2
C Programming 2051-241	3
Chemical Principles I, II 1011-211, 212	6
Chemical Principles I, II Lab 1011-205, 206	2
Intro. to Organic Chemistry 1011-213	3
Intro. to Organic Chemistry Lab 1011-207	1
University Physics 1017-311, 312	8
Calculus I, II, III 1016-251, 252, 253	12
Liberal Arts (Core)*	12
Physical Education†	0
<i>Second Year*</i>	
Geometrical Optics 2051-302	4
Physical Optics 2051-303	4
Interaction Between Light & Matter 2051-313	4
Instrumental Methods of Analysis 1008-318	3
Instrumental Methods of Analysis Lab 1008-311	1
Calculus IV 1016-305	4
Differential Equations 1016-306	4
Matrix Algebra 1016-331	4
University Physics 1017-313	4
Introduction to Modern Physics 1017-314	4
Liberal Arts (Core)*	12
Physical Education†	0
<i>Third Year</i>	
Radiometry 2051-401	4
Vision, Color & Psychophysics 2051-402	4
Macroscopic Properties of Imaging Systems 2051-403	3
Statistics I, II 2051-412, 413	8
Electronics 1017-431	4
Professional Electives	9-12
Liberal Arts (Core/Concentration)*	16
<i>Fourth Year</i>	
Research Practices & Technical Communications 2051-501	3
Sr. Project 2051-502, 503	6
Imaging Systems Analysis 2051-511	3
Advanced Imaging Systems Analysis 2051-512	3
Quantum Limitations of Imaging Processes 2051-513	3
Professional Electives	credit varies
Liberal Arts (Electives)*	12
Liberal Arts (Senior Seminar)*	2
<i>Total Quarter Credit Hours</i>	194

**See page 10 for Liberal Arts requirements.*

See page 11 for policy on Physical Education.

**Upon successful completion of the second year, the AS in general sciences may be awarded.*

SCHOOL OF PRINTING MANAGEMENT AND SCIENCES

C. Harold Gaffin, Director

The School of Printing Management and Sciences offers a complete array of programs based on the concepts needed in all printing 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 RITs programs from those at other colleges.

The school's facilities are unsurpassed: students learn from more than \$33 million worth of up-to-date equipment in 15 laboratories and 43,000 square feet of facilities

Scholarships and financial aid

Our large number of successful graduates testifies to the value of RITs printing programs. No student interested in attending the School of Printing Management and Sciences should turn away without first discussing financial questions with an expert in either RITs Financial Aid or Admissions offices.

The school enjoys substantial scholarship support from alumni and industry. More than 55 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 previous performance

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: Education Council of the Graphic Arts Industry

3515 Forbes Ave.
Pittsburgh, PA 15213

Students who have completed high school should also 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 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. RITs Office of Cooperative Education and Placement 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 currently 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 716-475-2712 for up-to-date information, transfer recommendations, and other details about transfer credit

Printing

Prospective students should look at all four of the school's degree programs before making a choice. The school offers three other programs to meet important and specific industry needs (described on succeeding page), but the Printing Program attracts 80 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.

Program of study

The curriculum includes a broad base of core concepts courses in the first two years followed by maximum flexibility through electives in the last two years

First-year printing courses cover the areas of aesthetics, imaging, and press. These are supplemented by three mathematics courses that cover material needed in later management and technology courses, two courses in chemistry, and four in liberal arts. The math and chemistry 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

The technology base begun in the first year is extended by concept courses in printing materials, print finishing and distribution, and electronic communications. A management foundation is provided by concept courses in financial controls, management planning (marketing and estimating), and leadership (production and human factors). Skills courses are required in graphic arts computer software, technical writing, and group communication. All students are required to take three courses in liberal arts and two courses in college physics. They may choose a third course in either physics or economics according to their interests

The third and fourth years involve many elective courses. However, seven liberal arts courses and a communication course are required. Students also are required to select a printing concentration that will consume 33-45 percent of their professional elective credits

Professional electives and printing concentrations

During the third and fourth years of the Printing Program, each student must complete 62 credits of professional electives. To meet this requirement, the student completes a specialized printing concentration and additional electives

selected from the advanced printing management and technology courses. The remaining electives may be used to expand a student's area of interest or sample many other available areas. With department permission, students take courses from other RIT colleges either as part of their concentration or as electives. The School of Printing Management and Sciences, however, offers more than 70 courses in the fields of printing management, aesthetics, and technology

The concentration requirement in the printing degree builds a body of in-depth knowledge, a kind of expertise. Each printing concentration consists of seven related courses and allows a student to focus on a specialized career path. In addition, with faculty approval, customized concentrations may be developed. Students work closely with faculty concentration advisers. Following is a partial list of printing concentrations.

Printing Concentrations

Color Reproduction
Composition Systems
Magazine Publishing Production Management
Packaging Printing
Print-Finishing Management
Printing Design & Typography
Printing Supervision
Production Management
Publishing Arts
Quality Control
Sales/Marketing
Screen Process

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Small Business Entrepreneurship

Printing, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Student Seminar 2080-001	0
Printing Processes Concepts 2081-201	4
Concepts of Design & Typography 2081-202	4
Prepress Imaging Concepts 2081-203	4
Algebra for Management Sciences 1016-225	4
Calculus for Management Sciences 1016-226	4
Data Analysis 1016-319	4
Fundamentals of Trigonometry 1016-220*	1
Chemical Foundations I, II 1011-281, 282	8
Liberal Arts (Core)†	16
Physical Education*	0
<i>Second Year</i>	
Printing Financial Controls 2080-301	
or	
Financial Accounting 0101-301	4
Printing Planning Concepts 2080-302	
or	
Principles of Marketing 0105-463§	4
Principles of Managerial Leadership 0102-350	4
Standard Software Packages 2080-311	2
Ink & Substrates 2081-316	3
Technical Writing I, II 2080-312, 313#	4
Print Finishing & Distribution 2081-317	3
Electronic Communications in Prtg./Publishing I 2080-319	4
College Physics I, III & Labs 1017-211/271, 213/273	8
College Physics II & Lab 1017-212/272	
or	
Principles of Economics I or II 0511-301 or 302	4
Liberal Arts (Core)†	12
Physical Education*	0
<i>Third Year</i>	
Dynamics of Personal Leadership 2080-404	3
Printing Concentration and Professional Electives	32
Liberal Arts (Concentration)†	12
Cooperative Education	Co-op
<i>Fourth Year</i>	
Printing Concentration and Professional Electives	30
Liberal Arts (Elective)†	12
Liberal Arts (Senior Seminar)†	2
<i>Total Quarter Credit Hours</i>	192

**Required only for those students lacking trigonometry.*

See page 10 for Liberal Arts requirements.

**See page 11 for policy on Physical Education.*

§SPMS students must be junior status or above to enroll in this course. See your adviser for scheduling of courses.

#Students must satisfy the Writing Competency requirement prior to graduation, either by a grade of B or higher in Technical Writing II or by passing the Writing Competency test given each quarter.

Each student must complete at least one printing concentration. A printing concentration consists of seven prescribed courses totaling 21-28 credits. The credit hours earned in printing concentration and professional and free electives must total at least 62 quarter credit hours.

PRINTING SYSTEMS

Frank Cost, Coordinator

Students interested in engineering should consider the printing systems program. Printing systems combines engineering course work with a rigorous preparation for management careers in one of America's largest high-tech industries. These careers involve a mixture of high technology and human factors that many people find rewarding and exciting

Graphic communication reproduction has experienced more changes in technology during the last two decades than during the previous two centuries. Electronics and computers have become important, while the importance of chemistry and mechanics has not diminished. Computers are used in both production and management

Few industries use the variety of processes and alternative techniques that graphic communication reproduction does. Almost every printing operation can be done by hand-craft methods, machine assistance, or full automation. Each technique has advantages, and effective managers need to understand both how and why a particular technological option fits their needs. The printing systems program educates young men and women to meet those challenges and become the shapers of the graphic reproduction industries in the coming decades

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 course list illustrates completion of the program in five years

Applicants must meet the admission requirements of both RITs College of Engineering and the School of Printing Management and Sciences

Transfer into this program from two-year college engineering science programs, math/science transfer programs, or comparable majors is encouraged

Program of study

The printing systems curriculum features strong courses in printing, industrial or electrical engineering, mathematics, science, and liberal arts. Printing courses provide depth and breadth in technology as well as important studies in managing and working with people. During the second year, students begin either industrial engineering or electrical engineering courses

The industrial engineering courses deal with design and installation of integrated systems of people, materials, and equipment. Through these courses, printing systems students become expert in understanding and using computers in both manufacturing and management: for example, in plant layout, process development, and control of manufacturing systems with robots and conveyors.

The electrical engineering sequence provides a sound education in the electronics of printing equipment and transmission systems. Printing equipment manufacturers and very large printing companies are interested in graduates with this electrical engineering background

Printing Systems, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Student Seminar 2080-001	0
Professional Electives	12
Calculus 1016-251, 252, 253	12
College Chemistry 1011-208, 209	8
Liberal Arts (Core)*	16
Physical Education*	0

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Second Year

Financial Controls 2080-301	4
Printing Planning Concepts 2080-302	4
Professional Engineering Specialty*	8
Calculus 1016-305	4
Probability 1016-351	4
University Physics 1017-311, 312, 313	12
University Physics Lab 1017-375, 376, 377	3
Liberal Arts (Core)*	8
Physical Education†	0

Third Year

Professional Engineering Specialty*	20
Liberal Arts (Concentration/Elective)*	12
Cooperative Education	Co-op

Fourth Year

Professional Engineering Specialty*	8
Professional Electives§	12
Technical Writing I, II#	4
Liberal Arts (Concentration/Elective)*	8
Cooperative Education	Co-op

Fifth Year

Professional Engineering Specialty*	4
Professional Electives§	17
Liberal Arts (Elective)*	8
Liberal Arts (Senior Seminar)*	2
Total Quarter Credit Hours	190

*See page 10 for Liberal Arts requirements

See page 11 for policy on Physical Education

*Professional Engineering Specialty courses

§Professional electives must include one course in each of these areas: aesthetics, printing materials, printing processes, imaging, print finishing

#Students must satisfy the Writing Competency requirement prior to graduation, either by a grade of B or higher in Technical Writing II or by passing the Writing Competency test given each quarter

Industrial Engineering

Second Year

Applied Statistics I 1016-352
Computing for Ind. Eng
0303-202

Third Year

Operations Research I 0303-401
Human Factors I 0303-415
Work Measurement 0303-420
Systems & Facilities 0303-422
Safety Engineering 0303-550
Complex Variables 1016-420

Fourth Year

Simulation 0303-503
Regression Analysis 0303-511

Electrical Engineering

Second Year

Differential Equations 1016-306
C Programming for Engineers
0301-345

Third Year

Numerical Methods 0301-310
Circuits I 0301-351
Circuits II 0301-352
Engineering Mathematics
1016-328

Fourth Year

Signals & Systems 0301-453
Intro. to Communication 0301-534

Fifth Year

Production Control 0303-482

Fifth Year

Digital Signal Processing 0301-554

NEWSPAPER OPERATIONS MANAGEMENT

Robert Hacker, 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 have to compete with the existing pools of talent and expertise as the functions of production merge with those of other departments.

They must be prepared in both the new technology and the ability to guide existing manpower and management systems through potentially stormy change to a useful and profitable position in the marketplace. The revolution in this industry points to the need for new people to deal with the technological and managerial problems of such change. This program is intended to fulfill the industry need for such people. As its name implies, the program concentrates on those courses that have been most helpful to graduates, particularly those interested in careers in newspaper operations management

The graduate with a BS degree in newspaper 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, chemistry, and physics. Placement will be determined through testing and a review of the students 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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Student Seminar 2080-001	0
Printing Processes Concepts 2081-201	4
Concepts of Design & Typography 2080-202	4
Prepress Imaging Concepts 2080-203	4
Newspaper Seminar 2080-211, 212, 213	3
Algebra for Management Science 1016-225	4

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Calculus for Management Science 1016-226	4
Data Analysis 1016-319	4
Fundamentals of Trigonometry 1016-220*	1
Chemical Foundations I, II 1011-281, 282	8
Liberal Arts (Core)†	16
Physical Education*	0

Second Year

Printing Financial Controls 2080-301	
OR	4
Financial Accounting 0101-301	
Printing Planning Concepts 2080-302	
OR	4
Principles of Marketing 0105-463§	
Principles of Managerial Leadership 0102-350	4
Standard Software Packages 2080-311	2
Newspaper Design 2081-306	3
Technical Writing I, II 2080-312, 313#	4
Newspaper Production I 2081-307	3
Adv. Concepts of Newspaper Production Systems 2081-308	3
College Physics I, III 1017-211/271, 213/273	8
College Physics II 1017-212/272	
OR	4
Principles of Economics 0511-301 or 302	
Liberal Arts (Core)†	12
Physical Education*	0

Third Year

Ink & Substrates 2081-316	3
Circulation & Mailroom 2081-411	3
Dynamics of Personal Leadership 2080-404	3
Electronic Communications/Printing & Publishing I 2080-319	4
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 Elective	14
Liberal Arts (Elective)†	12
Liberal Arts (Senior Seminar†)	2
Total Quarter Credit Hours	194

*Required only for those students lacking trigonometry

See page 10 for Liberal Arts requirements

*See page 11 for policy on Physical Education

§SPMS student must be junior status or above to enroll in this course. See your adviser for scheduling.

#Students must satisfy the Writing Competency requirement prior to graduation, either by a grade of B or higher in Technical Writing II or by passing the Writing Competency test given each quarter

PRINTING AND APPLIED COMPUTER SCIENCE

Frank Cost, 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 School 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.

The first-year curricula of this program and the Printing Systems Program are practically the same. Therefore, a student may transfer between the programs at that time with no loss of credit.

Professional electives

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

Printing and Applied Computer Science, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Student Seminar 2080-001	0
Printing Processes Concepts 2081-201	4
Concepts of Design and Typography 2081-202	4
Prepress Imaging Concepts 2081-203	4
Programming I, II 0601-241, 242	8
Assembly Language 0601-305	4
Calculus I, II, III 1016-251, 252, 253	12
Liberal Arts (Core)*	12
Physical Education†	0

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Second Year

Printing Financial Control 2080-301	4
Printing Planning Concepts 2080-302	4
Principles of Managerial Leadership 0102-350	4
Programming III 0601-243	4
Data Organization and Management 0603-325	4
Calculus IV 1016-305	4
Discrete Math 1016-265	4
Probability & Statistics 1016-351	4
University Physics I, II & Lab 1017-311, 312	10
Liberal Arts (Core)*	8
Physical Education†	0

Third-Fifth Years

Technical Writing I, II 2080-312, 313 *	4
Data Communications Systems 0603-420	4
Digital Computer Organization 0603-315	4
Probability & Statistics 1016-352	4
Ink & Substrates 2081-316	3
Intro. to Microprocessor Systems 0603-521	4
Print Finishing & Distribution 2081-317	3
Electronic Communications in Prtg./Publg. I 2080-319	4
Quality Control in Graphic Arts 2081-416	3
Computer Systems Selection 0603-565	4
Intro Computer Graphics 0603-570	4
Web Offset 2081-414	3
Professional Electives	19
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	195

**See page 10 for Liberal Arts requirements.*

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 Technical Writing II or by passing the Writing Competency test given each quarter.*

Certificate of Achievement Programs

The School of Printing Management and Sciences offers two certificate programs for part-time students. Designed to provide coursework in specific areas for those with a graphic arts interest, these certificate programs can be completed in two to two-and-a-half years of evening study. The certificates can stand alone or be used as an area of concentration in the College of Continuing Education's applied arts and sciences associate and bachelor's degree programs.

In addition full-time undergraduate students in non-printing 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, and photography.

For additional information and advising, contact Archie Provan at 716-475-2052

Desktop Design and Publication

This sequence of courses is designed for individuals new to the desktop environment as well as for those who have experimented with publication production using personal computers. The program

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provides students with a solid foundation in design and typographic principles. Advanced courses enable students to apply those principles using desktop tools and to expand their individual design abilities. Additional courses focus on the production, finishing, and distribution of the images created.

Quarter Credit Hours

Design and Typography Fundamentals 2081-225	3
Principles of Copy Preparation 2081-256	3
Print Finishing and Distribution 2081-317	3
Applications of Printing Design 2081-382	3
Image Capture and Analysis 2081-401	3
Desktop Pre-Press Systems 2081-561	3
Elective*	3-4
<i>Certificate Total</i>	<i>21-22</i>

**Must be chosen from 2081 courses: courses such as Color Separation Systems or Lithographic Process, or other courses from the Electronic Color Imaging Certificate Program, are recommended. See adviser for other choices.*

Electronic Color Imaging

This program acquaints students with both conventional and emerging digital imaging systems. The courses help prepare students for positions in the color printing market in occupations such as prepress manager, color reproduction specialist, technical service or customer service representative, and other technical and managerial functions in the graphic arts industry

Quarter Credit Hours

Introduction to Printing 2081-254	3
Image Capture and Analysis 2081-401	3
Color Separations Systems 2081-409	4
Techniques of Image Assembly 2081-366	3
Lithographic Process 2081-367	3
Electronic Color Imaging and Color Controls 2081-572	3
Elective*	3
<i>Certificate Total</i>	<i>22</i>

**Must be chosen from 2081 courses: courses such as Desktop Prepress Systems, Lithographic Press Problems, or other courses from the Desktop Design and Publication certificate are recommended. See adviser for other choices*

COLLEGE OF LIBERAL ARTS

Dr. William J. Daniels, Dean

While the College of Liberal Arts offers degree programs in criminal justice, economics, social work, professional and technical communication, as well as the technical and liberal studies option (all described in the following pages), it plays another role at RIT that affects the education of every student.

The courses that all students take in the College of Liberal Arts provide a comprehensive education that develops their potential as intellectually aware and responsible human beings. Liberal arts courses form the foundation for students' entire educational experience. Liberal education is distinguishable from professional education in that its purpose is not to nurture specifically professional knowledge or skills, but rather each student's capabilities as a thinking, creating, and responsible person.

The program aims to:

- Develop the ability to think rationally, read critically, and speak and write cogently and clearly;
- Develop the ability to analyze issues, question assumptions, investigate problems, and seek solutions;
- Develop understanding of aesthetic values and their relevance;
- Expand intellectual horizons by acquaintance with the western heritage;
- Develop awareness of how the past inevitably affects the present and future;
- Promote understanding of our society and how it interrelates with and is indebted to other cultures, thereby liberating the student from narrow provincialism;
- Acquaint students with knowledge of the basic principles and dynamics of individual and group behavior in the many areas of human interaction;
- Develop understanding of the nature of ethical values;
- Develop awareness of the social, ecological, and ethical consequences of technology and foster a sense of responsibility to self and society;
- Develop the ability to bring together varied insights and methods of analysis for the purpose of better understanding complex human and social problems

These goals are fostered throughout a student's education at RIT by the liberal arts curriculum, which offers each student the opportunity to acquire these abilities and understandings through courses in the humanities and social sciences. (See page 10 for specific requirements.) In addition to regular courses a student may engage in independent studies. These are planned by both student and instructor and provide an opportunity for the student to develop initiative and imagination in a flexible program of study.

The college and its faculty are active outside the classroom, sponsoring musical events and symposia to provide a wide range of cultural and academic experiences for the entire RIT community.

Included in the college are undergraduate degree programs in criminal justice, social work, economics, professional and technical communication, and the technical and liberal studies option, which are described later in this bulletin. The close involvement of these programs with instruction in the liberal arts is an example of what the college endeavors to do throughout the curriculum; that is, to demonstrate the interrelation of all fields of learning.

The college also offers the master of science degree in school psychology

Faculty

The faculty of the college is selected 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 learning experiences for students and continuing growth in their scholarly fields

Liberal arts program advising

The College of Liberal Arts is committed to providing advising services for students in Criminal Justice, Professional and Technical Communications, Social Work, and Economics throughout their academic program. Upon arrival at RIT, each student is assigned a faculty adviser, who helps formulate career goals and 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 mornings. 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, 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 and Lomb Center on campus

CRIMINAL JUSTICE

Richard B. Lewis, 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

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 advisor who assists in formulating career goals and planning a field of study in accordance with those goals.

Through core courses, students are exposed to the widest possible range of perspectives from which to view crime and the nature of criminal justice administration, thus broadening their career options.

During the junior and senior years, with faculty guidance, students select professional electives in a specific area of interest from courses offered within the program, within the college, or in any of RIT's other seven colleges. Criminal justice faculty offer concentrations in criminology, law enforcement, law corrections, and security. Other concentrations, planned according to individual career goals, may include courses in computer science, management, photography, liberal studies, and social work.

Career opportunities

Program alumni have entered a variety of careers in the criminal justice system directly following graduation or after completing graduate studies. Many graduates are engaged in law enforcement careers in agencies at all levels of government. A substantial number are employed by the Rochester Police Department, the Monroe County Sheriffs 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.

Pre-law 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 advisor in selecting appropriate professional and liberal arts electives. During their senior year, pre-law 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 Pre-law Association, comprised of 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 non-institutional 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, at the same time,

attend a field seminar and a class in planning and change 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

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 non-teaching hours in their offices with an open-door policy in order to assist students with academic or personal concerns and questions

Professional elective options

One of the strengths of the program is that students may elect to take professional electives from other designated colleges in the Institute and are thus able to develop a concentration in a professional area related to their career goals

The following professional electives illustrate those offered periodically within the program. A student selects professional elective courses with the advice of his or her faculty advisor

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

Law

- Introduction to Para-Legal
- 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

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Evidence
Police Community Relations
Victimless Crime
Hostage Taking and Terrorism
Substance Abuse
Stress
Forensic Photographic Evidence
Management in Criminal Justice
Computer Crime

Security

Organized Crime
Investigative Techniques
White-Collar Crime
Physical Security and Safety
Retail Security
Computer Crime
Security Management
Seminar in Security

Related professional areas

With the approval of the faculty advisor, 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, BSdegree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Criminal Justice System 0501-201	4
English Composition 0502-220	4
Criminology 0501-203	4
Liberal Arts Core*	12
Computer Applications in Criminal Justice 0501-406	4
Corrections 0501-207	4
Law Enforcement in Society 0501-303	4
Mathematics/Science*	12
Physical Education*	0
Cooperative Education (Optional)	
<i>Second Year</i>	
Juvenile Justice 0501-309	4
Professional Elective (e.g. Liberal Arts: Social Science)	4
Public Administration 0501-204	4
Concepts in Criminal Law 0501-301	4
Judicial Process 0501-304	4
Professional Elective (e.g. Investigative Techniques)	4
Liberal Arts Core*	12
Mathematics/Science*	12
Physical Education*	0
Cooperative Education (Optional)	
<i>Third Year</i>	
Seminar in Law Enforcement 0501-526	4
Professional Elective (e.g. Forensic Photographic Evidence)	4
Professional Elective (e.g. Hostage Taking & Terrorism)	4
Liberal Arts Electives/Concentrations*	12
Seminar in Corrections 0501-411	4
Professional Elective (e.g. Constitutional Law)	4
Scientific Methodology 0501-401	4
Professional Elective (e.g. Investigative Techniques)	4
Professional Elective (e.g. Evidence or Substance Abuse)	4

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Professional Electives (e.g. Management in Criminal Justice)	4
Cooperative Education (Optional)	
<i>Fourth Year</i>	
Field Experience (See C. J. Handbook) 0501-403	4
Field Seminar (See C. J. Handbook) 0501-404	4
Planning and Change in C. J. System 0501-514	4
Liberal Arts Senior Seminar 0520-501*	2
Etiology of Crime 0501-528	4
Research Methods in Criminal Justice 0501-541	4
Liberal Arts Electives/Concentrations*	12
Professional Elective (e.g. Seminar in Law)	4
Professional Elective (e.g. Computer-Related Crime)	4
Total Quarter Credit Hours	186

*See page 10 for Liberal Arts requirements

See page 11 for policy on Physical Education

*See page 11 for Mathematics/Science requirements

SOCIAL WORK

Helen Wadsworth, 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 baccalaureate social work program prepares students for entry into beginning-level social work practice in public and private settings offering assistance to individuals, families, groups, and communities

The social work profession is dedicated to the improvement of the human condition. Thus, coursework is organized in five basic areas: understanding of human behavior and interaction within the social environment; knowledge of social programs, policy processes, and the profession; professional practice methodology and skills; professionally supervised internship in a social agency; and research and evaluation of practice

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 advisor to assist with academic planning and career guidance throughout the course of study

We believe that social workers have a dual role in the process of social change: they directly serve the needs of individuals, families, groups, and communities, and they work on behalf of clients to effect change in policies, legislation, and society.

Personal growth

The social work curriculum encourages personal growth as an essential aspect of professional growth. In various courses students learn to increase their own self-awareness, to define their values, to understand and respect the values of others, and to develop the personal and professional strengths necessary for social work practice

Curriculum

The social work curriculum aims to develop an understanding of society and people's needs. Students learn how the institutions of society contribute toward resolving problems and may, sometimes, aggravate them.

Students become well-grounded in human behavior and the social environment from psychological, sociological, and biological perspectives. This gives them an understanding, on which they can base their social work practice, of how people develop and interact with their environments

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

Social work program and deafness: a unique opportunity

The National Technical Institute for the Deaf (NTID) at RIT provides a special opportunity for students and faculty in the Social Work Program. Because of the close relationship with NTID, RIT's Social Work Program offers an unsurpassed education in working with the deaf community, preparing deaf students for social work careers, increasing sensitization and responsiveness of future professionals, hearing and deaf, to the needs of disabled persons, and offering deaf and hearing students the opportunity to study the applications of social work to the needs of deaf persons.

Professional electives

Elective courses offer social work students knowledge about and preparation for work in the areas of family violence; services for children, families, deaf individuals, and the elderly; alcoholism and substance abuse; mental health; and legal social work

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

Graduates of the social work program receive advanced standing at most graduate schools of social work in the country. This means they can complete a two-year MSW program in only one year.

Graduates have found their RIT field placement experiences to be extremely helpful in making career decisions and in obtaining jobs. In addition, the resources of RIT's Office of Cooperative Education and Placement 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 program. 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 program. There is an option for field placements of four quarters that carry agency stipends

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 in the attorney general's office, 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

Senior field placement stipends

Social work students beginning their senior field instruction have the opportunity to complete the required 20-week internship in a social agency or apply for a 12-month internship that carries with it an agency financial stipend. The availability of these positions depends on the number of participating agencies and the students acceptance by the agency to which he or she applies. A financial aid application (FAFSA) must also be filed prior to April 15th. This program is especially attractive for students with severely limited financial resources. Students must spend at least their junior year in RIT's Social Work Program to qualify for this stipend, and placements are on a competitive basis.

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

<i>First Year</i>	<i>Quarter Credit Hours</i>
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
Liberal Arts Core*	24
History of Social Discrimination 0507-493	4
Liberal Arts Core: English Composition 0502-220*	4
One Liberal Arts Elective*	4
Physical Education†	0
<i>Second Year</i>	
Structure & Function of Social Welfare 0516-305	4
One Professional Elective	4
Cultural Diversity 0510-505	4
Two Science Requirements	8
Human Behavior and the Social Environment I 0516-354	8
Human Behavior and the Social Environment II 0516-355	4
Mental Health and Mental Illness 0516-357	4
College Mathematics	4
Two Liberal Arts Electives*	8
One Liberal Arts Concentration Course*	4
Physical Education†	0
<i>Third Year</i>	
The Family from a Social Work Perspective 0516-405	4
Computer Applications to SW Research 0516-435	4
Group Theory in Social Work 0516-456	4
Assessing Community Needs 0516-465	4
Interviewing and the Helping Relationship 0516-475	4
Policy and Planning Processes 0516-595	4
One Professional Elective	4
Introduction to Statistical Methods 1016-301, 302, 303	9
Statistical Methods Laboratory 1016-311, 312, 313	3
Two Liberal Arts Concentration Courses*	8
<i>Fourth Year</i>	
Assessment and Problem Solving 0516-505	4
Field Instruction I 0516-506	4
Field Seminar I 0516-527	3
Advanced Social Work Research 0516-535	2
Social Intervention 0516-550	4
Field Instruction II 0516-551	4
Field Seminar II 0516-560	3

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Evaluation of Practice 0516-540	2
Professional Seminar 0516-598	4
Two Professional Electives	8
Liberal Arts Senior Seminar 0520-501*	2
<i>Total Quarter Credit Hours</i>	186

*See page 10 for Liberal Arts requirements.

See page 11 for policy on Physical Education.

ECONOMICS

Dr. Michael 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, pre-law, or business or can be specially designed by the student. The faculty advisor 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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Principles of Economics I, II 0511-301, 302	8
Managerial Economics 0530-310	4
Algebra & Calculus for Management Science 1016-225, 226	
OR	
Calculus I, II 1016-251, 252	8

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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 and Policy 0530-501	4
Applied Econometrics I 0530-410	4
Applied Econometrics II 0530-411	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 0530-505	4
Intermediate Macroeconomic Theory 0530-506	4
Mathematical Methods for Economics 0530-460	4
Management Science 0106-334	4
Corporate Finance 0104-441	4
Professional Option	8
Free Electives	8
Liberal Arts (Concentration)*	12

Fourth Year

International Trade and Finance 0530-510	4
Industrial Organization 0530-520	4
Seminar in Applied Economics 0530-550	8
Professional Option	8
Free Elective	4
Liberal Arts (Electives & Senior Seminar)*	14
<i>Total Quarter Credit Hours</i>	182

**See page 10 for Liberal Arts requirements.*

See page 11 for policy on Physical Education.

PROFESSIONAL AND TECHNICAL COMMUNICATION

Dr. David Neumann, Department Chairperson

The BS in professional and technical communication combines education in the theory and practice of spoken, written, and visual communication with extensive instruction in one of RIT's professional or technical programs. Students in this program develop practical communication skills grounded in sound theoretical knowledge, along with a working familiarity with the central concepts and processes of a particular professional/technical field

Numerous surveys and 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 not only skilled in communication, but also 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 graduatework in communication and related fields

Curriculum

The following curriculum description displays the course distribution by academic area. The chart indicates the sequence for the required courses

Required communication courses

(56 total credit hours)

Foundations of Communication
Interpersonal Communication
Effective Speaking
Conference Techniques
Written Argument
Mass Communications
Persuasion
Theories of Communication
Visual Communication
Technical Writing
Professional Writing
Qualitative Research
Quantitative Research
Senior Thesis in Communication

Other required courses

(48 total credit hours)

	Credit Hours
Professional Core	24
Science	8
Math	8
Computer Science	4
Statistics or Math or Science	4

Communication electives

24

Liberal arts

54

Communication electives

Students are required to take six communication electives, including at least one writing elective, from the following:

Small Group Communication	0535-483
Interviewing	0535-324
News Writing	0502-517
Creative Writing--Poetry	0502-516
Creative Writing--Prose Fiction	0502-518
Organizational Communication	0535-415
Advanced Public Speaking	0535-420
Teleconferencing Communication Management	0535-425
History of English Language	0502-445
Public Relations	0535-421
Advanced Creative Writing	0502-519
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., Conflict Negotiation; Listening; History of Public Address; Propaganda)	0535-525
Advanced Technical Writing	0502-446
Film and Society	0535-550

The professional core

Students are required to take one of five available professional core options as part of their degree requirements. Each option is composed of several courses, for a total of 24 credit hours. These credit hours may be taken as a professional core from the School of Computer Science and Information Technology, School of Photographic Arts and Sciences, or the College of Business

With approval from the academic advisor and the program chairperson, an additional option—the individually designed professional core—is available to students with special study and career interests.

Cooperative education

The program includes two quarters of cooperative education, which give students an opportunity to apply classroom knowledge to a work situation. RIT's considerable experience with cooperative education indicates that it deepens students' knowledge of their fields, allows them to determine their suitability for a particular position, and increases chances for an advantageous placement after graduation.

Professional and Technical Communication, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Foundations of Communication 0535-200	4
English Composition 0502-220	4
Survey of Computer Science	4
Math: Algebra for Management Science	4
Interpersonal Communication 0535-210	4
Liberal Arts: Core*	16
Written Argument 0535-230	4
Math: Calculus for Management Science	4
Effective Speaking 0535-501	4
Physical Education*	0
<i>Second Year</i>	
Persuasion 0535-481	4
Conference Techniques 0535-310	4
Qualitative Research 0535-316	4
Communication Electives	8
Professional Core	8
Science: Human Biology I and Lab	4
Liberal Arts: Core*	8
Quantitative Research 0535-315	4
Science: Human Biology II and Lab	4
Mass Communications 0535-482	4
Physical Education*	0
<i>Third Year</i>	
Theories of Communication 0535-445	4
Technical Writing 0502-444	4
Liberal Arts Concentration*	8
Professional Core	8
Visual Communication 0535-450	4
Communication Writing Elective	4
Cooperative Education	Co-op
<i>Fourth Year</i>	
Liberal Arts Electives*	12
Communication Electives	12
Liberal Arts Concentration*	4
Professional Core	8
Professional Writing 0535-532	4
Math or Science or Statistics	4
Seminar Seminar*	2
Senior Thesis in Communication 0535-595	4
Cooperative Education	Co-op
<i>Total Quarter Credit Hours</i>	182

*See page 10 for Liberal Arts requirements.

See page 11 for policy on Physical Education.

THE TECHNICAL AND LIBERAL STUDIES OPTION

Dr. Katherine Mayberry, Program Chairperson

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 Technical and Liberal Studies Option (TLSO) 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 RITs departments, full-time TLSO 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, Academic Fields of Study, in which they explore both their own abilities and inclinations 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, although possibilities for exploration in art, crafts, and photography are somewhat limited due to heavy enrollment in those areas. Upon definitely identifying a major (sometime during their first year), TLSO students apply for a transfer to the new department

Students who select the Technical and Liberal Studies Option 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 TLSO student has spent time in preliminary exploration

Of the 12 courses that a student would take during three quarters in TLSO, however, at least nine would be required in any RIT baccalaureate degree program. Therefore, the maximum loss of time, no matter what the student's program choice, will be minimal

Each student is assisted by a faculty academic advisor. The dean of the college also will work directly with any student who has special difficulties in selecting a career path and degree program

After one to four quarters in TLSO, 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 students 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

Dr. Mary-Beth Krogh-Jespersen, 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, 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 90 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 and friend.

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

The College of Science was built in 1968. In addition to an auditorium and nine classrooms, there are 22 teaching laboratories and 16 research laboratories that provide space for laboratory course work and student research projects. Some of the facilities within the building have specialized purposes. For example, we have a laser-optics laboratory, an animal care facility, a diagnostic medical imaging laboratory, a plasma etching laboratory, three greenhouses, an electronics laboratory, a nuclear magnetic resonance laboratory, and an electron microscope center. All of these facilities are used by 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 advisor 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 plan

In our cooperative education plan (co-op), a student alternates quarters of paid work with quarters on campus in academic study for two or three 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 Placement to obtain a co-op position. At the beginning of the third year, students begin alternating quarters of work and study, as shown in the charts on the following page. Some students are on the A-block schedule and others on the B-block. Students in the five-year chemistry, 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 Schedule for Five-Year Program in Biology, Biotechnology, Mathematics, Statistics, and Biomedical Computing

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
5				
A	RIT	Work	RIT	-
B	Work	RIT	RIT	-

Cooperative Schedule for Five- Year Chemistry, Polymer Chemistry, and Physics* Programs

Year	Fall	Winter	Spring	Summer
1 and 2	RIT	RIT	RIT	Vac/Work
2, 3 and 4	A B	RIT Work	Work/RIT* RIT	RIT Work Work RIT
5				
A	RIT	Work	RIT	-
B	Work	RIT	RIT	-

**Physics majors ordinarily are all on A-block, and 2nd-year students attend classes Winter Quarter.*

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 these students 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 junior 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 and clinical chemistry. A master of science in materials science and engineering is offered jointly by the College of Science and the College of Engineering.

Premedical Studies

A student interested in entering a professional school of medicine, dentistry, optometry, or veterinary science after completing a baccalaureate degree may enroll in any BS program in the College of Science and combine that program's course requirements with what we call the premedical core (see chart). The premedical core is a set of courses required for admission to most medical, dental, veterinary, and optometry schools in the United States. These courses should be completed by the end of the third year or before the student expects to take the MCAT, DAT, GRE, or other admission tests required for entrance to a professional school

The way in which program requirements are combined with the premedical core courses varies according to the program in which a student is enrolled. Our biology and chemistry (biochemistry option) program requirements already include the premedical core courses. Biotechnology, chemistry, polymer chemistry, biomedical computing, medical technology, nuclear medicine technology, diagnostic medical sonography, and physician assistant programs contain some of the premedical core courses, and the remainder can be elected within the program with careful scheduling. The programs in the Mathematics and Physics departments do not contain many of the premedical core courses. A student in applied mathematics, computational mathematics, applied statistics, or physics will need to take course credits beyond the number required for a degree. This can be accomplished by taking courses during one or two summers. Advanced placement credit from high school may reduce the additional time needed. Careful scheduling and early planning will reduce the difficulties

Each student who is interested in Premedical Studies is assigned an academic adviser who helps the student select and schedule course work. In addition, our Premedical Advisory Committee provides counsel and guidance on how to apply to a professional school and coordinates the application process. Graduates of the college have been accepted and admitted to prestigious schools of medicine; dentistry; veterinary, osteopathic, and podiatric medicine; and optometry. However, all students considering Premedical Studies should remember that acceptance at a professional school is highly competitive and is entirely the decision of that school

Premedical students are encouraged to participate in an exclusive co-op in clinical medicine. Under the sponsorship of a local hospital, students who have completed one year of study at RIT are trained as NYS certified nursing assistants and hired to provide medical care to patients

We believe very strongly that all students in our program 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 a 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

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, additional courses in mathematics, psychology/behavioral sciences, or biology may be required by specific

schools. The admissions requirements of each medical school are published and may be obtained from the Premedical Advising Committee

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	
Biology	None
Biomedical Computing	Elect one year of organic chemistry
Biotechnology	Elect one year of physics
Chemistry	Elect one year of biology
Chemistry (Biochemistry Option)	None
Computational Mathematics	
Diagnostic Medical Sonography	Elect one year of general chemistry and one year of organic chemistry
Medical Technology	One quarter organic chemistry lab
Nuclear Medicine Technology	Elect one year of organic chemistry
Physics	
Polymer Chemistry	Elect one year of biology

*Some rearrangement of the typical pattern of course work within a program may be necessary

Course credits beyond the usual 12 quarters needed to complete degree requirements are necessary.

Call the College of Science, 716-475-7105, for more information

UNDECLARED SCIENCE

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 and mathematics

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 definite commitment to a particular major in science or mathematics without any loss of time toward a degree. This option has been attractive to quite a few first-year students

Below is a typical distribution of courses for the undeclared science option. The program covers a number of introductory college-level courses in science and mathematics and can be tailored to meet a student's interests. An academic adviser assists the student in selecting courses and identifying a major field of interest in which to enroll

Before the end of the first year, the student should decide upon a specific major. Most students find the decision is easily made after only a quarter or two of course work

Undeclared Science Option, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
General Biology Lecture 1001-201, 202, 203*	9
General Biology Lab 1001-205, 206, 207	3
General Chemistry Lecture I, II 1011-251, 252	8
General Chemistry I Lab 1011-255	1
Quantitative Analysis Lecture 1008-263	4
Quantitative Analysis Lab I, II 1008-265, 266	3
Calculus I, II, III 1016-251, 252, 253	12
University Physics Lecture I, II 1017-311, 312*	8
University Physics Lab I, II 1017-371, 372	2
Freshman Seminar for Undeclared Science 1018-210	1
Liberal Arts (Core)†	12
Physical Education Electives*	0
Total Quarter Credit Hours	66

**Any two of these in a given quarter*

See page 10 for Liberal Arts requirements

**See page 11 for policy on Physical Education.*

BIOLOGY

Tom Frederick, Ph.D., Head

The Department of Biology offers programs leading to the AS and BS degrees in biology.

Graduates receiving the BS degree find rewarding positions in occupations related to the life sciences, including:

- o biomedical research (e.g., human genetics, new vaccines and therapeutic drugs, diagnosis and treatment of cancer, transplantation)
- o ecology and environmental science
- o marine biology
- o pharmaceuticals
- o marketing divisions of major science companies
- o forensic science
- o scientific journalism
- o agriculture and new energy resources

The program also includes all of the coursework and support services to prepare students to enter schools of medicine, dentistry, veterinary medicine, optometry, podiatry, and chiropractic medicine

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 9-11 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 (10-20 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.

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
5				
A	RIT	Work	RIT	-
B	Work	RIT	RIT	-

Biology, BS degree, typical course sequence

First Year

	<i>Quarter Credit Hours</i>
Biology Symposium 1001-200	1
General Biology Lecture 1001-201, 202, 203	9
General Biology Lab 1001-205, 206, 207	3
General & Analytical Chemistry Lecture 1011-215, 216, 217	10
Chemical Principles Lab 1011-205, 206	2

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General & Analytical Chemistry Laboratory 1011-227	2
Survey of Computer Science 0602-200	4
Introduction to Calculus 1016-214, 215	6
Liberal Arts (Core)*	12
Physical Education Electives†	0

Second Year

Botany 1001-304	4
General Ecology 1001-340	4
Organic Chemistry Lecture 1013-231, 232, 233	9
Organic Chemistry Lab 1013-235, 236, 237	3
Elementary Statistics 1016-309	4
Biology Electives	8
Liberal Arts (Core)*	16
Physical Education Electives†	0

*Third/ Fourth Years**

Molecular Biology 1001-350	4
Biological Writing 1001-370	2
Introductory Microbiology 1001-404	5
Genetics 1001-421	4
Biology Seminar 1001-550	2
College Physics Lecture 1017-211, 212, 213	9
College Physics Laboratory 1017-271, 272, 273	3
Zoology Course	4
Physiology Course	4
Biology Elective Courses	14
Liberal Arts Concentration Courses	12
Liberal Arts Advanced Elective Courses	12
Liberal Arts Senior Seminar	2
Institute-wide Electives	6
Cooperative Education (Optional)	
Total Quarter Credit Hours	180

*See page 10 for Liberal Arts requirements

See page 11 for 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 still only be using the same number of academic quarters of classes to complete the degree.

BIOTECHNOLOGY

Tom Frederick, Ph.D., Head

The Department of Biology's program leading to the BS in biotechnology is the leading 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 marketing activities in:

- o human genetics
- o human gene therapy
- o cancer research
- o autoimmune diseases
- o vaccine development
- o agriculture
- o food products
- o pharmaceuticals
- o environment and energy

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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.

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 9-11 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 (10-20 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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Biology Symposium 1001-200	1
General Biology Lecture 1001-201, 202, 203	9
General Biology Laboratory 1001-205, 206, 207	3
General & Analytical Chemistry Lecture 1011-215, 216, 217	10
Chemistry Principles Laboratory 1011-205, 206	2
General & Analytical Chemistry Laboratory 1011-227	2
Survey of Computer Science 0602-200	4
Introduction to Calculus 1016-214, 215	6
Liberal Arts (Core)*	12
Physical Education Electives†	0
<i>Second Year</i>	
Cell Biology 1001-311	4
Immunology 1001-402	3
Tissue Culture 1001-445	4
Hybridoma Techniques 1001-442	2
Organic Chemistry Lecture 1013-231, 232, 233	9
Organic Chemistry Laboratory 1013-235, 236, 237	3
Analytical Chemistry--Separations Lecture 1008-312	3
Analytical Chemistry--Separations Laboratory 1008-319	1
Statistics 1016-309	4
Liberal Arts (Core)*	16
Physical Education Electives†	0

Scheduling by quarter of the following courses is variable and will depend on each student's academic interest and optional participation in co-op

*Third/Fourth/Fifth Years**

Plant Physiology 1001-310	4
Molecular Biology 1001-350	4
Biological Writing 1001-370	2
Cell Physiology 1001-403	4

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Introductory Microbiology 1001-404	5
Microbial & Viral Genetics 1001-407	4
Industrial Microbiology 1001-417	4
Genetics 1001-421	4
Plant Tissue & Cell Culture 1001-446	4
Genetic Engineering 1001-450	5
Biology Seminar 1001-550	2
Biochemistry 1009-334	4
Biochemistry 1009-702	3
Liberal Arts (Concentration)	12
Liberal Arts Advanced Electives	12
Liberal Arts Senior Seminar	2
Institute-wide Electives	7
Cooperative Education (Optional)	
<i>Total Quarter Credit Hours</i>	180

**See page 10 for Liberal Arts requirements.*

See page 11 for 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 still only be using the same number of academic quarters of classes to complete the degree.*

CHEMISTRY

Gerald A. Takacs, Ph.D., Head

The Department of Chemistry offers programs leading to the AS and BS degrees in chemistry, the BS degree in chemistry (biochemistry option), the BS degree in polymer chemistry, the MS degree in chemistry, and a five-year combined BS/MS program

Requirements for the BS degree

The student must meet the minimum graduation requirements of the Institute as described on pages 9-11 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 degree approved by the Committee on Professional Training of the American Chemical Society, the student must take specifically designated courses in chemistry and related sciences and must complete a minimum of 180 quarter credit hours

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 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 degree is 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 chemistry/MS chemistry and BS polymer chemistry/MS chemistry degree programs

These programs combine the existing BS and MS programs, allowing undergraduate chemistry and polymer chemistry 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 into the program 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 a total of 225 quarter credit hours: 180 toward the BS chemistry or BS polymer chemistry degree and 45 toward the MS chemistry degree.

Chemistry

The BSchemistry 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 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 (non-cooperative) four-year program

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, audio visual communications, biology, criminal justice, engineering, environmental science, packaging science, printing, computer science, physics, or mathematics.

Chemistry (ACS certified), BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Chemical Safety 1010-200	1
Intro. to Co-op Seminar 1010-230	1
General Chemistry I, II 1010-251, 252	8
General Chemistry I Lab 1010-255	1
Quantitative Analysis 1008-253	4
Quantitative Analysis Lab I, II 1008-265, 266	3
Calculus I, II, III 1016-251, 252, 253	12
Computer Techniques (FORTRAN) 0602-205	3
Liberal Arts (Core)*	16
Physical Education Electives†	0
Cooperative Education 1010-499 (Optional, summer)	
<i>Second Year</i>	
Instrumental Analysis 1008-311	3
Instrumental Analysis Lab 1008-318	1
Separations Techniques 1008-312	3
Separations Techniques Lab 1008-319	1
Calculus IV 1016-305	4
Organic Chemistry I 1013-431	3
Preparative Organic Chemistry I Lab 1013-435	1
University Physics 1017-311, 312	8
University Physics Lab 1017-375, 376	2
Liberal Arts (Core)*	8
Physical Education Electives†	0
Cooperative Education 1010-499 (Optional)	
<i>Third Year</i>	
Intro. to Physical Chemistry 1014-340	3
Differential Equations 1016-306	4
University Physics 1017-313	4
University Physics Lab 1017-377	1
Organic Chemistry II, III 1013-432, 433	6
Preparative Organic Chemistry II Lab 1013-436	1
Systematic ID of Organic Compounds III Lab 1013-437	2
Chemical Thermodynamics 1014-441	3
Chemical Thermodynamics Lab 1014-445	1

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Liberal Arts (Core/Concentration/Electives)*§	8
Physical Education Electives†	0
Cooperative Education 1010-499-01(Optional)	

Fourth Year

Quantum Chemistry 1014-442	3
Quantum Chemistry Lab 1014-446	1
Chemical Kinetics 1014-443	3
Chemical Kinetics Lab 1014-447	1
Chemical Literature 1010-401	2
Matrix Algebra 1016-331	4
Inorganic Chemistry I 1012-762	4
Liberal Arts (Concentration/Elective)*§	16
Institute-wide Elective*	*
Cooperative Education 1010-499-01 (Optional)	

Fifth Year

Inorganic Chemistry II 1012-763	4
Advanced Instrumental Analysis 1008-711	3
Advanced Instrumental Analysis Lab 1008-720	2
Preparative Inorganic Chemistry 1012-765	2
Chemistry Electives	6
Liberal Arts (Concentration)*§	4
Liberal Arts (Senior Seminar)*	2
Institute-wide Electives*	*
Cooperative Education 1010-499 (Optional)	
<i>Total Quarter Credit Hours</i>	180

*See page 10 for Liberal Arts Requirements.

See page 11 for 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 include two quarters of a language (preferably German) unless a student has three years of one language in high school.

Chemistry, combined BS/MS degree, typical course sequence (BS is ACS certified)

<i>First Year</i>	<i>Quarter Credit Hours</i>
Chemical Safety 1010-200	1
Intro. to Co-op Seminar 1010-230	1
General Chemistry I, II 1010-251, 252	8
General Chemistry I Lab 1010-255	1
Quantitative Analysis 1008-253	4
Quantitative Analysis Lab I, II 1008-265, 266	3
Calculus I, II, III 1016-251, 252, 253	12
Computer Techniques (FORTRAN) 0602-205	3
Liberal Arts (Core)*	20
Physical Education Electives†	0
Cooperative Education 1010-499-01 (Optional, summer)	

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

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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
Physical Education Electives†	0
Cooperative Education 1010-499-01 (Optional, summer)	

Third Year

Intro. to Physical Chemistry 1014-340	3
Chemical Literature 1010-401	2
Organic Chemistry II, III 1013-432, 433	6
Preparative Organic Chemistry II Lab 1013-436	2
Systematic ID of Organic Compounds III Lab 1013-437	2
Chemical Thermodynamics 1014-441	3
Chemical Thermodynamics Lab 1014-445	1
Matrix Algebra 1010-331	4
Liberal Arts Concentration**	8
Liberal Arts (Electives)*	12
Chemistry Electives§	§
Cooperative Education 1010-499-01 (Optional, summer)	

Fourth Year

Quantum Chemistry 1014-442	3
Quantum Chemistry Lab 1014-446	1
Chemical Kinetics 1014-443	3
Chemical Kinetics Lab 1014-447	1
Advanced Instrumental Analysis 1008-711	3
Advanced Instrumental Analysis Lab 1008-720	2
Matrix Algebra 1016-331	4
Inorganic Chemistry I, II 1012-762, 763	8
Preparative Inorganic Chemistry Lab 1012-765	2
Senior Seminar*	2
Liberal Arts (Concentration)*	12
Chemistry Electives§	§
Research and Thesis Guidance 1010-879#	3

Fifth Year

Chemistry Seminar 1012-870	2
Research and Thesis Guidance 1010-879#	6-13
Coursework in this year will be determined by the Graduate Committee and will need to fulfill the requirement of 225 total credit hours§	§
<i>Total Quarter Credit Hours</i>	<i>225</i>

**See page 10 for Liberal Arts requirements*

See page 11 for Physical Education.

**ACS requirements include two quarters of a language (preferably German) unless a student has three years of one language in high school*

§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.

Biochemistry Option

The biochemistry option 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 option often have an interest in combining the life and health sciences with a chemistry degree. Students pursuing this option take a year of general biology in addition to a typical chemistry curriculum during the first two or three years. During the upper-class years, students in the biochemistry option take a substantial core of biochemistry courses, physical chemistry, chemical literature, liberal arts, and elective courses in biology, biotechnology, and clinical sciences

Employment opportunities for chemistry graduates with the biochemistry option 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.

Chemistry, BS degree (Biochemistry option), typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Chemical Safety 1010-200	1
Intro. to Co-op Seminar 1010-230	1
General Chemistry I, II 1010-251, 252	8
General Chemistry I Lab 1010-255	1
Quantitative Analysis 1008-253	4
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
Liberal Arts (Core)*	8
Physical Education Electives†	0
Cooperative Education 1010-499-01 (Optional, summer)	
<i>Second Year</i>	
Instrumental Analysis 1008-311	3
Instrumental Analysis Lab 1008-318	1
Separations Techniques 1008-312	3
Separations Techniques Lab 1008-319	1
Calculus IV 1016-305	4
Organic Chemistry I 1013-431	3
Preparative Organic Chemistry I Lab 1013-435	1
Physics 1017-311, 312 (or 1017-211, 212)	8 (6)
Physics Lab 1017-375, 376 (or 1017-271, 272)	2
Liberal Arts (Core)*	8
Physical Education Electives †	0
Cooperative Education 1010-499-01 (Optional)	
<i>Third Year</i>	
Intro. to Physical Chemistry 1014-340	3
Differential Equations 1016-306	4
Physics 1017-313 (or 1017-213)	4 (3)
University Physics Lab 1017-377 (or 1017-273)	1
Organic Chemistry II, III 1013-432, 433	6
Preparative Organic Chemistry II Lab. 1013-436	1
Systematic ID of Organic Compounds III Lab 1013-437	2
Chemical Thermodynamics 1014-441	3
Chemical Thermodynamics Lab 1014-445	1
Liberal Arts (Core)*	4
Physical Education Electives†	0
Cooperative Education 1010-499-01 (Optional)	
<i>Fourth Year</i>	
Quantum Chemistry 1014-442	3
Quantum Chemistry Lab 1014-446	1
Chemical Kinetics 1014-443	3

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Chemical Kinetics Lab 1014-447	1
Chemical Literature 1010-401	2
Biochemistry 1009-702	3
Biochemistry-Nucleic Acids 1009-704	3
Liberal Arts (Core)*	4
Liberal Arts (Concentration)*	8
Computer Techniques (FORTRAN) 0602-205	3-4
Cooperative Education 1010-499-01 (Optional)	

Fifth Year

Biochemistry-Metabolism 1009-703	3
Biochemistry--Experimental Techniques 1009-705	3
Science Electives*	*
Liberal Arts (Electives)	12
Senior Seminar 0520-501	2
Liberal Arts (Concentration)*	4
Cooperative Education 1010-499-01 (Optional)	
Total Quarter Credit Hours	180

*See page 10 for Liberal Arts requirements.

See page 11 for Physical Education.

*1009-541, 542, 543, Biochemistry Research may be used as Science 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.

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. 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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Chemical Safety 1010-200	1
Intro. to Co-op Seminar 1010-230	1
General Chemistry I, II 1010-251, 252	8
General Chemistry I Lab 1010-255	1
Quantitative Analysis I 1008-253	4
Quantitative Analysis Lab I, II 1008-265, 266	3
Calculus I, II, III 1016-251, 252, 253	12
Computer Techniques (FORTRAN) 0602-205	3
Liberal Arts (Core)*	20
Physical Education Electives†	0
Cooperative Education 1010-499-01 (Optional, summer)	

Second Year

Instrumental Analysis 1008-311	3
Instrumental Analysis Lab 1008-318	1
Separations Techniques 1008-312	3
Separations Techniques Lab 1008-319	1

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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
Physical Education Electives†	0
Cooperative Education 1010-499-01(Optional)	

Third Year

Intro. to Polymer Technology 1014-301	2
Intro. to Physical Chemistry 1014-340	3
Differential Equations 1016-306	4
University Physics 1017-313	4
University Physics Lab 1017-377	1
Organic Chemistry II, III 1013-432, 433	6
Preparative Organic Chemistry II Lab 1013-436	1
Chemical Thermodynamics 1014-441	3
Chemical Literature 1010-401	2
Chemical Thermodynamics Lab 1014-445	1
Liberal Arts (Core/Concentration)*	4

Physical Education Electives†	0
Cooperative Education 1010-499-01 (Optional)	

Fourth Year

Quantum Chemistry 1014-442	3
Quantum Chemistry Lab 1014-446	1
Chemical Kinetics 1014-443	3
Chemical Kinetics Lab 1014-447	1
Organic Chemistry of Polymers 1013-601	4
Synthesis of High Polymers Lab 1014-605	2
Inorganic Chemistry I 1012-762	4
Physical Chemistry of Polymers 1014-602	4
Liberal Arts (Concentration)*	8
Cooperative Education 1010-499-01 (Optional)	

Fifth Year

Struc./Prop. Relationships-Polymers 1014-603	4
Characterization of High Polymers Lab 1014-604	2
Chemistry Electives	8
Liberal Arts (Electives)*	12
Liberal Arts (Senior Seminar)*	2
Institute-wide Electives*	
Cooperative Education 1010-499-01 (Optional)	
Total Quarter Credit Hours	180

*See page 10 for Liberal Arts requirements

See page 11 for 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 credits are necessary for full-time status

Polymer Chemistry, combined BS/MS degree, typical course sequence (BS degree is ACS certified)

<i>First Year</i>	<i>Quarter Credit Hours</i>
Chemical Safety 1010-200	1
Intro. to Co-op Seminar 1010-230	1
General Chemistry I, II 1010-251, 252	8

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General Chemistry I Lab 1010-255	1
Quantitative Analysis 1008-253	4
Quantitative Analysis Lab I, II 1008-265, 266	3
Calculus I, II, III 1016-251, 252, 253	12
Computer Techniques (FORTRAN) 0602-205	3
Liberal Arts (Core)*	20
Physical Education Electives†	0
Cooperative Education 1010-499-01 (Optional, summer)	

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
Physical Education Electives†	0
Cooperative Education 1010-499-01 (Optional, summer)	

Third Year

Intro. to Polymer Technology 1014-301	1
Intro. to Physical Chemistry 1014-340	3
Chemical Literature 1010-401	2
Organic Chemistry II, III 1013-432, 433	6
Preparative Organic Chemistry II Lab 1013-436	1
Chemical Thermodynamics 1014-441	3
Chemical Thermodynamics Lab 1014-445	1
Liberal Arts (Concentration)**	8
Liberal Arts Electives**	12
Chemistry Electives§	§
Cooperative Education 1010-499-01 (Optional, summer)	

Fourth Year

Quantum Chemistry 1014-442	3
Quantum Chemistry Lab 1014-446	1
Organic Chemistry of Polymers 1013-601	4
Physical Chemistry of Polymers 1014-602	4
Characterization of High Polymers Lab 1014-604	2
Synthesis of High Polymers Lab 1014-605	2
Chemical Kinetics 1014-443	3
Chemical Kinetics Lab 1014-447	1
Advanced Instrumental Analysis 1008-711	3
Advanced Instrumental Analysis Lab 1008-720	2
Inorganic Chemistry I 1012-762	4
Senior Seminar*	2
Chemistry Electives§	§
Research and Thesis Guidance 1010-879**	3

Fifth Year

Struc./Prop. Relationships-Polymers 1014-603	4
Chemistry Seminar 1010-870	2
Research and 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.§	§

**See page 10 for Liberal Arts requirements.*

See page 11 for Physical Education.

**ACS requirements include two quarters of a language (preferably German) unless a student has three years of one language in high school.*

§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.

MATHEMATICS AND STATISTICS

George T. Georgantas, Ph.D., 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 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 innovative 'smart classroom' and new symbolic computation lab 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 majors include the following:

- o actuary
- o analyst for mathematical modeling
- o statistician
- o mathematical statistician
- o demographics analyst
- o software designer
- o scientific programmer
- o systems analyst
- o cryptographic mathematician
- o manufacturing engineering consultant
- o biological systems analyst
- o computer modeling consultant
- o graphic modeling consultant
- o simulations programmer
- o reliability analyst
- o statistical forecaster
- o robotics software specialist
- o data base programmer
- o data analyst
- o telecommunications analyst
- o software engineer

- o marketing analyst
- o 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. The courses 1016-541 through 1016-545 not only provide a foundation for students who will work as actuaries, but also prepare students to take the first five actuarial exams. These courses may count for credit in any of the three major programs in the Department of Mathematics or may be taken independently.

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 will also be eligible to go directly into the Department of Mathematics' recently approved master of science program in Industrial and Applied Mathematics.

Transfer programs

Transfer programs are arranged on an individual basis

Requirements for the BS degree

The student must meet the minimum requirements of the Institute as described on pages 911. 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. 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

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 1016-210, 211	2
Calculus I, II, III 1016-251, 252, 253	12
Calculus IV 1016-305	4
Introduction to Programming 0602-208	4
Program Design & Validation 0601-210	4
Computer Techniques--Fortran 0602-205	4
Science Electives	12
Liberal Arts (Core)*	8
Physical Education Electives†	0
 <i>Second Year</i>	
Differential Equations I 1016-306	4
Probability & Statistics I 1016-351	4
Probability & Statistics II 1016-352	4

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Co-op Seminar 1016-399	0
Foundations of Discrete Mathematics 1016-265	4
Differential Equations II 1016-307 or	4
Matrices & Boundary Value Problems 1016-318 or	
Applied Statistics 1016-353	
Matrix Algebra 1016-331	4
Liberal Arts (Core)*	16
Institute-wide Electives	8
Physical Education Electives†	0

Third Year

Computer Methods in Applied Math 1016-437	4
Linear Algebra 1016-432	4
Mathematical Modeling 1016-461	4
Mathematics Elective	12
Liberal Arts (Core/Concentration)*	8
Cooperative Education (Optional)	

Fourth Year

Real Variables I, II 1016-411, 412	8
Mathematics Electives	8
Applications Minor	4
Liberal Arts (Concentration/Electives)*	12
Cooperative Education (Optional)	

Fifth Year

Abstract Algebra I, II 1016-531, 532	8
Applications Minor	8
Liberal Arts (Electives)*	8
Liberal Arts (Senior Seminar)*	2
Cooperative Education (Optional)	
<i>Total Quarter Credit Hours</i>	184

*See page 10 for Liberal Arts requirements.

See page 11 for Physical Education.

Computational Mathematics

Computational mathematics prepares students for a mathematical career that incorporates extensive computer science skills. In this program, much emphasis is given to use of the computer as a tool to solve mathematically modeled physical problems. Graduates of the program often choose positions as mathematical analysts, scientific programmers, software engineers, or systems analysts. Job opportunities in private industry and government literally abound in this field.

The BS in computational mathematics can be joined with the MS in computer science. An accelerated program of study allows students who choose this option to receive both the BS and MS degrees following one year of graduate study.

Computational Mathematics, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 1016-210, 211	2
Calculus I, II, III 1016-251, 252, 253	12
Calculus IV 1016-305	4
Programming I-Algorithmic Structures 0601-241*	4
Programming II-Data Structures 0601-242*	4
Assembly Language Programming 0601-305	4
Science Electives	12
Liberal Arts (Core)*	8
Physical Education Electives†	0

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Second Year

Differential Equations I 1016-306	4
Probability & Statistics I 1016-351	4
Probability & Statistics II 1016-352	4
Foundations of Discrete Mathematics 1016-265	4
Co-op Seminar 1016-399	0
Matrix Algebra 1016-331	4
Program Design & Implementation 0601-243*	4
Data Organization & Management 0603-325	4
Computer Techniques--Fortran 0602-205 or C-Language 0602-207	4
Institute-wide Elective	4
Liberal Arts (Core)*	12
Physical Education Electives†	0

Third Year

Linear Algebra 1016-432	4
Theory of Graphs & Networks 1016-467	4
Mathematical Modeling 1016-461	4
Digital Computer Organization ICSS-315	4
Mathematics Elective	4
Computer Science Elective	4
Liberal Arts (Core)*	8
Cooperative Education (Optional)	

Fourth Year

Real Variables I 1016-411	4
Numerical Analysis I, II 1016-511, 512	8
Mathematics Electives	4
Institute-wide Elective	3
Liberal Arts (Concentration)*	12
Cooperative Education (Optional)	

Fifth Year

Abstract Algebra I, II 1016-531, 532	8
Mathematics Elective	4
Computer Science Elective	4
Liberal Arts (Electives)*	12
Liberal Arts (Senior Seminar)*	2
Cooperative Education (Optional)	
Total Quarter Credit Hours	191

*See page 10 for Liberal Arts requirements

See page 11 for Physical Education

*The following sequence may be substituted: Introduction to Programming, 0602-208, Program Design & Validation, 0602-210; and Fundamentals of Computer Science for Transfer Students, 0603-360

Applied Statistics

The Applied Statistics Program provides the student with a solid foundation in mathematical and statistical principles, experience in the application of statistics, thorough knowledge of computers and statistical software, and the skills to communicate the results of a statistical analysis. The demand for graduates with this type of preparation is precipitated from the recognition by business, industry, and government that a large number of problems can be effectively analyzed and solved using statistical methodology.

Graduates of the program collaborate with specialists in both scientific as well as non-technical areas to design, experiment, and interpret the results. Application areas include product designs, quality control, marketing, customer satisfaction, and actuarial sciences

The BS in applied statistics may be combined with an MS in applied and mathematical statistics. An accelerated program of study allows the student who chooses this option to receive both the BS and MS degrees following one year of graduate study

Applied Statistics, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 1016-210, 211	2
Calculus I, II, III 1016-251, 252, 253	12
Calculus IV 1016-305	4
Introduction to Programming 0602-208	4
Program Design & Validation 0602-210	4
Computer Techniques--Fortran 0602-205	4
Science Electives	12
Liberal Arts (Core)*	8
Physical Education Electives†	0
 <i>Second Year</i>	
Differential Equations 1016-306	4
Probability & Statistics I, II 1016-351, 352	8
Foundations of Discrete Mathematics 1016-265	4
Co-op Seminar 1016-399	0
Applied Statistics 1016-353	4
Matrix Algebra 1016-331	4
Statistical Quality Control 1016-358	4
Institute-wide Elective	4
Liberal Arts (Core)*	16
Physical Education Electives†	0
 <i>Third Year</i>	
Linear Algebra 1016-432	4
Regression Analysis 1016-354	4
Design of Experiments 1016-355	4
Mathematics Elective*	4
Institute-wide Electives	8
Liberal Arts (Core/Concentration)*	8
Cooperative Education (Optional)	
 <i>Fourth Year</i>	
Nonparametric Statistics 1016-454	8
Mathematics Electives*	12
Institute-wide Elective	4
Liberal Arts (Concentration/Electives)*	12
Cooperative Education (Optional)	
 <i>Fifth Year</i>	
Mathematical Statistics I, II 1016-451, 452	8
Statistics Seminar 1016-555	4
Mathematics Elective*	4
Liberal Arts (Electives)*	8
Liberal Arts (Senior Seminar)*	2
Cooperative Education (Optional)	
<i>Total Quarter Credit Hours</i>	188

*See page 10 for Liberal Arts requirements.

See page 11 for Physical Education.

*Up to 16 quarter credits of mathematics electives may be chosen from the Applied Mathematics Minor courses.

PHYSICS

Arthur Z. Kovacs, Ph.D. 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. 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 biophysics, geophysics, atmospheric science, imaging science, and engineering

Requirements for the BS degree in physics

The student must meet the minimum requirements of the Institute as described on pages 911. 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

For additional information on AS and BS degree requirements, contact the head of the Department of Physics.

Physics, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Physics Orientation 1017-200	1
University Physics I, II 1017-311, 312	8
University Physics Lab I, II 1017-371, 372	2
Calculus I, II, III 1016-251, 252, 253	12
Chemical Principles I, II 1011-211, 212	6
Chemistry Lab I, II 1011-205, 206	2
Computational Physics with FORTRAN Applications 1017-317	4
Liberal Arts (Core)*	16
Physical Education Electives†	0
<i>Second Year</i>	
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 or Electronic Measurements 1017-431*	4
Liberal Arts (Core)*	12
Physical Education Electives†	0
(Free Elective, optional)	(6-8)
<i>Third Year</i>	
Intermediate Mechanics 1017-401, 402	8
Thermal Physics 1017-415	4
Electronic Measurements 1017-431 (or Free Elective*)	4
Theoretical Physics I, II 1017-480, 481	8
Liberal Arts (Concentration)*	8
Cooperative Education (Optional)	
<i>Fourth Year</i>	
Electricity and Magnetism 1017-411, 412	8
Experimental Physics I 1017-421	3
Optical Physics 1017-455	4
Introduction to Quantum Mechanics 1017-522	4
Physics Elective (400-500 level)	4

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Liberal Arts (Concentration)	4
Liberal Arts (Elective)*	4
Cooperative Education (Optional)	
<i>Continued, next page</i>	

Fifth Year

Solid State Physics1017-531	4
Physics Seminar 1017-550	1
Technical Elective	3
Free Elective	8
Liberal Arts (Electives)*	8
Liberal Arts (Senior Seminar)*	2
(Free Electives, optional)	(3-4)
Cooperative Education (Optional)	
<i>Total Quarter Credit Hours</i>	183

**See page 10for Liberal Arts requirements.*

See page 11 for Physical Education.

**Permission of adviser required.*

ALLIED HEALTH SCIENCES

John M. Waud, Ph.D., Head

The Department of Allied Health Sciences includes programs of study in biomedical computing, medical technology, physician 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 employment opportunities in hospitals and clinics, in research facilities, in industry, and with many governmental agencies. Some continue their education in graduate and professional schools

All of the BS programs offered by the Department of Allied Health Sciences can serve as pre-professional 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, MS, 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 School of Computer Science because of the increasing use of computers in biomedical research, education, and the health care industry. Students receive training in the basic sciences, medical sciences, and computer science 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.

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 during their last three years and 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, or for post-graduate professional school

Requirements for the BS in biomedical computing

The student must meet the minimum requirements of the Institute as described on pages 911 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 AS and BS degree requirements, contact the head of the Department of Allied Health Sciences.

Biomedical Computing, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
General Biology 1001-201, 202, 203	9
General Biology Lab 1001-205, 206, 207	3
General & Analytical Chem. Lec. 1011-215, 216, 217	10
Chemistry I, II Lab 1011-205, 206	2
General & Analytical Chem. Lab 1011-227	2
Survey of Computer Science 0602-200	4
Calculus I, II 1016-251, 252	8
or	
Intro. to Calculus I, II 1016-214, 215	(6)
Allied Health Sciences Freshman Seminar 1026-203	1
Liberal Arts (Core)*	12
Physical Education Electives†	0
<i>Second Year</i>	
Programming I--Algorithmic Structures 0601-241	4
Programming II--Data Structures 0601-242	4
M Programming 1027-305	4
Medical Terminology 1026-301	3
FORTTRAN 0602-220	4
Assembly Language Programming 0601-305	4
Intro. Biomedical Computing Seminar 1027-201	1
Physiology & Anatomy I, II 1001-305, 306	10
Program Elective	4
Liberal Arts (Core)*	12
Physical Education Electives†	0
<i>Third Year</i>	
Programming III--Design & Implementation 0601-243	4
Computer Science Elective	4
Clinical Lab Instrumentation 1024-432	4
Elementary Statistics 1016-309	4
University Physics I, II 1017-311, 312	8
University Physics Laboratory I, II 1017-375, 376	2
or	
College Physics I, II 1017-211, 212	(6)
College Physics I, II Lab 1017-271, 272	(2)
Liberal Arts (Core/Concentration)*	8
Cooperative Education (Optional)	
<i>Fourth Year</i>	
Digital Computer Organization 0603-315	4
Data Organization & Management 0603-325	4
Chemistry Elective	6
Electricity & Electronics 1017-331	4
Liberal Arts (Concentration/Elective)*	12
Cooperative Education (Optional)	

Fifth Year

Program Electives	16
Liberal Arts (Electives)*	8
Liberal Arts (Senior Seminar)*	2
Cooperative Education (Optional)	
<i>Total Quarter Credit Hours</i>	187-191

*See page 10 for Liberal Arts requirements.

See page 11 for Physical Education.

NOTE: Although cooperative education (co-op) can be any quarter beginning with the third year, this 'typical' course schedule includes it in winter quarter of the third, fourth, and fifth years.

MEDICAL TECHNOLOGY

James C. Aumer, MS, C(ASCP), 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 Committee on Allied Health Education and Accreditation (CAHEA). 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 and St. Mary's Hospital in Rochester, Daemen College in Buffalo, the Boston Veterans Administration Medical Center, and the Albany Medical Center Hospital. 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 911 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 AS and BS degree requirements, contact the head of the Department of Allied Health Sciences.

Medical Technology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
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 Lab 1011-227	2
Allied Health Sciences Freshman Seminar 1026-203	1

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Survey of Computer Science 0602-200	4
Intro. to Calculus I, II 1016-214, 215 or	6
Calculus I, II 1016-251, 252	(8)
Liberal Arts (Core)*	12
Physical Education Electives†	0

Second Year

Medical Technology Seminar 1024-210	1
Physiology & Anatomy 1001-305, 306	10
Organic Chemistry Lec. 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
Physical Education Electives†	0

Third Year

Special Topics in Med. Tech. 1024-559	3
Hematology/Immunohematology 1024-401	4
Microbiology 1001-404	5
Biochemistry 1009-334	4
Clinical Lab Instruments; Clinical Chemistry 1024-432, 433	8
Elementary Statistics 1016-309	4
Immunology 1001-402	3
Diag. Bacteriology and Mycology 1024-405	4
Liberal Arts (Concentration)*	12
Elective	4

Fourth year taken at an approved hospital for training medical technologists.

Total Quarter Credit Hours 150-152

**See page 10 for Liberal Arts requirements.*

See page 11 for Physical Education.

PHYSICIAN ASSISTANT

Heidi Miller, PA-C, BS, Program Director

The RIT Physician Assistant Program is a four-year curriculum focusing on primary care and awarding a bachelor of science (BS) degree upon completion. The first two years involve core courses in basic sciences, mathematics, and liberal arts. The third and fourth years, considered the Upper Division of the program, encompass 21 months. (Students participate in the program during the summer between these last two years.) This includes nine months of clinical course work and 12 months of clinical rotations. Qualified transfer students are accepted into any one of the first three years of the program.

Physician assistants provide diagnostic and therapeutic health care in conjunction with a supervising physician. They perform tasks that have, in the past, been performed by physicians, such as:

- o Eliciting medical histories
- o Conducting physical examinations
- o Ordering laboratory and radiological testing
- o Diagnosing common illnesses
- o Determining treatment
- o Giving medical advice
- o Counseling and educating patients
- o Promoting 'wellness' and disease prevention
- o Assisting in surgery
- o 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, 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 319), 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 high school students and 2.8 (on the basis of a 4.0 maximum) for transfer students. In order to graduate from the program, a GPA of 2.8 or better must be maintained.

Physician Assistant, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Allied Health Sciences Freshman Seminar 1026-203	1
General Biology Lec. 1001-201, 202, 203	9
General Biology Lab. 1001-205, 206, 207	3
Intro. to Calculus I, II 1016-214, 215	6
General & Analytical Chemistry Lec. 1011-215, 216, 217	10
General & Analytical Chemistry Lab 1011-205, 206, 227	4
Survey of Computer Science 0602-200	4
Liberal Arts (Core)*	12
Physical Education Electives†	0
 <i>Second Year</i>	
Physiology & Anatomy 1001-305, 306	10
Organic Chemistry Lec. 1013-231, 232, 233	9
Organic Chemistry Lab 1013-235, 236, 237	3
Elementary Statistics 1016-309	4
Physician Assistant Seminar 1032-210	1
Elective	4
Liberal Arts (Core)*	20
Physical Education Electives†	0
 <i>Third Year</i>	
Microbiology 1001-404	5
Pathophysiology 1026-415	4
Medical Lab Testing 1024-450	4
Patient History and Physical Exam I, II, III 1032-401, 402, 403	4
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	15
Clinical Rotation I 1032-490*	12
Liberal Arts (Core)*	8
 <i>Fourth year taken at an approved hospital for training physician assistants</i>	
Clinical Rotation II, III, IV 1032-491, 492, 493	36
Total Quarter Credit Hours	198

*See page 10 for Liberal Arts requirements.

See page 11 for Physical Education.

*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), Family Practice, Emergency Medicine, OB/Gyn, Pediatrics, General Surgery, and Psychiatry. Students will also be able to select one elective rotation and one final preceptorship.

These latter rotations allow students to individualize their experiences according to their own areas of interest.

MEDICAL IMAGING TECHNOLOGIES

Nuclear Medicine Technology

Anna M. Wicks, BS, MBA, CNMT, Program Director

Nancy H. McKee, BS, CNMT, Clinical Coordinator

The program leading to the 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

Clinical training

Students who complete 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. The first three weeks of training are 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 take place at affiliated hospitals. Before students are allowed to begin their clinical education, they must be certified in 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 the following upstate New York hospitals: Syracuse area--Community General Hospital, Crouse Irving Memorial Hospital; Rochester area--Strong Memorial Hospital, Genesee Hospital, Highland Hospital, Park Ridge Hospital, St. Mary's Hospital, Rochester General Hospital; Geneva General Hospital, Clifton Springs Hospital and Clinic; Binghamton area--Our Lady of Lourdes Hospital; UHS-Wilson Site (United Health Services); Elmira area--Arnot-Ogden Medical Center.

Requirements for the BS degree

The student must meet the minimum requirements of the Institute as described on pages 911 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

For further information on AS and BS 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.

Accreditation

The nuclear medicine technology program is accredited through the American Medical Association sponsored Committee on Allied Health Education and Accreditation

Nuclear Medicine Technology, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
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

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General & Analytical Chemistry Lab 1011-227	2
Allied Health Sciences Freshman Seminar 1026-203	1
Intro. to Calculus I, II 1016-214, 215	6
Survey of Computer Science 0602-200	4
Liberal Arts (Core)*	12
Physical Education Electives†	0

Second Year

Intro. to Diagnostic Medical Imaging 1026-205	2
College Physics 1017-211, 212, 213	9
College Physics Lab 1017-271, 272, 273	3
Survey of Organic Chemistry 1011-202	3
Survey of 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

Medical Terminology 1026-301	3
Radiation Physics 1017-351, 352, 353	15
Radiation Biology 1001-430	4
Elementary Statistics 1016-309	4
Liberal Arts (Concentration)*	12
Program Electives	10

Fourth Year

Introduction to Clinical Nuclear Medicine 1025-401§	4
Nuclear Medicine Procedures--Central Nervous System 1025-402	1
Procedures--Skeletal System 1025-502 N.M	1
N.M. Procedures--Respiratory System 1025-503	1
N.M. Procedures-- Urinary System 1025-510	1
N.M. Procedures--Endocrine System 1025-511	2
N.M. Procedures--Cardiovascular System 1025-512	2
N.M. Procedures--Digestive System 1025-513 N.M	2
N.M. Procedures--Special Studies 1025-514	1
N.M. Procedures--Hematological and In Vitro Studies 1025-515*	1
Instrumentation and Computers in Nuclear Medicine 1025-516	2
Radiochemistry and Radiopharmacology 1025-517	2
Radionuclide Therapy 1025-518	1
Radiation Health Safety 1025-519	2
Radioassay 1025-520	4
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	196

*See page 10 for Liberal Arts requirements

See page 11 for Physical Education

*Clinical internships--affiliated hospitals

§Students should be certified in CPR before this course is taken

Nuclear Medicine Technology, certificate program, typical course sequence

Quarter Credit Hours

Intro. to Diagnostic Medical Imaging 1026-205	2
Elementary Statistics 1016-309	4
Radiation and the Human Body 1025-310	2

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Nuclear Medicine Physics & Instrumentation 1017-358	6
Intro. to Nuclear Medicine 1025-401	4
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 and in Vitro Studies 1025-515	1
Instrumentation and Computers in Nuclear Medicine 1025-516	2
Radiochemistry & Radiopharmacology 1025-517	2
Radionuclide Therapy 1025-518	1
Radiation Health Safety 1025-519	2
Radioassay 1025-520	4
Review in Nuclear Medicine 1025-521	2
Clinical Nuclear Medicine 1025-522	7
Clinical Nuclear Medicine II 1025-523	7
Clinical Nuclear Medicine III 1025-524	7
<i>Total Quarter Credit Hours</i>	64

DIAGNOSTIC MEDICAL SONOGRAPHY (ULTRASOUND)

John M. Waud, Ph.D., Acting Program Director

The program offers two options: a bachelor of science degree or a certificate. The program is designed to prepare sonography professionals who will become leaders in the field. All options prepare the candidate to sit for the American Registry of Diagnostic Medical Sonographers examination in abdominal and OB-gyn specialties. Each candidate is also introduced to vascular examination. Depending on previous education and experience, program graduates may find positions in administration, teaching, industry, or research, in addition to the more traditional clinical positions. Some graduates decide to work freelance or attend graduate school

Requirements for the BS degree

The student must meet the minimum requirements of the Institute as described on pages 911 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 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 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 three-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 pre-clinical 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, BS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
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 Chem. Lab 1011-205, 206, 227	4
Allied Health Sciences Freshman Seminar 1026-203	1
Survey of Computer Science 0602-200	4
Intro. to Calculus I, II 1016-214, 215	6
Liberal Arts (Core)*	12
Physical Education Electives†	0
 <i>Second Year</i>	
College Physics 1017-211, 212, 213	9
College Physics Lab 1017-271, 272, 273	3
Intro. to Diagnostic Medical Imaging 1026-205	2
Medical Terminology 1026-301	3
Physiology & Anatomy 1001-305, 306	10
Elementary Statistics 1016-309	4
Liberal Arts (Core)*	16
Physical Education Electives†	0
 <i>Third Year</i>	
Sectional Anatomy 1030-412	4
Ultrasound Instrumentation 1030-413	4
Pathophysiology 1026-415	4
Medical Genetics 1004-315	2
Ultrasonic Physics 1017-361	5
Program Electives	16
Liberal Arts (Concentration)*	12
 <i>Fourth Year</i>	
Intro. to Obstetrical Ultrasound 1030-552	3
Intro. to Gynecologic Ultrasound 1030-553	3
Abdominal Ultrasound I 1030-556	3
Clinical DMS I 1030-570	7
Advanced Obstetrical Ultrasound 1030-554	4
Abdominal Ultrasound II 1030-557	3
Seminar I 1030-560	2
Clinical DMS II 1030-571	7
Small Parts Ultrasound 1030-558	3
General Vascular Examination 1030-414	4
Seminar II 1030-561	2
Clinical DMS III 1030-572	7
<i>Total quarter credit hours</i>	191

*See page 10 for Liberal Arts requirements.

See page 11 for Physical Education.

Diagnostic Medical Sonography, certificate program, typical course sequence

*Must be completed before entering certificate program**

Intro. to Diagnostic Medical Imaging 1026-205	4
Sectional Anatomy 1030-412	4
Ultrasound Instrumentation 1030-413	4
Pathophysiology 1026-415	4
 <i>Internship</i>	
Intro. to Obstetrical Ultrasound 1030-552	3
Intro. to Gynecologic Ultrasound 1030-553	3

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Abdominal Ultrasound I 1030-556	3
Clinical DMS I 1030-570	7
Advanced Obstetrical Ultrasound 1030-554	4
Abdominal Ultrasound II 1030-557	3
Seminar I 1030-560	2
Clinical DMS II 1030-571	7
Small Parts Ultrasound 1030-558	3
General Vascular Examination 1030-414	4
Seminar II 1030-561	2
Clinical DMS III 1030-572	7
<i>Total Quarter Credit Hours</i>	64

**Other prerequisites may apply.*

THE NATIONAL TECHNICAL INSTITUTE FOR THE DEAF

Dr. James J. DeCaro, Dean

The National Technical Institute for the Deaf (NTID), one of RIT's eight colleges, provides deaf students with technological training that leads to meaningful employment in business, industry, government, and education. Created in 1965 by Congress and funded primarily by the U.S. Department of Education, NTID represents the world's first effort to educate large numbers of deaf 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.

More than 1,100 deaf students from across the United States as well as from several U.S. territories and other countries study and reside at RIT.

NTID provides RIT's deaf students with technical and professional training in more than 30 programs. An NTID education prepares students for technical careers in areas such as applied accounting, applied art and computer graphics, applied computer technology, engineering technologies, ophthalmic optical finishing technology, and photo/media technologies.

Traditionally, 95 percent of NTID graduates who enter the work force find employment in their fields of study.

Deaf students who take courses or matriculate into one of RIT's seven other colleges may request educational access services, which may include sign language interpreting in classrooms and laboratories, notetaking, tutoring, personal and career counseling, and academic advising. This package of services is provided to students based on student need and resource availability.

For hearing students, NTID offers an associate degree in educational interpreting.

NTID's new centers

To serve its students, NTID is organized into seven operational 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 area that serves students with declared majors and offers a variety of certificate, diploma, and associate degree programs and courses in more than 30 technical areas, including applied accounting, applied art and computer graphics, applied computer technology, business occupations, electronic publishing and printing technology, engineering technologies, ophthalmic optical finishing technology, and photo/media technologies.

Center for Arts and Sciences

This center is a comprehensive student-oriented academic area that offers an array of arts and science courses to a broad-based population of NTID students, including those who have matriculated into a program or are pre-baccalaureate, 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 provides programs and services such as academic advising, tutoring, notetaking, and interpreting for students enrolled in a baccalaureate or graduate program in one of RIT's seven other colleges. Pre-baccalaureate discipline-related courses also are available through this center.

Center for Research, Teaching, and Learning

Activities within this center focus on understanding and enhancing the educational, social, and communication opportunities for deaf individuals. The center provides services and programs that enhance teaching and learning within the NTID community and beyond via broadly-based research activities, program and curriculum development, instructional design and evaluation, instructional media services, and faculty and staff professional development.

Center for Student Resources

This center offers services that enhance learning as well as personal and social growth for a broad-based population of matriculated students. In conjunction with other centers, the Center for Student Resources offers such services as career development counseling and advising; learning centers; and a range of audiological, speech/language, and psychological services. In addition, the center provides support for student life and athletic programs

Center for Outreach

This center establishes and maintains programs and linkages with external audiences, including prospective students, alumni, employers, school personnel, and media, in order to enhance opportunities for students and alumni as well as support the college in fulfilling its mission. Departments within this center include alumni relations, educational outreach, Center on Employment, marketing communications, and recruitment and admissions

Center for Institutional Services

All NTID administrative services are provided through this center, which coordinates comprehensive support services necessary for ensuring that access to computing and information resources meets the needs of students, faculty and staff members, and administrators. In addition, the center provides facilities management, including capital project management, space allocation, and classroom and meeting room scheduling

Admission requirements

To qualify for admission to RIT 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 Background

Admitted students should have an average eighth-grade achievement level or higher on a standardized achievement test that includes reading, math, and language

- 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

Degrees offered through NTID

The academic programs offered through NTID lead to certificates, diplomas, associate in occupational studies degrees, and associate in applied science degrees from RIT

Certificate: Certification at this level requires 45-60 credit hours of technical instruction. These programs allow students to acquire a minimum level of technical skill before entering the work force. In addition to technical courses, students are required to complete a specific number of credit hours, determined by the program of study, in general education and communication courses.

Diploma: Certification at this level requires 90-135 credit hours of technical and general instruction. Students attain a maximum level of technical competency for entry-level positions and minimum exposure in the general education field. In addition to 60-100 credit hours in technical courses, students must complete a specific number of credit hours, determined by the program of study, in general education and communication courses

Associate in Occupational Studies Degree (AOS) : Certification at this level requires 100-118 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 20 credit hours in general education courses and a specific number of credit hours, determined by the program of study, in communication courses

Associate in Applied Science Degree (AAS) : Certification at this level requires 115-118 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, nine credit hours in required general education courses, and approximately 32 credit hours in communication and English courses

Deaf students enrolled in other RIT colleges

In addition to NTID's programs, qualified deaf students also may take classes in another RIT college or may enroll in one of the more than 250 professional programs offered through RIT's other seven colleges: Applied Science and Technology, Business, Continuing Education, Engineering, Imaging Arts and Sciences, Liberal Arts, and Science. This process is called cross registration.

Each RIT college has an affiliated NTID support department that provides services for deaf students. These services may include sign language interpreting, notetaking, tutoring, and advising. The policies and procedures for requesting support services are outlined in 'The Student Handbook: Your Guide to Support Services at RIT through NTID'. Requests for support services are handled on the basis of student need and resource availability

Students may choose to enroll in courses taught through the other seven colleges of RIT for several reasons: They may take selected courses at another RIT college 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.

Deaf students who wish to enroll in a program in another RIT college must meet its admission standards. Furthermore, deaf students supported by NTID also must meet NTID admission requirements listed on this page and complete both the NTID Supplemental Admission Application and standard RIT admission forms.

General education

Learning at NTID and the other colleges of RIT means more than gaining technical skills. NTID's General Education Programs provide students with a range of courses and experiences that help them become independent thinkers, develop personal and social skills, and better understand themselves and their places in the world. General education courses also help students develop a better understanding of their personal values and how they influence attitudes and behaviors; increase their ability for self-direction, lifelong learning, and personal fulfillment; and enhance their skills in all modes of communication.

General education programs offer a variety of courses in the social sciences, humanities, and performing arts that provide a sound general education experience for students completing certificates, diplomas, and AOS degrees through NTID. The curriculum also provides preparatory courses for AAS and baccalaureate degree students completing their liberal arts requirements through RIT's College of Liberal Arts.

In addition, an array of educational programs in areas such as wellness, Deaf culture, and cross-cultural interactions; freshman year experiences; and minority student programming are sponsored.

Required courses

All deaf students enrolled in NTID's certificate, diploma, and associate degree programs are required to take three general education courses:

- **Freshman Seminar** helps students explore the academic and personal challenges of college life.

- **The Job Search Process** teaches students many skills they will need to find a job
- **Contemporary Life Issues** or **Contemporary Social Issues** helps students broaden their understanding of themselves and current social issues

Students pursuing an AOS degree are required to take one general education elective and **Human Experience I: An Individual Life; Human Experience II: The Individual and Society; and Human Experience III: The Individual and Technology**. These courses explore individual development and how the individual and society influence each other

Writing program

General education programs offer a developmental writing course sequence, **Written Communication I and II**, for students who meet the NTID English requirements for entry into College of Liberal Arts courses. These NTID courses provide additional experience with writing techniques needed for success in the College of Liberal Arts course **English Composition**. Eligible students must meet with NTID's writing coordinator before registering for these courses

Liberal arts requirements

Deaf 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. 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 so that interpreters and notetakers are not needed

Liberal arts courses taught by College of Liberal Arts faculty members include both deaf and hearing students. Educational access services, including academic advising, sign language interpreting, notetaking, and tutoring, may be requested by students and are provided based on student need and resource availability.

Deaf students are advised to earn a passing grade in **English Composition** 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 **English Composition** is based on the NTID Liberal Arts Placement Test (LAPT). Before registering for English Composition, students must first satisfactorily complete **Written Communication II**.

Students seeking an AAS degree also are required to take courses in behavioral science, social science, and science and humanities

Liberal Arts courses taught by NTID faculty members include:

Language, Literature, and Communication
English Composition
Literature

Criminal Justice
Criminal Justice System
Criminology

Social Work
Role of the Social Worker

Communication skills

Communication skills are critical for success in college, on the job, and in the community. NTID faculty members recognize the need for efficient, effective communication and therefore have established course offerings covering a range of communication styles

Deaf students are required to take up to 12 credit hours in communication courses, including American Sign Language, audiology, sign/simultaneous communication, and speech as well as up to 20 credit hours in English. Students may demonstrate English proficiency by achieving certain test scores or completing certain courses with passing grades. These courses are designed for students who demonstrate need for additional work in English in order to achieve their degree goals.

Pre-technical programs

Students who show talent and interest in certain technical programs, but do not have all the necessary skills to begin the program of study, are required to complete a pre-technical year. Pre-technical programs help students build basic skills in English, general education, mathematics, and science before beginning their technical courses. Programs that do not have pre-technical years build basic mathematics, science, and technical skills into their regular curricula

Special topics courses

Students may explore topics of special interest in areas not offered through existing courses. One five credit hours may be assigned for special topics courses

Career exploration

Students who are not ready to select a program following the summer orientation program may participate in Career Exploration. Students who choose Career Exploration are allowed up to three quarters to decide on a program; they must write a plan explaining what they will do each quarter

The program includes personal counseling; decision-making classes; field trips; sampling of various programs; and interpretation of interest, aptitude, and achievement testing. Career Exploration students also take courses in communication, English, general education, and mathematics.

Transfer from another postsecondary school

Students enrolled in other postsecondary educational programs or colleges are encouraged to apply for admission to RIT through NTID if:

- they need educational access services such as interpreters or tutors to aid them in their college studies, and these services are not available at the schools in which they are or were enrolled
- they decide to change their program of study to one that is not offered at the college they currently attend, but is offered by NTID or another RIT college
- they have completed a postsecondary program and have decided they want or need additional training; students may pursue advanced degrees by matriculating into any of RITs other colleges.

For information about transfer credits, see page 315

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 1994-95 are listed on the following page.

Required laboratory fees, books, and supplies will have an impact on students' costs. NTID costs for laboratory fees vary according to students' fields of study. Per-quarter laboratory fees for the 1994-95 academic year (Fall, Winter, and Spring quarters) range from \$60-\$170.

The cost of books and supplies is students' responsibility. These costs also vary depending on the program of study.

Annual costs for books and supplies for the 1994-95 academic year range from \$85-\$2,200

New students accepted to the Summer Vestibule Program will be charged according to the fee schedule at right.

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 at a cost of \$220 for the 1994-95 year, 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

Facilities

A modern academic/residence building complex on the RIT campus is designed to meet the specific needs of deaf students. The Lyndon Baines Johnson Building, NTID's main academic facility, houses laboratories, offices, speech and hearing areas, classrooms, and a 500-seat theater with closed-circuit television. All classrooms are designed to reduce distractions-these rooms have no windows; colors are soft; seats are arranged in a semicircle to allow for good vision from all parts of the room; and projection equipment is located outside the classroom to reduce unnecessary noise.

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 TVmonitors are located throughout the Lyndon Baines 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 provided by AT&T. The relay service operates 24 hours every day, seven days a week, and can be used to make and receive campus, local, long-distance, and international calls.

FIXED CHARGES FOR NTID-SPONSORED STUDENTS

	Summer Vestibule Program	All Fall Quarter	Other Quarters (per quarter)
Tuition	\$721	\$1,442	\$1,442
Room	511	1,022	1,022
Board	383	868	868
Student Fees		147	147
Orientation Fees		40	
SVP Accident/Sickness Insurance	18		
Accident/Sickness Insurance		220	
	\$1,633	\$3,739	\$3,479

¹ Student fees are required of all full-time students and include: Student Health (\$48); Student Activities (\$39); Athletic (\$5); Student Alumni Union (\$53); and NTID Activities (\$2).

² Charge to cover cost of Fall Orientation Program for new students.

TECHNICAL AND COLLEGES PROFESSIONAL EDUCATION

PROGRAMS OF NTID
(Leading to certificate, diploma,
or associate degrees)

NTID Programs
Applied Science/

RELATED TECHNICAL AND PROFESSIONAL EDUCATION PROGRAMS OF OTHER RIT

(Leading to associate, bachelor's, or master's degrees through cross registration into other RIT colleges; students may request interpreting, tutoring, and notetaking services, which are provided based on student need and resource availability.)

Other RIT Colleges

Other RIT Programs

ROCHESTER INSTITUTE OF TECHNOLOGY

Allied Health

Medical Laboratory
Technology
Ophthalmic Optical Finishing
Technology

College of Imaging Arts and Sciences

Biomedical Photographic Communication

College of Science

Applied Mathematics	Computational Mathematics
Applied Statistics	Diagnostic Medical Sonography
Biology	Materials Science and Engineering
Biomedical Computing	Medical Technology
Biotechnology	Nuclear Medicine Technology
Chemistry	Physics
Clinical Chemistry	Polymer Chemistry

Business/Computers

Applied Accounting

Applied Computer Technology
Business Occupations
Business Technology
Office Technologies

College of Applied Science and Technology

Computer Engineering Technology
Computer Science

College of Business

Business Administration-- Accounting	Business Administration-- Marketing
Business Administration-- Finance	Business Administration Photographic Marketing Management
Business Administration-- Information Systems	Business Administration--Management
Business Administration-- International Business	

Educational Interpreting

Educational Interpreting

Engineering Technologies

Architectural Drafting

Architectural Technology

Civil Technology

Electromechanical Technology

Industrial Drafting

Industrial Drafting
Technology

College of Applied Science and Technology

Civil Engineering Technology	Mechanical Engineering Technology
Computer Engineering Technology	Packaging Science
Electrical Engineering Technology	Telecommunications Technology
Energy Engineering Technology	

Manufacturing Engineering Technology

College of

Engineering

Electrical Engineering

A.A.S. Transfer Program
Manufacturing Processes
Technology
Industrial Engineering
Mechanical Engineering
Microelectronic Engineering

General Education

(Programs available through cross
registration into the College of
Liberal Arts)

College of Liberal Arts

Criminal Justice	Professional and Technical Communication
Economics	School Psychology Social Work

Visual Communications

Applied Art and Computer
Graphics

College of Imaging Arts and Sciences

Art Education	Printing
Biomedical Photographic Communication	Printing and Applied Computer Science

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Photo/Media Technologies	Ceramics/Ceramic Sculpture	Printing Systems
Electronic Publishing and	Computer Graphics Design	Printing Technology
Printing Technology	Film and Video	Professional Photographic Illustration
	Fine Arts (Painting, Printmaking, Medical Illus.)	Weaving and Textile Design
	Glass	Woodworking and Furniture Design
	Graphic Design	
	Imaging and Photographic Technology	
	Imaging Arts	
	Imaging Science	
	Industrial and Interior Design	
	Metalcrafts and Jewelry	
	Newspaper Production Management	
	Photographic Processing and Finishing Management	
Pre-Baccalaureate Studies	College of Engineering	All College of Engineering programs
(Available as a bridge to students accepted by NTID and interested in enrolling in another RIT college, but baccalaureate-level program.)	College of Liberal Arts	Criminal Justice Social Work
	College of Science	All College of Science Programsnot yet ready to enter into a

Hearing aid shop

The NTIDHearing 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)

Academic counseling/support services

Many services are offered to all RIT students, but NTIDoffers deaf students additional counseling services. Career development counselors assist students in getting along better with others, adjusting to college life, gaining self-confidence, and choosing a program of study

NTID also has communication, general education, mathematics, and physics learning centers that provide specialized academic support. For more information about academic counseling services, see page 309.

Personal/psychological counseling

NTID's psychological services department is part of a continuum of personal and social counseling services at RIT. Mental health emergency services and crisis intervention are provided by psychological services faculty on a 24-hour basis in collaboration with other campus service providers.

Psychological services faculty 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, personal identity, and adjustment to deafness

Psychological services also provides consultations with and outside the RIT community and shares 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.' Most 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 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 advisor experienced in employment assistance in the different academic concentrations. To help prepare students for obtaining cooperative work experiences and permanent employment, NCE has developed a required course

The 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, 94 percent of graduates entering the labor force found jobs. Seventy-four percent of these graduates are employed in business and industry, 11 percent in government, and 15 percent in education.

Research

NTID faculty members conduct research to understand and help improve the education as well as communication and social skills of deaf students on campus and elsewhere. Students are invited to help in research efforts; this can mean taking tests and being part of research studies and 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.

APPLIED SCIENCE/ALLIED HEALTH CAREERS

Frederic R. Hamil, 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 Medical Laboratory Technology or Ophthalmic Optical Finishing Technology.

MEDICAL LABORATORY TECHNOLOGY*

Beverly J. Price, MT(ASCP), Education Coordinator

This AAS degree program prepares students for careers as medical laboratory technicians

AAS Degree Program

On-the-job responsibilities

Perform routine medical laboratory procedures in hematology, urinalysis, microbiology, histology, clinical chemistry, bloodbanking, serology, and parasitology

Clinical experience

The program includes a 12-week clinical co-op experience during the summer quarter between the first and second years of the program and another affiliated experience during the winter and spring quarters of the second year. Students are responsible for their own transportation to clinical experience sites.

To participate in the required clinical experience sessions, students are required to take a physical examination. This may be performed by a family physician or RIT's Student Health Center, where examinations can be performed for a small fee

Places of employment

Clinical laboratories of hospitals, private clinics, physicians' offices, industrial clinical laboratories, municipal laboratories, and research clinical laboratories

Positions for which graduates qualify

Medical laboratory technician, clinical chemistry assistant, microbiology assistant, and hematology assistant

Approximate time

Ten quarters, including pre-technical program and one cooperative clinical experience
Seven quarters, including one cooperative clinical experience, but without pre-technical program

- * This program has been recommended for discontinuance by the college's strategic plan. If program discontinuance is approved by Institute governing bodies, the technical courses of this program will be discontinued at the end of the 1994/95 academic year.

Medical Laboratory Technology, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Anatomy/Physiology and Disease I, II 0816-101, 102	8
Basic Histology 0816-111	6
Urinalysis 0816-121	2
Hematology, Advanced Hematology 0816-122, 123	9
Microbiology I 0816-131	5
Immunology 0816-132	3
Blood Bank Procedures 0816-133	3
Pre Co-op Seminar 0816-200	1
Mathematics 0817-170 MLT	3
Job Search Process 0847-101	1
Communication	2
English	4
English or Liberal Arts	8
Cooperative Education	Co-op
 <i>Second Year</i>	
Medical Parasitology 0816-105	2
Electrocardiography 0816-115 2)clinical Chemistry I, II, III 0816-201, 202, 203	16
Laboratory Simulation 0816-224	3
Microbiology I, II 0816-232, 233	11
Contemporary Social Issues 0847-202	2
Communication	6
Liberal Arts	12
<i>Total Quarter Credit Hours</i>	109

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 certificate, diploma, 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

Pre-technical program

ROCHESTER INSTITUTE OF TECHNOLOGY

More than 90 percent of those applying for the Ophthalmic Optical Finishing Technology programs need to enroll in a pre-technical program. The program generally is three quarters long and provides course work in communication, English, mathematics, and physical education

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.

Certificate Program

On-the-job responsibilities

Follow vision care specialists' instructions as written on prescriptions, perform procedures requested by laboratory supervisors to prepare eyeglasses for use, and maintain laboratory and equipment according to industry (American National Standards Institute [ANSI]) standards

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 layout, automatic edging, hand beveling, lens heat treatment

Prerequisites

Fundamentals of College Mathematics

Introduction to Optical Finishing Technology I, II, III

Successful completion of a sampling experience in Ophthalmic Optical Finishing Technology, either through the Summer Vestibule Program or a departmental sampling program

Approximate time

Seven quarters, including pre-technical program and one cooperative work experience

Four quarters, including one cooperative work experience, but without pre-technical program

Ophthalmic Optical Finishing Technology, certificate, typical course sequence

<i>Pre-Technical Requirements</i>	<i>Quarter Credit Hours</i>
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Basic Mathematics 0817-120	3
Fundamentals of College Mathematics I, II 0817-140, 141	6
Introduction to OFT I, II, III 0827-105, 106, 107	6
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6
English	12
General Education	2
Physical Education	0

First Year

OFT Mathematics I, II 0827-111, 112	6
Prescription Analysis 0827-115, 116	6
Optical Finishing Techniques I, II, III 0827-121, 122, 123	16
Optical Finishing Terminology I, II, III 0827-161, 162, 163	9
Independent Study Surfacing 0827-399	2
Job Search Process 0847-101	1
Contemporary Life Issues 0847-102	1
Communication	4
English	8
Cooperative Education	Co-op
<i>Total Quarter Credit Hours</i>	91

Diploma Program

On-the-job responsibilities

ROCHESTER INSTITUTE OF TECHNOLOGY

Follow vision care specialists' instructions as written on prescriptions, perform procedures requested by laboratory supervisors to prepare eyeglasses for use, and maintain laboratory and equipment according to industry (ANSI) standards

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

Fundamentals of College Mathematics I, II
Introduction to Optical Finishing Technology, I, II, III

Successful completion of a sampling experience in Ophthalmic Optical Finishing Technology, either through the Summer Vestibule Program or a departmental sampling program

Approximate time

Ten quarters, including pre-technical program and one cooperative work experience
Seven quarters, including one cooperative work experience, but without pre-technical program

Ophthalmic Optical Finishing Technology, diploma, typical course sequence

<i>Pre-Technical Requirements</i>	<i>Quarter Credit Hours</i>
Basic Mathematics 0817-120	3
Fundamentals of College Mathematics I, II 0817-140, 141	6
Introduction to OFT I, II, III 0827-105, 106, 107	6
Freshman Seminar 0847-100	2
Communication	6
English	12
General Education	4
Physical Education	0
<i>First Year</i>	
OFT Mathematics I, II 0827-111, 112	6
Prescription Analysis I, II 0827-115, 116	6
Lens Design 0827-117	3
Optical Finishing Techniques I, II, III 0827-121, 122, 123	16
Optical Finishing Terminology I, II, III 0827-161, 162, 163	9
Independent Study Surfacing 0827-399	2
Job Search Process 0847-101	1
Communication	2
English	4
Cooperative Education	Co-op
<i>Second Year</i>	
Optical Finishing Techniques IV 0827-224	5
Lab Simulation I, II 0827-225, 226	10
Management of Optical Stockroom Procedures 0827-241	4
Optical Finishing Inspection/Correction 0827-243	3
Optical Finishing Technology Seminar 0827-251	2
Optical Finishing Technology Physics 0818-168	3
Contemporary Life Issues 0847-102	2
Communication	4
English	4
General Education	2
<i>Total Quarter Credit Hours</i>	127

AOS Degree Program

On-the-job responsibilities

Follow vision care specialists' instructions as written on prescriptions, perform procedures requested by laboratory supervisors to prepare eyeglasses for use, and maintain laboratory equipment according to industry (ANSI) standards

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

Fundamentals of College Mathematics I, II
Introduction to Optical Finishing Technology I, II, III

Successful completion of a sampling experience in Ophthalmic Optical Finishing Technology, either through the Summer Vestibule Program or a departmental sampling program

Completion of NTID English course requirements, California Reading Test score higher than 7.0, and Michigan Test score higher than 55

Approximate time

Ten quarters, including pre-technical program and one cooperative work experience

Seven quarters, including one cooperative work experience, but without pre-technical program

Ophthalmic Optical Finishing Technology, AOS degree, typical course sequence

Pre-Technical Requirements *Quarter Credit Hours*

Basic Mathematics 0817-120	3
Fundamentals of College Mathematics I, II 0817-140, 141	6
Introduction to OFT I, II, III 0827-105, 106, 107	6
Freshman Seminar 0847-100	2
Communication	6
English	12
General Education	4
Physical Education	0

Second Year

OFT Mathematics I, II 0827-111, 112	6
Prescription Analysis I, II 0827-115, 116	6
Lens Design 0827-117	3
Optical Finishing Techniques I, II, III 0827-121, 122, 123	16
Optical Finishing Terminology I, II, III 0827-161, 162, 163	9
Independent Study Surfacing 0827-399	2
Job Search Process 0847-101	1
Communication	2
English	8
Cooperative Education	Co-op

Third Year

Optical Finishing Techniques IV 0827-224	5
Lab Simulation I, II 0827-225, 226	10
Management of Optical Stockroom Procedures 0827-241	4
Optical Finishing Inspection/Correction 0827-243	3
Optical Finishing Technology Seminar 0827-251	2
Optical Finishing Technology Physics 0818-168	3
Contemporary Life Issues 0847-102	2

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Human Experience I, II, III 0847-166, 167, 168	12
Communication	4
<i>Total Quarter Credit Hours</i>	137

AAS Degree Program

On-the-job responsibilities

Follow vision care specialists' instructions as written on prescriptions, perform procedures requested by laboratory supervisors to prepare eyeglasses for use, and maintain laboratory equipment according to industry (ANSI) standards

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

Fundamentals of College Mathematics I, II

Introduction to Optical Finishing Technology I, II, III

Successful completion of a sampling experience in Ophthalmic Optical Finishing Technology, either through the Summer Vestibule Program or a departmental sampling program

Completion of NTID English course requirements, California Reading Test score higher than 7.0, and Michigan Test score higher than 55

Approximate time

Ten quarters, including pre-technical program and one cooperative work experience

Seven quarters, including one cooperative work experience, but without pre-technical program

Ophthalmic Optical Finishing Technology, AAS degree, typical course sequence

<i>Pre-Technical Requirements</i>	<i>Quarter Credit Hours</i>
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Basic Mathematics 0817-120	3
Fundamentals of College Mathematics I, II 0817-140, 141	6
Introduction to OFT I, II, III 0827-105, 106, 107	6
Freshman Seminar 0847-100	2
Communication	6
English	12
General Education	4
Physical Education	0

First Year

OFT Mathematics I, II 0827-111, 112	6
Prescription Analysis I, II 0827-115, 116	6
Lens Design 0827-117	3
Optical Finishing Techniques I, II, III 0827-121, 122, 123	16
Optical Finishing Terminology 0827-161, 162, 163	9
Individual Study Surfacing 0827-399	2
Job Search Process 0847-101	1
Communication	2
English or Liberal Arts	8
Cooperative Education	Co-op

Second Year

Optical Finishing Techniques IV 0827-224	5
Lab Simulation I, II 0827-225, 226	10
Management of Stockroom Procedures 0827-241	4

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Optical Finishing Inspection/Correction 0827-243	3
Optical Finishing Technology Seminar 0827-251	2
Optical Finishing Technology Physics 0818-168	3
Contemporary Social Issues 0847-202	2
Communication	4
Liberal Arts	12
<i>Total Quarter Credit Hours</i>	<i>137</i>

BUSINESS OCCUPATIONS

Dr. William J. Rudnicki, Chairperson

Employment opportunities in business and industry increase daily. Business Occupations programs respond to industry's need for people skilled in operating office equipment, keeping financial records, performing clerical duties, and using computers

Students may choose a certificate program in Business Occupations and an AOS program in Business Technology as well as diploma and AAS degree programs in Applied Accounting and Office Technologies.

Pre-technical program

None

Applied Accounting

This program offers a diploma and an AAS degree and provides graduates with a basic knowledge of office technologies and 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

Prerequisite

Successful completion of certificate in Business Occupations

Approximate time

Seven quarters, including one cooperative work experience

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

Prerequisite

Successful completion of diploma in Applied Accounting

Approximate time

Eleven quarters, including two cooperative work experiences

Applied Accounting, diploma, typical course sequence

<i>First year</i>	<i>Quarter Credit Hours</i>
General Accounting I, II 0801-201, 202	6
Orientation to Business 0804-101	3

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Business English 0804-110	3
Keyboarding 0804-111	6
OASFormatting 0804-112	6
OAS Document Production I 0804-113	6
Records Management/Business Calculations 0804-211	6
Payroll/Spreadsheet Applications 0804-212	6
Basic Mathematics 0817-120	3
Fundamentals of College Mathematics I, II 0817-140, 141	6
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	4
English	12
Physical Education	0
Cooperative Education	Co-op

Second Year

Applied Accounting I, II 0801-251, 252	8
Data Processing for Business Occupations 0802-210	3
OASDocument Production II 0804-221	3
Fundamentals of Management 0804-284	3
Fundamentals of Marketing 0804-286	3
Contemporary Life Issues 0847-102	2
Law and Society 0847-147	2
Communication	8
English	8
English Elective	4
General Education (optional)	2 (2)
Physical Education	0
<i>Total Quarter Credit Hours</i>	98-100

Applied Accounting, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
General Accounting I, II 0801-201, 202	6
Orientation to Business 0804-101	3
Business English 0804-110	3
Keyboarding 0804-111	6
OASFormatting 0804-112	6
OAS Document Production I 0804-113	6
Records Management/Business Calculations 0804-211	6
Payroll/Spreadsheet Applications 0804-212	6
Basic Mathematics 0817-120	3
Fundamentals of College Mathematics I, II 0817-140, 141	6
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6
English	12
Physical Education	0
Cooperative Education	Co-op

Second Year

Applied Accounting I, II, III 0801-251, 252, 253	12
Data Processing for Business Occupations 0802-210	3
OASDocument Production II 0804-221	3
Fundamentals of Management 0804-284	3
Fundamentals of Marketing 0804-286	3
Fundamentals of College Mathematics III 0817-142	3
Communication	6
English	8
Liberal Arts	4
Physical Education	0

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Third year

Economics I, II 0801-231, 232	6
Applied Accounting IV 0801-254	4
Applied Accounting Techniques 0801-260	2
Law and Society 0847-147	2
Contemporary Social Issues 0847-202	2
General Education Elective	4
Liberal Arts	16
Cooperative Education	Co-op
<i>Total Quarter Credit Hours</i>	135

Business Occupations

Certificate Program

This certificate program combines basic business office skills with an introduction to data-entry concepts.

Places of employment

Business, industry, government, and schools

On-the-job responsibilities

Type business communications, operate electronic calculators, maintain files, keep basic payroll records, enter and retrieve data on computer terminals, and use electronic mail and basic word processing skills on a personal computer.

Positions for which graduates qualify

General office clerk, records management clerk, data-entry clerk, and payroll records clerk

Approximate time

Six quarters, including one cooperative work experience

Business Occupations, certificate, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Orientation to Business 0804-101	3
Business English 0804-110	3
Keyboarding 0804-111	6
OASFormatting 0804-112	6
OAS Document Production I 0804-113	6
Records Management/Business Calculations 0804-211	6
Payroll/Spreadsheet Applications 0804-212	6
Basic Mathematics 0817-120	3
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6
English	12
General Education Elective	2
Physical Education	0
Cooperative Education	Co-op
<i>Second Year</i>	
OASDocument Production II 0804-221	3
Applied Business Techniques 0804-291	3
Contemporary Life Issues 0847-102	2
Law and Society 0847-147	2
Communication	4
English	8
General Education	2
Business Elective	3
<i>Total Quarter Credit Hours</i>	71

Business Technology

AOS Degree Program

This AOS degree program includes technical course work in accounting, computers, payroll, general office skills, and word processing/information processing skills

This is a non-transfer 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; and 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

Prerequisite

Appropriate English language ability as defined by AOS guidelines

Approximate time

Eight quarters, including two cooperative work experiences

Business Technology, AOS degree, typical course sequence

<i>First year</i>	<i>Quarter Credit Hours</i>
General Accounting I, II 0801-201, 202	6
Orientation to Business 0804-101	3
Business English 0804-110	3
Keyboarding 0804-111	6
OASFormatting 0804-112	6
OAS Document Production I 0804-113	6
Records Management/Business Calculations 0804-211	6
Payroll/Spreadsheet Applications 0804-212	6
Basic Mathematics 0817-120	3
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6
English	12
Physical Education	0
Cooperative Education	Co-op
<i>Second Year</i>	
Applied Accounting I, II, III 0801-251, 252, 253	12
OASDocument Production II 0804-221	3
Fundamentals of Management 0804-284	3
Fundamentals of Marketing 0804-286	3
Word Processing I, II 0804-301, 302	8
Clear Thinking & Writing 0862-144	6
Professional/Practical Writing 0862-189	3
Fundamentals of College Mathematics I, II 0817-140, 141	6
Human Experience I 0847-166	4
Communication	2
English	4
Physical Education	0
Cooperative Education	Co-op
<i>Third Year</i>	
Applied Accounting Techniques 0801-260	2
Data Processing for Business Occupations 0802-210	3
Applied Business Techniques 0804-291	2

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Contemporary Life Issues 0847-102	2
Law & Society 0847-147	2
The Human Experience II, III 0847-167, 168	8
Communication	4
General Education Elective	2
<i>Total Quarter Credit Hours</i>	127

Office Technologies

This 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

Prerequisite

Successful completion of certificate in Business Occupations

Approximate time

Seven quarters, including one cooperative work experience

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

Prerequisite

Successful completion of diploma in Office Technologies

Approximate time

Eleven quarters, including two cooperative work experiences

Office Technologies, diploma, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Orientation to Business 0804-101	3
Business English 0804-110	3
Keyboarding 0804-111	6
OAS Formatting 0804-112	6
OAS Document Production I 0804-113	6
Records Management/Business Calculations 0804-211	6
Payroll/Spreadsheet Applications 0804-212	6
Basic Mathematics 0817-120	3
Fundamentals of College Mathematics I 0817-140	3
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	4
English	12
Physical Education	0
Cooperative Education	Co-op

Second Year

General Accounting I, II 0801-201, 202	6
Data Processing for Business Occupations 0802-210	3
OAS Document Production II 0804-221	3
Office Technologies Seminar 0804-230	2
Fundamentals of Management 0804-284	3
Applied Business Techniques 0804-291	3
Word Processing I 0804-301	4
Fundamentals of Marketing 0804-286	3
OR	
Law and Society 0847-147	(2)
Contemporary Life Issues 0847-102	2
Communication	6
English	8
General Education (optional)	(2)
Physical Education	0
<i>Total Quarter Credit Hours</i>	86-90

Office Technologies, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Orientation to Business 0804-101	3
Business English 0804-110	3
Keyboarding 0804-111	6
OAS Formatting 0804-112	6
OAS Document Production I 0804-113	6
Records Management/Business Calculations 0804-211	6
Payroll/Spreadsheet Applications 0804-212	6
Basic Mathematics 0817-120	3
Fundamentals of College Mathematics I 0817-140	3
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	4
English	12
Physical Education	0
Cooperative Education	Co-op

Second Year

General Accounting I, II 0801-201, 202	6
Data Processing for Business Occupations 0802-210	3
OAS Document Production II 0804-221	3
Office Technologies Seminar 0804-230	2
Fundamentals of Management 0804-284	3
Word Processing I, II 0804-301, 302	8
Communication	6
English	8
Liberal Arts	4
Physical Education	0
Cooperative Education	Co-op

Third Year

Fundamentals of Marketing 0804-286	3
Applied Business Techniques 0804-291	2
Word Processing III, IV 0804-303, 304	8
Desktop Publishing Concepts and Applications 0804-310	3
Contemporary Social Issues 0847-202	2
Law and Society 0847-147	2
General Education	4
Liberal Arts	16
<i>Total Quarter Credit Hours</i>	126

Computer Careers

Careers that involve work with computers increase daily. Computers are an important part of business, industry, and other parts of the economy. Computer careers involve operating computers, writing programs that direct computers to solve problems, and networking computers so that they can communicate with one another.

Students may choose from certificate, diploma or AAS degree programs in Applied Computer Technology.

APPLIED COMPUTER TECHNOLOGY

Dr. Bruce Peterson, Chairperson

On-the-job responsibilities

Certificate and diploma: Work in either the computer operations area controlling computers, in a variety of operations-related support areas, or in hardware and networking

AAS degree: Operate mainframe computer systems or remote computers or program at the entry level. Major concentration is possible in either large mainframe computer operations or networking personal computers.

Places of employment

Banks, insurance companies, large stores, manufacturing companies, public utilities, government agencies, and other data processing centers

Prerequisite

Grade of C or better in all required technical courses

Certificate Program

Positions for which graduates qualify

Computer operations support positions such as data control, librarian, or 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

Students with Michigan Test scores lower than 55 or with low mathematics skills may have difficulty in this program.

Approximate time

Five quarters, including one cooperative work experience

Diploma Program

Positions for which graduates qualify

Computer operator trainee 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

Students with Michigan Test scores lower than 55 or with low mathematics skills may have difficulty in this program.

Approximate time

Seven quarters, including one cooperative work experience

Applied Computer Technology, certificate, typical course sequence

<i>First Year</i>	<i>Quarter</i>	<i>Credit Hours</i>
Beginning Computer Operations 0802-157		2
Beginning Computer Operations Lab 0802-158		1

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Utilities/JCL for Computers 0802-170	2
Utilities/JCL Lab 0802-172	1
Applications Software 0802-213	3
Computer Hardware I 0802-220	3
Multiprogramming/Spooling for Operations 0802-250	2
Multiprogramming/Spooling Lab 0802-251	1
Orientation to Business 0804-101	3
Fundamentals of College Mathematics I, II, III 0817-140, 141, 142	9
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	4
English	12
Physical Education	0
Cooperative Education	Co-op

Second Year

Introduction to Business Programming 0802-101	4
Software & Operating Systems I 0802-222	3
Contemporary Life Issues 0847-102	2
Business Elective	3
Communication	2
English	4
Physical Education	0
<i>Total Quarter Credit Hours</i>	64

Applied Computer Technology, diploma, typical course sequence

First Year *Quarter Credit Hours*

Beginning Computer Operations 0802-157	2
Beginning Computer Operations Lab 0802-158	1
Utilities/JCL for Computers 0802-170	2
Utilities/JCL Lab 0802-172	1
Applications Software 0802-213	3
Computer Hardware I 0802-220	3
Multiprogramming/Spooling for Operations 0802-250	2
Multiprogramming/Spooling Lab 0802-251	1
Orientation to Business 0804-101	3
Fundamentals of College Mathematics I, II, III 0817-140, 141, 142	9
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6
English	12
Physical Education	0
Cooperative Education	Co-op

Second Year

Logic and Problem Solving 0802-100	3
Introduction to Business Programming 0802-101	4
Software and Operating Systems I 0802-222	3
Networking I 0802-224	3
System Generation 0802-260	2
System Generation Lab 0802-261	1
OR	
Computer Hardware II 0802-221	(3)
Advanced Operating Systems 0802-262	2
Advanced Operating Systems Lab 0802-263	1
OR	
Spreadsheet Software 0802-214	(3)
Integrated Mathematics I, II 0817-150, 151	6
Contemporary Life Issues 0847-102	2
Business Elective	9
Communication	4

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English	8
Physical Education	0
Cooperative Education	Co-op
<i>Total Quarter Credit Hours</i>	96

Credits shown in parentheses () are substitutes for those above without parentheses

AASDegree Program

Positions for which graduates qualify

Computer operator and entry-level business programmer trainee or network 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

Students with Michigan Test scores lower than 55 or with low mathematics skills may have difficulty meeting liberal arts requirements and third-year technical course requirements

Approximate time

Eleven quarters, including two cooperative work experiences

Applied Computer Technology, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Beginning Computer Operations 0802-157	2
Beginning Computer Operations Lab 0802-158	1
Utilities/JCL for Computers 0802-170	2
Utilities/JCL Lab 0802-172	1
Applications Software 0802-213	3
Computer Hardware I 0802-220	3
Multiprogramming/Spooling for Operations 0802-250	2
Multiprogramming/Spooling Lab 0802-251	1
Orientation to Business 0804-101	3
Fundamentals of College Mathematics I, II, III 0817-140,141,142	9
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6
English	12
Physical Education	0
Cooperative Education	Co-op

<i>Second Year</i>	
Logic and Problem Solving 0802-100	3
Introduction to Business Programming 0802-101	4
Software and Operating Systems I 0802-222	3
Networking I 0802-224	3
System Generation 0802-260	2
System Generation Lab 0802-261	1
OR	
Computer Hardware II 0802-221	(3)
Advanced Operating Systems 0802-262	2
Advanced Operating Systems Lab 0802-263	1
OR	
Spreadsheet Software 0802-214	(3)
Integrated Mathematics I, II 0817-150, 151	6
Data Processing Mathematics 0817-163	3
Business Elective	3
Communication	6
English	8
Liberal Arts	4

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Physical Education	0
Cooperative Education	Co-op
<i>Third Year</i>	
COBOL I or RPG I 0802-230 or 0802-232	3
COBOL II or RPG II 0802-231 or 0802-233	3
Contemporary Social Issues 0847-202	2
Business Elective	6
Technical Elective	6 (3*)
Liberal Arts	16
Total Quarter Credit Hours	133-136
Credits shown in parentheses () are substitutes for those above without parentheses	

* Optional

EDUCATIONAL INTERPRETING

Gary E. Mowl, Chairperson

AASDegree Program

On-the-job responsibilities

Work in educational and similar settings where deaf people can use interpreting and other support services such as tutoring and notetaking

Places of employment

Elementary, secondary, and postsecondary educational institutions; community service organizations; vocational rehabilitation agencies; business/industry; and government agencies

Special entrance requirements

High school diploma or equivalent and intermediate sign language competence

A pre-AAS program may be required of students depending on skill level in sign language at application. Pre-AAS courses include Introduction to Sign Language, Sign Language I and II, and Introduction to the Deaf Community. The Pre-AAS program is offered in the summer for six weeks before the fall quarter of entrance.

This is a two-year program for a typical entering freshman who has basic sign language competency.

Approximate time

Six quarters, may be taken over a three-year period

Educational Interpreting, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
American Sign Language (ASL) I, II 0870-110, 120	6
Aspects and Issues of Deafness I, II 0870-112, 122	6
Intercultural Communication 0870-114	3
Processing Skills 0870-123	3
Introduction to Interpreting 0870-124	3
Fingerspelling and Numbers 0870-131	3
Interpreting I 0870-133	3
Practical and Ethical Applications 0870-134	3
Voice Interpreting I 0870-135	3
English Composition	4
Liberal Arts: Literature	4
Mathematics	4
Science	4
Physical Education	0

Second Year

Principles and Practices of Tutoring and Notetaking 0870-127	3
Professional Interpreter 0870-214	3

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Voice Interpreting II, III 0870-215, 225	6
Transliteration I, II 0870-216, 226	6
Oral Transliteration 0870-217	3
Mainstreaming: Programs and Alternatives 0870-222	3
Support Service Professional 0870-232	3
Practicum I, II 0870-311, 321	10
Seminar I, II 0870-313, 323	2
Liberal Arts: Humanities	4
Liberal Arts: Social Science	8
<i>Total Quarter Credit Hours</i>	100

Engineering Technologies Careers

Students selecting Engineering Technologies careers may choose one of three areas.

Construction Technologies careers involve participating in the design and construction of buildings, roads, and bridges. **Electromechanical Technology** careers involve working with engineers and researchers to provide technical support for the design, installation, and maintenance of machines using electrical, electronic, and mechanical devices. **Industrial Technologies** careers involve working with systems and special equipment used in industry throughout the country.

Students may choose programs in:

Construction Technologies

Architectural Drafting (Diploma)
Architectural Technology (AAS)
Civil Technology (AAS)

Electromechanical Technology (AAS)

Industrial Technologies

Industrial Drafting (Diploma)
Industrial Drafting Technology (AOS, AAS)
Manufacturing Processes Technology (Diploma)

Accreditation

The AAS programs in Architectural Technology, Civil Technology, Electromechanical Technology, and Industrial Drafting Technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc

C.O.R.E. year experience

Most students are required to enroll in the C.O.R.E. (Career Orientation and Exploration) year sequence. This lasts three quarters and includes an in-depth sampling of program offerings within Engineering Technologies (Architectural Technology, Civil Technology, Electromechanical Technology, Industrial Drafting Technology, and Manufacturing Processes Technology) as well as course work in communication, English, general education, and mathematics

C.O.R.E. year experience, typical course sequence

	<i>Quarter Credit Hours</i>
Fundamentals of College Mathematics I, II, III 0817-140,141,142	9
Freshman Seminar 0847-100	2
Career Exploration*	3
Communication	6
Core Elective†	4
English*	12
General Education§	6
Total Quarter Credit Hours	42

* Students choose at least three of the following career exploration courses: NETA-100 (Architectural Technology), NETC-100 (Civil Technology), NETI-100 (Industrial Drafting Technology), NETM-100 (Electromechanical Technology), NETT-100 (Manufacturing Processes). Students must sample a program to be admitted to it

Students are strongly encouraged to complete one core elective both winter and spring quarters. They may select these from the following courses: Introduction to Computer-Assisted Drafting (CAD), Basic Tool Skills, Basic Graphic Skills, Basic Science Skills, and Basic Computer Skills.

* Students may be required to register for more than one English course per quarter depending on their entry-level skills.

§ Students are encouraged to start Physics after completing Fundamentals of College Mathematics III. Students may register for Technical Physics I instead of General Education

CONSTRUCTION TECHNOLOGIES

James D. Jensen, Chairperson

Construction Technologies programs teach students the skills related to the design and construction of architectural (buildings) and civil (roads, bridges, etc.) projects. Students may choose a diploma program in Architectural Drafting or an AAS degree program in Architectural or Civil Technology.

Architectural Drafting

Diploma Program

On-the-job responsibilities

Draw detailed plans of buildings and other structures working from architects' and designers' notes and sketches; operate a computer-aided drafting (CAD) system; do lettering; make models; and know construction methods and materials

Places of employment

Architectural and engineering firms, building materials suppliers, construction companies, and government agencies

Position for which graduates qualify

Architectural drafter, CAD operator

Prerequisites

Fundamentals of College Mathematics II

English level: Marginally qualified

Approximate time

Nine quarters, including C.O.R.E. year experience

Six quarters without C.O.R.E. year experience

Architectural Drafting, diploma, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Construction Terminology 0808-110	4
Construction Drafting I, II, III 0808-111, 112, 113	6
Construction Methods I, II 0808-201, 202	6
Fundamentals of College Mathematics III 0817-142	3
Integrated College Mathematics I, II 0817-150, 151	8
Physics I 0818-201	4
Advanced Topics in Mechanics 0818-203	4
Freshman Seminar 0847-100	2
Communication	6
English	8
Physical Education	0
<i>Second Year</i>	
Architectural Materials I, II 0808-211, 212	6
Principles of Structural Systems 0808-220	4
Architectural Design Drafting I, II, III 0808-221, 222, 223	12
Construction Computations 0808-224	2

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Architectural History 0808-375	2
Building Estimating 0808-376	2
Building Equipment 0808-377	3
Architectural Technology Seminar 0808-390	2
Mapping I 0809-241	2
Physics II 0818-202	4
Job Search Process 0847-101	1
Contemporary Life Issues 0847-102	2
General Education	2
Total Quarter Credit Hours	95

Students who enter this program without the C.O.R.E. year experience will need to take additional English and communication courses

Architectural Technology

AASDegree Program

On-the-job responsibilities

Work with architects and engineers to plan construction and remodeling of buildings and other structures using CAD systems, preliminary drawings, design development drawings, working drawings, presentation graphics, model making, cost estimating, structural planning, and knowledge of construction methods and materials

Places of employment

Architectural, engineering, and construction companies; government agencies; and corporate design offices

Positions for which graduates qualify

Architectural drafter, architectural technician, CAD operator, construction engineering drafter, and planning aide

Prerequisites

Fundamentals of College Mathematics III
English level: Marginally qualified

Approximate time

Thirteen quarters, including C.O.R.E. year experience and one cooperative work experience

Ten quarters, including one cooperative work experience, but without C.O.R.E. year experience

Architectural Technology, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Construction Terminology 0808-110	4
Construction Drafting I, II, III 0808-111, 112, 113	6
Construction Methods I, II 0808-201, 202	6
Integrated College Mathematics I, II, III 0817-150, 151, 152	12
Physics I 0818-201	4
Advanced Topics in Mechanics 0818-203	4
Freshman Seminar 0847-100	2
Communication	6
English	8
Physical Education	0
 <i>Second Year</i>	
Architectural Materials I, II 0808-211, 212	6
Principles of Structural Systems 0808-220	4
Architectural Design Drafting I, II, III 0808-221, 222, 223	12
Architectural Technology Seminar 0808-390	3
Mapping I 0809-241	2
Advanced Mathematics I, II 0817-210, 211	6

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Physics II 0818-202	4
Job Search Process 0847-101	1
Liberal Arts	8
Cooperative Education	Co-op

Third Year

Planning Project 0808-340	5
Architectural Project I, II 0808-351, 352	10
Architectural History 0808-375	2
Building Estimating 0808-376	2
Building Equipment 0808-377	3
Statics 0809-250	4
Strength of Materials 0809-260	4
Contemporary Social Issues 0847-202	2
Liberal Arts	12
Technical Elective	1-3
Total Quarter Credit Hours	139-140

Students who enter this program without the C.O.R.E. year experience will need to take additional English and communication courses

Civil Technology

AAS Degree Program

On-the-job responsibilities

Use a variety of skills such as drafting, CAD operation, surveying, materials testing and measuring, construction, inspection, report writing, and knowledge of construction materials and methods

Places of employment

Government agencies; construction companies; engineering, surveying, and architectural firms; oil and steel industries; transportation agencies; and materials testing laboratories

Positions for which graduates qualify

Design assistant, materials laboratory technician, construction inspector, civil drafter, assistant surveyor, CAD operator, and structural drafter

Prerequisites

Fundamentals of College Mathematics III

English level: Marginally qualified

Approximate time

Thirteen quarters, including C.O.R.E. year experience and one cooperative work experience

Ten quarters, including one cooperative work experience, but without C.O.R.E. year experience

Civil Technology, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Construction Terminology 0808-110	4
Construction Drafting I, II, III 0808-111, 112, 113	6
Construction Methods I, II 0808-201, 202	6
Integrated College Mathematics I, II, III 0817-150, 151, 152	12
Physics I 0818-201	4
Advanced Topics in Mechanics 0818-203	4
Freshman Seminar 0847-100	2
Communication	6
English	8
Physical Education	0

Second Year

Surveying and Mapping 0809-211	6
Statics 0809-250	4

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Strength of Materials 0809-260	4
Soil Mechanics 0809-283	4
Engineering Materials 0809-284	4
Civil Technology Seminar 0809-285	2
Programming for Civil Technicians 0809-290	3
Construction Seminar 0809-390	2
Advanced Mathematics I, II 0818-210, 211	6
Physics II 0818-202	4
Job Search Process 0847-101	1
Liberal Arts	8
Cooperative Education	Co-op

Third Year

Surveying Projects 0809-311	3
Mapping and Site Design 0809-312	2
Structural Design Drafting I, II, III 0809-321, 322, 323	12
Fundamentals of Fluid Mechanics 0809-340	4
Highway Design and Construction 0809-350	4
Principles of Environmental Technology 0809-385	4
Contemporary Social Issues 0847-202	2
Liberal Arts	12
Technical Elective	1-3
<i>Total Quarter Credit Hours</i>	138-140

Students who enter this program without the C.O.R.E. year experience will need to take additional English and communication courses.

ELECTROMECHANICAL TECHNOLOGY

Robert A. Moore, Chairperson

A variety of career options are offered through the Electromechanical Technology Program. Graduates of this program work with systems and equipment used in many different industries throughout the country.

AAS Degree Program

On-the-job responsibilities

Construct and maintain equipment; apply knowledge of mechanical, electronic, and computer principles; service test equipment; and test complex electromechanical equipment

Places of employment

Engineering and manufacturing industries, government agencies, and military laboratories

Positions for which graduates qualify

Research aide, engineering technician, quality control technician, service technician, engineering aide, automated equipment technician, and field service representative

Prerequisites

Fundamentals of College Mathematics III

English level: Marginally qualified

Approximate time

Ten quarters, including cooperative work experience and assuming above prerequisites are satisfied at time of admission

Electromechanical Technology, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Basic Drafting I 0811-101	2
Computer Techniques 0811-210	4
Mechanical Components 0811-211	4
DC Circuits 0811-213	5

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Tool Skills 0811-241	2
Integrated College Mathematics I, II, III 0817-150, 151, 152	12
Physics I, II 0818-201, 202	8
Freshman Seminar 0847-100	2
Communication	4
English	8

Second Year

Digital Systems 0811-171	4
AC Circuits 0811-304	5
Kinematics 0811-317	4
Fluid Power 0811-321	4
Electrical Power Systems 0811-322	4
Electronics I, II 0811-368, 369	9
Advanced Mathematics I, II 0817-210, 211	6
Concepts of Calculus 0817-212	3
Job Search Process 0847-101	1
Communication	2
Liberal Arts	8
Physical Education	0
Cooperative Education	Co-op

Third Year

Technical Graphics 0811-209	2
Optical Systems 0811-234	4
Transducers 0811-324	4
Control Systems 0811-325	4
Microprocessor Control Systems I, II 0811-327, 328	4
Electronics III 0811-370	4
Contemporary Social Issues 0847-202	2
Liberal Arts	12
Technical Elective	8
<i>Total Quarter Credit Hours</i>	145

Students who enter this program without the C.O.R.E. year experience will need to take additional English and communication courses.

INDUSTRIAL TECHNOLOGIES

Robert A. Moore, Chairperson

Industrial Drafting

Diploma Program

On-the-job responsibilities

From sketches, drawings, and specifications prepared by others, prepare detailed production drawings (manually and using computer-aided drafting equipment) for manufactured products

Places of employment

Manufacturing industries, engineering firms, metal-working industries, drafting shops, government agencies, and engineering research firms

Positions for which graduates qualify

Mechanical, electrical, and electromechanical drafter; detailer; and CAD operator

Prerequisites

Fundamentals of College Mathematics III

English level: Marginally qualified

Approximate time

Ten quarters, including C.O.R.E. year experience and one cooperative work experience

Seven quarters, including one cooperative work experience, but without C.O.R.E. year experience

Industrial Drafting, diploma, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Manufacturing Processes I, II 0810-131, 132	2
Basic Technical Drafting I, II, III 0810-141, 142, 143	9
Integrated College Mathematics I, II, III 0817-150, 151, 152	12
Physics I, II 0818-201, 202	8
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6
English	12
Physical Education	0
Cooperative Education	Co-op
 <i>Second Year</i>	
Materials and Processes I, II 0810-151, 152	6
General Tolerancing I 0810-230	2
Geometric Tolerancing I, II 0810-231, 232	4
Technical Mechanical Drafting I, II, III 0810-241, 242, 243	9
Technical Electrical Drafting I, II, III 0810-251, 252, 253	9
Contemporary Life Issues 0847-102	2
Communication	4
English	4
Physical Education	0
<i>Total Quarter Credit Hours</i>	92

Industrial Drafting Technology

AOS Degree Program

On-the-job responsibilities

Handle normal drafting assignments using drafting standards and engineering terms; gather data and information for engineers; draw layouts of design concepts for new machines, products, and for drafters' use in drawing parts; and use computer-aided drafting equipment

Places of employment

Manufacturing industries, engineering firms, drafting shops, government agencies, metal-working industries, and engineering research firms

Positions for which graduates qualify

Mechanical, electrical, and electromechanical drafter; mechanical designer; CAD operator; and electromechanical designer

Prerequisites

Fundamentals of College Mathematics III
English level: Marginally qualified

Approximate time

Fourteen quarters, including C.O.R.E. year experience and two cooperative work experiences
Eleven quarters, including two cooperative work experiences, but without C.O.R.E. year experience

Industrial Drafting Technology, AOS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Manufacturing Processes I, II 0810-131, 132	2
Basic Technical Drafting I, II, III 0810-141, 142, 143	9
Integrated College Mathematics I, II, III 0817-150, 151, 152	12
Physics I, II 0818-201, 202	8
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6

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English	12
Physical Education	0
Cooperative Education	Co-op

Second Year

Materials and Processes I, II 0810-151, 152	6
General Tolerancing 0810-230	2
Geometric Tolerancing I, II 0810-231, 232	4
Technical Mechanical Drafting I, II, III 0810-241, 242, 243	9
Technical Electrical Drafting, I, II, III 0810-251, 252, 253	9
Advanced Mathematics I, II 0817-210, 211	6
Concepts of Calculus 0817-212	3
Communication	6
English	4
Cooperative Education	Co-op

Third Year

Technical Drafting IV, V, VI 0810-204, 205, 206	11
Statics 0810-213	5
Strength of Materials 0810-214	5
Mechanisms 0810-215	4
Machine Design I, II 0810-221, 222	8
Contemporary Life Issues 0847-102	2
Human Experience I, II, III 0847-166, 167, 168	12
Technical Elective (with department approval)	3
<i>Total Quarter Credit Hours</i>	151

Industrial Drafting Technology

AAS Degree Program

An AAS degree prepares students for the same responsibilities as an AOS degree except that the required liberal arts courses prepare students to continue toward a bachelors degree if they so desire.

On-the-job responsibilities

Handle normal drafting assignments using drafting standards and engineering terms; gather data and information for engineers; draw layouts of design concepts for new machines, products, and for drafters' use in drawing parts; and use computer-aided drafting equipment

Places of employment

Manufacturing industries, engineering firms, metal-working industries, drafting shops, government agencies, and engineering research firms

Positions for which graduates qualify

Mechanical, electrical, and electromechanical drafter; mechanical or electromechanical designer; CAD operator

Prerequisites

Fundamentals of College Mathematics III
English level: Marginally qualified

Approximate time

Fourteen quarters, including C.O.R.E. year experience and two cooperative work experiences
Eleven quarters, including two cooperative work experiences, but without C.O.R.E. year experience

Industrial Drafting Technology, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Manufacturing Processes I, II 0810-131, 132	2
Basic Technical Drafting I, II, III 0810-141, 142, 143	9
Integrated College Mathematics I, II, III 0817-150, 151, 152	12

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Physics I, II 0818-201, 202	8
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6
English	12
Physical Education	0
Cooperative Education	Co-op

Second Year

Materials and Processes I, II 0810-151, 152	6
General Tolerancing 0810-230	2
Geometric Tolerancing I, II 0810-231, 232	4
Technical Mechanical Drafting I, II, III 0810-241, 242, 243	9
Technical Electrical Drafting I, II, III 0810-251, 252, 253	9
Advanced Mathematics I, II 0817-210, 211	6
Concepts of Calculus 0817-212	3
Communication	2
English	4
Liberal Arts	8
Cooperative Education	Co-op

Third Year

Technical Drafting IV, V, VI 0810-204, 205, 206	11
Statics 0810-213	5
Strength of Materials 0810-214	5
Mechanisms 0810-215	4
Machine Design I, II 0810-221, 222	8
Contemporary Social Issues 0847-202	2
Liberal Arts	12
Technical Elective (with departmental approval)	3
<i>Total Quarter Credit Hours</i>	155

MANUFACTURING PROCESSES TECHNOLOGY

Frederic R. Hamil, Acting Chairperson

Diploma Program

On-the-job responsibilities

Set up and operate such machine tools as lathes, drill presses, 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; demonstrate required English skills (Michigan Test score higher than 50, and California Reading Test score higher than 7.0); and be prepared for Fundamentals of College Mathematics I

Approximate time

Six quarters, including one cooperative work experience, but without the C.O.R.E. year experience

Ten quarters, including C.O.R.E. year experience and two cooperative work experiences

Manufacturing Processes Technology, diploma, typical course sequence

First Year

Quarter Credit Hours

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Manufacturing Processes I, II, III 0813-131, 132, 133	12
Blueprint Reading I, II 0813-139, 140	4
Precision Measurement 0813-154	2
Fundamentals of College Mathematics I, II, III 0817-140, 141, 142	9
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6
English	12
Physical Education	0
Cooperative Education	Co-op

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
Integrated College Mathematics I, II, III 0817-150, 151, 152	12
Contemporary Life Issues 0847-102	2
Communication	6
English	8
Physical Education	0
<i>Total Quarter Credit Hours</i>	100

Manufacturing Processes Technology

AOS Degree Program

On-the-job responsibilities

Set up and operate such machine tools as lathes, drill presses, 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; demonstrate required English skills (Michigan Test score higher than 50, and California Reading Test score higher than 7.0); and be prepared for Fundamentals of College Mathematics I

Approximate time

Nine quarters, including two cooperative work experiences, but without the C.O.R.E. year experience

Fourteen quarters, including C.O.R.E. year experience and two cooperative work experiences

Manufacturing Processes Technology, AOS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Manufacturing Processes I, II, III 0813-131, 132	12
Blueprint Reading I, II 0813-139, 140	4
Precision Measurement 0813-154	2
Fundamentals of College Mathematics I, II, III 0817-140, 141, 142	9
Freshman Seminar 0847-100	2
Job Search Process 0847-101	1
Communication	6

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English	12
Physical Education	0
Cooperative Education	Co-op

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
Integrated College Mathematics I, II, III 0817-150, 151, 152	12
Contemporary Life Issues 0847-102	2
Communication	6
English	8
Physical Education	0
Cooperative Education	Co-op

Third Year

Numerical Control I, II, III 0812-151, 152, 153	12
Welding I 0813-153	2
Advanced Machining and Processes 0813-237	4
Advanced Precision Measurement 0813-256	3
Senior Seminar 0813-260	1
Human Experience I, II, III 0847-166, 167, 168	12
General Education Elective	3
Technical Elective*	9
<i>Total Quarter Credit Hours</i>	146

**Technical electives with department approval; suggested areas include mathematics, physics, drafting, and Welding II.*

APPLIED ART AND COMPUTER GRAPHICS

Careers

Dr. John W. Cox, Chairperson

The art field has two major career areas: applied and fine art. Applied artists create art to be used by other individuals or companies for which they work. Fine artists create art to express themselves.

Pre-technical program

Some students who want to enter the Applied Art and Computer Graphics program require a pre-technical program that usually lasts one quarter. Students can meet pre-technical program requirements and take first-year courses at the same time

First-year program

First-year courses provide basic art experience to prepare students for entry into a program. With this experience as a basis, students may choose continued studies in either NTIDs Applied Art and Computer Graphics Department or the College of Imaging Arts and Sciences

Work experience

All NTID Applied Art and Computer Graphics students gain experience with the real world of applied art in a work setting, which is part of their third-year course work

Applied Art and Computer Graphics, diploma, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Basic Design I, II, III 0849-111, 112, 113	6
Basic Drawing I, II, III 0849-121, 122, 123	9
Career Seminar I, II, III 0849-141, 142, 143*	3
Computer Graphic Systems I, II 0849-151, 152	4
Media and Processes I, II, III 0849-161, 162, 163	6
Applied Art Elective	2

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Communication	4
English	12
Physical Education	0

Second Year

Introduction to Typography I, II, III 0849-231, 232, 233	6
Art Survey I, II, III 0849-241, 242, 243	6
Traditional/Electronic Layout I, II, III 0849-261, 262, 263	9
Production Methods I, II, III 0849-271, 272, 273	6
Computer Illustration Methods 0849-280	2
Communication	4
English	8
Physical Education	0

Third Year

Graphic Applications I, II 0849-311, 312	10
Employment Seminar I, II, III 0849-321, 322, 323 *	9
Graphic Applications/Portfolio Review 0849-330	5
Applied Art Elective	8
Communication	4
<i>Total Quarter Credit Hours</i>	<i>123</i>

**Career Seminar I, II, III and Employment Seminar I, II, III are substitutes for Freshman Seminar, Job Search Process, and Contemporary Life Issues.*

Applied Art and Computer Graphics, AAS Degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Basic Design I, II, III 0849-111, 112, 113	6
Basic Drawing I, II, III 0849-121, 122, 123	9
Career Seminar I, II, III 0849-141, 142, 143*	3
Computer Graphic Systems I, II 0849-151, 152	4
Media and Processes I, II, III 0849-161, 162, 163	6
Applied Art Elective	2
Communication	4
English	12
Physical Education	0

Second Year

Introduction to Typography I, II, III 0849-231, 232, 233	6
Art Survey I, II, III 0849-241, 242, 243	6
Traditional/Electronic Layout I, II, III 0849-261, 262, 263	9
Production Methods I, II, III 0849-271, 272, 273	6
Computer Illustration Methods 0849-280	2
Applied Art Elective	4
Communication	4
English	8
Liberal Arts	4

Third Year

Graphic Applications I, II 0849-311, 312	10
Employment Seminar I, II, III 0849-321, 322, 323*	9
Graphic Applications/Portfolio Review 0849-330	5
Applied Art Elective	4
Communication	4
Liberal Arts	16
Physical Education	0
<i>Total Quarter Credit Hours</i>	<i>143</i>

**Career Seminar I, II, III and Employment Seminar I, II, III are substitutes for Freshman Seminar, Job Search Process, and Contemporary Life Issues.*

Applied Art and Computer Graphics Diploma and AAS Degree Programs

NTID Applied Art and Computer Graphics programs prepare students for technical careers in the art field. Students may choose from diploma or AAS degree programs

Students who qualify for the AAS degree program may select a concentration in electronic publishing and imaging, which includes related technology courses from NTID's printing production technology and photo/media technologies departments

On-the-job responsibilities

Use traditional and computer-based methods to produce drawings, layouts, and mechanical art for advertising, sales promotion, public relations, and display purposes; prepare 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

Advertising agencies; art studios; computer graphics studios; newspapers; large department stores; manufacturing, printing, and publishing firms; educational institutions; and government agencies

Positions for which graduates qualify

Computer graphics artist, layout artist, mechanical artist, and production artist

Prerequisites

Successful completion of a sampling experience in art, either through the Summer Vestibule Program or the Career Exploration course offered through the department during the academic year

Students must demonstrate basic skills in the following areas: two-dimensional design, computer graphics, freehand drawing, technical media, measurement, mathematics, and program/career information. Skills are demonstrated by completing a series of projects. Students' work is assessed by faculty members who use a checklist of specific requirements provided by the department

Approximate time

Nine quarters

PHOTO/MEDIA TECHNOLOGIES CAREERS

Jean-Guy Naud, Chairperson

Numerous organizations in business, industry, education, and government that use photography, television, and computers as ways to communicate need support from custom photo lab services and media production services. Photo/ media technologies involve jobs such as developing film, making prints and display materials, assisting in video production, making special-effects slides, and preparing presentation graphics using computers

Students may choose from diploma and AOS and AAS degree programs in photo/media technologies.

Pre-technical program

The Photo/Media Technologies Department does not have a pre-technical program at this time. Instead, it offers a common core of photo/media courses in each of the three program options (diploma, AOS and AAS degrees) that provides the necessary foundation for careers in the photo/media industry.

Photo/Media Technologies

Diploma, AOS and AAS Degree Programs

Students may choose from diploma, AOS and AAS degree programs. All three program options require students to complete a common core of photo/media courses in basic photography, imaging labs, computer technology, image design, and image manipulation in addition to

presentation media. Upon completion of the required fundamental courses, students can graduate with a diploma or continue their studies toward AOS and AAS degrees. AOS and AAS students are expected to complete advanced courses in one or more technical areas such as multimedia and advanced imaging techniques. AAS students are offered the added flexibility to transfer to a BS program in Photographic Systems Management in the School of Photographic Arts and Sciences or acquire additional skills in Electronic Publishing and Imaging. Some of the required courses leading to the Electronic Publishing and Imaging option are provided by NTIDs Applied Art and Computer Graphics and Printing Production Technology departments. A 10-week cooperative work experience is required for students in the AOS and AAS degree programs

On-the-job responsibilities

Prepare layouts and mechanical art work for projection and television; set type with imagesetting equipment; operate a variety of computer peripherals; produce presentation graphics with personal computers; operate a variety of 35mm copy stands in photo lab; produce special effects slides and filmstrips from flat art or transparencies; operate 35mm photo equipment in the studio and on location; process and print black and white and color film; work in video; operate ENG and studio cameras and U-Matic and VHS videocassette recorders; produce programs; dub 1/2 inch and 3/4 inch tape; operate 3/4 inch editing equipment; operate film and paper processors; produce color print (enlargers) and color copy work (slides and negatives); make internegatives, slide duplicates, and use various display materials; monitor processing and printing using several computer-assisted systems

Places of employment

Custom or commercial photographic labs; in-house industrial photographic labs; industrial training or media departments; imaging production houses; school or university media centers

Positions for which graduates qualify

Advanced custom color printer technician; custom copy technician; custom color printer; custom color print inspector/ evaluator; film processing technician; media production technician; photographic laboratory technician; presentation graphics technician; television production technician

Prerequisite

Successful completion of an orientation/sampling experience offered during the Summer Vestibule Program and also during Winter and Spring quarters. The sampling activities provide opportunities for students to learn about the photo/ media industry, identify career opportunities, and evaluate their interest in and aptitude for the photo/media field

Approximate time

Six quarters for the diploma. Ten quarters for the AOS and AAS degrees, including one co-op work experience

Photo/Media Technologies, diploma, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar--Photo/Media I, II, III 0872-101, 102, 103	3
Computers in Visual Communication 0872-121	2
Image Sources I 0872-122	3
Image Manipulation 0872-123	3
Imaging Lab I, II, III 0872-141, 142, 143	9
Basic Imaging Design 0872-181	2
Image Design 0872-182	2
Presentation Media I 0872-183	3
Introduction to College Mathematics 0817-120	3
Communications	6
English	12
Physical Education	0
 <i>Second Year</i>	
Image Manipulation II, III 0872-224, 225	4
Imaging Lab IV, V, VI 0872-244, 245, 246	9

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Presentation Media II, III 0872-284, 286	6
Image Sources II 0847-285	3
Technical Elective	2-4
Job Search Process 0847-101	1
Contemporary Life Issues 0847-102	2
Communications	6
English	8
<i>Total Quarter Credit Hours</i>	89-91

Photo/Media Technologies, AOS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar--Photo/Media I, II, III 0872-101, 102, 103	3
Computers in Visual Communication 0872-121	2
Image Sources I 0872-122	3
Image Manipulation I 0872-123	3
Imaging Lab I, II, III 0872-141, 142, 143	9
Basic Imaging Design 0872-181	2
Image Design 0872-182	2
Presentation Media I 0872-183	3
Introduction to College Mathematics 0817-120	3
Communications	6
English	12
Physical Education	0

Second Year

Image Manipulation II, III 0872-224, 225	4
Imaging Lab IV, V, VI 0872-244, 245, 246	9
Presentation Media II, III 0872-284, 286	6
Image Sources II 0872-285	3
Technical Elective	2-4
Job Search Process 0847-101	1
Communications	6
English	8
Human Experience I 0847-166	4
Cooperative Education 0872-299	Co-op

Third Year

Display Imaging 0872-347	3
Composite Imaging 0872-348	3
Retouch/Restore 0872-349	3
Multimedia 0872-388	3
Presentation Media IV 0872-387	3
Multimedia Interactive 0872-389	3
Open Electives (3 credits from Gen Ed)	18
Contemporary Life Issues 0847-102	2
or	
Contemporary Social Issues 0847-202	2
Human Experience II, III 0847-167, 168	8
<i>Total Quarter Credit Hours</i>	137-139

Photo/Media Technologies, AAS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar--Photo/Media I, II, III 0872-101, 102, 103	3
Computers in Visual Communication 0872-121	2
Image Sources I 0872-122	3
Image Manipulation I 0872-123	3
Imaging Lab I, II, III 0872-141, 142, 143	9
Basic Imaging Design 0872-181	2
Image Design 0872-182	2
Presentation Media I 0872-183	3
Introduction to College Mathematics 0817-120	3

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Communications	6
English	12
Physical Education	0

Second Year

Image Manipulation II, III 0872-224, 225	4
Imaging Lab IV, V, VI 0872-244, 245, 246	9
Presentation Media II, III 0872-284, 286	6
Image Sources II 0847-285	3
Technical Elective	2-4
Job Search Process 0847-101	1
Communications	6
English	8
Liberal Arts	4
Cooperative Education 0872-299	Co-op

Third Year

Presentation Media IV 0872-387	3
Multimedia 0872-388	3
Multimedia Interactive 0872-389	3
or	
Display Imaging 0872-347	3
Composite Imaging 0872-348	3
Retouch/Restore 0872-349	3
Contemporary Social Issues 0847-202	2
Technical Electives	9-12
Open Electives (3 credits for Gen Ed)	9-12
Liberal Arts	16
<i>Total Quarter Credit Hours</i>	136-144

Photo/Media Technologies, AAS degree, concentration in Electronic Publishing and Imaging, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar--Photo/Media I, II, III 0872-101, 102, 103	3
Computers in Visual Communication 0872-121	2
Image Sources I 0872-122	3
Image Manipulation 0872-123	3
Imaging Lab I, II, III 0872-141, 142, 143	9
Basic Imaging Design 0872-181	2
Image Design 0872-182	2
Presentation Media I 0872-183	3
Introduction to College Mathematics 0817-120	3
Communications	6
English	12
Physical Education	0

Second Year

Image Manipulation II, III 0872-224, 225	4
Imaging Lab IV, V, VI 0872-244, 245, 246	9
Presentation Media II, III 0872-284, 286	6
Image Sources II 0847-285	3
Survey of Image Reproduction 0822-268	2
Job Search Process 0847-101	1
Communication	6
English	8
Liberal Arts	4
Cooperative Education 0872-299	Co-op

Third Year

Presentation Media IV 0872-387	3
Multimedia 0872-388	3

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Multimedia Interactive 0872-389	3
Survey of Electronic Layout 0849-268	2
Advanced Desktop Publishing 0822-215	2
Output Devices & QC 0822-220	2
Basic Design II 0849-112	2
Elec. Halftone & Ill. Produc. 0822-225	2
Color Separation Methods 0872-260	2
Advanced Computer Ill. Techniques 0849-398	2
Open Electives	4
Contemporary Social Issues 0847-202	2
Liberal Arts	16
<i>Total Quarter Credit Hours</i>	136

Photo/Media Technologies, AAS degree, concentration leading toward a BS in Photographic Systems Management (SPAS), typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar--Photo/Media I, II, III 0872-101, 102, 103	3
Computers in Visual Communication 0872-121	2
Image Sources I 0872-122	3
Image Manipulation 0872-123	3
Imaging Lab I, II, III 0872-141, 142, 143	9
Basic Imaging Design 0872-181	2
Image Design 0872-182	2
Presentation Media I 0872-183	3
Introduction to College Mathematics 0817-120	3
Communications	6
English	12
Physical Education	0

<i>Second Year</i>	
Image Manipulation II, III 0872-224, 225	4
Imaging Lab IV, V, VI 0872-244, 245, 246	9
Presentation Media II, III 0872-284, 286	6
Image Sources II 0872-285	3
Algebra for Management Science 1016-225	4
Job Search Process 0847-101	1
Communications	6
English	8
Liberal Arts	4
Cooperative Education 0872-299	Co-op

<i>Third Year</i>	
Display Imaging 0872-347	3
Composite Imaging 0872-348	3
Retouch/Restore 0872-349	3
Materials & Processes of Photography 2076-211, 212, 213	9
Financial Accounting 0101-301	4
Managerial Accounting 1010-302	4
Technical Writing I, II 2080-262, 263	4
Contemporary Social Issues 0847-202	2
Liberal Arts	16
<i>Total Quarter Credit Hours</i>	141

Note that math/science requirements may necessitate additional coursework while matriculated in SPAS.

ELECTRONIC PUBLISHING AND PRINTING TECHNOLOGY CAREERS

Kenneth F. Hoffmann, Chairperson

Printing offers a variety of challenging and rewarding career options. All people in the printing industry are part of a team and contribute to the production of magazines, books, brochures,

catalogs, packages, newspapers, greeting cards, and more. Because of the size and national impact of the printing industry--currently the fastest growing of all manufacturing industries in the country--printing graduates have excellent employment opportunities. Current and projected career opportunities include computer operator positions in electronic publishing and pre-press, craft positions in conventional pre-press, and manufacturing positions in printing press operation

Electronic Publishing and Printing Technology

Certificate, Diploma, AOS, and AAS Degree Programs

Students may choose from certificate, diploma, AOS, and AAS degree programs. All four degree options require students to complete basic courses in four areas of printing production: computer publishing, photographic and digital image capture/editing, image assembly and platemaking, and offset press and finishing. Upon completion of the required fundamental courses, diploma, AOS, and AAS students are expected to complete the advanced course sequence in at least one of the above four production areas. 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 diploma, AOS, and AAS degree programs

Students who qualify for the AAS degree may select a concentration in electronic publishing and imaging, which also includes required related-technology courses from the Applied Art and Computer Graphics and Photo/Media Technologies departments

On-the-job responsibilities

Prepare documents for reproduction using desktop publishing systems, prepare illustrations and photographic single- and full-color images for reproduction by using electronic methods, operate imagesetters, operate process cameras, make contact films and proofs, operate film processors, assemble films for platemaking, image plates, operate offset presses, operate electronic document printing and publishing systems, operate simple bindery and finishing equipment

Places of employment

Commercial printing plants; pre-press and color trade shop companies; in-plant printing departments; book and magazine printers; newspapers; local, state, and national government printing facilities

Positions for which graduates qualify

Desktop publishing technician; electronic pre-press technician; imagesetter operator; line and halftone photographer; film assembly technician; contact film, proof, and platemaking technician; electronic printing and publishing system operator; offset process operator; small bindery/finishing technician

Prerequisite

Successful completion of an orientation/sampling experience offered during the Summer Vestibule Program and also during each academic quarter; the sampling activities provide opportunities for students to learn about the printing industry, identify career opportunities, and evaluate their interest and aptitude for the printing field

Approximate time

Five quarters for the certificate. Eight quarters for the diploma, including one co-op work experience. Ten quarters for the AOS and AAS degrees, including one co-op work experience

Electronic Publishing and Printing Technology, certificate, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Keyboarding 0804-114	2
Introduction to Printing Processes 0822-101	2
Page Creation Methods 0822-110	2
Fundamentals of Reproduction Photography 0822-120	2
Film Contacting, Proofing, and Platemaking 0822-125	2
Offset Duplicator Operation I 0822-140	2
Introduction to College Mathematics 0817-120	3
Freshman Seminar 0847-100	2
Communication	8

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English	12
Physical Education	0
<i>Second Year</i>	
Fundamentals of Desktop Publishing 0822-115	2
Fundamentals of Offset Film Assembly 0822-130	2
Offset Duplicator Operation II 0822-145	2
Production Procedures and Quality Control 0822-200	2
Job Search Process 0847-101	1
Contemporary Life Issues 0847-102	2
Communication	4
English	8
Printing Elective (200-level)	2
<i>Total Quarter Credit Hours</i>	62

Electronic Publishing and Printing Technology, diploma, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Keyboarding 0804-114	2
Introduction to Printing Processes 0822-101	2
Page Creation Methods 0822-110	2
Fundamentals of Reproduction Photography 0822-120	2
Film Contacting, Proofing, and Platemaking 0822-125	2
Offset Duplicator Operation I 0822-140	2
Introduction to College Mathematics 0817-120	3
Freshman Seminar 0847-100	2
Communication	6
Elective	2
English	12
Physical Education	0

<i>Second Year</i>	
Fundamentals of Desktop Publishing 0822-115	2
Fundamentals of Offset Film Assembly 0822-130	2
Offset Duplicator Operation II 0822-145	2
Production Procedures and Quality Control 0822-200	2
Production Printing I 0822-241	2
Job Search Process 0847-101	1
Communication	6
Elective	2
English	8
Printing Elective (200-level)	10
Cooperative Education	Co-op

<i>Third Year</i>	
Production Printing II, III 0822-242	2
Employment Seminar 0822-298	2
Contemporary Life Issues 0847-102	2
Printing Elective (200-level)	6
<i>Total Quarter Credit Hours</i>	86

Electronic Publishing and Printing Technology, AOS degree, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Keyboarding 0804-114	2
Introduction to Printing Processes 0822-101	2
Page Creation Methods 0822-110	2
Fundamentals of Reproduction Photography 0822-120	2
Film Contacting, Proofing, and Platemaking 0822-125	2
Offset Duplicator Operation I 0822-140	2
Introduction to College Mathematics 0817-120	3
Freshman Seminar 0847-100	2
Communication	6

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Elective	2
English	12
Physical Education	0

Second Year

Fundamentals of Desktop Publishing 0822-115	2
Fundamentals of Offset Film Assembly 0822-130	2
Offset Duplicator Operation II 0822-145	2
Production Procedures and Quality Control 0822-200	2
Production Printing I 0822-241	2
Job Search Process 0847-101	1
Communication	6
Elective	4
English	8
Printing Elective (200-level)	8
Cooperative Education	Co-op

Third Year

Production Printing II 0822-242	2
Production Printing III 0822-243	2
Production Printing IV 0822-244	2
Employment Seminar 0822-298	2
Contemporary Life Issues 0847-102	2
Human Life Experience I, II, III 0847-166, 167, 168	12
Elective	2
Printing Elective (200-level)	12
<i>Total Quarter Credit Hours</i>	110

Electronic Publishing and Printing Technology, AAS degree, typical course sequence

First Year

Quarter Credit Hours

Keyboarding 0804-114	2
Introduction to Printing Processes 0822-101	2
Page Creation Methods 0822-110	2
Fundamentals of Reproduction Photography 0822-120	2
Film Contacting, Proofing, and Platemaking 0822-125	2
Offset Duplicator Operation I 0822-140	2
Introduction to College Mathematics 0817-120	3
Freshman Seminar 0847-100	2
Communication	8
English	12
Physical Education	0

Second Year

Fundamentals of Desktop Publishing 0822-115	2
Fundamentals of Offset Film Assembly 0822-130	2
Offset Duplicator Operation II 0822-145	2
Production Procedures and Quality Control 0822-200	2
Production Printing I 0822-241	2
Job Search Process 0847-101	1
Communication	4
Elective	2
English	8
Liberal Arts	4
Printing Elective (200-level)	8
Cooperative Education	Co-op

Third Year

Production Printing II, III, IV 0822-242, 243, 244	6
Employment Seminar 0822-298	2
Contemporary Life Issues 0847-102	2
Elective	2

Liberal Arts	16
Printing Elective (200-level)	12
<i>Total Quarter Credit Hours</i>	114

PRE-BACCALAUREATE STUDIES

Criminal Justice, Engineering and Science, and Social Work

Dr. Linda Rubel, Interim Chairperson, Department of Liberal Arts Support

Dr. Rosemary Saur, Chairperson, Science and Engineering Support

Dean Santos, Staff Chairperson, Social Work

Pre-Baccalaureate Studies are available as a bridge to students accepted by NTID and interested in enrolling in another RIT college, but not yet ready to enter into a baccalaureate-level program. Students spend one year in these studies preparing for matriculation. Reasons for entering Pre-Baccalaureate Studies include the need to further develop either mathematics or English skills, indecision as to program of study, or lack of space in the chosen baccalaureate program.

While in a Pre-Baccalaureate Studies program, students receive academic advising as well as personal and career counseling. The academic program is flexible and is set up individually for each student. Courses are chosen to address as closely as possible the strengths and needs of individual students. Regular NTID technical and developmental courses taught by support department faculty members are supplemented by courses in the colleges of Science, Engineering, and Liberal Arts, including the social work and criminal justice courses indicated. This strategy enables students to develop needed skills while at the same time progressing in their chosen fields of study.

Students receive no degree in pre-baccalaureate studies. Rather, at an appropriate time, they are advised to apply to the program of their choice and are assisted in doing so

Entry requirements

Students entering NTID during the Summer Vestibule Program must complete the prescribed sampling experience in science, engineering, or social work. Students may be accepted directly into Pre-Baccalaureate Studies if so recommended by the Recruitment and Admissions Department or upon approval of the NTID Department of Liberal Arts or Department of Science and Engineering Support. Students already matriculated in an NTID program may change to Pre-Baccalaureate Studies upon the recommendation of their current department and with the approval of a support department adviser and chairperson

Prerequisites

Students interested in baccalaureate-level programs must have the appropriate high school background for their area of interest. They should consult appropriate sections of the catalog for individual program requirements. High school courses should be of a level comparable to New York State Regents or college preparatory. Ideally, grades should be at the 'B' level or better.

Approximate time

Students generally take three-four quarters to matriculate into an associate or baccalaureate-level program of study

Pre-Baccalaureate Studies in Criminal Justice, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0847-100	2
Written Communication I, II 0847-218, 219	8
Fundamentals of College Mathematics I, II 0817-140, 141	6
Communication	4
Criminal Justice System	4
English Composition	4
General Education Elective	10-18
Mathematics	3-4
Physical Education	0
<i>Total Quarter Credit Hours</i>	41-50

**Pre-Baccalaureate Studies in Engineering,
typical course sequence**

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0853-100	2
Learning Strategies 0853-105	3
Reading and Thinking in Science and Technology 0853-200 *	3
Written Communication I, II 0847-218, 219 †	8
Calculus I, II, III	12
Chemistry	4
Communication	4
English Composition	4
Physical Education	0
University Physics I, II	6
University Physics Lab I, II	2
Total Quarter Credit Hours	48

- * Chemistry 1011-209 may be included in students' schedules if they are deferred from Reading and Thinking in Science and Technology during the Spring Quarter

Students judged as proficient—those having a Michigan Test score higher than 80 and a 10th grade California Achievement Test score—start the English Composition series assigned by the NTID Liberal Arts Placement Test (LAPT). Students judged as provisionally qualified take at least one quarter of NTID English

**Pre-Baccalaureate Studies in Science,
typical course sequence**

<i>First Year</i>	<i>Quarter Credit Hours</i>
Freshman Seminar 0853-100	2
Learning Strategies 0853-105	3
Reading and Thinking in Science and Technology 0853-220	3
Integrated Mathematics I, II, III 0817-150, 151, 152	9
Written Communication I, II 0847-218, 219 *	8
College Algebra and Trigonometry †	(4)
Introduction to Calculus I, II	(8)
OR	
Calculus I, II, III	(12)
General Chemistry	9
OR	
General Biology	(9)
AND	
General Biology Lab	(3)
OR	
Physics Orientation	(2)
University Physics I, II	(6)
AND	
University Physics Lab I, II	(2)
Communication	4
English Composition	4
Physical Education	0
Total Quarter Credit Hours	42

- * Students judged as proficient—those having a Michigan Test score higher than 80 and a 10th-grade California Achievement Test score—start the English Composition series assigned by the NTID Liberal Arts Placement Test (LAPT). Students judged as provisionally qualified take at least one quarter of NTID English

Credits shown in parentheses () are substituted for those above without parentheses

Pre-Baccalaureate Studies in Social Work, typical course sequence

<i>First Year</i>	<i>Quarter Credit Hours</i>
Professional Social Work Role 0516-210	4

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Self-Awareness in the Helping Role 0516-212	4
Fundamentals of College Mathematics I, II, III 0817-140, 141, 142	9
Freshman Seminar 0847-100	2
Written Communication I, II 0847-218, 219	8
Communication	4
English Composition	12
General Education	2-3
General Education Bridging Course	6
Introduction to Psychology	4
Physical Education	0
<i>Total Quarter Credit Hours</i>	<i>55-56</i>

ORGANIZATION OF COURSES

College of Applied Science and Technology

- School of Computer Science and Information Technology
 - Information Technology
 - Computer Science
- Packaging Science
- School of Engineering Technology
 - Civil Engineering Technology
 - Electrical Engineering Technology
 - Mechanical Engineering Technology
 - Manufacturing Engineering Technology
 - Computer Engineering Technology
- School of Food, Hotel and Travel Management
 - Nutrition Management
 - Food Management
 - Hotel and Resort Management
 - Travel and Tourism Management
- Department of Military and Aerospace Science - Reserve Officers Training Corps (ROTC)
 - Army
 - Air Force

College of Business

- Accounting
- Management
- Economics
- Finance
- Marketing
- Decision Sciences

College of Continuing Education

- Business and the Arts
 - Accounting
 - Business Law
 - Data Processing and Systems Analysis
 - Finance
 - General Management
 - Small Business Management
 - Health Care Management
 - Marketing
 - Mathematics and Statistics for Business
 - Personnel Administration
 - Production Management and Industrial Engineering
 - Logistics and Transportation Management
 - Real Estate
 - International Business
 - Interdisciplinary Studies
- Ceramics
- Design
- Drawing
- Painting
- Sculpture
- Illustration
- Printmaking
- Metalcrafts and Jewelry
- Weaving/Textiles
- Woodworking
- Deaf Studies

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- Humanities
- Communication
- Social Sciences
- Science and Technology
- Mathematics
- Contemporary Science
- Computer Systems
- Machine Shop
- Emergency Management
- School of Professional Studies
- Environmental Management
- Learning Development Center - Technical

College of Engineering

- General Engineering
- Computer Engineering
- Electrical Engineering
- Industrial and Manufacturing Engineering
- Mechanical Engineering
- Microelectronic Engineering

College of Imaging Arts and Sciences

- School of Art and Design
 - Graphic Design
 - Foundation
 - Interior Design
 - Packaging Design
 - Illustration
 - Medical Illustration
 - Painting
 - Printmaking
 - Industrial Design
 - Art History
- School of American Crafts
 - Ceramics and Ceramic Sculpture
 - Glass
 - Metalcrafts and Jewelry
 - Weaving and textile Design
 - Woodworking and Furniture Design
- School of Photographic Arts and Sciences
 - Fine Art Photography
 - Biomedical Photography
 - Film/Video
 - Professional Photographic Illustration
 - Photo Systems Management
 - Imaging and Photographic Technology
- Center for Imaging Science
 - Imaging Science
- School of Printing Management and Sciences

College of Liberal Arts

- Criminal Justice
- Economics
- Professional and Technical Communication
- Social Work
- Liberal Arts Courses:
 - Language
 - Literature
 - Science and Humanities
 - Fine Arts
 - History

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- Science, Technology, and Society
- Philosophy
- Behavioral Science
- Anthropology
- Psychology
- Sociology
- Social Sciences
- Economics
- Political Science
- Service Courses

College of Science

- Biology
- Chemistry
- Mathematics
- Physics
- General Science
- Allied Health Sciences
- Clinical Chemistry
- Materials Science and Engineering

National Technical Institute for the Deaf

- Applied Accounting
- Applied Art and Computer Graphics
- Applied Computer Technology
- Architectural Technology
- Audiology
- Business Occupations/Business Technology/Office Technologies
- Civil Technology
- Educational Interpreting
- Electromechanical Technology
- English
 - Entry Courses
 - Integrative Courses
 - Emphasis Courses - Reading
 - Emphasis Courses - Vocabulary
 - Emphasis Courses - Grammar
 - Emphasis Courses - Writing
- General Education
 - Fine Arts and Humanities
 - History
 - Language and Literature
 - Religion
 - Interdisciplinary
 - Mathematics and Science
 - Social Science
 - Economics and Political Science
 - Psychology
 - Sociology and Anthropology
 - Theatre
- Industrial Drafting Technology
- Manufacturing Processes Technology
- Medical Laboratory Technology
- Ophthalmic Optical Finishing Technology
- Photo/Media Technologies
- Electronic Publishing and Printing Technology
- Sign Communication
- Speech-Language
- Technical Mathematics
- Pre-Baccalaureate Studies
- College of Liberal Arts Courses

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Criminal Justice
Language, Literature, Communication
Social Work
College of Science Courses
Biology
Chemistry
Mathematics
Physics

COURSE DESCRIPTIONS

Unless otherwise noted, the following courses are offered annually. Specific times and dates can be found in each quarter's course listing

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 three digits are unique to each course and identify whether the course is non-credit (less than 099); lower division (100-300); upper division (400-699); or graduate level (700 and above).

Course Number Index

0101	Accounting
0102	Management
0103	Economics
0104	Finance
0105	Marketing
0106	Quantitative
0201	Accounting
0202	Business Law
0203	Information Systems Management
0204	Finance
0205	Business Administration
0206	Health Systems Management
0207	Marketing
0208	Mathematics & Statistics for Business
0209	Personnel Administration
0212	Logistics & Transportation
0213	Real Estate
0214	Insurance
0285	Emergency Management
0286	Environmental Management
0222	Ceramics
0223	Design
0224	Fine Arts
0225	Metalcrafts & Jewelry
0226	Textiles
0227	Woodworking
0234	Gen. Ed.--Deaf Studies
0235	Gen. Ed.--Humanities
0233	International Studies
0236	Gen. Ed. Communications
0237	Gen. Ed. Behavioral Science
0290	Career & Human Resource Development
0291	Instructional Technology
0220	Interdisciplinary Studies
0240	Tech. Studies--Mathematics
0245	App. Sci. Physics
0246	Contemporary Science
0249	Computer Programming
0250	Computer Systems
0253	Electrical Engineering Tech.
0255	Manufacturing Engineering Tech.
0254	Mechanical Engineering Tech.
0256	Photography
0257	Photographic Science
0266	Machine Shop
0306	Computer Engineering

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0301	Electrical Engineering
0302	General Engineering
0303	Industrial Engineering
0305	Microelectronics
0304	Mechanical Engineering
0307	Quality & Applied Statistics
0407	Illustration
0510	Anthropology
0514	Psychology
0515	Sociology
0501	Criminal Justice
0530	Economics
0517	General Studies, General
0519	Interdisciplinary--Aerospace
0520	Interdisciplinary--Liberal Arts
0502	Language
0503	Foreign Language
0504	Literature
0518	Lang./Lit. Basic Communications
0535	Professional & Technical Communication
0505	Fine Arts
0506	Science & Humanities
0507	History
0508	Science, Technology & Society
0509	Philosophy
0511	General Economics
0512	Social Science
0513	Political Science
0516	Social Work
0640	Reserve Officer Training--Army
0602	Information Tech.--Software
0605	Graduate Computer Science
0616	Information Science
0611	Computer Systems Management
0601	Computer Programming
0603	Computer Science
0604	Information Tech--IT/IMD
0650	Aerospace Studies
0607	Packaging Science
0620	Nutrition Management
0621	Food Management
0622	Hotel & Resort Management
0624	Hospitality-Tourism
0623	Travel Management
0608	Civil Engineering Tech.
0609	Electrical Engineering Tech.
0617	Manufacturing Engineering Tech.
0610	Mechanical Engineering Tech.
0618	Computer Engineering Tech.
0606	Engineering Technology
2010	Graphic Design
2011	Art Education
2013	Foundation Courses
2014	Computer Graphic Design
2015	Interior Design
2017	Packaging Design
2019	Illustration
2020	Medical Illustration
2021	Painting
2022	Printmaking
2035	Industrial Design

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2037	Graduate Studies
2039	Art History
2001	Interdisciplinary ImagingArts
2050	Color Science
2051	Imaging Science
2060	Fine Art Photo
2061	Biomedical Photo
2065	Film/Video Photo
2066	Graduate Photography
2067	Illustration Photo
2068	Photo Management
2076	Technical Photography
2080	Printing Management
2081	Printing Technology
2040	Ceramics
2041	Glass
2042	Metals
2043	Textiles
2044	Wood
0801	Accounting Tech.
0802	Applied Computer Tech.
0804	Business Occupations
0860	Speech
0862	English
0864	Tech./Integrated Comm. Studies
0861	Audiology
0863	Sign Communication
0849	Applied Art
0808	Architectural Tech.
0809	Civil Tech.
0810	Industrial Drafting
0811	Electromechanical Tech.
0812	Numerical Control
0813	Manufacturing Processes
0847	General Education
0848	General Education/Theater
0870	Educational Interpreting
0817	Technical Math
0815	Chemistry
0827	Optical Finishing Technology
0816	Medical Lab
0818	Technical Physics
0819	Medical Records
0828	Media Production Tech.
0821	Applied Photo
0822	Printing Production Tech.
0872	Photo/Media Tech.
0851	Applied Photography
1001	Biology
1004	General Biology
1008	Analytical Chemistry
1009	Biochemistry
1010	Chemistry
1011	General Chemistry
1012	Inorganic Chemistry
1014	Physical Chemistry
1027	Biomedical Computing
1023	Clinical Chemistry
1026	Clinical Science--General
1024	Medical Tech.
1025	Nuclear Medicine Tech.

ROCHESTER INSTITUTE OF TECHNOLOGY

1032	Physician Assistant
1030	Diagnostic Medical Sonography
1028	Materials Science & Engineering
1016	Mathematics
1019	Technology Mathematics
1017	Physics
1701	English Language Center
1705	Learning Development Center
1710	Learning Dev. Ctr.--Technical
1108	Adapted Physical Education
1109	Fitness
1110	Health & Safety
1111	Lifetime Rec. Activities

COLLEGE OF APPLIED SCIENCE AND TECHNOLOGY COURSES

School of Computer Science and Information Technology

Information Technology

Computer Science

Packaging Science

School of Engineering Technology

Civil Engineering Technology

Electrical Engineering Technology

Mechanical Engineering Technology

Manufacturing Engineering Technology

Computer Engineering Technology

School of Food, Hotel and Travel

Management

Nutrition Management

Food Management

Hotel and Resort Management

Travel and Tourism Management

Department of Military and Aerospace Science - Reserve Officers Training Corps (ROTC)

Army

Air Force

COLLEGE OF APPLIED SCIENCE AND TECHNOLOGY

Wiley R. McKinzie, Dean

The College of Applied Science and Technology (CAST) provides programs that stress the development, integration, and implementation of technology in areas ranging from the manufacturing environment to a global service economy. Modern technology is a focal point in each CAST program. This technology is used to provide the productive manufacture and distribution of durable and consumable goods and the proper flow of many forms of information worldwide and to enhance customer satisfaction in the service sector.

The college units are the School of Engineering Technology; the School of Computer Science and Information Technology; the School of Food, Hotel, and Travel Management; and the Department of Packaging Science. The college has programs at the associate, baccalaureate, and master's degree levels. The Department of Military Science and the Department of Aerospace Studies, ROTC, are also part of the college.

SCHOOL OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

School of Computer Science and Information Technology courses are normally offered at least once annually.

INFORMATION TECHNOLOGY

Courses are offered in the Department of Information Technology both for students enrolled in one of the programs in the department and for those who are enrolled in other programs at the Institute. Students are advised to take note of prerequisite requirements. Equivalent experience may be substituted for prerequisites upon approval by the department

0602-200 Survey of Computer Science

Survey of computers and problem solving by using general purpose application software. Students will 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 will utilize packages individually and in an integrated fashion. **Class 4, Credit 4**

0602-201 Freshman Seminar

An orientation seminar to be taken by first-year students in Information Technology. Topics to be covered include a curriculum overview, co-op and career alternatives in Information Technology, and orientation to RIT and college life

0602-202 Computing Tools and Environments

An introduction to key computing environments in the Information Technology Program. These environments vary in computing platform, user interface, and the collection of tools and applications available. Course objectives are: to build skills that will enhance success in later courses; to emphasize common computing paradigms at the operating system level; to teach students how to perform common operations on multiple platforms; to make the student a knowledgeable network citizen. Emphasis will be placed on the use of the Internet as an information source. Each topic will be taught on more than one computing platform, and topics will be covered at an accelerated pace. (Computer literacy)

0602-203 Introduction to Scripting

An introduction to computer scripting and high-level programming languages. These 'English-like' languages introduce students to programming concepts and enable them to design simple computer applications. Computer laboratory work will be required. (0602-202 or permission of instructor)

0602-205 Computer Techniques --FORTRAN Language

Students will be 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 will be required. (Pre-calculus) **Class 3, Credit 3**

0602-207 Computer Techniques --C Language

Students will be 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 will be required. (Pre-calculus) **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. The course is organized around weekly programming assignments that stress features of structured programming and C++. (0602-200 or 202) **Class 4, Credit 4**

0602-210 Program Design and Validation

A second course in programming and data structures, where students use C++ to implement moderately large programs. Topics include sorting, searching, arrays of records, text files, files of records, multidimensional arrays, recursion, pointers, classic data structures and their

implementations (stacks, queues, linked lists, trees), and the application of these concepts to solve problems of intermediate complexity. The role of testing in the validation and acceptance of a program will be stressed. Programming projects will be required. (0602-208)**Class 4, Credit 4**

0602-212 Abstractions in Programming

A third course in programming where the student studies methods of dealing with complexity of large software systems. Abstractions include structured programming, modularity, and object-oriented systems. Software integration and interoperability is the major emphasis. Programming projects will be required. (0602-210)**Class 2, Lab 4, Credit 4**

0602-220 FORTRAN Programming for Engineers

Students will be introduced to computer systems, learn problem solving techniques, and have an opportunity to study the FORTRAN programming language. Topics available for study include straightline programming, decision and repetition capabilities, formatted input/output, data structuring, use of subprograms, and application packages (e.g., plotter routines and the IMSL package). Several classical numerical techniques are illustrated. Programming projects will be required. **Class 4, Credit 4**

0602-300 Business Applications Using COBOL

A study of elementary COBOL programming, using structured design and programming concepts developed in 0601-210. The course will emphasize 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 will write programs that adhere to specific programming and documentation standards. (0602-210)**Class 4, Credit 4**

0602-303 Advanced Business Applications

An advanced course developing more expertise in the application of COBOL to business and industrial problems. Topics include advanced COBOL constructs, direct and indexed sequential access methods, sorting and searching, and database system access using commands embedded in the COBOL source. Students will write programs which adhere to specific programming and documentation standards. (0602-300)**Class 4, Credit 4**

0602-310 Computer-Human Interface Design

A rapidly expanding and evolving community of computer users has inspired exciting research into the design of computer-human interfaces. Students in this course 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 will include the design, implementation, and evaluation of interfaces. (0602-203)**Class 4, Credit 4**

0602-320 Electronic Imaging

The broad bandwidth capability of today's computer workstations makes it possible to store and display high-quality electronic images. Students enrolled in this class will use still video cameras to capture color images. The digitized images will then be incorporated in electronic and paper documents. A variety of techniques will be introduced for image enhancement, transformation, and compositing. Current practice and experimental work in electronic imaging will be discussed. Projects required. (0602-202)**Class 4, Credit 4**

0602-350 Technology Transfer

In spite of the fact that a technological innovation can be designed and produced, it has limited effectiveness if it is not used, or is not used correctly. The area of technology transfer deals with these and other related problems. This course examines change strategies that can facilitate technology transfer. It gives students hands-on experience, through simulations and activities, with the events that can facilitate and hinder change. Students examine case studies to explore the intended and unintended effects that technological change has on systems and participants.**Class 4, Credit 4**

0602-410 Computer Concepts and Software Systems

An introduction to the overall organization of digital computers and operating systems for non-majors. Topics include basic machine organization, an overview of machine and assembly language, properties of common I/O devices, synchronization and scheduling of processes, physical and virtual memory management techniques, resource allocation and protection, and user interface issues. (0602-208) **Class 4, Credit 4**

0602-411 Data Communications and Computer Networks

An introduction to data communications hardware and software, and use of these components in computer networks. Topics include communication system components, communications software, packet switching, network control, common carrier issues, long-haul vs. local area networks, and performance considerations. (0602-208)**Class 4, Credit 4**

0602-420 Artificial Intelligence: Expert Systems

This course presents a survey of the mechanisms of intelligence and all supporting technologies that provide the infrastructure for the study of cognitive science. This course requires the study of expert systems, including the knowledge base and inference engine required in an expert system. Students will develop an expert system. (0602-208)**Class 4, Credit 4**

0602-425 Human Factors in Information Processing

This course focuses on the exploration of the nature of the mind, exploring the foundational concepts of cognitive psychology, sensation, perception, attention, knowledge, problem solving, and memory. Cognitive theories will be discussed and related to computer human interactions and the representation of knowledge and information in the computing environment.**Class 4, Credit 4**

0602-444 Technical Writing for Computer Scientists

A computer professional needs to communicate clearly with other people in a variety of ways. This course addresses both the theory and practice behind writing as a professional. It approaches writing from a user-centered perspective, and enables students to create instructional, explanatory, and persuasive documents. **Class 2, Credit 2**

0602-445 Technical Writing

A further study of professional writing for computer scientists. In addition to creating instructional, explanatory, and persuasive documents, this course deals with project documentation. Additional topics include a review of grammar and mechanics, understanding the novice user, and task analysis. **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 is designed to build student skills in two different-yet interacting--areas: needs assessment (requirements analysis) and group problem solving. The student will use interviewing and problem-solving techniques to uncover the constraints that surround problem areas. The student will learn the questions to ask during needs assessment, along with developing the interpersonal skills to conduct these meetings. Emphasis is placed on the steps in creative problem solving, the basics of meeting planning to maximize group effectiveness, and helping a client to focus his concerns into a clearly defined problem. **Class 4, Credit 4**

0602-475 Image and Voice Communications

Provides an understanding of basic telephony and associate image/voice and video-based applications. Topic highlights include audio text, voice mail, digital representations of images, image compression, and ISDN (Integrated Services Digital Network). Practical assignments emphasize 'real world' applications. (0602-202, 411)**Class 3, Lab 2, Credit 4**

0602-483 Applied Database Management

An introduction to issues in data management in organizations, and the role of database management systems in addressing these issues. Topics include the uses and needs for data in organizations, review of simple data structures, the influence of computer architecture and I/O devices on the management of data, basic file organizations supporting data management (sequential, direct access, indexed sequential), logical data models and their physical implementation, database administration, and DBMS selection. (0602-208 or permission of instructor) **Class 4, Credit 4**

0602-510 Fundamentals of Instructional Technology

One technology transfer strategy is to effectively train the end users to run the new technology. Information technologists need to design small to moderately sized instructional programs that can teach skills to end users. This course emphasizes an Instructional System Design (ISD) model of developing instruction. Students will apply the model to a selected topic and develop and validate a unit of instruction for end users. **Class 4, Credit 4**

0602-512 Interactive Courseware

A specialized educational change strategy involves the design of microcomputer courseware (educational software for personal computers). This will be an area of expertise for information technologists who will likely work as part of a design team with instructional designers. This course teaches the student to develop branching computer tutorials, as well as simple instructional interactive video disk programs. The process of systematic instructional design is emphasized. The student is also encouraged to consider adaptive systems and the design benefits and constraints of non-human delivery systems. (0602-203, 510)**Class 4, Credit 4**

0602-519 Principles of Education for Dietetics

Dietetics and nutrition professionals are expected to communicate effectively with people. That translates into the ability to give presentations—to instruct, to inform, and to persuade. At the completion of this course, students should be able to create and effectively implement instructional, informational, and persuasive presentations related to nutrition or dietetics, for a specified audience, using at least one medium. Additional topics include training, media design, and message design.

0602-525 Performance Support System Design

The modern workplace requires workers to be the center of a large mass of information. Although the information is available, the worker needs to be able to access it quickly in a useful form. Performance support systems involve online job aids, expert systems, data bases, and tutorials integrated into a system that enables a worker to access specific information effectively. This capstone course in the Technology Transfer option integrates skills and knowledge learned in previous courses. It enables the learner to create, implement, and evaluate an integrated performance support system that meets specific needs within an organization. (0602-203, 510)**Class 4, Credit 4**

0602-532 Electronic Prototyping and Participatory Design

Participatory design involves the user of an application in the design process, from the initial visualization of a design to evaluation of the final product. Students will apply techniques for rapid prototyping and evaluation to a problem requiring the design of an interactive interface. They will interview users who are familiar with the task and proceed through an iterative process of prototyping and user evaluation to produce a fully functional interactive interface. Students will be required to critique assignments and evaluate prototypes developed by other class members. (0602-202, 203)**Class 4, Credit 4**

0602-534 Dynamic Graphics and Animation

The ability of today's workstations and microcomputers to represent animation in real time has provided users with an abundant vocabulary for visualization and an extended set of metaphors for interaction. This class will survey the use of dynamic graphics in user interfaces and animation in the simulation and visualization of information. Tools and techniques for the production of computer graphics and animation will be introduced, and student projects will be required. (0602-202, 203)**Class 4, Credit 4**

0602-536 Electronic Media Management

The decreasing cost of high-quality computer graphics devices is changing the way people describe, store, and transmit information. Scientists, educators, and the business community are recognizing the power inherent in the graphic representation of information. This course presents fundamental topics in visual design for electronic media. Each topic is presented along with the underlying computer technology that supports it. Interactive media have made possible startling changes in how we think and communicate. New databases offer researchers electronic libraries of images, sounds, and film. Collageability—electronic media's ability to build new images and metaphors through the compositing of existing media—encourages authors and designers to quote existing imagery to create multimedia presentation. (0602-483)**Class 4, Credit 4**

0602-550 Software Integration and Interoperability

The study of system integration and the construction of system components designed to provide capabilities for cooperation in the accomplishment of given tasks. Topics covered include inter-program communication and representation of data. Methods of design interoperability will be covered. An introduction to system integration is included. (0602-202, 411)**Class 4, Credit 4**

0602-556 Electronic Data Interchange

The study of an alternative way for companies to conduct business electronically. Topics of study include comparison between paper-based business documents and the electronic equivalent, how companies have sought improvements for the problems inherent to the paper-based method of operation, and how EDI may solve these problems in the future. Additional discussions will focus upon the preparedness of companies for EDI, the planning, implementation of EDI within various industries, and EDI standards. (0602-210) **Class 4, Credit 4**

0602-570 Windows Programming

The theme of this course is Windows 3.1 programming using C++. Students will learn how to write stand-alone applications with Windows dialog boxes, radio buttons, menus, and so on; how to use built-in Windows DLL(dynamic link libraries) such as USER, KERNAL, and GDI; how to design custom DLLs; and how to use API (application program interface). They will also experiment with DDE(dynamic data exchange) and OLE(object linking and embedding). Students will be expected to design and implement several small applications.(0602-208, 210)

0602-572 Macintosh Programming

In this course, students learn to create stand-alone applications for the Macintosh featuring dialog boxes; radio buttons; pull-down, pop-up, and hierarchical menus; scroll bars; and other interface elements typical of the Macintosh environment. Topics will include the Macintosh Toolbox (the library of routines that underlies the Macintosh graphical user interface), Resources (the data that a program uses to make library calls to routines within Tool box), and ResEdit (the editor that enables programmers to create, modify, and delete resources within programs). Students will be expected to design and implement several small applications.(0602-208, 210)

0602-574 Advanced Applications Programming

In this capstone course, students will build a substantial Windows, Macintosh, or X-Windows application. They will explore advanced topics in areas of interest and can expand upon concepts introduced in the earlier courses in the concentration. Additional topics will include a comparative analysis of event-driven programming in the Windows and Macintosh environments, the limits of development tools such as Visual Basic and Hypertalk, porting applications between platforms, and programming X-Windows. (0602-570, 572)

0602-590 Seminar in Applied Computer Studies

Current topics and advances in applications of computer technology for undergraduate students. (Permission of instructor) **Credit variable 2-4**

0602-595 Senior Seminar in Information Technology

Capstone seminar to be taken by graduating students in the Information Technology curriculum. Topics to be covered will include recent advances and future impacts in information technology. (Fourth-year standing) **Class 1, Credit 1**

COMPUTER SCIENCE

Computer science courses may be taken as computer science electives except as noted

0601-203 APPascal

This course is used only for the purpose of transferring in Advanced Placement (AP) Pascal credit. Amount of credit (either 4 or 8 quarter hours) will depend on the student's score in the APPascal ABexam. Transfer credit of 4 quarter hours will be granted for scores representing mastery of the principles of the programming language Pascal. Topics include variables, expressions and assignment, control structures (sequencing, selection, and repetition), modularity via modules, procedures and functions, parameter mechanisms, recursion, one- and two-dimensional arrays. Transfer credit of 8 quarter hours will be granted for scores representing mastery of the above principles and basic data structures. These topics would include arrays, records, pointers, dynamic storage allocation, linked lists, stacks, queues, and trees. May not be taken for credit.**Class 0, Credit variable**

0601-242 Programming II Data Structures

An introduction to the basic data structures used in computer applications. Both abstract concepts and implementation details will be discussed, including comparisons of alternative implementations. Topics include arrays, records, pointers, dynamic storage allocation, linked lists, stacks, queues, and trees. Programming projects are an integral part of the course. (0601-241) **Class 3, Lab 2, Credit 4**

0601-243 Programming III Design and Implementation

A first course on the design and implementation of moderately large software systems. Modern principles of design and testing will be presented in class and reinforced by programming assignments. The importance of both internal and external program documentation will be stressed. Topics include top-down design, stepwise refinement, test data selection, modularity measures (cohesion and coupling), common programming paradigms, and advanced file I/O. Programming projects are required; one of these will be a team project. (0601-305)**Class 3, Lab 2, Credit 4**

0601-305 Assembly Language Programming

A study of assembly language concepts and programming methods, including computer organization, assembly process, addressing, binary arithmetic, relocatability, storage allocation, subroutine linkage, looping and address modification, character manipulation, bit manipulation, floating point arithmetic, decimal instructions, some I/O, macros, and debugging techniques. Programming projects will be required. (0601-242)**Class 3, Lab 2, Credit 4**

0601-306 Systems Programming Fundamentals

A study of systems programming concepts and techniques. Topics include the roles of assembly languages, systems implementation languages, systems macros and supervisor calls, program linkage, reentrant and recursive subroutines, I/O programming at the device level, macros and conditional assembly. Programming projects will be required. (0603-325)**Class 4, Credit 4**

0601-309 C Programming

The course is an introduction to the C language for programmers already familiar with a high-level language and an assembly language. Topics include: data types and data structures, control structures, I/O, pointers, program design and maintenance, programming techniques, and interfacing with assembly language. (0601-305) Cannot be taken for credit if credit has been given for 0601-306. **Class 1, Credit 1**

0601-319 Scientific Applications Programming

An introduction to classical algorithms used in the solution of numerical problems encountered in science and engineering. The FORTRAN and APL languages will be introduced as tools for implementing these algorithms. Topics include an introduction to FORTRAN and APL, algorithms for finding roots of equations, solutions to systems of equations, general matrix manipulation. Programming projects will be required. (0603-325)**Class 4, Credit 4**

0601-450 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- 325) **Class 4, Credit 4**

0601-488 Programming Systems Workshop

A workshop for the application of systems analysis, specification, design, implementation, and documentation techniques. Students will work in teams to solve specific problems. While working toward a solution of their problems, students will practice requirements analysis, system specification, data modeling, design specification, implementation, documentation, project management, quality assurance and software testing. Programming projects will be required. (0603-435, 485) **Class 4, Credit 4**

0603-101 Freshman Seminar

This course provides first-year students an opportunity to build upon skills necessary to succeed in the Computer Science Program. Through interactions in a small group environment, students will make friends with other computer science students, create a stronger bond with RIT and their college through increased relationships and extended orientation information, and focus on communication and small group skills valuable for future project work. The students will become more knowledgeable about the computer science curriculum, career options, and ethical issues. **Credit 1**

0603-231 Computer Science 1

An introduction to computing and problem solving, emphasizing the development and documentation of modular computer-based, object-oriented systems. An object-oriented

programming language, Eiffel, is used to demonstrate modern programming principles. Topics include variables, expressions and assignment, control structures (sequencing, selection, and repetition), and modularity via classes and methods. Instruction on many of the essential tools of the laboratory's computing environment will be covered both textual and graphical. Programming assignments are an integral part of the course. **Class 3, Lab 2, Credit 4**

0603-232 Computer Science 2

An introduction to the basic data types used in computer applications. Both abstract concepts and implementation details will be discussed, including comparisons of alternative implementations. Topics include dynamic storage allocation and containers commonly known as arrays, linked lists, stacks, queues, and trees. Students will work individually and in small groups on programming assignments, which are an integral part of the course. (0603-231) **Class 3, Lab 2, Credit 4**

0603-233 Computer Science 3

This course examines internal and external sorting and searching techniques and introduces the analysis of efficiency and space/time trade-offs. Some analysis of sorting and searching algorithms will be included. C++ is introduced and provides an alternate object-oriented programming language with which these topics are covered. In addition an introduction is given to alternate paradigms: procedural and parallel programming. Students will work individually and in small groups on programming assignments, which are an integral part of the course. (0603-232) **Class 3, Lab 2, Credit 4**

0603-263 Computer Science for Transfer Students

This course introduces the student to the object-oriented programming paradigm, the computer science workstation environment, and the C++ language. The course then examines internal and external sorting and searching techniques and introduces the analysis of efficiency and space/time trade-offs. Also an introduction is given to an alternate paradigm: parallel programming. Students will 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 0603-252; not to be taken as a computer science elective. **Class 4, Lab 2, Credit 5 (not offered in 1994-95)**

0603-312 Introduction to Software Engineering

An introduction to basic software engineering methodologies and technologies used to develop high-quality, cost-effective software under time and resource constraints. The course focuses on the development of software products, while maintaining a broad perspective that emphasizes both process and product viewpoints. Topics include an overview of software engineering and software engineering paradigms, project planning, metrics, and cost estimation models, requirements analysis, design techniques and strategies, implementation concerns, quality assurance, software testing techniques and strategies, and software maintenance and configuration management. (0603-325) **Class 4, Credit 4**

0603-315 Digital Computer Organization

An introduction to computer architecture and implementation. Topics include Boolean algebra, combinatorial and sequential circuit design, flip-flops and adders, storage mechanisms and their organization, instruction fetching, decoding, and execution in a simple CPU, microprogramming, input/output subsystems, and interrupts. The laboratory experiments introduce elementary integrated circuit building blocks including gates, flip-flops, registers, counters and elementary sequential circuits. (0601-305) **Class 3, Lab 2, Credit 4**

0603-325 Data Organization and Management

A course on the considerations associated with the external storage of data. Topics include file organization (sequential, indexed and direct access), secondary storage devices, an introduction to external sorting and searching, and the basics of database organization and management. Programming projects will be required. (0601-243 or 0603-360) **Class 3, Lab 2, Credit 4**

0603-334 Computer Science 4

A course on the implementation of both transient and persistent data structures. Topics include several implementation strategies for internal data structures, efficiency, file organization (sequential, indexed, and direct access), secondary storage devices. Students will work individually

and in small groups on programming assignments, which are an integral part of the course. The C++ language will be used. (0603-233 or 0603-263) **Class 3, Lab 2, Credit 4 (not offered in 1994-95)**

0603-341 Professional Communication for Computer Science and Software Engineering

This course provides an introduction to the types of communication that will be 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 will also be emphasized. Small and large group activities will be used to simulate a wide range of work and communications environments. (Corequisite 0603-233 or 0603-263) **Class 4, Credit 4 (not offered in 1994-95)**

0603-351 Introduction to Digital Design

An introduction to computer architecture and implementation. Topics include number systems, boolean algebra, combinational 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 (not offered in 1994 -95)**

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. (0603-351) **Class 3, Credit 3 (not offered in 1994 -95)**

0603-355 The Human Side of Computers

The impact of computer systems of society is studied via class discussion, lectures, and films. Current topics such as the following are covered: the impact of computers on employment, automation and the labor force; overview of computer applications in government; innovative medical applications; robots in industry; office automation; computers in education and computer assisted instruction issues; privacy and the Freedom of Information Act; computer abuses and crime; the impact on law enforcement; the future; a cashless society; universal identifiers; computers in the home. Participants will develop several short discussion papers and a major study in one of the course topics. (0601-241) **Class 4, Credit 4**

0603-360 Fundamentals of Computer Science for Transfer Students

This course covers selected topics from 0601-241, 242 and 243 and introduces students to the Unix operating system, the Modula-2 programming language, and concepts of software engineering. 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 0601-242; not to be taken as a computer science elective. (0601-242 or equivalent) **Class 3, Lab 2, Credit 4**

0603-361 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. Typically two moderate-size projects will be required: one done by individuals, the other by small teams (2-4 persons). Projects will be performed in C++ using specifications and existing systems provided by instructors. Oral presentations and written documentation will be required. (0603-233) **Class 3, Lab 2, Credit 4 (not offered in 1994 -95)**

0603-380 Introduction to Computer Science Theory

A survey of important topic areas in theory of computer science. Topics may include regular expressions; deterministic and non-deterministic finite state machines; analysis of time and space complexity of algorithms; algorithm design paradigms, concept of NP-Hard and NP-Complete

algorithms; introduction to formal correctness of programs; Turing machines; and the halting problem. (Corequisite 1016-266 or 1016-467; 1016-265)**Class 4, Credit 4**

0603-400 Logical Design

An in-depth study of the logical design of digital circuits. Topics include combinatorial circuit design with emphasis on use of MSI and LSI circuits and CAD tools, sequential circuit synthesis, both synchronous and asynchronous, and an introduction to interfacing techniques. Additional topics to be covered include testing, CAD tools such as logic simulators and logic reduction programs, integrated circuit technologies, and an introduction to VLSI design. Lab experiments required. (0601-315 and 1016-265 or equivalent)**Class 3, Lab 2, Credit 4**

0603-420 Data Communication Systems

This course is an introduction to the concepts and principles of computer communication subsystems. It examines the effects of communications 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**

0603-430 Numerical Methods

Topics include introductory error analysis, roots of an equation, solution of systems of linear and non-linear equations, interpolation, power series calculation of functions, numerical integration, and first order ordinary differential equations. The computational aspects rather than mathematical development will be emphasized. Programming projects will be required. (Either 1016-252 or 1016-215, and a high-level scientific programming language)**Class 4, Credit 4**

0603-435 Systems Specification, Design and Implementation

An introduction to the basic concepts of systems analysis, specification, design and implementation, and project management. Topics include an introduction to methodologies and tools in system design, with an emphasis on structured design techniques. Tools include scheduling tools, structured English, structured flowcharts, decision trees, Jackson design method, Warnier-Orr diagrams, dataflow diagrams, hierarchical design of programming systems, and cost estimation models. Online design tools may be used to prepare diagrams and specifications. (0603-325) **Class 4, Credit 4**

0603-440 Operating Systems

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. (0603-315, 325)**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, LISP) 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. (0601-450)**Class 4, Credit 4**

0603-456 Expert Systems

This course provides an introduction to the issues and techniques employed in expert systems. Topics will 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 a group project involving both the creation of an expert system and explorations of ways to effectively use such systems. (0603-455)**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**

0603-485 Data Base Concepts

A broad introduction to data base management systems (DBMS) and the design, implementation, and applications of data bases. Topics include an overview of DBMS architectures, concepts and implementations of the relational model, data base design and modelling techniques, hierarchical and network approaches, and issues such as recovery, concurrency, physical implementation concerns, and performance and management aspects. Optional topics include distributed data bases, data base machines, and data base interfaces and languages. A data base programming project is required. (0603-325) **Class 4, Credit 4**

0603-499 Cooperative Education

One quarter of appropriate work experience in industry. **Credit 1**

0603-510 Software Specification and Design

An introduction to software specification methods and the transformation of specifications into modular designs suitable for implementation. Qualitative and quantitative measures of good design will be coupled with discussions of specific design methodologies. The role of design in the larger software life cycle will be stressed. Topics include a review of formal and informal specification techniques, key attributes of successful designs, design methodologies and techniques, transformation of specifications into data structures and algorithms comprising a design, and design documentation. Some programming to demonstrate design feasibility may be required. (0603-312, 1016-266) **Class 4, Credit 4**

0603-511 Software Testing and Quality Assurance

An introduction to software quality assurance and its relationship to testing, leading to the production of acceptable software products. Software inspections and testing techniques will be discussed in detail, and their roles in software quality assurance will be stressed. (0603-312) **Class 4, Credit 4**

0603-515 Analysis of Algorithms

A course covering the techniques and mathematics needed to analyze the computational complexity of algorithms. Several classic algorithm paradigms will be studied to determine their applicability and space/time efficiency. (0603-380) **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, primary memory organization and access, internal and external bus structures, and virtual memory schemes. Alternatives to classical machine architecture, such as the stack machine and the associative processor, are defined and compared. Parallel processors and distributed systems are also presented, along with an analysis of their performance relative to non-parallel machines. Programming projects will be required. (0603-440) **Class 4, Credit 4**

0603-521 Introduction to Microprocessor Systems

An examination of microcomputers and microcomputer applications, including the study of microprocessors and their use in the construction of microcomputers. Additional topics covered include microcomputer busses, parallel and serial interfaces, analog interfacing, interrupts, and real time clocks. The use of microprocessors in real world situations is emphasized. Single board microcomputer systems are used in laboratory projects to explore hardware and software design issues, as well as memory design and I/O interface techniques. Students who have taken 0603-545 cannot receive credit for this course. Programming projects will be required. (0603-315) **Class 3, Lab 2, 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 will be required. (1016-309 or 1016-352 and third-year standing in Computer Science) **Class 4, Credit 4**

0603-531 Introduction to Parallel Computing

A study of the hardware and software issues in parallel computing. Topics include an introduction to the basic concepts, parallel architectures, parallel algorithms, parallel languages, network

topology, coarse- versus fine-grained parallelism, applications, parallel programming design and debugging. Programming projects will be required. (0601-450, 0603-440) **Class 4, Credit 4**

0603-532 Parallel Algorithms and Program Design

A study of the principal trends in parallel algorithm design through the analysis of algorithms used in various areas of application. Specific techniques that have gained widespread acceptance will be highlighted. 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. Each student will be required to research an area of parallel program design and then implement a parallel computing project for an application within that area. Programming projects will be required. (0603-380) **Class 4, Credit 4**

0603-540 Operating Systems Laboratory

Application of operating system concepts. Laboratory work includes development of a small multi-tasking operating system and a study of its functional characteristics; special topics include I/O programming, interrupt handling, resource allocation and scheduling methods. A significant programming project is an integral part of the course. (0601-306, 0603-440) **Class 4, Credit 4**

0603-541 Introduction to Computer Networks

This course presents the concepts and principles of the higher level protocols of the ISO reference model, as introduced in 0603-420 Data Communication Systems. 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 Distributed Systems Laboratory

This course will build on topics developed in 0603-420 Data Communication Systems and 0603-541 Introduction to Computer Networks 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. (0603-540, 541) **Class 4, Credit 4**

0603-545 Computer Architecture Laboratory

This course applies the hardware and software concepts learned from logic design, computer architecture, data communications, and operating systems. Laboratory work will include the design, implementation, debugging, and documentation of major hardware-software projects. Topics to be presented in the lecture include busses, interfacing, bit slice architectures, microprogramming, microprocessors, analog interfacing, and real time computing. Additional topics related to the specific laboratory projects will also be covered. (0603-400, 420, and 520) **Class 3, Lab 2, Credit 4**

0603-555 Software Engineering Project Laboratory

This course provides practical experience in software engineering in a team project setting. Given the specifications for a substantial software system, student teams will design, code, and test the system, using modern software engineering methods and software quality assurance techniques. Computer-aided software engineering (CASE) tools will be emphasized, including design, testing, and configuration management tools. Software inspections will be emphasized as a means for achieving high-quality software. (0603-510, 511) **Class 4, Credit 4**

0603-560 Compiler Construction Laboratory

A course in the design and implementation of high-level language compilers. Laboratory projects to be assigned in the areas of parsing, code generation, code optimization, and language design. (0603-580) **Class 4, Credit 4**

0603-565 Computer Systems Selection

A study of computer systems design, evaluation, and selection methodology. The design aspect deals with the problem of specifying physical systems on the basis of logical design criteria, and performance analysis of existing and proposed computer systems. The selection aspect covers vendor proposal requests, evaluation and validation of proposals, and procurement methods. (0603-315, 325) **Class 4, Credit 4**

0603-570 Introduction to Computer Graphics

A study of the hardware and software principles of computer graphics. Topics include an introduction to the basic concepts, 2-D transformations, viewing transformations, display file

structure, geometric models, picture structure, interactive and noninteractive techniques, raster graphics fundamentals, 3-D fundamentals, graphics packages, and graphics systems. Students will use and develop a graphics software system based on an accepted graphics standard. Programming projects will be required. (Third-year standing in Computer Science)**Class 4, Credit 4**

0603-571 Computer Graphics Laboratory

This project-oriented course will build on topics developed in 0603-570. Expanded topics will 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 which incorporates several of the above areas. Programming projects will be required. (0603-570)**Class 4, Credit 4**

0603-580 Language Processors

A course exposing students to issues in the design of a variety of language processors and translators. The basic concepts will be presented in conjunction with the design of several such programs (e.g., assemblers, compilers, linkage editors, and processors). Programming projects will be required. (0601-450 and 0601-306 or 309)**Class 4, Credit 4**

0603-590 Seminar in Computer Science

Current advances in computer science (Prerequisites set by instructor)**Class 2-4, Credit 2-4**

0603-599 Independent Study

Faculty-directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to study particular computer science topics in greater depth. (Faculty and departmental approval are required prior to registration. A maximum of two independent study courses is allowed) **Class 4, Credit 4**

0603-690 Seminar in Computer Science

Current advances in computer science. Open to graduate students and fourth- and fifth-year undergraduates. (Prerequisites set by instructor)**Class 1-4, Credit 1-4**

PACKAGING SCIENCE

0607 -201 Principles of Packaging Registration #0607-201

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 will be 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, Lab 3, Credit 3**

0607-302 CAD Drawing

A course in computer-aided drafting (CAD). Students will learn how drawing is accomplished using a CAD application package. Course begins with basics and progresses to advanced CAD practices. Drawing assignments required, concentrating on packaging applications. (0607-301) **Class 1, Lab 3, Credit 3**

0607-311 Packaging Materials I Registration #0607-311

The manufacture, physical and chemical properties, and uses of common packaging materials. Emphasis is on metals and plastics used in packaging, and adhesives, propellants, and other component materials. (0607-201) **Class 4, Credit 4**

0607-312 Packaging Materials II Registration #0607-312

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 will be presented, and students will 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, Lab 4, Credit 3**

0607-321 Rigid Containers

A detailed study of primary packages. History, manufacturing processes, characteristics, and applications for containers in direct contact with the product. Structural design, chemical compatibility and suitability of container for intended use will be analyzed for basic container types. Students will practice structural design and testing of prototype containers. Primary emphasis will be on rigid paperboard, glass, plastic and metal containers. (0607-301, 311, 312)**Class 2, Recitation 1, Lab 2, Credit 4**

0607-322 Flexible Containers

Corollary course for 321. Primary emphasis will be on flexible paper, foil, plastic, and laminated materials, and selected processing techniques. (0607-301, 311, 312)**Class 2, Recitation 1, Lab 2, Credit 4**

0607-341 Computer Applications

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, Lab 4, Credit 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. This course is open only to packaging majors and is 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 will be considered. Students will gain practice in setting up complete production lines for packaging various products. (0607-321, 322) **Class 2, Lab 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 will be studied. (0607-301, 321, 322) **Class 2, Lab 4, Credit 4**

0607-433 Packaging for Marketing

The interrelationship between packaging and marketing, detailing how the retail consumer package can be used as a marketing tool.. The course 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 will be considered. Students will gain practice in the development of a complete package system. (0607-431, 432) **Class 2, Lab 4, Credit 4**

0607-462 Packaging Regulations

A detailed study of federal, state, and local regulations that affect packaging. History of the development of packaging law; detailed study of recent packaging regulations, including the Fair Packaging and Labeling Act and the Poison Prevention Packaging Act; consideration of Food and Drug Administration regulation of packaging, including requirements for tamper evident packaging;

hazardous materials packaging regulations administered by the Department of Transportation; freight classifications, freight claims, the Interstate Commerce Act as it applies to shipment of goods in packages; 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 and Vibration

A study of the factors involved in analyzing potential damage to packaged items resulting from impact or vibration forces. Students will be expected to master basic mathematical and physical concepts and to use various pieces of testing equipment. (0607-432)**Class 2, Lab 4, Credit 4**

0607-499 Packaging Co-op

One quarter of appropriate work experience in industry. Two quarters of co-op experience are required. (0607-321, 3221) **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 will be taught, as well as equipment operation and evaluation procedures. (0607-322, SPSP-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 will be discussed and compared with typical industry practice. Other topics will include PERT, value analysis, and the impact of regulatory agencies upon packaging from a management standpoint. (Professional elective) **Class 3, Recitation 1, Credit 4**

0607-524 Packaging Economics

A study of firm behavior with concentration on production costs and revenues. Market structures will be analyzed in order to develop an understanding of how packaging fits into the general economy. Students will be 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 and the Environment

Consideration of packaging in a social context. Factors which enhance secondary use, recycling, recovery of resources, and proper disposal will be discussed. Package design in relation to solid waste disposal and materials and energy shortages will be considered. Other topics of current social interest will be discussed. Primarily a discussion class for senior students. Open to non-majors. (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, Lab 2, Credit 4**

0607-555 Military and 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, Lab 2, Credit 4**

0607-568 Food Preservation and Packaging

Study of food products, common methods of processing and preservation, impact on quality and nutritional value of the product, and the relationships with common packaging methods and distribution practices. (0607-432; professional elective)**Class 3, Lab 2, Credit 4**

0607-570 Point of Purchase Displays

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. (Course is intended to be an interdisciplinary, senior elective for students in packaging, packaging design, marketing, retailing and printing.) (Professional elective)**Class 2, Lab 4, Credit 4**

0607-577 Packaging Internship

This course number is used by students in the Packaging Science program for earning internship credits. The number of credits and the nature of on-location experience is determined by the student's advisor, subject to approval of the department.**Credit variable 1 -8**

0607-590 Senior Thesis

An in-depth study of some phase of packaging which will enable the student to make use of the knowledge and skills acquired during the course of the program.**Arranged, Credit 4**

0607-598, 599 Independent Study

Independent study, in consultation with the instructor, on any packaging-related topic. (Independent study total credit allowed is limited to a maximum of 8 credits)**Credit variable 1 -4**

SCHOOL OF ENGINEERING TECHNOLOGY

0606-099 Co-op Preparation

This course is intended for third-year SET students. It introduces the concept of cooperative education and the services of the Office of Cooperative Education and Placement, and provides the student with basic job search skills: research and identification of potential employers; resume writing and correspondence; interviewing techniques. Ethics of the job search and expectations of employers will also be covered. This course is required for all SET students before registering for co-op and using the services of the Office of Cooperative Education and Placement. **Class 1, Credit 0**

0606-101 Engineering Technology Seminar

A seminar course for the undeclared engineering technology student. Information and activities are presented to introduce students to the various engineering technology programs. Included will be discussions, presentations, and student activities enabling students to become familiar with RIT resources, adjust to college and college-level course work, and identify career interests. Students will practice communication skills, work in teams, and discuss issues related to college life. **Class 3, Credit 2**

CIVIL ENGINEERING TECHNOLOGY

0608-101, 102 Architectural & Structural Blueprint Reading

(Residential, Commercial) Reading and interpretation of architectural and structural drawings; use of scales, symbols for materials, drafting conventions, schedules and specifications; freehand sketching, elementary mathematics, and some quantity take-off. **Credit 3**

0608-198 Introduction to Civil Engineering Technology, 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 P.E. registration and N.I.C.E.T. certification. **Class 1, Credit 1**

0608-199 Introduction to Civil Engineering Technology, 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 P.E. registration and N.I.C.E.T. certification. **Class 1, Credit 1**

0608-201 Architectural Drawing I

Introduction to architecture, the role of architectural drawings in the construction process, and basic drafting techniques used in architectural drawing including pencil techniques, freehand sketching and lettering. Introduction to drawings required in the traditional construction drawing set. **Credit 2**

0608-202 Architectural Drawing II

Introduction to the techniques of the architectural design process including preliminary presentation drawings, isometrics, and perspectives. Preparation of drawings required in the design and construction process of different building types. (0608-201) **Credit 2**

0608-203 Architectural Drawing III

Advanced study in the complete architectural process required in developing more complex building types. Preparation of design and schematic drawings of different building types with concentration on detail and construction drawings. (0608-202) **Credit 2**

0608-204, 205, 206 Architectural Drawing IV, V, VI

Design development, presentation and working drawing preparation including: plans, elevation, sections, and details of different building types. Site planning, perspective presentation and related design skills. (0608-203) **Credit 2**

0608-207, 208, 209 Architectural Drawing VII, VIII, IX

Advanced design development, presentation and working drawing preparation including: plans, elevation, sections, and details of different building types. Site planning, perspective presentation and related design skills. (0608-206) **Credit 2**

0608-210 Engineering Graphics

An introduction to engineering graphics as a means of communication in the technological occupations of manufacturing and construction. The course is laboratory oriented and provides development of basic graphical communication skills using manual and computer-aided drafting (CAD) techniques. The course is designed for students with no knowledge of engineering drawing.

Class 2, Lab 4, Credit 4

0608-220 Civil Engineering Graphics

This course includes background information and actual work performance related to the preparation of plans and drawings for civil engineering works, as well as a basic exposure to the graphics of interfacing disciplines: architecture, mechanical and electrical engineering, and landscape architecture. It builds upon the fundamentals of graphics learned in 0608-210, Engineering Graphics, and focuses on the actual drawings and related documents used in building civil engineering works: for example, site development, structures, water and wastewater transport systems, water and wastewater treatment facilities, highways, and bridges. **Class 2, Lab 4,**

Credit 4

0608-231 Surveying

Introduction to surveying including measurement of horizontal distances, leveling, theory of error, bearings and azimuths, measurement of angles, tacheometry, traverse surveys and computations. Several field trips provide familiarization with instrument use. (High school algebra and trigonometry or equivalent) **Credit 4**

0608-241 Building Construction (Materials)

Study of basic construction materials including concrete, masonry, metal, wood, bitumens, plastics, coatings, glass and glazing. Basic physical properties of materials are defined and emphasis is placed on practical applications. Design of concrete mixtures and basic stress-strain relationships are covered. **Credit 3**

0608-242, 243 Building Construction I, II (Methods and Procedures)

Elements and details of building construction. Study of fundamental design concepts, building codes, foundations, wood, steel and concrete construction, specifications and construction management. (0608-241 or equivalent) **Credit 3**

0608-251 Construction Contracting

Construction activities from the contractors' viewpoint. Bidding procedure from bid advertisement to bid opening; bonds, insurance, contracts, subcontracts and bidding documents; construction safety, project planning, scheduling and control. Governmental controls including zoning and building codes. **Credit 3**

0608-252, 253 Building Estimating I, II (Residential, Commercial)

Basic cost estimating of residential and commercial construction projects including types of estimates, quantity taken off, unit price, material and labor costs, overhead, profit and contingencies. Job cost data sources and cost indices are reviewed. (0608-101 or 0608-203 or equivalent) **Credit 3**

0608-301 Structural Theory

Analysis of loads, determination of reactions, horizontal and vertical shear, shear diagrams, bending moments, axial and combined stress, truss analysis, deflections and introduction to computer analysis. (0610-302 and 0610-303 or equivalents) **Credit 4**

0608-302 Structural Design

Fundamentals of structural design including the basic design concepts of structural steel, reinforced concrete, and timber: design of beams, columns, and trusses including connections. (0608-301 or equivalent) **Credit 4**

0608-311, 312, 313 Architectural Projects

Advanced work in architectural drafting to develop specialized skills in design development, contract documents, frame construction, shop drawings, site planning or other related areas.

Program to be planned individually to match the individual requirements of each student. (0608-206 or equivalent) **Credit 2**

0608-320 Plane Surveying

This course provides an introduction to plane surveying. Topics include note keeping, line and grade measurement, leveling, vertical and horizontal measurement, care of instruments and stadia. The course exposes the student to all aspects of plane surveying in regard to civil engineering technology in a 'hands-on' concept involving both office and field work. (Trigonometry). **Class 3, Lab 2, Credit 4**

0608-330 Materials of Construction

A study of the materials used in Portland cement and asphalt cement concrete. Laboratory work will include mix design and the testing of concrete mixes and materials by ASTM and AASHTO Standard Methods. **Class 3, Lab 2, Credit 4**

0608-340 Route Surveying

Introduction to route surveying and earth work. Topics include simple horizontal curves, reverse and compound curves, transitional spiral curves, vertical curves, plane and profile views, cross sections, volume computations, and mass diagrams. Laboratory exercises include layout of curves in field. (Plane Surveying). **Class 3, Lab 2, Credit 4**

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, and effect of water on soil characteristics. Laboratory tests commonly used to evaluate engineering properties of soils are performed. (0610-302, 303 or equivalent) **Class 3, Lab 2, Credit 4**

0608-380 Elementary Structures

Application of the principles of Statics and Strength of Materials to the design of basic structural elements such as beams, columns, trusses, slabs, and footings. The emphasis is on structural steel (allowable stress design) and reinforced concrete (strength design), with some time spent on timber members (allowable stress design). There will also be practice in the use of ASIC and ACI specifications. (0610-302, 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; dynamic effects in analysis of material strength. (0610-302, 303) **Class 4, 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 properties of liquids and major laws of fluid mechanics. Operating various laboratory equipment and devices while concurrently taking 0608-420, Hydraulics, for principal theoretical studies of physical and mechanical properties of liquids, hydrostatics, fluid kinematics and dynamics, hydraulic machinery and its operation. **Lab 3, Credit 1**

0608-422 Elements of Building Construction

Elements and details of building construction; study of building codes from a design concept; foundations; wood, steel and concrete construction and wall systems; overview of highway bridges. **Class 4, Credit 4**

0608-432 Water and Wastewater Transport Systems

Discussion of surface and groundwater sources. The hydraulic design of sanitary and storm sewer systems and water distribution systems, including pump systems and storage. (0608-420, 421) **Class 1, Recitation 2, Credit 2**

0608-438 Principles of the Treatment of Water and Sewage

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. (SCHG-272, 276) **Class 3, Lab 2, Credit 4**

0608-444 Mechanical Equipment for Buildings

Presentation of mechanical and electrical equipment used in building construction. The codes applicable to plumbing, heating, air conditioning, and operation and control will be studied. **Class 2, Credit 2**

0608-460 Construction Equipment

Fundamentals of equipment selection; determining equipment requirements based upon the design and capabilities of currently available construction equipment. Emphasis is given to economic aspects of equipment ownership, principles of equipment management, and earthmoving project analysis. **Class 4, Credit 4**

0608-470 Timber Design and Construction

Discussion of the properties of structural lumber including grades, sizes, and design properties. Design of beams, columns, trusses, plywood diaphragms and shear walls. Other topics include glued-laminated timber and nailed joints. The provisions of various building codes are investigated, and the specification of the National Forest Products Association is followed. (0608-404) **Class 4, Credit 4**

0608-480 Groundwater Hydraulics

Groundwater movement, flow-net concept, graded filter design and construction, flow to wells and trenches, dewatering system analysis and design, water-flow cut-off methods and their use for construction. (0608-420 and 527 or permission of instructor) **Class 4, Credit 4**

0608-482 Hydrology

Course presents major theoretical and practical considerations of hydrology in application to study groundwater hydraulics, hydraulic structures, water transportation systems, and transportation engineering. (0608-420) **Class 4, Credit 4**

0608-485 Hydraulic Structures

This course will study analysis and design of dams, spillways, storage reservoirs, canals, tunnels and river diversion systems for the effective utilization of water resources, energy, soil conservation, and flood control. Principles of maintenance and operation of hydraulic structure also will be studied. (0608-432) **Class 4, Credit 4**

0608-490 Structural Analysis

Introduction to the analysis of statically determinate and indeterminate structures by classical and modern techniques. The types of structures 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 and impact loads, determination of degree of indeterminacy, approximate methods (including the Portal Method), slope deflection, moment distribution, and an introduction to matrix methods. Some computer work 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; and design of slabs, beams, columns, and footings. Emphasis is on use of the ACI code. (0608-404 and 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, high-strength bolts, welding, compression members, and beams. Practice in the use of the AISC specifications will be emphasized. (0608-404 and 490) **Class 4, Credit 4**

0608-499 Cooperative Education

One quarter of appropriate work experience in industry. (0606-099) **Credit 0**

0608-500 Labor Relations

Introduction to the fundamentals of labor law and its applications to the construction industry. Topical areas include the Fair Labor Standards Act, Davis-Bacon Act, Title VII of the Civil Rights Act, National Labor Relations Act, hiring halls, pre-hire agreements, strikes and Open Shop construction. Several guest speakers representing government, private industry and organized labor also lecture. **Class 2, Credit 2**

0608-505 Construction Safety

General safe practices in construction operations. Safety standards, both voluntary and mandatory. Employer responsibilities under the provisions of OSHA and state labor law. A portion of this course is audiovisual. **Class 2, Credit 2**

0608-509 Cost Estimating

An introduction to direct cost estimating of a construction project. The estimating techniques reviewed include productivity analysis, material pricing, and quantity take-offs. (0608-422 may be taken concurrently) **Class 1, Recitation 2, Credit 2**

0608-510 Design of Water Treatment Facilities

Principles of water treatment plant design, conceptual and hydraulic design of water purification and conditioning facility. Includes: settling, filtration, softening, disinfection, organics removal, and plant design construction elements. (0608-420) **Class 2, Credit 2**

0608-513 Computer Techniques in Civil Engineering Technology

During the first half of the course, students will work on the RIT VAX/VMS time-sharing system in a computer laboratory. In the second half of the course, classes will be held in the School of Engineering Technology Personal Computer Laboratory, where students will work with IBM-compatible machines. Course topics include becoming familiar with the VAX/VMS and DOS systems; using electronic mail, spreadsheets, word processing, plotting, computer-aided drafting; performing library searches by computer; and using and modifying existing programs dealing with such subjects as matrix algebra and truss analysis. (0602-205) **Class 1, Lab 2, Credit 2**

0608-514 Land Planning

The environmental and social aspects of land planning are covered as well as the engineering and cost considerations. 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**

0608-518 Masonry Design

An introduction to masonry design and construction. Both brick and concrete masonry will be covered, with the emphasis on concrete masonry. Topics covered include terminology, non-reinforced masonry, reinforced masonry, joint reinforcement, types of mortar, design of bearing walls and partitions. Use will be made of various building codes and the publications of the Brick Institute of America, the National Concrete Masonry Association, the Portland Cement Association, and the Masonry Institute of America. (0608-404) **Class 2, Credit 2**

0608-520 Design of Wastewater Treatment 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 will be discussed. Processes, plant design, and construction elements are stressed. (0608-438) **Class 3, Lab 2, Credit 4**

0608-525 Hazardous Waste

Identification, classification and legal aspects of hazardous waste are studied. Topics include: generator, transport, storage and disposal of hazardous waste with emphasis on chemical landfill and incineration of hazardous and toxic wastes. (0608-438) **Class 4, Credit 4**

0608-527 Soil Mechanics and Foundations

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, study of modern and traditional soil improvement technology. (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 will include tests in internal friction by direct shear, unconfined compression, triaxial compression, consolidation and compaction. **Lab 2, Credit 1**

0608-530 Transportation Engineering

The course 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. (Route Surveying) **Class 4, Credit 4**

0608-535 Pavement Design

This course expands on the background of the Transportation Engineering core course, providing additional detailed engineering knowledge on pavement design. Included with the theoretical knowledge will be the development of, and practice in, the necessary design skills. 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 attached in a practical manner, utilizing the expertise of national organizations and state highway departments involved in this work. (0608-330, 530) **Class 3, Lab 2, Credit 4**

0608-544 Contracts and Specifications

This course 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 and Practices

A treatment of legal and ethical aspects of the profession; review of codes of ethics and current professional problems; featuring several guest speakers representing different segments of the civil engineering 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 non-construction students. **Class 4, Credit 4**

0608-556, 557 Wastewater Treatment Plants Operation and Control I and II

A self-paced, audiovisual course. Emphasis on the functional aspects of wastewater treatment plant operation. Discussion of the significance of the results of laboratory analysis and interpretation and application to the control of treatment processes. (0608-438 and permission of instructor) **Credit variable 1-4**

0608-560 Construction Project Management

An introduction to basic construction management and organization. Topics include company and project organization, bonds, insurance, bidding, cost and financial accounting, and project planning and scheduling. (0608-509 and 0608-422 may be taken concurrently) **Class 4, Credit 4**

0608-561 Construction Project Management II

An overview of advanced applications in construction management through precedence modeling. Both CPM and PERT precedence models will be used for scheduling, resource leveling, and cost control. (0608-560) **Class 4, Credit 4**

0608-570 Principles of Dynamics in Civil Engineering Technology

Study of basic principles of dynamics and their application for the analysis of typical problems inherent in various fields of civil engineering technology such as water transportation systems,

hydraulic engineering, structural systems, and geotechnical engineering. Principle topics include kinematics of particles and rigid bodies, concepts of work and energy, force-impulse and momentum, introduction to vibration. Civil engineering technology application topics include wave propagation and hydraulic shocks, effects of moving loads, cycle loading and impacts, phenomenon of fatigue, earthquake effects, and soil liquefaction conditions.(0608-404, 420, 490)
Class 4, Credit 4

0608-580 Senior Construction Seminar

Special topics are offered in a seminar format. In the past topics have included construction finance, cost engineering, quality and production control, special engineering subjects, and value engineering. (Seniors only; permission of the instructor)**Class 3, 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 4 quarter credit hours of independent study projects and 2 sections in any quarter, plus a maximum of 8 quarter credit hours of independent study credits earned toward degree requirements.**Credit variable 1-4**

ELECTRICAL ENGINEERING TECHNOLOGY

0609-201 DC Circuits

An introduction to DC circuit analysis techniques. Topics include resistance, inductance, and capacitance, with circuit techniques of Ohm's Law, current-voltage division, simplification of series, parallel, bridge, and ladder networks, Kirchhoffs Laws, Thevenin's and Norton's Theorem, Mesh and Nodal Analysis and Superposition. (Corequisite 1016-204)**Class 3, Lab 2, Credit 4**

0609-202 AC Circuits

AC circuits and devices with topics of phasor algebra, reactance, impedance, AC power and power factor, resonance, maximum power transfer, frequency, bandwidth, and three-phase circuits. Use of the computer to solve and simulate circuit problems. (0609-201; corequisite 1019-420)**Class 3, Lab 3, Credit 4**

0609-203 Electronics I

An introduction to semiconductor theory covering the basics of semiconductor materials and the structure of P and N type semiconductors. Emphasis will be placed on diode and bipolar transistor characteristics, specifications, modeling, and applications. (0609-202; 1019-420)**Class 3, Lab 3, Credit 4**

0609-207 EETFirst-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.**Class 1, Credit 1**

0609-231 Logic

Introduction to digital logic, number systems and codes, TTL gates, simplification of logic expressions, combination logic and sequential logic.**Class 3, Lab 2, Credit 4**

0609-271 Telecommunication Fundamentals

A survey of and introduction to the structure and regulation of the telecommunications industry is provided. 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**

0609-337 Electric Machines/Transformers

Topics include power concepts, magnetism, electro-magnetic force, fields, armature, commutators, rotors, stators, brushes, starters, controllers, DC motors, DC generators, AC motors, alternators, single-phase and three-phase dynamos, three-phase circuits, phasors and transformers-properties, isolation, efficiency and voltage regulation. Control of electric motors by solid state devices is introduced. (0609-201, 202, 203)**Class 3, Lab 2, Credit 4**

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. Included is an introduction to frequency response of circuits. (0609-203) **Class 3, Lab 2, Credit 4**

0609-362 Electronics III

A continuation course in the analysis and design of simple linear circuits for students who have completed the introductory course sequence in transistor amplifiers. Included is the analysis of multistage transistor amplifiers and the differential amplifier. Emphasis is on the operational amplifier and its applications. Topics include the ideal operational amplifier, non-ideal characteristics, summing amplifiers, and integrators. Also included is an introduction to special purpose electronic devices (SCR, TRIAC, LCD, etc.) (0609-361) **Class 3, Lab 2, Credit 4**

0609-363 Electronics IV

This course applies the concepts of circuits and electronics to basic communication circuits for amplitude and frequency modulation. Topics studied are AM and FM transmission and reception, phase-locked loops, synthesizers, oscillators, and SSB communication systems (0609-362) **Class 3, Lab 2, Credit 4**

0609-403 Advanced Circuit Theory

An introduction to advanced circuit analysis techniques, including signal decomposition by Fourier Series and transient analysis using the LaPlace Transform. (1019-421) **Class 3, Lab 2, 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 lead-lag compensation to improve system performance is included. (0609-403, 1019-422) **Class 3, Lab 2, Credit 4**

0609-408 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) **Lecture 3, Lab 2, Credit 4**

0609-411 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, P.F. correction, and basics of transformers. The laboratory is an integral part of the course, and the experiments complement lecture material. **Class 3, Lab 2, Credit 4**

0609-412 Electrical Principles for Design II

An introductory survey course in the basics of analog and digital electronics. Analog topics include basic semiconductors, transistor circuits, operational amplifiers. Fundamental digital logic concepts include an introduction to microcomputers. (0609-411) **Class 3, Lab 2, Credit 4**

0609-413 Applied Microprocessors

Applications of microprocessors for Manufacturing Engineering Technology students. Application of the INTEL 8085 microprocessor, with emphasis on the interface to SDK-85 microcomputers. Microcomputers as applied to robotics and numerically controlled machinery (0609-412) **Class 3, Lab 2, Credit 4**

0609-414 Basic Electrical Principles

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. (1019-421) **Class 3, Lab 2, Credit 4**

0609-437 Applications of Computer Programming

The objective of this course is to learn to write good, well documented programs using C as the programming language. The emphasis of the program will be to learn modern programming techniques and methods of solving problems using computers. **Class 4, Credit 4**

0609-439 Microcontrollers

An advanced course in microprocessors emphasizing interfacing to standard input/output and control devices. The particular microcontroller employed is a function of instructor availability and interest. (0618-301, 303) **Class 3, Lab 3, Credit 4**

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. (0609-403, 0618-225, 320) **Class 3, Lab 2, Credit 4**

0609-472 Telecommunication Concepts

This course introduces the student to digital modulation, multiplexing, microwave, and communications concepts. The time and frequency domains of different types of digital modulation and multiplexing are studied in the laboratory with spectrum analyzers. Data communications and protocols are reviewed and examined in the laboratory with protocol analyzers. Software is used to display the various types of digital modulation, eye diagrams, and vector displays. (0609-363; 0618-301) **Class 3, Lab 2, Credit 4**

0609-473 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. (0609-363) **Class 3, Lab 2, Credit 4**

0609-474 Voice Communications: Principles and Technology

Provides an understanding of basic telephony concepts and associated voice-based applications. Various telephone architectures are studied. Topic highlights include audiotext, ISDN (Integrated Service Digital Networks), and voice mail. Practical assignments emphasize "real-world" applications. (0609-271, 0602-200 or 208) **Class 3, Lab 2, Credit 4**

0609-475 Switching Technologies

To familiarize the student with the various switching methods and equipment used in the telephone network. Voice and data switching methods such as matrix, circuit, message packet, burst, and LAN are studied and compared. The function of the switch in the network and network routing methods are examined. (0609-474, 1016-309) **Class 4, Credit 4**

0609-476 Local Area Network Administration

This course uses Novell Netware to study local area network administration issues such as directory structures, drive mappings, security, printing, user environments, and services of network utilities. Novell certificate of completion for the associated Novell courses completed will be provided. The textbooks for the course list the courses that will be completed. (0609-472 or 0602-411) **Class 3, Lab 2, Credit 4**

0609-477 Networking Technologies

Provides a practical overview of the data communications environment and concepts; historical evolution of the standards organizations; and the connection of mainframe, wide area networks (WANs), and local area networks (LANs). Topic highlights include the interrelationship of the OSI model, protocols, local area networks, services, and topologies of LANs and WANs. Novell certification for the associated Novell courses will be provided at the end of the course. A list of the Novell courses is provided in the required textbooks for the course. (0602-411 or 0609-472) **Class 4, Credit 4**

0609-480 Telecommunications Policy and Issues

This course provides an introductory overview of domestic and global information/telecommunications policy, standards, and regulation. Topic highlights include the European Unification, the automatic number identification (ANI)/call ID (CID) debate, privacy in the information age, transborder flow of information and security, and Personal Communications Network (PCN) standards. (0609-271) **Class 4, Credit 4**

0609-499 Cooperative Education

One quarter of appropriate work experience in industry. (0606-099) **Credit 0**

0609-520 Electrostatic and Magnetic Fields

Basic principles of electrostatic and magnetic fields including vector analysis, Coulomb's Law, field intensity, Gauss's Law, energy and potential gradient, conductors, dielectrics, capacitance, Biot-Savart Law, Ampere's Circuit Law, Stokes' Theorem, magnetic flux density, force on current element and magnetic boundary conditions. (1019-422)**Class 3, Recitation 2, Credit 4**

0609-524 Microwave Systems

Microwave power sources, waveguide transmission systems, measurement of standing waves, impedance, Smith charts, power flow in waveguides, solid state microwave devices, microwave antennas and microwave communication system design are discussed. (0609-520)**Class 3, Lab 2, Credit 4**

0609-534 Analog Communication Systems

The Fourier Series is reviewed, and the Fourier Transform is introduced. Circuit design and systems concepts for AM, DSB, SSB, VSB, and FM of each type of modulation is determined. The noise figure, noise temperature, and signal-to-noise ratio of a system is explained. (1019-423)**Class 3, Lab 2, Credit 4**

0609-535 Telecommunication Systems

Various types of digital and data communication systems and their components are studied. Digital communication modulation schemes and transmission techniques are introduced. Data communication concepts such as protocols, error control, transmission methods, coding, and circuit configurations are explained. Microwave radio and satellite communication systems concepts are studied with software in the laboratory. (0609-534 or knowledge of basic electronic communication concepts such as AM/FM transmission, tuned circuit and filter concepts, and basic digital theory. **Class 3, Lab 2, Credit 4**

0609-547 Digital Processing of Signals

Basic concepts of linear systems are covered, followed by an introduction to digital signal processing. Emphasis is placed on digital filter design and digital spectral analysis. Significant programming projects are assigned. (1019-423)**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. The symmetrical component method of analysis is introduced. (0609-337, 411, or 414)**Class 3, Recitation 2, Credit 4**

0609-551 Protective Relaying

The physical construction and characteristics of electromechanical relays, short circuit calculation and line, bus, transformer and motor generator protection are studied. Solid state relays, instrument transformers, and telecommunications and supervisory control are included. (0609-402, 0609-550, or equivalent)**Class 4, Credit 4**

0609-552 Power Systems II

The symmetrical component method of three-phase circuit analysis is used for fault analysis. Lightning and surge protection, load flow, economic operation, and system stability are covered. System protection is introduced. (0609-550, 411, 414, or permission of instructor)**Class 3, Recitation 2, Credit 4**

0609-554 Electronic Optic Devices

An introductory course in the basics of optoelectronics. Basic optics is reviewed. Topics covered include the introduction to optics, lenses and optical systems; light sources and transmitters; modulation; light detectors and receivers; fiber optics, and lasers. (0609-442)**Class 3, Lab 2, Credit 4**

0609-560 Microelectronics I

Fabrication techniques of bipolar devices are presented: crystal growth, oxide growth, lithography, diffusion, epitaxy, ion implantation, and metallization. The physical basis of semiconductor operation is introduced along with IC transistor design considerations.**Class 3, Recitation 2, Credit 4**

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0609-561 Microelectronics II

The fabrication techniques of MOS/CMOS devices are presented along with the physical basis of their operation and use in IC devices. VLSI design procedures using MOS devices are introduced and developed. (0609-560) **Class 3, Recitation 2, Credit 4**

0609-571 Network Engineering

This course uses network simulation software to study the basic concepts for the design of telecommunication networks and the associated algorithms. Probability, statistics, and the erlang tables are reviewed, and telecommunication queuing systems are introduced. Centralized network design topics such as loss and delay, graph, and routing algorithms are studied in the course. (1016-309, 0609-477) **Class 3, Lab 2, Credit 4**

0609-572 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 lab-based assignments emphasize 'real world' experience. (0609-474, 477) **Class 4, Credit 4**

0609-574 Network Planning and Design

This advanced course exposes the student to the practical aspects of network design. Network design, simulation, and diagnostics form the laboratory experience for participants. The emphasis is on providing the student with hardware and software design skills applicable across a multi-vendor environment. (0609-571, 572) **Class 4, 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**

MECHANICAL ENGINEERING TECHNOLOGY

0610-101 Freshman Seminar

A seminar course for incoming freshmen in the Mechanical Engineering Technology and Manufacturing Engineering Technology programs. Course will include discussions, presentations, field trips, and student activities that will help students become familiar with RIT resources, adjust to college and college-level course work, and identify career interests. Students will practice communication skills, work in teams, and discuss issues such as values, diversity of cultures, and stress. **Class 1.5, Credit 1**

0610-102 Sophomore Seminar

A seminar course for sophomores in the Mechanical Engineering Technology and Manufacturing Engineering Technology programs. Course will consist of panel discussions with professionals in career areas such as manufacturing, design, construction, facilities, and technical sales. There will be field trips and panel discussions with 5th-year students about co-op and career opportunities. Students will become more familiar with career paths open to them and will be able to visit potential work environments and develop co-op interests. **Class 1.5, Credit 1**

0610-211 Introduction to Materials Technology

This course provides a survey of engineering materials and how they are matched to the service requirements of the component. Emphasis will be on metals-their structure, properties, and applications. (0610-304 concurrently) **Class 3, Credit 3**

0610-212 Metrology

A course dealing with precision measurements as applied to the manufacturing processes. Gaging of dimensions, surfaces, and contours by various techniques are among the topics covered. (0610-220) **Class 1, Lab 2, Credit 2**

0610-220 Mechanical Design Drawing

A course dealing with the preparation of working drawings and their relation to actual production. Emphasis is placed on dimensioning and tolerancing, both conventional and geometric, along with sectional views and threads and fasteners. (0608-210) **Class 2, Lab 4, Credit 4**

0610-302 Introduction to Statics

An introduction to statics covering forces, moments, vectors, equilibrium, friction, areas, volumes, and masses. (SPSP-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 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. (0610-211 concurrently) **Class 0, Lab 2, Credit 1**

0610-305 Pneumatic and 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 will be studied. (0610-302) **Class 3, Lab 2, Credit 4**

0610-306 CAD Applications in Mechanical Design I

This is an applications course in CAD which uses the fundamental concepts and software studied in Introduction to CAD, CAD I and CAD II. Instruction will be provided in geometric dimensioning and tolerancing. Laboratory exercises will emphasize machine component design problems. (0617-260 or 261) **Class 2, Lab 4, Credit 4**

0610-307 CAD Applications in Mechanical Design II

This is the second of a two-course sequence in CAD applications. Students will have the opportunity to improve their CAD skills by solving more extensive problems. Instruction will be provided in statistical tolerancing. Laboratory exercises will emphasize machine design problems. (0610-306) **Class 2, Lab 4, Credit 4**

0610-308 Kinematics

A study of basic kinematics, using analytical, graphical, and computer-aided techniques. Kinematics analysis of mechanisms and machine components. The design of cams, gear trains, linkages, flexible machine elements, hydraulic mechanisms. Case studies of mechanisms. (0610-303) **Class 3, Lab 2, Credit 4**

0610-315 Principles of Mechanical Design I

A course in mechanics of materials as applied to mechanical design. Principles of deflection, stress, bending, and torsion in parts. Working stresses and failure in parts. Design of shafts, springs, 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**

0610-330 Computation Methods in MET

Applications of computing methods to the solution of typical mechanical technology problems using RIT academic computing system and personal computers. Concepts of BASIC language are presented with student writing programs to solve specific technical problems. Topics consist of both fundamentals of programming and mechanical technology applications. (0610-303, 1017-212) **Class 3, Lab 2, Credit 4**

0610-351 Electro-Mechanical Systems Design

Concepts, principles, and analysis of components used in the design of control systems. This includes electrical, mechanical, thermo, and fluid system components. The analysis of control types and stability of various control systems are also presented. (0609-337, 0610-303) **Class 3, Lab 2, 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. The course 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 the geometry of motion. Kinetics relates the forces on objects to their resulting motion. This includes the study of Newton's Laws of Motion, energy methods, and impulse and momentum and kinetics. (0610-404, 1019-421, or concurrent) **Class 3, Recitation 2, Credit 4**

0610-406 Dynamics of Machinery

A study of the kinematics of machine elements. Applications in robotics mechanisms are studied. Both graphical and computer methods are used. (0610-405 and 432) **Class 3, Lab 2, Credit 4**

0610-407 Mechanical Engineering Technology Laboratory I

A course in mechanical laboratory techniques and the preparation of laboratory reports; experimental work in strength of materials, experimental stress analysis and dynamics. Instruction in the preparation of laboratory reports. (0610-405 and 432 concurrently) **Class 2, Lab 2, Credit 2**

0610-408 Applied Mechanics I

Elements of statics and strength of materials. Topics include plane equilibrium, friction, stress, strain, torsion, and the bending of beams. Offered as a service course to electrical engineering technology and electrical/mechanical technology students. (1017-211) **Class 3, Recitation 2, Credit 4**

0610-409 Mechanical Engineering Technology Laboratory II

A course in laboratory techniques, the analysis of experimental results 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; 0610-416 concurrently) **Class 1, Lab 2, Credit 2**

0610-410 Applied Mechanics II

The basic concepts of statics and strength of materials are briefly reviewed. Additional strength of materials topics are introduced with the view of developing basic analytical procedures for the preliminary design of engineering structures and machine components. Topics include combined stress, transformation of plane stress, principal stresses and maximum shear stress, Mohr's circle, thin walled pressure vessels, columns, and structure stability. The fundamentals and kinematics and kinetics of particle motion are developed, including the study of Newton's Laws of Motion, energy methods, and impulse and momentum. Rigid body analysis is previewed. Offered as a service course to electrical engineering technology and electrical/mechanical technology students. (0610-408, 1016-421 concurrently) **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

The use of computers to solve problems encountered in mechanical engineering technology will be emphasized. This will include an introduction to the RIT academic computing system and introduction to the use of personal computers. Instruction will be provided in word processing, spread sheet programming, plotting and other applications programs. Assignments will be based on problems encountered in mechanics of materials, dynamics, materials testing, energy analysis, etc. (0610-330) **Class 1, Lab 2, Credit 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 advisor)**Class 3, Recitation 2, Credit 4**

0610-441 Thermodynamics and 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. (1019-421 or permission of advisor) **Class 3, Recitation 2, Credit 4**

0610-442 Heat Transfer

The first course in heat transfer. The theory and application of the fundamentals of heat conduction, convection, and radiation. The design and applications of heat transfer-apparatus. (0610-440, corequisite 0610-460)**Class 3, Lab/Recitation 2, Credit 4**

0610-451 Vibration and 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 conservation principle, dimensional analysis, and fluid momentum. Also covered are laminar and turbulent flow in pipes and products, fluid machinery, fluid meters, and lifting vanes. (1019-422 or permission of advisor)**Class 3, Recitation 2, Credit 4**

0610-465 Thermofluid Laboratory

Laboratory experiments in thermodynamics, fluid mechanics and heat transfer. Special emphasis is placed on report preparation and computer-aided data reduction. (0610-440, 460)**Class 1, Lab 3, Credit 3**

0610-499 Cooperative Education

One quarter of appropriate work experience in industry. (0606-099)**Credit 0**

0610-506 Machine Design I

The study of static and fatigue failure of machine elements and the design and analysis of fasteners, springs, and spur gears. (0610- 405, 432)**Class 3, Lab/Recitation 2, Credit 4**

0610-508 Machine Design II

The study of selected topics such as bearings, helical, bevel and worm gears, belts, chains, clutches and brakes. Computer applications are presented for many of the topics studied. (0610-506) **Class 3, Lab/Recitation 2, Credit 4**

0610-509 Product Design

Integrates the product development and design process with materials, manufacturing methods, process planning, assembly, testing, reliability, and quality assurance. Special emphasis will be placed on part design and the assembly operation. Students will learn how to reduce material costs, part costs, assembly time, and the number of parts. (4th-year status)**Class 3, Lab/Recitation 2, Credit 4**

0610-512 Computer Integrated Mechanical Design

The use of computers in solving mechanical design problems will be emphasized. This will include introduction of data manipulation, plotting, graphics, applications programming, and finite element analysis. (0610-432, 506) **Class 3, Lab 2, Credit 4**

0610-515 Plastics Processing Technology

A course of dealing with the 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 Plastics Product Design and Material Selection

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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 advisor)**Class 4, Credit 4**

0610-530 Instrumentation

The basic approach to the design and use of pressure, temperatures, flow, humidity and liquid level measurement instrument transducers. Techniques of test, calibration, and proper use will be demonstrated. Principles of experimentation and computerized data reduction are examined. (0609-411, 0610- 460, 1019-422)**Class 3, Lab 2, 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. (0610-440, 460)**Class 4, Credit 4**

0610-542 HVAC System Engineering

Principles and applications of refrigeration, air conditioning, comfort heating, and ventilating. Thermodynamics of air conditioning, psychometrics, moisture calculations; also related heat transfer topics. (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**

0610-545 Solar Thermal Applications

Study of analytical methods to model and predict the performance of solar energy systems. The emphasis will be on the application and design of systems appropriate for the available technology. Additional areas of study include the economic feasibility and analysis of potential solar energy applications, selection of appropriate equipment based on the energy value and economic-based adjustment of system designs derived from technical performance optimizations. (0610-440)**Class 4, Credit 4**

0610-570 Robust Design

The fundamental principles of robust design are developed, and the history of the robust design engineering methodology is presented. The concepts of loss function, concept selection, parameter design, and tolerance design will be covered in detail. A structured design engineering methodology is taught with strict attention to the importance of linking engineering knowledge to Taguchi's approach to designed experiments. Metrics and analysis techniques are developed to optimize the performance of product or process components in spite of the variability of their design, manufacturing, or customer-use environments. Specific attention will be paid to case studies to reinforce the students' conceptualization of the methods and their focus on engineering of optimized products and processes. (Fifth-year status or department approval)**Class 4, Credit 4**

0610-599 Independent Study

A supervised investigation within a mechanical technology area of student interest. (Permission of instructor and departmental approval are required.)**Credit variable 1-4**

MANUFACTURING ENGINEERING TECHNOLOGY

0617-200 Survey of Computer-Aided Design (CAD)

The course will provide a broad survey of computer-aided design. It will include the role of design in manufacturing, automation of design functions, CAD systems, functions and components of CAD, integration of CAD with other manufacturing systems, and a survey of CAD systems in the market. **Class 2, Credit 2**

0617-220 Manufacturing Processes I

This course will introduce the student to basic metal cutting machine tool operation, proper machining practices and cutting tool selection. Hands-on experience will be emphasized through lathe, milling machine, drill press, band saw, grinder and precision layout work. The course will provide the student with the knowledge and the 'how-to-do' skills of manufacturing. (0608-210)**Class 3, Lab 3, Credit 4**

0617-260 Introduction to CAD

This is a first course in CAD. It introduces the basic concepts in automated drafting and design. The course will be taught with the help of PC workstations and CADKEY CAD system. (0608-210)
Class 3, Lab 2, Credit 4

0617-261 Introduction to CAD-A

This is a first course in CAD and introduces the basic concepts in automated drafting and design. It will be taught with the help of PC workstations and AUTOCAD CAD system. (0608-210)
Class 3, Lab 2, Credit 4

0617-330 Introduction to Computer

INTEGRATED MANUFACTURING

The course provides an overview of the various technologies used to accomplish and integrate the manufacturing functions. It deals with such technologies as CAD, CNC, GT, MRP, JIT, SPC, PLCS, robotics, vision, and others and how they are used to integrate the manufacturing functions in an organization. (0617-220, 260)
Class 3, Lab 2, Credit 4

0617-331 Programmable Logic Control Systems

This course deals with the principles and application of programmable logic controllers. Topics include PLC hardware, programming, and application of PLCs.
Class 3, Lab 2, Credit 4

0617-372 CAD Applications to Tool Design

This course deals with the design of tools used in the manufacturing processes. The course will employ a CAD system for design purposes. (0617-260)
Class 3, Lab 2, Credit 4

0617-375 Introduction to Computer-Aided Manufacturing

This is the first course in computer-aided manufacturing, and deals with the concepts in distributed numerical control systems. It provides hands-on experience in the automatic fabrication of parts designed in a CAD System. (0617-260)
Class 3, Lab 2, Credit 4

0617-403 Machine Elements

This course covers the basic principles that apply to the design and selection of such frequently used machine elements as bearings, shafts, fasteners, variable speed drives, gears, cams and springs. Emphasis will be given to applications for manufacturing equipment.
Class 2, Recitation 2, Credit 3

0617-405 Materials in Manufacturing

A course dealing with the materials used in modern manufacturing processes. Topics include metals, composites, plastics, and the selection of manufacturing materials from the point of view of design and manufacture.
Class 4, Credit 4

0617-410 Computers in Manufacturing

A course dealing with the use of computers in the manufacturing environment. It will cover data acquisition and control and application of controls for manufacturing process integration. The course will be taught using a high-level programming language. It will also deal with the concepts of networking and distributed systems. (Any high-level language, such as Basic or Fortran)
Class 2, Lab 2, Credit 3

0617-420 Manufacturing Processes II

A comprehensive course in metal manufacturing processes. Topics include metal solidification processes, bulk deformation processes, sheet-metal working processes, particulate processing, machining, and joining processes. The course will address the processes from the point of view of 'how,' 'why' and 'under what conditions.' Emphasis will be placed on the laboratory projects.
Class 3, Lab 3, Credit 4

0617-425 Statistical Quality Control

A study of total quality management to include control charts for variables, control charts for attributes, sampling plans, and MIL-STDs. (1016-309)
Class 3, Credit 3

0617-434 Operations Management

A study of modern manufacturing organization and how it is managed. The course will cover manufacturing systems design, analysis, and control. Techniques of decision making process,

design of manufacturing process, materials handling, design of physical facilities, and control of manufacturing operations will be discussed. **Credit 4, Class 4**

0617-436 Engineering Economics

The course deals with techniques required to make economic decisions. Topics covered in the course include cash flow analysis, present worth analysis, annual worth comparisons, rate of return evaluations, benefit cost analysis, breakeven analysis, replacement evaluations, bonds, and the effect of taxes on cash flows. **Class 4, Credit 4**

0617-437 Value Analysis

The course presents the techniques involved in analyzing products from the point of view of value and cost. It is a project oriented course where students select and solve real world problems. The techniques covered in the course include team building, project selection, brainstorming, Gordon techniques, attribute listing, morphological analysis, functional analysis, value index, paired comparisons, magnitude estimation, criteria analysis, and cost estimation. It also analyzes the role of VA in product design for manufacturing. **Class 3, Credit 3**

0617-450 Plastics Processing

A course dealing with the various methods used to manufacture plastics products. Topics include compression and rotational molding, extrusion, injection molding, blow molding, thermoforming, pre- and post-molding operations and economics of plastics processing. **Class 3, Lab 2, Credit 4**

0617-460 Computer-Aided Design

The course introduces CAD as an integral part of Computer Integrated Manufacturing. It deals with the basic concepts in CAD, the hardware and software related to 2D and 3D interactive graphics, CAD applications, the relationship between CAD and CAM, and the economics of CAD. The course concentrates on the CAD functions involving geometric modeling, finite element analysis, and drafting. Emphasis is placed on the laboratory work involving turn-key systems for 3D wire frame modeling and 3D solids modeling. (Engineering Drawing) **Class 3, Lab 2, Credit 4**

0617-470 Controls for Manufacturing Automation

The course deals with the principles and application of programmable logic controllers. Topics include PLC hardware, programming, and application of PLCs in the manufacturing environment. (0609-411) **Class 2, Lab 2, Credit 3**

0617-471 Computer Numerical Control

An advanced course in the application of numerical control. Emphasis is placed on computer-assisted part programming for contouring in two and three axes. The course will concentrate on N/C programming with APT. (0617-420 or Manufacturing Processes) **Class 2, Lab 2, Credit 3**

0617-472 Tool Engineering

An advanced course dealing with manufacturing tools. Examines concepts in tool design, tool specification and tool selection. Emphasis is on the design of dies. (0617-220, 420) **Class 2, Lab 2, Credit 3**

0617-475 Computer-Aided Manufacturing

A course dealing with the process aspects of Computer Integrated Manufacturing systems. Introduces the various elements of CIM and concentrates on the role of CAM in CIM. Deals with the concepts and application of Group Technology, Computer-Aided Process Planning, and Flexible Manufacturing Systems. Includes the relationships between CAD, CNC, Robotics, MRP and CAM. Emphasis is placed on building mini CAM systems in the laboratory. (0617-470, 471, 485, 0609-413) **Class 3, Lab 2, Credit 4**

0617-481 Work Simplification and Measurement

Principles and application of basic methods for the improvement of productivity and production environment. Methods of measuring and analyzing work, motion studies, process analysis, and productivity improvement are covered. **Class 3, Credit 3**

0617-485 Robots in Manufacturing

A course dealing with the technology and application of robotics. Included are the study of hardware and software of robots and the integration of robots with other elements of Computer Integrated Manufacturing (CIM) systems. The hardware aspects will include the mechanical components, the power systems, the control units, and the sensors. The software aspects will

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cover the various methods of programming the robots and interfacing them with other components of CIM. The integration aspects include the potential areas of application of robots and their economics. (0617-470, 0609-413) **Class 3, Lab 2, Credit 4**

0617-491 Production Control

Fundamentals of production and inventory control concepts are presented. Major portion of the course is devoted to the principles and the application of MRP. Deals with the inventory control theories, forecasting, master production schedules, bill of materials, lead times, order points, gross to net procedures, and production schedules. **Class 4, Credit 4**

0617-499 Manufacturing Technology Co-op

One quarter of appropriate work experience in industry. (0606099) **Credit 0**

0617-502 Non-Traditional Manufacturing Processes

A course dealing with precision machining using non-traditional processes. Includes such processes as electric discharge machining, electro-chemical machining, chemical milling, laser beam machining, electron beam machining, ultrasonic machining, water jet cutting, abrasive flow machining and plasma arc machining. **Class 3, Credit 3**

0617-510 Process Design

Project-oriented independent course. Presents an opportunity for the student to apply the knowledge gained in the program. The student is expected to design and build a system and demonstrate its operation. May include oral and written reports. (0617 core or instructor's consent) **Class 1, Recitation 4, Credit variable 3 -4**

0617-526 Quality Systems

Study of quality-related aspects from design of products to providing maintenance services in the field. Students are presented with case studies for analysis and problem solving. **Class 3, Credit 3**

0617-530 Special Topics in Computer Integrated Manufacturing

An advanced course covering various problems faced by the industry in computer integrated manufacturing. Topics will include design for assembly, problems in design analysis, incompatible system components, hardware and software integration problems, universal standards, IGES, MAPS, hardware and software related problems in feedback devices and management and personnel problems. (0617-485 or permission of instructor) **Class 3, Credit 3**

0617-599 Independent Study

A supervised investigation within a manufacturing technology area of student interest. (Consent of the instructor and department approval) **Credit variable 1-8**

COMPUTER ENGINEERING TECHNOLOGY

0618-101 Freshman Seminar

A seminar course for incoming freshmen in the Computer Engineering Technology Program. Course will include discussions, presentations, field trips, and activities that help students become familiar with RIT resources, adjust to college and college-level course work, and identify career interests. Students will practice communication skills, work in teams, and discuss issues such as values, diversity of cultures, and stress. **Class 1.5, Credit 1**

0618-220 Electronic Fabrication Techniques

An introduction to the engineering technology field with emphasis on the skills that a student will need in a laboratory environment. The skills include electrical layout, prototyping, wirewrapping, and soldering. The fundamentals of printed circuit board fabrication and assembly will be discussed. (Corequisite 0609-201) **Class 1, Lab 2, Credit 2**

0618-225 Schematic Capture

An introductory course in the use of an automated drafting tool for both digital and analog circuits. The course will teach the proper drawing techniques needed to prepare a schematic using a computer-aided drafting (CAD) tool. The GED Graphic Editor, of Cadence Design System's Electronic Design Automation software package, will be used as the CAD tool. **Class 1, Lab 2, Credit 2**

0618-301 Digital Fundamentals

A first course in digital fundamentals. Topics include binary arithmetic, Boolean algebra, logic gates, Karnaugh mapping, and an introduction to sequential logic. (0618-201, 220, 225)**Class 3, Lab 2, Credit 4**

0618-303 Microcomputers

A first course involving the hardware and structure of a basic microprocessor-based microcomputer. Emphasis will center on the hardware characteristics that dictate performance limitations, design considerations, and interfacing principles. The course will culminate in a small system design. (0618-301, a formal programming course)**Class 3, Lab 3, Credit 4**

0618-320 Principles of Electronic Design Automation

This is an introductory course in design, capture, and validation of digital and analog circuit designs. The automation process will use Cadencés EDA software package operating on a UNIX/SUN platform. (0618-301, 0609-203)**Class 2, Lab 4, Credit 4**

0618-403 Advanced Circuit Theory

An introduction to advanced circuit technique applicable to the electronic, microcomputer and instrumentation applications likely to be encountered by computer engineering technology graduates. Topics include Kirchhoffs Laws, Thevenin's and Norton's Theorems, ideal operational amplifier circuits (summing, non-inverting, integrating, differentiating), LaPlace Transforms of arbitrary time functions and of differential equations, circuit applications of LaPlace transforms, transfer functions, inverse LaPlace transforms by partial fractions for simple and repeated roots, both real and complex. Fourier series analysis is also covered. (0618-312 or 0609-362, 1019-422)**Class 3, Lab 2, Credit 4**

0618-429 Advanced Electronics

A continuation of advanced circuit techniques applicable to the electronic, microcomputer and instrumentation applications likely to be encountered by computer engineering technology graduates, plus further, more detailed coverage of real operational amplifier circuits and related circuits. This includes comparators, sample and holds, regulators, analog to digital and digital to analog conversion and filters. Topics also include LaPlace solution of first-order step responses, phasors, pole-zero plots, graphical sinusoidal steady-state, and Bode plots. (0618-403)**Class 3, Lab 2, Credit 4**

0618-499 Cooperative Education

One quarter of appropriate work experience in industry and third-year status in computer engineering technology. (0618-303, 0601-305; 0606-099)**Credit 0**

0618-538 Digital Systems Design I

An advanced course in the design techniques of complex combinational and sequential logic circuits and subsystems. Emphasis is on the use of systematic design procedures for implementing state machine designs. The internal structure and function of various logic gates and families are analyzed. The problems of interfacing various logic families are discussed. (0618-303, 310 or 203) **Class 3, Lab 3, Credit 4**

0618-539 Digital Systems Design II

A study of the design of complete digital systems using combinational and sequential subsystem circuit design and microprocessors. Included is the hardware design used in digital communications systems. Laboratory work is based around the designing, building and modifying of a multifunction microcomputer from individual components. Included are the hardware ramifications of software and operating system design, and small system architecture problems. (0618-538) **Class 3, Lab 3, Credit 4**

0618-540 Digital Systems Design III

An introduction to the design of complete digital control systems. A/D and D/A converters, Digital Control Theory and sensing devices are emphasized. (0618-405, 429, 539, 0603-420)**Class 3, Lab 3, Credit 4**

0618-571 Topics in Computer Engineering Technology

A course for majors in computer engineering technology, with topics as needed for updating technology. Anticipated offerings may include topics in new programming languages, advanced microprocessors and microcomputer systems, and computer communications systems and

techniques. (Fifth-year status in computer engineering technology is required.)**Class 3, Lab 3, Credit 4**

0618-580 Senior Project

Selected independent study design project by computer engineering technology students with the approval of the department. Approval must be granted first week of the fall or winter quarter for spring quarter registration. (Fifth-year status in computer engineering technology)**Class/Lab as required, Credit 4**

SCHOOL OF FOOD, HOTEL AND TRAVEL

RIT's School of Food, Hotel, and Travel Management offers five programs: hotel and resort management; travel and tourism management; food management; nutrition management; and food marketing and distribution.

The school prepares students for a wide variety of career choices that include, but are not limited to, food management; hotel/resort management; health care; travel consulting; 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 school programs provide a broadly based view of 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 components 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, leadership, and excellence. The school's first priority is to equip students with these skills and qualities.

Now in its 102nd year, RIT's School of Food, Hotel, and Travel Management is one of the nation's leading hospitality-travel management programs and has been recognized for its programs by *Forbes*, *Travel Weekly*, *Nation's Restaurant News*, and *Corporate Travel* magazines.

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

The goal of the school 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.

Undeclared Food, Hotel, and Travel Management Option

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.

MANAGEMENT

NUTRITION MANAGEMENT

0620-213 Contemporary Nutrition

The study of specific nutrients and their functions; physiological, psychological, and sociological needs of humans for food; development of dietary standards and guides; application of nutritional principles in planning and analyzing menus for individuals of all ages; survey of current health nutrition problems and food misinformation. **Class 4, Credit 4**

0620-402 Dietetics Environment Coordinated Dietetics Program

Introductory clinical dietetics course. Students interact with a representative sampling of personnel in all areas of dietetics. Supervised observations are planned in food management systems, health care facilities and community nutrition programs. **Class 1, Credit 4, Practicum hours by arrangement**

0620-525, 526 Advanced Nutrition and Diet Therapy I & 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. **0620-525 Class 5, Credit 5; 0620-526 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 non-traditional markets. Independent projects involving nutrition care in community facilities are required. Assignments are arranged by the instructor. **Class 3, Credit 8, Practicum hours by arrangement**

0620-551 Food Systems Management II (Coordinated Dietetics Program)

This is 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. **Class 1, Credit 8, Practicum in hospital by arrangement**

0620-554 Nutrition in Life Cycle

This is an applied course in nutritional needs throughout the life cycle. Emphasis will be 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. **Class 4, Credit 5, Practicum hours by arrangement**

0620-560, 561 Clinical Dietetics I & II (Coordinated Dietetics Program)

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. **0620-560 Class 4, Credit 4; 0620-561 Credit 4, Practicum hours by arrangement**

0620-562, 563 Clinical Dietetics III & IV (Coordinated Dietetics Program)

A continuation of 0620-560, 561 in the succeeding quarter with the practicum experience being conducted primarily in the hospital. **0620-562 Class 4, Credit 4; 0620-563 Credit 8, Practicum hours by arrangement**

FOOD MANAGEMENT

0621-220 Career Seminar

Registration #0621-220

Seminar designed to define career opportunities in the food, hotel, and travel industries. Students receive guidance in developing career objectives. Leading industry executives will participate. **Class 2, Credit 2**

0621-222 Introduction to Foodservice Management

An introductory course to foodservice management, which presents an overview of trends, customer expectations, and operations shaping the industry. Topics will include elements of menus (as a management tool), nutrition, food safety and sanitation, purchasing, receiving, and storage. Emphasis will be on defining and identifying standards for quality food production and presentation. **Class 4, Credit 4**

0621-224 Decision Making in Foodservice Management

Insights into the dynamics of foodservice management decisions for cost control with consideration given to availability, quality, and cost of raw ingredients, distribution systems, labor required, available equipment, and merchandisability. **Class 4, Credit 4**

0621-225 Principles of Food Production

Introduction to the basic principles involved in the preparation of high quality food. Topics include composition, varieties, availability and function of foods and ingredients. Organization, management and techniques for efficient food production are stressed. Uniform and professional knife and pastry kits are required. (0621-222) **Class 2, Lab 4, Credit 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 will be analyzed. Students will be introduced to technical price analysis, basis analysis, and the global economics of foodservice commodities. **Class 4, Credit 4**

0621-315 Foodservice Marketing

This course provides students with a business-to-business perspective of the marketing of products to the foodservice industry. It also provides an understanding of distribution systems and foodservice marketing environments. Both macro and micro marketing environments and issues will be explored. The class will consider various marketing mix elements as they relate to segments of the foodservice industry. Case studies and readings will be utilized to give students realistic opportunities to analyze and develop practical solutions. **Class 4, Credit 4**

0621-321 Menu Planning and Merchandising

The menu is the main focus of the foodservice operation, and its relationship to efficient operation, merchandising, theme, and customer satisfaction will be considered. 'Truth in menu' issues, layout, copywriting, standardized recipes, and pricing techniques will be explored. A wide variety of menus will be critiqued. The student will plan and produce a menu for a theme restaurant and will also create a cycle or other menu for a specific customer and situation. (0621-222) **Class 2, Credit 2**

0621-330 Quantity Food Production

Principles of quantity food production including equipment operation, holding techniques, use of standard recipes, conversion of small quantity recipes to large quantity, production techniques, forecasting, temperature control, cafeteria/buffet service, purchasing, and inventory systems. Additionally, various sanitation and safety topics will be explored. A survey of micro-organisms that cause food spoilage and poisoning, with an emphasis on causes of spoilage and their prevention, will be covered. (0621-222) **Class 4, Credit 4**

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 will be assigned to defined job descriptions in production and service on a rotating basis. (0621-330) **Class 3, Lab 10, Credit 6**

0621-410 Food Processing/Quality Assurance

An introduction to traditional and contemporary food processing methods with emphasis on applications to foodservice operations. The effect of these technologies on the storage life and sensory qualities of the products will be examined along with common modes of quality loss in foods. Students will be introduced to industry-standard quality assurance measures. **Class 4, Credit 4**

0621-416 Product Development

Food experimentation; sensory and objective evaluation of food quality; interaction of food ingredients; recipe development, writing, and presentation; problem solving; experimental design; written and oral communication of research. (0621-331) **Class 2, Lab 6, Credit 6**

0621-424 Food and Labor Cost Control

This course will deal with industry related problems and will combine 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 Center for Cooperative Education and Career Services and the School of Food, Hotel and Travel Management. 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. **Class 0**

0621-502 Decorative Techniques

Students will be introduced to techniques of food decoration, with emphasis on elementary and advanced pastry bag work; design and color in the creation of special-occasion cakes; molding of gum paste, marzipan, and pulled sugar decorative items; and the art of molded and piped

chocolate pieces. Students will design and create four projects representing these skills.**Lab 4, Credit 2**

0621-505 Foodservice Market Segments and Analysis

This course will provide students with a strategic and tactical foundation for effective marketing to the specific foodservice industry market segments. Students will also discover and develop sources of market information as related to specific segments. The various methods of obtaining market information and the analysis of research information will be explored.**Class 4, Credit 4**

0621-511 Banquet and Catering

Designed to give students management experience in planning, organizing, supervising, preparation and service of foods for specially booked functions. Students plan catered events for 80 people and invite the public to attend. Open to seniors only. (0621-331)**Class 1, Lab 12, Credit 4**

0621-512 Design and 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 Foodservice Concept Development and Planning

This course will provide students with the theoretical basis for developing and implementing sound foodservice plans and theme concepts. The course will give consideration to the variety of financial, economic, and demographic factors influencing concept planning. Special emphasis will be placed on developing food service 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**

0621-520 Foodservice Computer Applications

The student will be introduced to personal computer operating system commands and spreadsheet and data base software to explore effective computer-assisted management. Projects include applying or adapting existing templates and components of standard software to summarize and analyze data for effective management. Students will apply this to creation of an original program on spreadsheet and/or data base software. **Class 4, Credit 4**

0621-521 Computerized Models for Decision Making

Students will explore several special-use software packages in food service management, including those used for menu-engineering, labor management, marketing data, and standard recipe/costing/ordering/inventory functions. Software and data will be integrated and evaluated in various decision-making scenarios. **Class 4, Credit 4**

0621-522 Contract Environment of the Foodservice Industry

The course will provide students with the theoretical basis for identifying the legal environment of the foodservice industry. Special emphasis will be placed on identifying the rights and obligations of the foodservice operator in the contractual environment of foodservice operations.**Class 2, Credit 2**

0621-525 Restaurant Management

This course is designed to develop entry-level management competence through the operation of a full-service restaurant with beverage operations. Students will rotate through various management positions. They will be exposed 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, Lab 10, Credit 6**

0621-530 Specialized Commercial Operations

Application of foodservice operating principles to specific commercial operations. Operations from single cart to multi-unit dining in various settings (such as sports arenas, convention centers, industry, health care, schools, hotels, and resorts) and with various constraints will be explored. Staffing, layout, traffic flow, equipment requirements, decor, and control will be covered.**Class 4, Credit 4**

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 will be examined. Extensive exposure to industry representatives. **Class 4, Credit 4**

0621-532 Foodservice Marketing and Distribution Seminar

Presentation and discussion of current and relevant issues in food-service marketing and distribution. Discussion topics will compare and contrast domestic and international distribution and marketing systems and 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 it applies to the commercial beverage industry. Emphasis in the course is placed on administrative objectives, operational procedures, and internal control. **Class 2, Credit 2**

HOTEL AND RESORT MANAGEMENT

0622-200 Hotel Operations

This course serves to introduce the student to the distinctive nature of hotel operations. This is accomplished by identifying the standard functions that interrelate to produce the whole hotel service. The hotel's principle product, the guest room, will be 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

This course is designed to provide 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 will be 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 will be explored. **Class 4, Credit 4**

0622-210 Hotel Marketing and Sales Management

This course introduces the student to the application of the marketing concepts in hotel operations and the visitor industry. Included will be conventions and visitors' bureaus, hotels and convention centers. This will be 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**

0622-310 Resort Development and Management

This course is designed to give the student an understanding of how resort and hotel properties are developed as tourist and business destinations. Focus will be on the planning, development, operation, design, special needs of recreational surfaces and financing of such properties. Students will, as part of this study, select a specific type of property and analyze the methods used to develop it. **Class 4, Credit 4**

0622-315 Hotel Engineering and Maintenance

This course 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 the Hospitality Industry

This course 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 of budgeting, and capital budgeting strategies are examined. **Class 4, Credit 4**

0622-470 Leadership and Executive Development

This course presents a 'hands-on' look at the leader/manager. It will provide FHTM students with a variety of leadership and management principles, applications and exercises specifically designed for the hospitality industry. These new skills will enable them to progress more effectively in the hospitality industry and to begin to establish their own personal leadership and management style.

The course makes extensive use of lectures, laboratories and industry expertise. **Class 4, Credit 4**

0622-480 Personnel and Training for Hospitality Industries

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 current 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

This course provides the student with an opportunity to explore the function of conventions from the point of view of the convention center manager. Consideration will be given to various methods used to sell a location to a planner and the servicing of large groups. Also included will be 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 will also be reviewed. **Class 4, Credit 4**

0622-530 Hotel Law

Policies, laws and liabilities are examined in this course as they pertain to the innkeeper. Focus will be on current management problems and on the legal responsibilities of management. The rights of innkeepers will also be discussed. **Class 4, Credit 4**

0622-540 Risk Management for the Hotel Industry

An examination of the environment in which the hospitality manager functions. Focus is on the management of risk as part of operations. The implications of tort and contract law specifically relating to the industry will be undertaken, and an explanation of how persons may avoid exposure to risk will be made. This will include forms of insurance, hold-harmless clauses, and management decisions on the importance of coverage given different degrees of risk. **Class 4, Credit 4**

0622-560 Tourism Concepts

This course 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 and Development

This course examines the processes involved in planning and developing a tourist's destination, including the required infra-structure. A major focus will be 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

This course focuses on the processes and techniques used to promote tourism destinations such as resorts, attractions, and individual communities. Emphasis will be placed on the role that destination marketing organizations such as convention centers, visitor's bureaus and tourism promotion agencies play in marketing a destination. The development of tourism marketing plans and management of inquiry-fulfillment-referral processes will be discussed. **Class 4, Credit 4**

TRAVEL AND TOURISM MANAGEMENT

0623-206 Travel Distribution Systems

A functional approach is used to describe the market distribution channel for travel products/services. The role of retail travel agents, wholesale tour operators, and specialty channelers such as meeting planners is discussed. Various economic models are examined in order to analyze the pricing structure associated with the travel supplier's ability to provide travel services. **Class 4, Credit 4**

0623-210 Introduction to A. A. SABRE Reservations

This course emphasizes acquiring operational proficiency with American Airlines' SABRE reservation system. Using SABRE's live and training modes, the course topics addressed include: creating passenger name records (PNRs), 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

Reservation procedures and documentation sourcing for each of the various modes of passenger transportation are examined. Particular attention is given to hotel reservation guide books, cruise ship deck plans and reservation procedures, and interpreting travel brochures. Emphasis is on the various forms used in travel documentation. **Class 2, Credit 2**

0623-314 Salesmanship Techniques for Travel

The role of personal selling as persuasive communication and part of the partnering relationship is examined. Course topics include: qualifying clients, identifying buying motives, making the presentation, handling objections, closing the sale, and sale follow-up. Role-play scenarios are used to reinforce selling concepts. **Class 2, Credit 2**

0623-410 Meeting Management

A course to introduce the student to the field of meeting management. We take the point of view of a corporate or independent meeting planner in examining the various phases of meeting planning. Students also examine the formulation of goals and how meetings may be evaluated from both a return on investment perspective and the satisfaction of the attendees. Computer programs will be investigated and tested, and a variety of budget strategies will be examined. **Class 4, Credit 4**

0623-413 Corporate Travel Marketing and Sales

This course focuses on the processes and techniques used to promote tourism attractions and communities to the corporate buyer. Emphasis will be on the role that corporate travel plays in marketing the corporation. How promotional organizations can be used by the corporate meeting planning and travel manager to compare sites will be discussed. **Class 4, Credit 4**

0623-420 Corporate Travel Planning

This course focuses on the specific travel goals, accounting policies, and informational requirements of corporate (commercial-business) travel. Three major orientations of corporate travel are examined: corporate travel operated through the firm's travel coordinator; corporate travel provided by the retail travel agency; and incentive travel. Major topics include: corporate travel policy and procedures, exhibition marketing, requests for proposal (RFP), house organs and newsletters, and the sales blitz. **Class 4, Credit 4**

0623-520 Exhibit Marketing

This course emphasizes the examination of the budgeting process associated with developing and marketing corporate exhibits. A major focus of the course is the evaluation of exhibits based on cost-to-revenue ratios. **Class 2, Credit 2**

0623-522 Negotiations and Conflict Management in Hospitality/Tourism

This course examines the negotiation process within the hospitality/tourism industry by exploring the nature and sources of interpersonal conflict and its dynamics. Collaborative versus competitive approaches to managing conflict are discussed. Role-play situations are used to differentiate and reinforce negotiation strategies. **Class 2, Credit 2**

0623-524 Risk Management in Travel/Tourism

This course examines the risk management process as it applies to the travel/tourism industry. Topics include insurance mechanisms; property and time element risks; criminal insurance risks (burglary, hiring, safes, credit risks); casualty risk (general liability, business risk); workers' compensation; personal, personnel, and travel insurance. **Class 2, Credit 2**

0623-526 Travel/Tourism Policy & Law

An examination of the various laws associated with travel and tourism and their resultant policy implications. Four major areas are examined: domestic and international air transportation; car rental, cruise and rail; hotels and resorts; and retail travel agents and wholesale tour operators. **Class 4, Credit 4**

ISMT) 0623-530 Intermediate SABRE Applications

This course enables students to progress to the 'total automation' level associated with SABRE. The focus of the course is to provide an overall picture of how the SABRE system provides accurate invoicing and readable itineraries. Topics include: Phase IV ticketing, queues, currency conversions, segments, and accounting data entry. Most of the course work is done in SABRE's live mode. **Class 4, Credit 4**

0623-535 SABRE Non-Air Applications

This course uses SABRE's direct reference system (DRS) as a basis for information concerning non-airline-oriented information. The course is designed to accommodate non-travel and tourism majors. Topics include: car sales options, hotel index descriptions, hotel availability, tour index, immigrations and customs guide, and FAACTS reports. **Class 4, Credit 4**

0623-550 Seminar in Travel/Tourism Management

This course surveys various issues and events that influence the travel and tourism industry. Emphasis is also on how these factors will affect the careers of future professionals. This course is intended for students who have completed all of their required cooperative education experience. **Class 4, Credit 4**

DEPARTMENT OF MILITARY AND AEROSPACE SCIENCE RESERVE OFFICERS TRAINING CORPS (ROTC)

ARMY

First Year

0640-201 Introduction to Military Science

This course is designed to introduce the student to the ROTC program and military map reading techniques. Topics of primary interest will include: the organization and purpose of ROTC program, the organization of the U.S. Army, the National Guard, the Army Reserve, career branches and the role of a lieutenant; leadership laboratory. Students must register for Lab under the Department of Physical Education. **Class 1, Lab 2, Credit 2**

0640-202 Applied Military Dynamics

This course is designed to give the student an introduction to some military dynamics. Topics of primary interest are military writing style, experiential small group leadership opportunity, weapons and marksmanship training and an introduction to evaluating and applying first aid. Students must register for Lab under the Department of Physical Education. **Class 1, Lab 2, Credit 2**

0640-203 Military Heritage

This course is designed to provide a practical introduction to the basic military organization and rank structure; the historical basis for customs and traditions found in the military, and current discussions on the military and its impact upon society; leadership laboratory. Students must register for Lab under the Department of Physical Education. **Class 1, Lab 2, Credit 2**

Second Year

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 will include identification of terrain features, use of grid coordinates, polar coordinates, military correspondence, and First Aid tasks. This course stresses practical application rather than theory; leadership lab. Students must register for Lab under the Department of Physical Education. **Class 1, Lab 2, Credit 2**

0640-302 Psychology and Leadership

This course provides the student the basic principles of leadership and management of human resources; motivation, morale and communication. Special emphasis is planned on applying the theories and models of the behavioral sciences and personnel management to leadership as it functions in a military environment; leadership laboratory. Students must register for Lab under the Department of Physical Education. **Class 1, Lab 2, Credit 2**

0640-303 The Military and American Society

This course is designed to give the student an introduction to the principles of war and the study of the application of these principles in recent military history. Emphasis will be placed on the Army's role today as peacekeeper and NATO partner. Other topics will include Soviet Union military systems command and staff functions and the officer personnel management system. Leadership laboratory. Students must register for Lab under the Department of Physical Education. **Class 1, Lab 2, Credit 2**

Third Year

0640-401 Military Tactics

This course stresses practical exercises on basic map reading skills and provides a working knowledge of fundamentals and principles of combat operation as planned for and executed at light infantry squad and platoon level; leadership laboratory. Students must register for Lab under the Department of Physical Education. **Class 2, Lab 2, Credit 3**

0640-402 Military Communications

This course provides knowledge and training of basic military skills essential as a junior officer; an introduction to military communication equipment and techniques; the leadership communication

process. Leadership laboratory. Students must register for Lab under the Department of Physical Education. **Class 2, Lab 2, Credit 3**

0640-403 Military Operations

A continuation of military skills training with emphasis on military intelligence/security, operations at the small unit level; staff functions and leadership laboratory; field training exercise. Students must register for Lab under the Department of Physical Education. **Class 2, Lab 2, Credit 3**

Fourth Year

0640-501 Combined Arms Operations

The course introduces the student to the mission, organization, and capabilities of the branches of the Army. Discussions on the tactics of the air/land battle, advanced studies in U.S. and Soviet capabilities and tactics, U.S. NBC defense and U.S. Army intelligence and electronic warfare system; leadership laboratory. Students must register for Lab under the Department of Physical Education. **Class 2, Lab 2, Credit 3**

0640-502 Military Administration and Logistic Management

This course includes discussions and seminars on the Army training management system, military justice, supply and property accountability, maintenance management, officer-enlisted personnel management; leadership laboratory. Students must register for Lab under the Department of Physical Education. **Class 2, Lab 2, Credit 3**

0640-503 Military Ethos

This course examines the ideas and issues that define the role of the military in our larger society. Emphasis is placed on the professional and ethical standards required of the military officer. Other topics include: planning and conducting meetings, teaching and counseling, active duty orientation, preparations for commissioning; leadership laboratory; field training exercise. Students must register for Lab under the Department of Physical Education. **Class 2, Lab 2, Credit 3**

0640-510 Senior Seminar and 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 may also 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**

AIR FORCE

0650-201, 202, 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, 211, 212 The Air Force Today I, II, 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, 302, 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, 402, 403, Leadership Lab III, IV, V 404, 405, 406, 501, 502, 503

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.

COLLEGE OF BUSINESS COURSES

Accounting
Management
Economics
Finance
Marketing
Decision Sciences

COLLEGE OF BUSINESS

Richard N. Rosett, Dean

In an era of increasing global competitiveness, and an emphasis on quality management, the environment that graduates of the College of Business will enter is both complex and rapidly changing. A well-educated and prepared manager must have a broad foundation of knowledge not only in business but also in the social sciences, humanities, and science in order to be professionally competitive. In addition, specialization is necessary if one hopes to make immediate contributions to an organization following graduation

Plan of education

To achieve the educational aims described above, the College of Business has prepared a program that has four components: the liberal arts, the business core, the major, and the cooperative work experience.

The liberal arts component of the business students program is found in 16 courses (nearly one-third of the total program) in the humanities, science, and social sciences. Within this component, the student is expected to display proficiency in both oral and written forms of communication and to choose a humanities or social science concentration. 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 such as global competitiveness, 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.

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. **Credit 4**

0101-302 Managerial Accounting

This course introduces students to the use of accounting information by managers within a business. It 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 and Accounting

An 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,' will be analyzed. (0101-301) **Credit 2**

0101-319 Legal Environment of Business

An introduction to legal principles and their relationships to business organizations. This includes a review of the laws and regulations that govern their operations. This course will explore 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 will deal with contract law. A legal research project is an important aspect of this course. **Credit 4**

0101-320 Business Law

This course explores in depth the implications of the Uniform Commercial Code to business operations. Topics covered include: sales, commercial paper, corporations, partnerships, joint ventures, sole proprietorships, bailments, and agency. Topical cases and examples are used to help the student grasp the business implications of the law and its nomenclature. A legal research project is an important aspect of this course. (0101-319)**Credit 4**

0101-400 International Accounting

The course will deal with international dimensions of accounting and control. Policy issues of foreign currency translation, global inflation, transnational reporting and disclosure. International standards of accounting and auditing, analyzing, financial statements of multinational firms.**Credit 4**

0101-450 International Business Law

An introduction to international law, its sources and scope, and analysis of the responsibilities and rights of both individuals and states. Topics include business forms in the international environment, labor, imports and exports, sales, transportation, and intellectual property. Comparisons are made between the laws of foreign jurisdictions and the United States. Relevant cases are used to help the student grasp the business implications of the law in an international setting. A legal research project and class presentations are important aspects of this course. (0101-319) **Credit 4**

0101-408 Financial Reporting and 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 or 451, junior status)**Credit 4**

0101-409 Financial Reporting and Analysis II

In-depth consideration of generally accepted accounting principles and theory as they apply to the recognition and measurement of all noncurrent assets, current and noncurrent liabilities, and owner equities, including partnerships. Issues related to convertible securities and the computation of earnings per share are discussed. (0101-408)**Credit 4**

0101-410 Taxes for Decision Making

A basic introduction to federal taxation with an emphasis on its impact on corporations. Intended for anyone interested in a condensed version of corporate taxes. (Junior status)**Credit 2**

0101-431 Cost and Managerial Accounting

This course is an extensive introduction to the use of accounting information by managers within a business. It explores the value of accounting information to 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. (0101-408)**Credit 4**

0101-432 Advanced Cost Accounting Issues

Further study of issues facing accountants in industry. Cases and problems will be used to cover topics, including the design of cost systems, the use of cost data in making short-term operating decisions, activity-based costing, and transfer pricing. (0101-431)**Credit 2**

0101-435 The Role of Accounting in the Organization

The course objective is to give students an understanding of how accounting is used to help organizations achieve their goals. Students will learn how to account and the reasons why we account as we do. Special emphasis will be placed on the resolution of controversial accounting issues within the context of the firm's goals. Positive accounting theory and agency theory will be 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, deductibility of personal and business expenses, and tax consequences of property transactions. (0101-301, junior status)**Credit 4**

0101-523 Tax Accounting II

A continuation of Tax Accounting I. Emphasis is on taxation of corporations and income from conduit entities, such as partnerships and S Corporations. Topics include tax consequences of forming a business, income measurement and reporting requirements, distributions to owners, and business reorganizations or liquidations. (0101-522)**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**

0101-539 Accounting for Complex Organizations

The application of generally accepted accounting principles to corporations with investments in subsidiaries. Issues involving the preparation of consolidated financial statements under complicating factors like minority interest, intercompany transactions, and international operations are considered. (0101-409, senior status)**Credit 2**

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 and Reporting Issues

A study of complex issues facing preparers and users of financial statements and how these issues are resolved. Topics include revenue recognition, accounting changes, deferred taxes, pensions, post-employment benefits, leasing, cash flows, price level statements, interim reporting, and segment disclosures. (0101-409, senior status)**Credit 4**

0101-560 Not-for-Profit and Governmental Accounting

Consideration of objectives for not-for-profit organizations and governmental agencies. This course examines how these objectives affect financial accounting and reporting for these entities as specified by applicable, generally accepted accounting principles. (0101-409)**Credit 2**

MANAGEMENT

0102-011 Freshman Seminar

This course serves as an 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**

0102-230 Quality Concepts I

The first in a four-course sequence, focusing on RIT resources and presentation and team interactive skills. This course will introduce the concepts of TQM.**Credit 2**

0102-231 Quality Concepts II

A continuation of Quality Concepts I emphasizing the concepts of TQM as they relate to organizational structure. The Baldrige framework is introduced, and the relationship of functional areas to the process of creating goods and services is studied. Self-assessment and career goal clarifications are explored. The development of formal meeting skills is introduced.

Credit 2

0102-232 Quality Applications I

The theme for this course is TQM and its application. Some of the gurus of quality are introduced, and the application of the concept of empowerment is studied. Students work in teams and apply the Xerox Problem Solving Model to actual problems. Many of the 7 Basic Tools are used to develop students' abilities to gather, use, understand, and present data.**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. **Credits 2**

0102-235 Quality Concepts for Transfers

This course is required for incoming transfer students. Its purpose is to expose students to the current Total Quality Management (TQM) movement and consider 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, 311 Air Force Management and Leadership I, 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. (ROTC) **Credit 5 each**

NOTE: Other Air Force ROTC course listings can be found under the College of Applied Science and Technology .

0102-350 Principles of Managerial Leadership

Course purpose is to familiarize Printing Management students with basic principles and techniques of managerial leadership and organizational behavior. The course is 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. **Credit 4**

0102-360 Survey of International Business

This course is a 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. **Credit 4**

0102-405 Introduction to Work Organizations

This course will introduce students to the concept of work organizations and how they function. Students will 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 will learn about the diverse workforce, social issues, and government regulation of work. (This is a telecourse.) **Credit 4**

0102-406 Management Concepts

This course introduces you 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**

0102-410 Small Business Management for Non-Business Majors

An exploration of the basics of small business management with an emphasis on understanding the role of the small business owner. Major topics include: starting and operating a small business, small business marketing, financial and administrative controls, and governmental interactions with

small business. (junior status or equivalent) **Credit 4 (not expected to be offered in coming year)**

0102-430 Organizational Behavior

An overview of human behavior in organizations with respect to enhancing individual and organizational effectiveness. The course 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 will be examined. (0102-430, junior status) **Credit 4**

0102-438 Business Ethics

This course 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. (0102-430, 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 and Leadership

This course focuses on 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. The course also includes an overview of management functions. (0102-430, junior status) **Credit 4**

0102-462 Management Development

Course 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 is also presented, along with basic aspects of career management. Course examines manager's role in achieving total quality management. (0102-430, junior status) **Credit 4**

0102-465 Multinational Business Operations and Strategy

International Business Operations and Strategy focuses on the strategic challenges faced by the management of a corporation operating in a global environment. The course will specifically address the issues faced by planners in functional areas as they develop strategic planning to manage in a global economy. **Credit 4**

0102-490 Entrepreneurship

The focus of this course 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 will be the development, writing, and presentation of a business plan. (Junior status) **Credit 4**

0102-507 Business, Government, and Society

This course is 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 Total Quality Management

This seminar 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) (This course may be used as a management, marketing, or business elective)**Credit 4**

0102-536 Organizational Performance and 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 Studies in Small Business Management

Students enrolled in this course are provided the opportunity to serve as consultants to a specific small business firm within this geographic area. Under an arrangement with the Small Business Administration, and working under the supervision of a senior faculty member, teams of students provide management consulting about a variety of problems to small businesses. As a practicum this course does not have regularly scheduled class hours. Instead, project teams confer with their faculty member on an as-needed basis. (senior status)**Credit 4**

0102-551 Strategy and Policy

This is 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. The course 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 will 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, 0104-441 or 451, 0106-401, senior status)**Credit 4**

0102-554 Management Seminar

A variety of special interest topics in the field of management, ordinarily treated in more depth than would be possible in a survey course. The topic and instructor for each seminar will be announced in advance, along with any prerequisites or other special requirements. Seminar topics in recent years have included stress management, microcomputers in human resources management, compensation and appraisal, and human resources planning. (Junior 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.**Credit 4**

BUSINESS ECONOMICS

0103-408 Business Cycles and Forecasting

Analysis of economic conditions affecting the firm. Theory of business fluctuations. Forecasting techniques and services available to the firm. (0103-405 or 0103-406, junior status)**Credit 4 (not expected to be offered in the coming year)**

0103-451 Managerial Economics

An applications-oriented course focusing on business decision making and total quality management using economic tools of analysis. Business decisions relating to pricing, production, employment, promotion, and capital investment under different market environments are examined. A business simulation for the personal computer, which places students in the role of managing a firm, is used to provide hands-on experience applying the economic and management concepts taught in the classroom. (Junior status)**Credit 4**

0103-452 Macroeconomics for Managers

A current events-oriented course focusing on the relationship between the macroeconomy and business performance. Economic theory is used to explain and predict changes in economic growth, consumer spending, business investment, and national savings. Financial markets—domestic and international—are examined to understand changes in interest rates, inflation rates, and exchange rates. The likely effects of government fiscal and monetary policies on the economy and business are evaluated. *The Wall Street Journal* is used as a primary source for classroom discussions and assignments. (Junior status)**Credit 4**

0103-554 Seminar in Economics

Investigation of advanced problems and policies in economics. Emphasis is on student reports and papers. (junior status, permission of instructor)**Credit 4** (not expected to be offered in the coming year)

FINANCE

0104-340 Personal Financial Management and Personal Investing

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.**Credit 4**

0104-420 Theory and Application of Basic Financial Concepts

This course 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

This is the basic course in financial management. It covers the concepts of security markets, risk analysis, time value of money, asset valuation (as it applies to capital budgeting, working capital management, and long-term financing), and cost of capital. Analytic techniques and computer applications are introduced and used. Not for accounting or finance majors. (1016-319, 0101-302, 0511-301, junior status)**Credit 4**

0104-451 Valuation of Real and Financial Assets

This course describes theories and procedures for valuing corporate projects as well as financial instruments such as stocks and bonds. Specific topics include: present value techniques, Markowitz portfolio theory, Capital Asset Pricing Model, Capital Budgeting, and Market Efficiency. (0101-301, 0511-301 and 302, 1016-319, junior status)**Credit 4**

0104-452 Managing Corporate Assets and Liabilities

This course focuses on corporate financial management. Asset management topics include working capital management and advanced capital budgeting. Liability management topics include dividend policy, capital structure policy, security issuance, and leasing. (0104-451, 1016-320, 380)**Credit 4**

0104-453 Intermediate Investments

This course 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 is also included. (0104-451)**Credit 4**

0104-504 International Finance

This course discusses problems posed by the international financial environment in which corporations operate. In particular, students will learn to quantify and manage risks arising from shifting exchange rates. Other topics include exchange rate systems, international trade finance, international capital budgeting, country risk analysis, and long-term international financing. (0104-441 or 451)**Credit 4**

0104-505 Advanced Corporate Financial Planning & Analysis

This course focuses on the strategic management of the corporation. Topics include: forecasting models for critical variable such as sales; budgeting; strategic decisions such as mergers, divestitures, executive compensation; working capital management. (0104-452)**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 or 451)**Credit 4**

0104-554 Seminar in Finance

Course will be designed by individual instructor. (Varies by seminar content) (Permission of instructor, junior status) **Credit 4 (not expected to be offered in the coming year)**

MARKETING

0105-363 (previously 0105-463) Principles of Marketing

An introduction to the field of marketing, stressing its role in the organization and society. Emphasis will be 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 for Total Customer Satisfaction

This course will review 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 will be emphasized through applying quality management principles to the marketing function. (Distance Learning course, not for College of Business majors)**Credit 4**

0105-505 Buyer Behavior and Satisfaction

A study of the determinants of consumer and business buying behaviors. Emphasis will be on identifying customer requirements and measuring customer satisfaction using a decision-making process. (0105-363, junior status) **Credit 4**

0105-530 Marketing Channels

This course 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. This course will focus on 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 designed to give 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) **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

A course centered around 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 will be the focus of the course. Topics have included direct 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 will be 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 will be emphasized. Relationship management/partnering with customers and truly seeking to meet their requirements will be discussed as key to long-term success. (0105-363, junior status)**Credit 4**

0105-560 Marketing Communications

This course presents an in-depth view of tools of advertising, sales promotion, and public relations. Students will develop a comprehensive promotion plan, beginning with the marketing strategy and ending with implementation and evaluation. (0105-363, junior status)**Credit 4**

0105-570 Business Marketing

The course is concerned with developing an understanding and application of marketing processes to business organizations. Topics include understanding business customer requirements, organization of purchasing, and designing channels of distribution. (0105-363, junior status)**Credit 4**

DECISION SCIENCES

0106-320 Business Computer Applications

Information systems in organizations and the use of personal computers to enhance personal productivity. Extensive hands-on experience with PC operating system(s) and spread sheets. **Credit 4**

0106-330 Data Analysis I

An introduction to the use of data analysis and applied statistics in decision making. Topics include descriptive statistics (graphics, two variable regression and correlation) and a brief overview of probability theory, probability distributions, sampling theory and sampling distributions, the central limit theorem and confidence intervals. Extensive use of MINITAB. (1016-226, 0106-320 or equivalent) **Credit 4**

0106-332 Advanced Data Analysis

A second course in data analysis and statistics emphasizing inference. Topics to be covered include: hypothesis testing; non-parametric statistics; multiple regression analysis; ANOVA and experimental design. Extensive use of MINITAB. (0106-330 or equivalent)**Credit 4**

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. Extensive use of computer software. (1016-319 or equivalent)**Credit 4**

0106-353 Business Forecasting

An introduction to forecasting methods in business, with an emphasis on data-based, statistical techniques. Extensive use of MINITAB. (1016-319 or equivalent)**Credit 4**

0106-363 Systems Analysis and Design I

The system development process, with emphasis on the analysis of information and logical design of a system. Topics include: systems development lifecycle, the role of the systems analyst, systems analysis tools and techniques, system performance analysis and feasibility analysis. (0602-303) **Credit 4**

0106-401 Operations Management

A survey of production/operations management. Topics include quality control and improvement, project management, forecasting, production planning, scheduling, material requirements and capacity planning, inventory management, just-in-time/total quality management (JIT/TQM), international operations and strategic considerations. (0106-334, junior status)**Credit 4**

0106-405 Statistical Methods for Quality Control

This is a course in statistical quality control. Topics will 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. (1016-320 or equivalent)**Credit 4**

0106-406 Quality Control and Improvement

Study of total quality management (TQM) (including Demings philosophy), objectives of quality planning, quality function deployment (QFD), control and improvement, problem-solving methods and tools, the use of statistical methods for quality control and improvement, vendor relations, reliability concepts, and recent developments in quality; for example, Taguchi methods. The course focus is on the management and continuous improvement of quality and productivity in manufacturing and service organizations. This course may not be taken for credit if credit is to be earned for 0106-416. (1016-319, or equivalent, and junior status)**Credit 4**

0106-408, 409 Materials & Operations Planning & Control I, II

Study of the planning and control aspects of materials and operations for the product-process life cycle of a selected 'thread' product. Production settings include: project/one-time build; job/lot build; and repetitive/continuous manufacturing. Planning topics include: product/process design and start-up, defect/problem prevention, forecasting and scheduling, materials and capacity planning, operations organization and planning/control systems. Execution and control topics include executing the schedule, just-in-time applications, cost management (direct, indirect), throughput and lead time management, work-in process inventory management, waste management, material management, interactions with the rest of the firm (e.g., ethics, policies, procedures, responsibilities, and contributions), measurement and reporting, including the use of corrective feedback loops. (0106-401, or equivalent, and junior status; 408 is prerequisite for 409)**Credit 4 each**

0106-412 Inventory Management & Material Control

Study of inventory management emphasizing the independent demand environment including distribution. Definition and functions of inventory; concepts, principles, techniques and systems necessary to select, order or ship, store, account for, and value inventory; inventory performance measures. (0106-401 or equivalent, junior status)**Credit 4**

0106-415 Purchasing Management

Study of the activities, responsibilities, relationships and systems involved in the purchase of materials, services and capital equipment. Topics include: identifying requirements; evaluating and selecting "best value" vendors; techniques for planning and executing the purchasing function, including fundamentals of negotiation; ethical and legal aspects of purchasing; interactions with the engineering, quality, manufacturing, materials management, transportation and legal functions and with suppliers; and international aspects of purchasing. Purchasing's responsibility for quality, delivery, inventory, price and contribution to profit are also covered. (Junior status)**Credit 4**

0106-416 Quality Planning and Improvement

Study of total quality management (including Demings philosophy), objectives of quality planning and improvement, quality function deployment (QFD), problem-solving methods and tools, the use of statistical methods for quality improvement, vendor relations, Malcolm Baldrige National Quality Award, international quality standards (i.e., ISO 9000), and recent developments in quality. The course focus is on the management and continuous improvement of quality and productivity in manufacturing and service organizations. (1016-319, or equivalent, and junior status)**Credit 4**

0106-425 Tools for Total Quality Management

This course examines the concepts of quality and total quality. It 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? Course 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**

0106-444 Manufacturing Strategy and Tactics

This course integrates the skills learned in operations management with the fundamental disciplines of accounting, financial and marketing management. Key focuses in the course are manufacturing strategy, the creation and maintenance of a culture for continuous improvement, and the management of change. Manufacturing is investigated in a global context, including the risks and opportunities involved, the successes and failures of foreign and domestic firms and the strategies and tactics employed by them. The viability of an economy without a manufacturing base is questioned. Teams develop, execute, and report on a manufacturing strategy audit. (0106-401 or equivalent, junior status)**Credit 4**

0106-464 Systems Analysis and Design II

A continuation of the system development process, with focus on advanced design issues and an automated systems design tool. (0106-363, junior status)**Credit 4**

0106-505 Information Systems

The role of information systems in business organizations is discussed. Basic systems concepts and the software components of computer-based information systems are introduced. Hands-on use of personal computer technology is an integral and substantial part of the course. (0602-200, 0101-302, 0102-430, senior status)**Credit 4**

0106-540 Microcomputer Hardware and Applications

A survey of current microcomputer hardware and software being used in business. Topics include personal computers, the internal functions of PC's and peripheral equipment, DOS, and applications software including the use of spreadsheet, database, and graphics programs. (0602-483, junior status)**Credit 4**

0106-553 Information Systems Management

Examines the value of information in an organization and the management of the information technology (IT) area. Covers the strategic use of IT for competitive advantage, the introduction of new technologies within the organization, and the role of the IT manager in both managing IT operations and developing relationships within the organization. (0602-483, 0106-464, senior status)**Credit 4**

COLLEGE OF CONTINUING EDUCATION COURSES

Business and the Arts

- Accounting
- Business Law
- Data Processing and Systems Analysis
- Finance
- General Management
- Small Business Management
- Health Care Management
- Marketing
- Mathematics and Statistics for Business
- Personnel Administration
- Production Management and Industrial Engineering
- Logistics and Transportation Management
- Real Estate
- International Business
- Interdisciplinary Studies
- Ceramics
- Design
- Drawing
- Painting
- Sculpture
- Illustration
- Printmaking
- Metalcrafts and Jewelry
- Weaving/Textiles
- Woodworking
- Deaf Studies
- Humanities
- Communication
- Social Sciences

Science and Technology

- Mathematics
- Contemporary Science
- Computer Systems
- Machine Shop
- Emergency Management

School of Professional Studies

- Environmental Management

Learning Development Center - Technical

COLLEGE OF CONTINUING EDUCATION

Dr. Raymond Santirocco, Acting Dean

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 in non-credit workshops and seminars; for the traditional college student who wants a non-traditional degree, the College of Continuing Education (CCE) may be the answer. Students can earn degrees, diplomas, and certificates through a number of CCE programs in a variety of ways

CCE courses and programs are offered during the day, at night, on Saturdays, through Weekend College, and even via distance learning courses that students can take at home

CCE is on the forefront of developing new degree programs such as environmental management. Its precollegiate programs help underserved and other young adults decide what they want to study and what they want to do, as well as master the skills necessary to do them. CCE also offers diverse non-credit courses in areas ranging from total quality management and computing to printing and the graphic arts.

BUSINESS AND THE ARTS

ACCOUNTING

0201-201 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**

0201-203 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. (0201-201) **Credit 4**

0201-308, 309 Intermediate Accounting I & II

Designed to broaden understanding of accounting practices and improve skills in gathering, analyzing, reporting, and evaluating accounting theory and concepts as they relate to business problems. (0201-203) **Credit 4/Qtr.**

BUSINESS LAW

0202-301 Business Law I

Introductory course in business law including basic legal principles and procedures, criminal law, torts, contracts, sales and real property. **Credit 4**

0202-302 Business Law II

Continuation of 0202-301 includes law agency, partnerships, corporations, insurance and bankruptcy. Also presents survey of commercial paper, secured transactions, and bank deposits. **Credit 4**

0202-310 Legal Environment of Business

Foundation course which introduces: the function of law in society; the fundamentals of the federal and state court systems; contract formation (offer, acceptance, consideration, and capacity) and related ethical issues; and the emergence of the federal regulatory agencies and the practical impact of these agencies on the American business community. **Credit 4**

DATA PROCESSING AND SYSTEMS ANALYSIS

0203-321 Data Processing Principles

Introduction to computer technology including an examination of the current concepts, functions and techniques associated with information processing. This course includes discussion and practical examples of the interrelatedness of computer operations, programming, and systems analysis. Typically includes minimal introductory exposure to computer lab and a few computer applications assignments. **Credit 4**

0203-322 Data Processing Systems

Covers the spectrum of management considerations pertaining to the use of computers in business systems. Provides a methodology for effective planning, development, installation, and management of computer based business information systems. (0203-321 or equivalent) **Credit 4**

FINANCE COURSES

0204-204 Personal Financial Management

The main objective of this course is to enable you to manage your personal finances more effectively. The course deals with personal budgeting, protection of personal assets, consumer credit, investments, and estate planning. **Credit 4**

GENERAL MANAGEMENT

0205-200, 201, 202 The Management Process

A comprehensive three-quarter course in effective supervision and management for supervisors and potential supervisors. Approximately 50 topics of current importance to supervisors are

presented, as well as essential management principles, business communication, and practical supervision techniques. Specific supervisory problems of course participants are discussed in informal sessions and through projects conducted outside the classroom. Instruction is usually guided by a team of management specialists. Lecture-discussion, panel presentations, audiovisual presentation, simulation exercises and case studies. (Course extends over three consecutive quarters and should be taken in sequence.) A management certificate is awarded for successful completion of the course. **Credit 4/Qtr. (12 total)**

0205-203 Organization and Management

A general introduction to the major management functions and the organization of business. Topics include business and personal planning, organizing, staffing, implementing, directing, control, time management, appraisal, compensation, organization theories, decision-making, problem solving, influences on managerial decision making, communication, management styles and motivation. Extensive use is made of learning groups in which students work together to discuss and apply concepts. Some out of class time is required to prepare for a learning group presentation. **Credit 4**

0205-306 Customer Service Technology

An overview and analysis of technological systems for handling goods and information quickly and cost effectively to maximize customer satisfaction. **Credit 4**

0205-353 Management Science

Foundation course which introduces mathematical model-building and the use of management science in the decision-making process. Mathematical techniques will include: linear programming; the assignment model; the transportation model; inventory control models; critical-path models (PERT/CPM); and computer simulation. Homework assignments will include running 'canned' computer application programs. (0208-201, 202, 351, 352 and 0203-321) **Credit 4**

0205-298, 398 Special Topics: Management

Special topics are experimental courses offered quarterly. Watch for titles in the course listing each quarter. **Credit Variable**

SMALL BUSINESS MANAGEMENT

0205-221 New Venture Development

Course presents factors to be considered by those interested in the ownership and management of small business enterprises. Includes who should be an entrepreneur, guidelines for starting a new business, basic legal consideration, and approaches for obtaining capital and credit. **Credit 4**

0205-222 Small Business Management and Finance

The functions required to successfully manage and finance a small business are presented. A variety of topics include staffing a small business, purchasing and supplier relations, consumer credit policies, and the financial and administrative controls necessary to minimize business risk. **Credit 4**

0205-223 Small Business Marketing and 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**

HEALTH CARE MANAGEMENT

0206-310 Survey of Health Care Systems

An overview of the development, structure, and current forces transforming the health care system. Topics will 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 coursework in health care and permission of chair) **Credit 4**

0206-320 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 will be discussed. (0206-310 or previous experience or coursework in health care and permission of chair)
Credit 4

0206-351 Health Care Economics and Finance

This course will provide a knowledge of the efficiency, effectiveness, and equity of the new economics of health care, and 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. (0206-310 or 320)**Credit 4**

0206-421 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. (0206-310 or 320)**Credit 4**

0206-431 Health Care Quality Assurance

An introduction to quality assurance in health care. Course will explore past and current definitions of quality and competing concepts of quality assurance; will review existing quality assurance requirements and accrediting organizations, federal and state agencies, and third party payers; will describe and explain quality assurance methods and tools and their application in various settings. (0206-310 or 320) **Credit 4**

0206-441 Health Planning and Program Development

A review of the methodology of planning effectively for health care services. The use of data systems, forecasting, and identifying and analyzing problems is explored, along with the process of strategic planning, setting priorities, developing projects, and allocating resources. Students will prepare actual applications for new programs to regulatory agencies. (0206-310 or 320)**Credit 4**

MARKETING COURSES

0207-210 Effective Selling

Investigates the importance of the sales function within the overall marketing organization and the necessary general characteristics of a successful salesperson. The various steps of the sales process and the practical applications of effective sales presentation are discussed.**Credit 4**

0207-213 Advertising Principles

Social, economic and mass communication aspects of advertising with special emphasis on the role of advertising in the marketing mix. Special topics include agency/client relationship, radio and TV ratings, history of advertising, the creative process and psychographics. Guest lectures discuss corporate campaigns. **Credit 4**

0207-214 Advertising Evaluation and Techniques

Course presents basic approaches used in planning, preparation and evaluation of advertising and sales promotional materials. Course incorporates a number of projects involving writing/layout/production for print, broadcast and specialized media advertising.**Credit 4**

0207-361 Marketing

An introductory course in marketing designed to provide a better awareness of the function of marketing and how marketing relates to other areas of business. Topics include the marketing concept, developing a product strategy, behavioral aspects of consumer marketing, the marketing mix, segmentation and current marketing issues.**Credit 4**

0207-362 Marketing Practices for the Service Economy

Focuses on applications of traditional marketing concepts and techniques to the service sector (e.g., banking, health care, transportation, and services within organizations) to optimize quality, customer satisfaction, and sales/revenues/profits. Includes a brief review of the increased role of services in the economy. **Credit 2**

0207-398 Special Topics

Special topics are experimental courses offered quarterly. Watch for titles in the course listing each quarter. **Credit Variable**

MATHEMATICS AND STATISTICS FOR BUSINESS

0208-201, 202 Mathematics for Business

An introduction to mathematical concepts and quantitative methods required in business management. Included are: sets and real number system, linear, non-linear and exponential functions; and system of equations and inequalities. Differential and integrated calculus is introduced plus some special topics in quantitative analysis such as linear programming and simulation. **Credit 4/Qtr.**

NOTE: Entering students who want to register for CBCH-201 are required to take a diagnostic examination to determine the level at which they may start the sequence. Students who have had previous college level mathematics courses should consult with an adviser

0208-351, 352 Business Statistics

An introduction to the basic tools of statistical analysis used in business including charts, frequency distribution, averages, dispersion, probability theory, sampling. Logical procedures for making business decisions under conditions of uncertainty are emphasized. Hypothesis testing including one, two, and k-sample test means, proportions, regression and correlation analysis are also included. (0208-202) **Credit 4/Qtr.**

PERSONNEL ADMINISTRATION

0209-224 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**

0209-225 Recruiting, Training and Supervising Service Industry Personnel

This course examines problems and solutions related to establishing realistic and attractive wages and career paths for employees in service sector businesses. In addition, it explores motivation, training and communication techniques that lead to the kind of quality performance required in service industries and organizations to optimize customer satisfaction. **Credit 2**

0209-229 Personnel Administration

An introduction to personnel administration including an overview and discussion of employment, equal employment opportunity, job evaluation, training, performance appraisal, compensation, benefits, personnel planning, labor relations, and other related topics. **Credit 4**

PRODUCTION MANAGEMENT AND INDUSTRIAL ENGINEERING

0210-209 Production Management

The organization of production functions with emphasis on management responsibilities. All levels of factory operation are discussed and relationships between various aspects of production are presented. **Credit 4**

0210-305 Fundamentals of Industrial Engineering

An overview of industrial engineering problems and techniques is presented including facilities selection and layout, methods analysis, work measurements, operations planning and control materials handling and an introduction to operations research. **Credit 4**

0210-306 Industrial Engineering Economy

The economic factors required for rational decisions are presented. Emphasis is placed on analytical tools used in a manufacturing environment including evaluation of capital spending alternatives, depreciation methods, decision-making under risk conditions, and value analysis methods. **Credit 4**

0210-332 International Standards

As the marketplace becomes increasingly oriented toward the international exchange of goods and services, the International Organization of Standards continues to develop a set of quality standards assuring that goods and services produced by a supplier are capable of meeting the requirements of customers around the globe. This course will address the emerging developments of international standards in terminology and quality standards. It will also consider manufacturing

standardization in such industries as telecommunications and electronics. This course is an elective for the International Business and Culture Certificate. **Credit 2**

LOGISTICS AND TRANSPORTATION MANAGEMENT

0212-234 Introduction to Logistics and 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**

0212-239 Traffic and Transportation Law, Rates, Accounting and Control

Introduces the role of government in the transportation industry. The evolution 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**

0212-241 International Logistics and Transportation

Introduces the basic skills required to move materials in support of the logistics function internationally. Includes discussions of duties, customs regulations, and the various instruments used to facilitate international trade. **Credit 4**

REAL ESTATE

0213-201 Basic Real Estate Principles: Salesperson's Course

Comprehensive study of real estate principles including: law of agency, human rights and fair housing, real estate instruments, financing, valuation and listing, contracts, license law and ethics, closings, land use regulations, and real estate math. Completion of this course satisfies the NYS educational requirement for a real estate salesperson's license. For licensure, participants must meet 90% attendance (40 1/2 hours) requirement and pass the final exam. Individuals interested in licensure only should call 475-4927. **Credit 4**

0213-202 Advanced Real Estate Principles: Broker's Course

A study of topics related to real estate including: operation of a broker's office, construction, general business law, subdivision and development, leases, taxes, assessments, investment property, alienation, property management, condominiums and cooperatives, rent regulations, appraisals, and advertising. Completion of this course and Basic Real Estate Principles satisfies the educational requirement for a real estate broker's license. For licensure, participants must meet 90% attendance (40 1/2 hours) requirement and pass the final exam. Individuals interested in licensure only should call 475-4927. **Credit 4**

0213-203 Real Estate Investment and Finance

An introduction to real estate investment with emphasis on the purchase and sale of real estate, the acquisition of financing, the selection of appropriate ownership forms, and the use of statistical data in making real estate decisions. **Credit 4**

For license renewal this course is approved by NYS Department of State as a 30-hour course with exam.

0213-212 Residential Properties Management

An introductory course focusing on the application of management principles to residential properties. The course is geared to the property manager rather than the on-site manager. Topics include: property analysis, the relationship between management and value, the scope and history of property management, marketing, and apartment operation and administration. This course has been designed in cooperation with the Institute of Real Estate Management and may qualify the student to receive elective credit toward the Certified Property Manager (CPM) designation awarded by IREM. **Credit 4**

INTERNATIONAL BUSINESS

0218-410 Doing Business in International Markets

This course provides an orientation to conducting business successfully in the global marketplace. Emphasized are manufacturing, management, marketing, sales, technology transfer, transportation of goods, and those factors that influence commerce in world markets. The course will also introduce the environmental framework of labor, finance, international regulations, competition, cooperative agreements and arrangements, and relevant political and cultural factors. This is a general course in the International Business Certificate. **Credit 4**

0218-411 Doing Business in the European Economic Community

This course is designed to give the student an understanding of European business customs, practices, and attitudes through a study of the environment in which business transactions take place. Topics include a study of the European Common Market that looks at both the evolutionary roots and history and the forces that compel the ECC trends of today, each country in the ECC, economic and political features of the agreement, discussions of the problems and possibilities of trade, and the likely effects of current issues (i.e., changes in Eastern Europe, German re-unification) on the European economic scene. This is a specialty course in the International Business Certificate. **Credit 4**

0218-412 Doing Business in Mexico and Latin America

Political, social, and regulatory changes like the North American Free Trade Agreement (NAFTA) have made Mexico and Latin America an attractive market for U.S. goods and for multinational manufacturers. Topics in this course include an examination of NAFTA and the social, political, cultural, and economic environments influencing trade and commerce and business transactions in Mexico, Brazil, and Argentina. This is a specialty course in the International Business Certificate. **Credit 4**

0218-413 Doing Business in Japan and the Pacific Rim

This course is designed to give students an understanding of the cultural, political, and social environments affecting commerce and trade with Japan and countries that form the Pacific Rim. Differences and similarities of the countries' business environments will be analyzed. Topics include tradition, quality, and participatory responsibility in production and management of Japanese business and their effect on the environments in which business transactions take place; the importance of a single ethnic and cultural source; and the importance of specific idiosyncratic styles. This is a specialty course in the International Business Certificate. **Credit 4**

0218-414 Doing Business in Russia and Eastern Europe

A study of the socio-economic, political, and cultural aspects that affect commerce and trade in Russia and Eastern Europe. Students will gain an appreciation for the way business is transacted in those countries. Monetary and government regulations, rules and restrictions for trade unique to each country, new trade and business opportunities are covered. In addition, the course includes country-specific topics such as historical, political, and religious perspectives of the countries of Eastern Europe and C.I.S. business culture, negotiating style, and protocol for Russia. This is a specialty course in the International Business Certificate. **Credit 4**

0218-430 Communicating Across Cultures

Individuals will encounter profound cultural differences when travelling internationally or interacting with people of different cultures. Behavior is rooted in the cultural experience of locale, region, and country. Communicating across cultures is about managing differences between distinct ways of life. Course topics include deciphering variations in dress, demeanor, body language, interpersonal and social behavior, material things in business and social contexts, and applying these insights to various host countries. This is a general course in the International Business Certificate. **Credit 4**

0218-450 International Economic Policies and Principles

This course will help students prepare to work effectively in both international and domestic economic settings. Emphasis will include policies and principles associated with macroeconomic effects of trade, international monetary instruments, and the economics of major nations and regions of the world. This is a general course in the International Business Certificate. **Credit 4**

0218-452 International Trade: Importing and Exporting

This course introduces students to the logistics, cultural and transportation systems, and regulations necessary to transact international trade. Topics include documentation procedures, regulations, related services, and techniques to reduce the costs of international trade. This is a specialty course in the International Business Certificate. **Credit 4**

0218-454 International Advertising and Public Relations

An examination of the various elements that must be considered when embarking on a marketing support program for products or services in countries outside the United States. The course will follow the traditional path of advertising and public relations marketing support activities, identifying and learning how to deal with the unique characteristics of the international marketplace. Major areas of study include standardization of localization, agency operations, language and cultural considerations, media planning and analysis, international communication, processes and production of marketing plans, and strategy selection. This is a specialty course in the International Business Certificate. **Credit 4**

0218-456 International Manufacturing for a Worldwide Economy

In our competitive global economy, international manufacturing is an important strategic issue. This course gives students a broad understanding of international manufacturing and examines the various geographic trade initiatives (EC92, NAFTA, ALADI, GATT . . .); the types of international manufacturing arrangements; international standards, codes, and regulations; and the financial implications of multinational manufacturing. This is a specialty course in the International Business Certificate. **Credit 4**

INTERDISCIPLINARY STUDIES

0220-220 Careers and Credits

This course is designed specifically for adults who want to know more about themselves-their talents and skills--so that they can make informed career choices and realistic educational plans. Using skills and interest inventories, class discussion, individualized and group activities, assigned readings and papers, students will be able to assess their individual goals, interests and abilities. **Credit 2**

0220-230 Introduction to Quality

An introduction to the fundamental concepts of total quality management. Includes an overview of the competitive environment, the cost of non-quality, and the history of quality; a systematic examination of the leading definitions of quality and models of quality management; and an exploration of the implications of quality management concepts for organizational structure and roles, decision making, and interpersonal relations. **Credit 4**

0220-231 Basic SQC Techniques

An introductory course in Statistical Quality Control techniques used in determining operating quality levels and recognizing degrees of process control and capability in a service industry or a manufacturing process. Topics include tools for diagnosing sources of variation; construction and interpretation of charts for variables and attributes; tolerances, specifications, and process capability. Product quality (i.e., high yield) and product reliability are also addressed. (High school algebra or equivalent) **Credit 4**

0220-270 Methods of Inquiry

This course is designed to provide 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**

0220-330 Leadership Skills for Quality

Analytical and behavioral strategies and techniques for providing leadership in quality management. Includes examination of problem-solving models and processes; personal values related to leadership; and behavioral, conceptual, and communication skills for successful team building and team working, conferencing, negotiating, and assessing and promoting quality behavior. Case studies, interactive simulations, and assessment of individual leadership characteristics. (0220-230 or approval of department) **Credit 4**

0220-340 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**

0220-410 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 procedures and financial statements, an introduction to cost accounting, an analysis of items that are directly and indirectly affected by conformance or non-conformance to customer requirements. (Certificate in Basic Quality or approval of department) **Credit 4**

0220-430 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**

0220-440 Creative Critical Thinking and Problem Solving

An inter-disciplinary approach to the generation and evaluation of ideas and solutions. Includes analysis of the conditions limiting creativity and the development of a 'tool kit' 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**

0220-442 Managing Change, Conflict, and Differences in Organizations

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, conflict, and differences in personal and professional life. The strategies to be covered include, but are not limited to, community building, recognizing prejudice, conflict management, managing change, identifying resistance, negotiation/ mediation, and related communication skills. The course will emphasize real-life applications and experiential learning in class. Teaching strategies will include case studies, experience logs, self-assessment inventories, role playing, and assigned reading.**Credit 4**

0220-501 Honors Seminar

An interactive seminar for advanced students that focuses on interdisciplinary issues of wide interest and application. Course theme and content change periodically, ranging from 'Negotiation and Conflict Resolution,' to 'Microeconomic Battle Plans' and 'Organizational Culture.' Limited to qualified Applied Arts and Science BS degree students. (Approval of adviser)**Credit 4**

CERAMICS

0222-201 Introduction to Ceramics

An extensive survey of on and off the wheel forming techniques using stoneware and porcelain clays. Students will be 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**

0222-211 Intermediate Ceramics

An exploration of Japanese wheel-throwing techniques. Students will work with raku stoneware and porcelain, using methods and tools common to Japanese potters. Class projects will concentrate on production techniques with special emphasis being given to glazing and firing procedures. (0223-201 or equivalent)**Credit 2**

0222-301 Advanced Ceramics

An introduction to the world of the professional potter. Work will center on advanced forming and decorative techniques ranging from sectional throwing to photo-sensitive emulsion glazing. Special emphasis will be on independent projects which require the potter to master clay and glazing formulation, design, production and firing techniques. Kiln design and construction as well as marketing techniques for finished work will be discussed. (0222-211 or equivalent)**Credit 2**

0222-240 Ceramic Wheel-Throwing Techniques

A broad survey of wheel-throwing skills with an emphasis on developing the student's ability to create well-designed, functional wares. **Credit 2**

0222-243 Porcelain Techniques

An intensive introduction to porcelain with an emphasis on Japanese techniques of throwing, finishing and glazing. Basic wheel-throwing skills are required. **Credit 2**

0222-245 Earthenware Techniques

An intensive introduction to earthenware with an emphasis on exploring the characteristics of unglazed, functional and sculptural forms. **Credit 2**

0222-295 Independent Study: Ceramics

Independent study may be developed at upper division level. Projects must be developed with instructor, subject to the approval of the program chairperson. Credit may vary from one to five quarter-credits. For information on independent study contact your advisor or the program chairperson. **Credit Variable**

0222-298 Special Topics: Ceramics

Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter. **Credit Variable**

DESIGN

0223-201, 202, 203 Basic Design

Study of basic elements of design: line, shape, texture, color, space and their incorporation in design principles as applied to two- and three-dimensional design problems including the graphic arts. **Credit 2/Qtr.**

0223-211, 212, 213 Display Design

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. (0224-201, 202, 203 and 0223-201, 202, 203 or equivalent experience) **Credit 2/Qtr.**

0223-215, 216, 217 Rendering Techniques

This course will introduce students to the materials and techniques used by designers in rendering interiors, layouts, products, etc. Marker sketching, perspective, shadowing, media selection, and presentation techniques will be covered. Suggested for all design students. (0224-201, 202, 203; 0223-201, 202, 203 or equivalent) **Credit 2/Qtr.**

0223-220 Art for Reproduction

This course prepares students to enter the field of graphic design by providing orientation and the studio experience in the presentation of imagery for reproduction. Presentations will include board techniques, materials, tools, mechanical art procedures, printing and bindery processes, etc. (0223-201, 202, 203 or equivalent) **Credit 3**

0223-224, 225 Interior Design

Career orientation. Emphasis on practical aspects of the profession. Details of purchasing all furnishings used in a home. Client centered planning and design. (0224-201, 202, 203; 0223-201, 202, 203 or equivalent) **Credit 2/Qtr.**

0223-226 History of Interior Design

Historical survey of period decoration and furniture styles from antiquity to the present. **Credit 2**

0223-227 Business Aspects of Environmental Design

This course will introduce students to the various occupations available to the environmental and interior designer, and instruct 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 will also be covered. Assignments will be structured to meet the personal business needs of each student. **Credit 2**

0223-231 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 the visual impact of color. (0223-201, 202, 203 or equivalent experience)**Credit 2**

0223-235 Commercial Interior Design

Students will learn to develop a good commercial interior plan given clear specifications and boundaries. Presentation techniques, client relations and fee philosophy will also be discussed with frequent field trips and guest speakers. (0223-224, 225 or equivalent)**Credit 2**

0223-251, 252, 253 Environmental Design

The study of enclosed space, using material and the elements of design, line form, texture, and color to develop living space. (0224-201, 202, 203 and 0223-201, 202, 203 or equivalent experience) **Credit 2/Qtr.**

0223-260 Marker Rendering Techniques

Students will be introduced to marker techniques and materials used in rendering layouts, interiors, products and illustrations. Other mediums will be united with marker to develop shadow and highlighting, sketching and presentation techniques.**Credit 2**

0223-261, 262, 263 Advanced Design and Typography

Study of 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. Proceeds from rough letter indication to development of finished lettering, and application in commercial advertising problems. Typography and photo lettering methods will be studied in relationship to their use in commercial design. (0224-201, 202, 203 and 0223-201, 202, 203) **Credit 2/Qtr.**

0223-270 Graphic Communication for the Non-Artist I

Introduces basic skills in communication graphics, including: elements of design (line, shape, texture, color, space) and their application to two-dimensional projects; typography and commercial layout procedures (from rough layouts to comprehensives); and rendering techniques (marker sketching, shadowing, and perspective). Course is designed for people with little or no previous art training. Lecture/demonstration and studio format; student projects followed by critiques.**Credit 3**

0223-271 Graphic Communication for the Non-Artist II

An exploration of current approaches to solving graphic design problems in the communications professions, applying basic skills in design, lettering and layout, and rendering, with emphasis on the use and selection of art materials, photographs, and photographic/electronic image producing equipment; and an exploration of design in the advertising process, involving planning, creating, producing, and evaluating media. (0223-270 or equivalent)**Credit 3**

0223-280 Basic Computer Graphics

This course is designed for students with no computer background. Experimenting with basic principles and elements of design, students approach the computer as a tool for image making. No prior design training is necessary. **Credit 2**

0223-301, 302 Advertising

Advertising is planned, created, and placed by bright, inquisitive, hard working people in a fast paced, time-conscious business. They work within limits of budgets, marketing objectives, research, media, competitors' actions and a growing list of government regulations. This course examines the world of advertising and what is required to create advertising campaigns by tracing a campaign development step by step. **Credit 4/Qtr.**

0223-311, 312, 313 Graphic Design

A contemporary approach to design for printed advertising with the emphasis on creative experience. The purpose of this course is to provide a working knowledge of the field of graphic design, its history, its future, and general practices among current professionals. The role of the graphic designer in the communications field and how the designer actually implements that role will be discussed. (0224-201, 202, 203; 0223-201, 202, 203 or equivalents. 0223-261, 262, 263 recommended) **Credit 2/Qtr.**

0223-315, 316, 317 Advertising Design

The functions and skills of the art director touch on all phases of advertising art from concepts and professional studio procedures to practical approaches in design and production. (0224-201, 202, 203 and 0223-201, 202, 203 or equivalent experience. 0223-261, 262, 263 and 311, 312, 313 recommended) **Credit 2/Qtr.**

0223-360 Portfolio Workshop

A workshop designed to help students take what they have learned in art classes (or work situations) and prepare and present a portfolio. Students will produce a resume and cover letter appropriate to their career goals. Projects will be tailored to the needs of individual students, allowing them to compile an accurate representation of their skills in a concise, positive, and beneficial manner. Visits from prominent people in the field showing their work and sharing their experiences. **Credit 2**

0223-371, 372, 373 Designing with Computers I, II, III

An introduction to the Macintosh computer as a design tool. Created for people just beginning to apply their design skills to a computer. In a hands-on lab, over three quarters, the basic software covered includes: ALDUS Superpaint (bit-map program), Pagemaker (page-layout program), and Freehand (vector-based program) for illustrative techniques. Discussions on a variety of related topics, such as design concepts, other software, computer needs and misconceptions. Previous design experience is necessary. (0223-201, 202, 203 or 0223-270, 271 or equivalent; must be taken in sequence) **Credit 3/Qtr.**

0223-295 Independent Study: Design

Independent studies may develop at the upper division level. Projects must be developed with instructor, subject to approval of the program chairperson. Credit may vary from one to five quarter-credits. For information on independent study contact your advisor or the program chairperson. **Credit Variable**

0223-298, 398 Special Topics: Design

Special Topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter. **Credit Variable**

DRAWING

0224-201, 202, 203 Basic Drawing and Media

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.**

0224-207 Basic Figure Drawing

Drawing from the costumed and nude model. The student makes 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 the control of media. (0224-201, 202, 203 or equivalent) **Credit 2**

0224-210 Interpretive Landscape Drawing

Students will sketch directly from nature on location during field trips. In subsequent studio sessions compositions translating first impressions using various media will then be developed. Special attention will be given to individual approaches and expression. **Credit 2**

0224-250 Cartooning

Various cartooning styles are examined, identifying and discussing the factors that make cartoons appealing and effective. The focus of the course will be the study and practice of the principles of cartoon illustration. The importance of obtaining good reference materials, as well as maintaining a file of other cartoon art, will be stressed. Students will complete weekly drawing assignments, covering different elements of cartoon, building in complexity and culminating in the completion of several finished cartoon pieces. (0223-201, 202, 203; 0224-201, 202, 203 or permission of chairperson) **Credit 2**

0224-306 Advanced Drawing

Drawing in a variety of media, including an introduction to line, form and color as elements of pictorial expression. Presents organic, inorganic, and imaginative stimuli. May be elected more than once for credit. (0224-201, 202, 203; 0223-201, 202, 203 or equivalent) **Credit 2**

0224-307 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 than once for credit. (0224-207 or equivalent recommended)**Credit 2**

0224-350 Advanced Cartooning

This course will build upon the foundation established in Cartooning. The value of gesture drawing will be stressed, and an exploration of the many elements of cartooning will be made. Assignments will be more specific and become more comprehensive in content. Color will be used more, and a wide variety of media options will be explored. Composition, layout, and attention to detail will be stressed. Reference materials will be integrated into many of the assignments. Client-vendor relationships and the pros and cons of free lancing will be discussed. (0224-250)**Credit 2**

PAINTING

0224-211 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. (0224-201, 202, 203; 0223-201, 202, 203 or equivalents) **Credit 2**

0224-301 Painting

Painting with opportunities for gifted and advanced students to explore media, seek new skills, 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 will be used for inspiration. May be elected more than once for credit. (0224-211 or equivalent)**Credit 2**

0224-227 Figure Painting

Painting from costumed and nude models. The emphasis is placed 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. (0224-307 or equivalent)**Credit 2**

0224-337 Portrait Painting

Particular attention is given to the development of anatomical understanding. Several media will be explained. Emphasis will be 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. (0224-207 and 0224-211 or equivalents) **Credit 2**

0224-341 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. (0224-201, 202, 203 or equivalents) **Credit 2**

SCULPTURE

0224-247 Sculpture

Study of basic theories of form and space utilizing sculptural processes and techniques. Solutions to problems, traditional and modern, are achieved through exercises using various materials such as clay, wood, plaster, plastic. Through discussion and practice, the student is introduced to the proper use of the sculptor's tool and methods. (0224-201, 202, 203 and 0223-201, 202, 203 or equivalents) **Credit 2**

0224-357 Sculpture Workshop

An in-depth study of sculptural methods, techniques and materials (clay, wood, plaster, stone and welded metal). Students may concentrate in one material. May be elected more than once for credit. (0224-247) **Credit 2**

ILLUSTRATION

0224-361 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. (0224-207 or equivalent) **Credit 2**

0224-362 Airbrush Techniques

This course is designed to provide an opportunity for beginners to develop the basic skills and techniques of painting with an airbrush and allow experienced users to enhance their skills. Graphic artists, fine artists, illustrators, and photographers can benefit from this exposure to airbrush techniques and applications through demonstration and experiential learning. Class will be limited to 10 students. (0223-201, 202, 203 and 0224-201, 202, 203 or equivalent) **Credit 3**

0224-230 Collage

A basic study of the history, materials, and techniques used in collage. Students will explore a variety of materials used by past and contemporary artists and then apply these techniques to develop their own work. May be elected more than once for credit. (0223-201, 202, 203; 0224-201, 202, 203) **Credit 2**

0224-263 Calligraphy

This course will introduce students to either the Foundational or Italic form of lettering. Students will explore the history, theory, and techniques that have shaped letter forms as we know them today. Emphasis will be 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 to be studied include majuscules, minuscules, rhythm, spacing, techniques, media, color, design, page layout, and either the mechanics of bookbinding or camera ready art. **Credit 2**

0224-363 Calligraphy Workshop

Further study in the methods and techniques of calligraphy. Students will be able to pursue study in a variety of styles and letter forms in a concentrated manner. May be elected more than once for credit. (0224-263 or equivalent) **Credit 2**

PRINTMAKING

0224-296 Introduction to Printmaking

An introduction to the methods, materials, tools, and techniques of printmaking. Areas covered may include woodcut, etching, engraving, stencil, collographs, and lithography. Students are required to pull an edition of print in one area. (0224-201, 202, 203 and 0223-201, 202, 203 or equivalents) **Credit 2**

0224-397 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. (0224-296) **Credit 2**

0224-295 Independent Study: Fine Arts

Independent studies may be developed at the upper level. Projects must be developed with an instructor, subject to approval of the program chairperson. Credit may vary from one to five quarter-credits. For information on independent study contact your advisor or the program chairperson. **Credit Variable**

0224-298, 398 Special Topics: Fine Arts

Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter. **Credit Variable**

METALCRAFTS AND JEWELRY

0225-201 Introduction to Metalcrafts and Jewelry

Emphasis will be placed on basic jewelry making techniques involving sawing, filing, soldering, hand and machine finishing techniques, simple stone setting and more. Design will be stressed throughout the course. May be elected more than once for credit. **Credit 2**

0225-211 Intermediate Metalcrafts and Jewelry

Work of a more complex nature will be introduced. Some techniques included will be surface treatment of metal, more sophisticated stone setting, basic hollowware, casting and more. Independent and creative statements will be emphasized in keeping with the student's technical

and aesthetic development. May be elected more than once for credit. (6 credits 0225-201 or presentation of portfolio) **Credit 2**

0225-301 Advanced Metalcrafts and 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 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**

0225-295 Independent Study: Metalcrafts/Jewelry

Independent studies may be developed at the upper division level. Project must be developed with instructor, subject to approval of the program chairperson. Credit may vary from one to five quarter-credits. For information on independent studies contact your advisor or the program chairperson. **Credit Variable**

0225-298 Special Topics: Metalcrafts and Jewelry

Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter. **Credit Variable**

WEAVING/TEXTILES

0226-201 Introduction to Weaving

An introduction to the materials, processes and techniques of weaving. Emphasis on basic skills includes fiber analysis, yarn calculations, warping loom dressing, four-harness loom techniques, finishing, designing, drafting and color effects. May be elected more than once for credit. **Credit 2**

0226-211 Intermediate Weaving

A continuation in the development of weaving techniques and design skills through advanced study of color effects, drafting, four-harness and tapestry techniques. The course will include samples of a particular technique plus home assignments and a final project to satisfy individual needs. May be elected more than once for credit. (6 credits 0226-201 or presentation of portfolio) **Credit 2**

0226-301 Advanced Weaving

For advanced students in the arts or crafts interested in and capable of exploring a particular area. Content and method 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 the class and outside assignments schedules. May be elected more than once for credit. (Presentation of portfolio) **Credit 2**

0226-295 Independent Study: Weaving/Textiles

Independent studies may be developed at the upper division level. Projects must be developed with the instructor, subject to the approval of the program chairperson. Credit may vary from one to five quarter-credits. For information on independent study contact your advisor or program chairperson. **Credit Variable**

0226-298 Special Topics: Weaving/Textiles

Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter. **Credit Variable**

WOODWORKING

0227-201 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**

0227-211, 212, 213 Intermediate Woodworking

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 will be emphasized. May be elected more than once for credit. **Credit 2/Qtr.**

0227-301 Advanced Woodworking

For advanced students in the arts or crafts interested in and capable of exploring a particular area. Content and methods decided before registration by conference between student and instructor and directed toward development of students 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**

0227-295 Independent Study: Woodworking

Independent studies may be developed at the upper division level. Projects must be developed with an instructor, subject to the approval of the program chairperson. Credit may vary from one to five quarter-credits. For information on independent study contact your advisor or program chairperson. **Credit Variable**

0227-298 Special Topics: Woodworking

Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter. **Credit Variable**

DEAF STUDIES

0234-211 Sign Language and Manual Communication: System I

Develops fluency at a basic level. This course includes introduction and practice of approximately 300 basic signs, theoretical consideration and practice of grammatical features of sign language, fingerspelling and sociolinguistic information regarding the appropriate application of manual communication skills in communicating with deaf persons.**Credit 2**

0234-212 Sign Language and Manual Communication : System II

A continuation of conversational signing skill development. The course includes 300 additional basic signs, continued practice with the grammatical features of sign language, fingerspelling practice, and further sociolinguistic information regarding the appropriate use of manual communication skills between deaf and hearing persons. (0234-211 or equivalent sign skill)**Credit 2**

0234-213 Sign Language and Manual Communication : System III

The third in a series of basic conversational sign language courses. Introduces the student to approximately 300 additional signs, continues the practice of the grammatical features of sign language, refines fingerspelling skills, and further develops students sensitivity to the use of manual communication by deaf and hearing persons. (0234-212 or equivalent sign skill)**Credit 2**

0234-241 Aspects and 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**

0234-242 Aspects and 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 will be implemented. (Recommended: 0234-241)**Credit 3**

0234-311 American Sign Language I

This course is designed to 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 A.S.L. Videotapes, dialogues, language games, lecture and readings are used in presentation of this content. (0234-213 or equivalent sign skill)**Credit 2**

0234-312 American Sign Language II

The second in a series of American Sign Language courses. This course continues the study of grammar, syntax and lexical items of A.S.L. Cultural aspects of the deaf community are considered as they relate to the language of deaf people. (0234-311 or equivalent sign skill)**Credit 2**

HUMANITIES

0235-201 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**

0235-202 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 prerequisite for other courses. **Credit 4**

0235-203 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**

0235-340 Values and 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**

0235-341 Symbols, Behavior, Culture, and Technology

A study of symbol and sign systems, emphasizing principles and rules that underlie linguistic behavior. Examines the ways in which behavior reflects and influences culture, and the ways in which miscommunication results from technical, behavioral and cultural factors. This is a science, technology and humanities elective. **Credit 4**

0235-342 Dimensions of Science

A survey and exploration of the impact of science on, and its interactions with, other elements of civilization, such as literature, technology, politics, philosophy, the arts, and human values. This is a science, technology and humanities elective. **Credit 4**

0235-359 Contemporary Moral Problems

A one-quarter course that presents moral issues which 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., those of Plato, Locke, Hume, etc.) **Credit 4**

0235-360 African-American Film : Survey and Interpretation

Five thematic periods of African-American film-making are explored through the lenses of history, theme type, and sociological content. Special emphasis will be given to the evolution of roles played by African-American actors and to the achievements of African-American directors. **Credit 4**

0235-298 Special Topics: Humanities

Experimental lower-division courses will be offered under this number; titles will appear in each quarter's course listing. **Credit Variable**

COMMUNICATION

NOTE: Students who apply for Dynamic Communication I, 0236-204, or Communication, 0236-220, must take a pre-test to determine the course most appropriate for their communication needs. Only students who have credit for 0236-204, or equivalent, may register for Dynamic Communication II, 0236-205.

0236-204 Dynamic Communication I

The first of a two-course sequence, Dynamic Communication I focuses on writing skills. The achievement of clarity, coherence, logical development of ideas, and effective use of language is emphasized. Basic research techniques are included. (Requires pre-test) **Credit 4**

0236-205 Dynamic Communication II

This course builds on the skills acquired in Dynamic Communication I, emphasizing organization, support, and effective expression of ideas in papers of several paragraphs. 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. (0236-204 or equivalent)**Credit 4**

0236-220 Communication

This course 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 pre-test)**Credit 4**

0236-240 Interpersonal Communication Skills

Knowing when to speak, what to say, and how to say it is a prime asset for achieving success in many areas of our lives. This course focuses on techniques for communicating successfully in career, social, and personal interactions. Topics include assessing communication situations, clarifying ideas, listening, persuading, and managing conflicting viewpoints.**Credit 2**

0236-301 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 video-taped speeches. **Credit 4**

0236-302 Discussion Skills and 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 which simulate those of civic, business, and industrial settings. Peer critiquing and video tapings allow students to apply theory as they learn to recognize the elements of successful conferences.**Credit 4**

0236-307 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. (0236-205, 220 or equivalent)**Credit 4**

0236-308 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. (0236-205, 220 or equivalent)**Credit 4**

0236-315 Report Writing

Principles of organizing information into clear, concise reports; techniques for oral technical reports, letters, and memos included. **Credit 2**

0236-323 Technical Writing and Editing

This course 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 chairperson.)**Credit 4**

0236-324 Research Techniques

This course focuses on techniques for information generation. Interviewing skills, review and use of literature, and task analysis are included. (For students in Basic Technical Communication program. Others contact chairperson.)**Credit 2**

0236-325 Instructional Design Principles

An introduction to the process of designing instructional packages from need and task analysis through identifying goals and objectives, media selection, program development, and validation testing. (0236-323 and 324)**Credit 2**

0236-326 Document Design

An overview of the principles and techniques involved in document design. Includes basic principles of graphic design and visual communication, use of computer graphics, and introduction to typography and reproduction methods. (0236-323 and 324)**Credit 2**

0236-327 Practicum: Designing Manuals

With supervision, students apply general principles of technical communication to the process of planning, researching, writing, editing, formatting, and producing a technical manual. (0236-323 and 324) **Credit 2**

0236-328 Writing for the Sciences

Reviews conventions used in presenting the results of scientific investigation in articles for trade journals, general news magazines, textbooks, and proceedings. Includes practice in researching, selecting, and organizing content, citing and verifying references, and preparing manuscripts. (0236-220 or equivalent) **Credit 2**

0236-329 Oral Skills for Technical Communication

Focuses on effective techniques for oral presentation of technical material and participation, both as leader and member, in formal and informal meetings. **Credit 2**

0236-330 Writing Software User Documentation

Defines and provides examples of end-user documentation for software products; defines the conventional audience, content, structure, and language of software user manuals; identifies typical problems in user manuals; explores types of online user information; and defines usability testing. Practice in writing step-by-step procedures, defining system and software concepts, and describing functional processes. **Credit 2**

0236-331 Promotional Writing

Focuses on practical guidelines for preparing marketing materials including brochures, data sheets, trade press articles, press kits, and advertising copy. (0236-205, 220 or equivalent)**Credit 2**

0236-332 Managing the Project

Principles of project management are studied and applied in cases and examples taken from the fields of technical and public relations communication. Major topics include planning, organizing, scheduling, budgeting, controlling, monitoring, and reporting. Conflict resolution, team building, and motivation are also covered. **Credit 2**

0236-333 Managing Media Presentations

Introduces the processes and techniques of producing media presentations, from simple forms that can be produced in-house to more sophisticated ones that require the services of graphic designers, photographers and video production units. Students learn to evaluate the variables of schedules, resources, and costs; match media, message, and audiences; and coordinate the stages of production. (Formerly Audiovisual Presentations)**Credit 2**

0236-340 Interpersonal Communication for Customer Service

This course 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**

0236-360 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 advisor to management; and as spokesperson, media manager, and services purchaser and provider. Course may be counted as either a business or communication elective. (Consult advisor) **Credit 2**

0236-365 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. (0236-220 or equivalent)**Credit 2**

0236-366 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, covering meetings, adapting interviews for print, and statements for various media. (0236-365 or equivalent) **Credit 2**

0236-368 Scripting for AV and Video Presentations

Introduces writing and production techniques for audio/visual and video presentations. Scripting prepares students to write a specialized form of communication—dialogue that is to be spoken and heard. Instruction on enhancing the verbal message with visuals is presented. Dimensions of wording, voice characterization, sound, motion, and color are explored. Includes storyboarding and an introduction to traditional and emerging production methods. (0236-220 or equivalent) **Credit 2**

0236-369 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. (0236-220 or equivalent)**Credit 2**

0236-395 Coordinating Publications 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. (0236-323 or 366, or equivalent) **Credit 2**

0236-298, 398 Special Topics: Communication

Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter. **Credit Variable**

0236-415 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. (0236-220 or 301, or equivalent) **Credit 4**

SOCIAL SCIENCES

0237-227 The New Service Economy

Provides an overview of the emerging national and regional service economies. Defines the service sector, both consumer and producer services, using a variety of local examples drawn from health care, information and communication, hospitality, financial and personnel services. Economic and labor force implications of the service economy are analyzed along with the structure of service organizations, service delivery systems and levels of service.**Credit 2**

0237-316 Psychology: Behavior in Industry

Industry presents one environment for understanding human behavior. This course applies psychological and social concepts to the industrial setting. Topics to be covered are motivation, performance, assessment, quality of work life, group behavior, leadership, organizational structure, communication and decision making. (0514-210 recommended)**Credit 4**

0237-317 Psychology of Stress and Adjustment

Physiological, psychological, and social stress can have serious consequences on one's daily life. This course is designed to familiarize students with basic concepts, the positive and negative ramifications of stress, and strategies for stress management. (0514-210 or equivalent)**Credit 4**

0237-320 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 will require students to use theory in designing effective strategies for various purposes and audiences. This course is required for the Public Relations Communications Certificate. **Credit 2**

0237-431 Understanding Corporate Culture

An introduction to the concepts of organizational/corporate culture and the methods of analyzing it. Course focuses on the development of skills required to assess corporate culture in terms of such constituent parts as ritual, symbol, structure, language, and identity. Also included will be a history of the study of corporate culture, an analysis of leadership styles and communication patterns in the workplace, an overview of strategies for managing corporate and organizational change, and an orientation to leadership styles appropriate to the successful manipulation of cultural elements. Emphasis will be placed on both individual and interactive learning processes. (0510-210 and either 0514-210 or 0515-210) **Credit 4**

SCIENCE AND TECHNOLOGY

MATHEMATICS

NOTE: A diagnostic examination is required of students applying for mathematics course 0240-201

0240-201, 202 Technical Mathematics

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 pre-test)**Credit 4/Qtr.**

0240-203 Technical Calculus

An elementary applied calculus course. This course covers the basic differential and integral calculus of algebraic and transcendental functions with applications. (0240-202 or equivalent)**Credit 4**

0240-205 Mathematical Thought and Processes

An examination of mathematical thought and processes through a study of elementary mathematical concepts. This course is designed to acquaint the student with the 'mathematical way of thinking.' Topics covered include sets, numeration systems, number theory, real numbers, and finite systems. **Credit 4**

0240-206 Modern Mathematical Methods

A continuation of 0240-205 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**

CONTEMPORARY SCIENCE

0246-221 Contemporary Science: Biology

An introduction to the fundamental principles of biology for nonscience majors and the application of these concepts to areas of interest in our contemporary technological society. Topics to be 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. (0240-201 or 0240-205 or 0208-201 or equivalent)**Credit 4**

0246-222 Contemporary Science: Chemistry

An introduction to the fundamental principles of chemistry for nonscience majors and the application of those concepts to areas of interest and concern in our contemporary technological society. Topics to be discussed include the atomic theory, chemical periodicity, nuclear reactions and energy, physical states of matter, chemical compounds, chemical reactions, organic chemistry, biological chemistry and macromolecular chemistry. The course is presented in lecture-demonstration format. (0240-201 or 0240-205 or 0208-201 or equivalent)**Credit 4**

0246-223 Contemporary Science: Physics

An introduction to the fundamental principles of physics for nonscience 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. (0240-201 or 0240-205 or 0208-201 or equivalent)**Credit 4**

0246-224 Contemporary Science: Oceanus

An introduction to the fundamental principles of oceanography for nonscience majors, and the application of those concepts to areas of interest and concern in our contemporary technological society. The marine environment will be investigated in terms of basic scientific concepts, and topics to be discussed will include plate tectonics and earthquake prediction, the impact of ocean

pollutants, climate fluctuations, cetacean intelligence and resources from the sea. (A Telecourse offering) **Credit 4**

0246-289 Contemporary Science: Mechanical Universe

This course is an introduction to physics for nonscience majors that uses the video course, 'The Mechanical Universe . . . and Beyond,' as the main method for presentation of material. The topics covered include: units and dimensional analysis, motion, force, energy, heat, waves, light, relativity, atoms and quantum mechanics. (A Telecourse offering.) **Credit 4**

COMPUTER SYSTEMS

0250-200 Introduction to Computers and 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. (High school intermediate algebra) (Also a Telecourse offering) **Credit 4**

0250-201 Applications Software

An introduction to several types of applications software. The lectures and hands-on experience labs are oriented to the IBM PC. Major subjects covered will include: hardware components; disk storage; disk operating system (DOS); word processing (WORDSTAR or WORDPERFECT); spreadsheeting (LOTUS 1-2-3); and data base management (DBASE III). A course for persons involved in information management. (0250-200) **Credit 4**

0250-203 Advanced Topics in Application Software

This is a continuation of 0250-201 and prepares students for more in-depth interaction with their PCs and the applications software. Major topics include: MS-DOS, Print Graph and programming with macros in Lotus, custom screen layouts and query language in DBASE III+. (0250-201) **Credit 4**

MACHINE SHOP

NOTE: All courses must be taken in the proper sequence in each program. For additional information call department, 475-5021.

0266-101, 102 Precision Measurement

The care and use of all common inspection and gauging equipment. Techniques of inspecting various types of parts, quality control procedures and discussion and application on the use of tolerancing; blueprints and true positioning. Sine bar, contour projector, casting layout, surface finishes, thread gauging, common types of production gaging and the use of optical flats are used in the second quarter. **Credit 1/Qtr.**

0266-103 Precision Measurement (SPC)

A study of statistical process control. The topics include comparisons and contrasts to conventional quality programs, basic statistical concepts, theory, calculation of control limits, sampling and sampling plans, charting and graphing, and applications of computers for SPC. **Credit 1**

0266-104 to 0266-109 Advanced Machine Shop I, II

Advanced work on lathes, milling machines and grinders; explanations and demonstrations of more difficult problems; assemblies and temporary tooling. Some work done entirely in metrics. Must accurately handle tool room layout, machining, and measuring equipment. Special emphasis on skill, neatness and accuracy. (0266-203) **Credit 1/Qtr.**

0266-111 to 0266-119 Instrument Making & Experimental Work I, II, III

Student must operate all tool room equipment. Skillful manipulation of hand tools; make small temporary tooling required to form or bend the finished parts; blank development and precision layout; make small punches, dies, cutters and assemblies to simulate actual industrial model work. (0266-203) **Credit 1/Qtr.**

0266-121 to 0266-129 Tool and Die Making I, II, III

Planning and making accurate, complete tool and die assemblies. Emphasis is on accuracy of the individual parts and the fitting of the assembled tool or die. Samples from the forming and blanking dies are inspected for quality. (0266-106) **Credit 1/Qtr.**

TLDT-051 Shop Mathematics

TLDT-052 Shop Algebra

TLDT-053 Shop Geometry

TLDT-054 Shop Trigonometry

These courses are now offered through the Learning Development Center and can be found under Learning Development Center-Technical

0266-161, 162 Heat Treatment

Practical heat treatment of metals; carburizing, cyaniding, nitriding, annealing, normalizing and hardening of steels. Relation of tool steels to particular applications and their resulting properties, including hardness, toughness, wear resistance, machinability and movement in hardening; treatment of nonferrous alloys including aluminum, brass, bronze, zinc beryllium, copper, silver, monel, stainless and magnetic steel. Several types of heat treating furnaces and atmospheres are available for laboratory exercises and demonstrations of these metals and alloys to prove out the theories of class lectures and discussions. **Credit 2/Qtr.**

0266-200 Mechanical Blueprint Reading

Mechanical Blueprint Reading is the study of mechanical detail and assembly drawings. Topics include sketching, orthographic projection, and section views. The course will emphasize dimensioning practices, including geometric dimensioning and tolerancing used on detail and assembly drawings. **Credit 2**

0266-201, 202, 203 (Lec.) Machine Shop

0266-206, 207, 208 (Lab)

Machine shop theory and techniques involving basic machine tools, machining theories and practices. Explanations, demonstrations and working out of basic problems in measuring, layout and cutting tools, with lathe, milling, drilling and grinding work. Must register for lecture and lab. **Credit 2/Qtr.**

0266-281 Computer Numerical Control (Mill)

This course is designed to offer the student the fundamentals and techniques in computer numerical control. Point-to-point and contour programming, linear and circular interpolation, looping and macros. Special canned cycles are introduced and used along with the hands-on experience. (Phase I Machine Shop diploma or equivalent) **Credit 3**

0266-282 Computer Numerical Control (Lathe)

Code System and format as used by industry for writing programs in contour, linear and circular interpolation along with safe and efficient tooling techniques. Canned turning, facing, drilling and threading cycles will be covered with compensation for tooling radius. Bar feed programming along with straight and taper threading. Will include hands-on. (Phase I Machine Shop diploma programs or approval of machine shop counselor) **Credit 3**

0266-283 Computer-Aided Manufacturing

Course emphasizing computer-aided manufacturing (CAM) for numerically controlled machine tools. Automatic fabrication of parts utilizing programs developed for a computer system will be stressed. Part programming output consisting of original input information, necessary information for post-processors for various machine tools with graphical output of optimum cutter path. CAM is introduced utilizing the SmartCAM computer-aided system. (0266-281 or 282 or programming experience) **Credit 3**

EMERGENCY MANAGEMENT

0285-201 Earth Sciences for the Emergency Manager

Introduction to applied meteorology and crustal dynamics. The meteorological topics include basic atmospheric parameters, air mass theory, weather maps, generation and effects of severe weather, atmospheric stability, and the simple Gaussian model of plume transport. The crustal dynamics segment includes a qualitative treatment of plate tectonics and faults with emphasis on earthquake generation, the Richter scales, damage from earthquakes, and the state of the art of earthquake prediction. **Credit 4**

0285-202 Man-Made Hazards

Survey of the chemistry of hazardous materials, including toxics, caustics, flammables, and reactives. Industrial storage and transportation practices; effects of exposure on humans; protective measures. Introduction to the physics of radiation. Radioisotopes in common use; methods of storage and transportation. Effects of exposure on humans; protective actions. Design of commercial power reactors and safety features. **Credit 4**

0285-301 Emergency Management Laws and Regulations

An introduction to the principal statutes, regulations, and court cases governing emergency preparedness in New York State. The chief topics are NYS Executive Law (Article 2-B), Title III, of the Superfund Amendment and Reauthorization Act of 1986, NuReg-0654 governing radiological accident preparedness, federal and state disaster aid statutes, and the principles of NYS liability law as they apply to disaster clean-up. (0285-201 or 202) **Credit 4**

0285-302 Emergency Planning and Methodology

Quantitative methods of risk and hazard analysis; the scope of a comprehensive emergency plan; classes of protective actions; evacuations; turf problems associated with multi-agency plans; command structures; the post-incident recovery phase; the design of exercises; the role of new technologies in disaster response. Students will prepare hazard analyses and write sections of comprehensive plans for actual communities. (0285-201, 202, 301) **Credit 4**

0285-330 Health, Safety, and Security Abroad

A non-culture-specific survey of personal health and safety issues abroad. The anatomy of international terrorism is discussed, including major groups in Europe, Africa, and the Middle East; their tactics; and protective measures to be taken by targets and general public, with special emphasis on travel. Kidnapping and hostage behavior are discussed. Criminal activity is discussed in the context of types of generalized social structures that may be encountered abroad. Finally, health issues are discussed, including common health hazards, features of selected overseas health care systems, insurance, and extra protective measures that should be taken in underdeveloped areas. **Credit 2**

0285-381 Emergency Operations

Classroom study of the roles of fire, police, emergency medical services, and volunteer agencies like the Red Cross at various types of major disasters; how to set up on-scene command posts and off-site operations centers; the Incident Command System; role of the media; how to critique incidents. Students will gain familiarity with on-scene command responsibilities through role plays on an incident simulator. (0285-201, 202, 301; 0285-302 may be taken concurrently) **Credit 4**

SCHOOL OF PROFESSIONAL STUDIES

The **School of Professional Studies (SPS)** develops and delivers innovative and interdisciplinary bachelor's degrees for new and emerging careers. The SPS bachelor of science in environmental management provides in-depth knowledge of solid waste management science and technology, plus training in related disciplines, including politics and policy, economics, budgeting and finance, environmental regulatory law, public relations, and communications. It is the first program of its kind and has attracted the attention of students and employers both locally and across the country. For more information, call 716-475-7213

ENVIRONMENTAL MANAGEMENT

0286-101 Environmental Management Seminar

A course required of all entering students describing the EM (SW) academic program and expectations and the nature of the field. **Credit 1**

0286-201 Principles of Municipal Solid Waste Management

Introduction to municipal solid waste systems. The topics include an overview of the relationship of municipal solid waste, environmental protection, protection of public health, and public service; solid waste generation and natural resources; and the unit operations of municipal solid waste collection, transfer, resource recovery, and disposal. (1016-204) **Credit 4**

0286-220 Environmental Engineering Science

Basic principles of work, force, hydraulics, statics, and shear strength; properties of materials; unit conversions; mass balances; and engineering problem-solving techniques. (1016-204, 1011-211) **Credit 4**

0286-301 Recycling

A survey of recycling technology and its relationship to the general problem of municipal solid waste management. Explores both the mechanics and the economics of the problem. Topics include the separation and collection of recyclable materials, recycling as a manufacturing process, the development of markets, and public education issues. (0286-201) **Credit 4**

0286-311 Waste Reduction

A study of the techniques and strategies being developed and used to reduce the generation of waste in both public and private sectors. Examines methods of reducing waste toxicity and quantity and of increasing the recyclability of waste materials. (0286-201) **Credit 4**

0286-360 Environmental Monitoring and Measurement

This course provides an in-depth view of environmental monitoring and measurement, giving the student the knowledge to plan, execute, and interpret a sampling project. The course will cover techniques for sampling air, soil, surface water, and groundwater with an emphasis on landfill construction and monitoring. Students will learn to plan sampling events, determine the number and type of samples needed, collect quality assurance/quality control samples, determine correct sampling technique, and document sampling. (1011-211, 1001-201, 1004-210, 1011-213) **Credit 3**

0286-362 Environmental Monitoring and Measurement Lab

Laboratory to accompany 0286-360, Environmental Monitoring and Measurement. (Credit or co-registration in 0286-360) **Credit 1**

0286-371 Environmental Geology

An introduction to environmental geology, including a survey of basic geology and topics applicable to environmental management. Basic geology topics include earth materials and the earth's internal and external processes. Environmental geology topics include erosion and slope stability, soil properties, glacial geology of Monroe County, and geologic aspects of landfill siting. (0286-220) **Credit 3**

0286-372 Environmental Geology Lab

Laboratory to accompany 0286-371, Environmental Geology. (Credit or coregistration in 0286-371) **Credit 1**

0286-381 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. (0286-371, 372) **Credit 3**

0286-382 Introduction to Hydrology Lab

Laboratory to accompany 0286-381, Introduction to Hydrology. (Credit for or coregistration in 0286-381) **Credit 1**

0286-401 Land Disposal and Treatment

(Previously under 0286-321) A survey of the technological factors in siting, designing, and operating modern landfills and composting facilities. Topics to be discussed include the dynamic processes occurring in landfills and composting sites, site selection, facility design and operation, special operational needs, and the closure of landfills and end uses for the sites. (0286- 360, 380) **Credit 4**

0286-411 Energy Recovery

(Previously under 0286-331) A survey of solid waste energy recovery and material conversion technologies. Course will examine MSW as a feedstock for the production of energy and material products. Topics include mechanical, thermal, chemical, and biological processes and conversions. (0286-360) **Credit 4**

0286-450 Environmental Health and Safety

Comprehensive examination of methods of minimizing employee exposure to chemical, biological, and physical hazards in the workplace. Topics include OSHA/NIOSH requirements, hazardous waste reporting, hazard communication, workplace monitoring, lockout/tagout, confined space, etc. (1001-201, 1011-211, 213, 1004-210) **Credit 4**

0286-452 Environmental Accounting and Finance

Examines environmental and resource accounting approaches, environmental financial accounting, planning and control systems, disclosures of environmental costs, environmental impacts on financial systems, full-cost accounting for life-cycle costs, valuations of contaminated properties, allocating environmental costs, green investing, pollution credits, and developing strategies. (0617-426) **Credit 4**

0286-455 Business, Public Policy, and the 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**

0286-475 Special and Hazardous Wastes

A survey of the techniques and strategies used to manage hazardous wastes, non-hazardous industrial wastes, infectious wastes, and other problematic materials that enter municipal solid waste systems. (0286-360, 362, 401, 411) **Credit 4**

0286-480 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 4th-year students) **Credit 4**

0286-481 Environmental Law II

A continuation of 0286-480, further examining environmental law and regulation and the requirements of the Resource Conservation and Recovery Act; Comprehensive Environmental Response, Compensation, and Liability Act; Superfund Amendment and Reauthorization Act; Clean Water Act; Clean Air Act; National Environmental Policy Act; public vs. private environmental legal issues; and pollution prevention mandates. (0286-480) **Credit 4**

0286-490 Project Management

Students will 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. This course is applicable to a broad range of educational fields and work situations; projects will be tailored to students' area of programmatic interests. (Open only to 4th- or 5th-year students)

0286-509 Senior Project Planning

(Previously Integrated Solid Waste Management Seminar, 0286-510) This individualized course prepares the student for the senior project, 0286-511. (Open only to 5th-year EM majors)**Credit 1**

0286-511 Senior Project

This course consists of independent work demonstrating the ability to solve a significant solid waste management problem in a comprehensive fashion. The problem will focus on future or emerging technologies as well as current techniques. (0286-509)**Credit 4**

LEARNING DEVELOPMENT CENTER -TECHNICAL

1710-011 Introductory Algebra

This course starts with a quick review of arithmetic and geometry and then introduces topics from algebra. These topics include signed numbers, order of operations, polynomials, linear equations, inequalities, word problems, and factoring.**Credit 0**

1710-012 Intermediate Algebra

This course is a continuation of Introductory Algebra and will begin with topics in factoring and algebraic fractions. Also included are graphing linear equations, working with systems of equations, exponents, and scientific notation.**Credit 0**

1710-013 Intermediate Algebra & Trigonometry

The first part of this course is a continuation of Intermediate Algebra and will include the study of radicals, complex numbers, and the solution of quadratic equations. Other topics included will be logarithms and logarithmic and exponential equations. The last part of the course will cover topics in trigonometry, including the solutions of right and oblique triangles and the graphs of trig functions.**Credit 0**

1710-051 Shop Mathematics

Elements of computational mathematics designed to increase analytical ability to solve complicated shop problems. This course includes fractions, decimals, percents, conversion to the metric system, tolerances, use of calculator, area, and volume. Additional application problems such as tapers included as time permits.**Credit 0**

1710-052 Shop Algebra

Elements of algebra with applications in shop problems. Topics included are algebraic operations, solutions of equations, rearrangement of formulas, ratio, and proportion. Applications are in gears and pulleys, speeds and feeds, and gears.**Credit 0**

1710-053 Shop Geometry

Elements of geometry with applications in shop problems. Topics included are lines, points, planes, angles, triangles, polygons, circles, and the Pythagorean theorem. Applications are learned through constructions. Additional material in compound angles is included if time permits.**Credit 0**

1710-054 Shop Trigonometry

Elements of basic trigonometry with applications in shop mathematics. Topics included are the six basic trigonometric functions, simple applications, machine diagrams, law of sines and cosines, and numerical control (both incremental and absolute).**Credit 0**

COLLEGE OF ENGINEERING COURSES

General Engineering
Computer Engineering
Electrical Engineering
Industrial and Manufacturing Engineering
Mechanical Engineering
Microelectronic Engineering

COLLEGE OF ENGINEERING

Paul E. Petersen, Dean

The programs offered by the College of Engineering prepare students for careers in industry or for graduate study in specialized 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

Resources

The departments of Electrical, Industrial and Manufacturing, and Mechanical Engineering maintain extensive laboratory facilities in the James E. Gleason Building for both undergraduate and graduate instruction and research by faculty and graduate students. The departments of Computer Engineering and Microelectronic Engineering operate laboratories in the Center for Microelectronic and Computer Engineering, which has over 10,000 square feet of clean-room laboratory space for the fabrication of integrated circuits and a 15-station HP/Mentor Graphics VLSI Design Center. The Institute's extensive computer facilities are augmented for students and faculty in the College of Engineering by the Gleason User Center and the Center for Electronic Design Analysis. Desktop and personal computers are readily available in all offices and most labs. Laboratory instruction is a vital part of the college's five undergraduate curricula, and the faculty pride themselves on having integrated both the computer and real-life laboratory work in the academic program. Laboratory experience helps prepare engineering students for their cooperative work experience and, ultimately, their industrial work assignments

UNDECLARED ENGINEERING

Required Courses

0302-210 Introduction to Engineering

This one-credit course is designed for the undeclared engineering student. The main objective is to present information and exercises to introduce the student to the five engineering curricula offered by RIT. Various aspects of the curricula requirements, as well as career opportunities that are available, will be 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. The course involves extensive development of programming skills required in the engineering disciplines. **Class 4, Credit 4 (F)**

GENERAL ENGINEERING

0302-610 Multidisciplinary Design Experience I

The first course of a two-course sequence. Most products designed today reflect the fusion of the efforts of a team of engineers from many disciplines. It follows that 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. This course will be offered as an elective and will be open normally to undergraduate and graduate students

The first course includes lectures and seminars about organizing and planning techniques, an introduction to team dynamics, and courses and seminars relating to the specific product 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 Design Experience II

The second of a two-course sequence. In this course, the main thrust is 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 will usually be a very busy time, the lectures and seminars are run 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 (F, W)**

COMPUTER ENGINEERING

Required Courses

0306-200 Introduction to Computer Engineering

The purpose of this course is to briefly describe the field of computer engineering and to provide a frame of reference for the sequences of computer engineering, computer science, and electrical engineering courses that appear in the computer engineering curriculum. Topics will include an introduction to computers and computing, basic concepts, nomenclature, historical background, and some elements of data representation. **Class 1, Credit 1 (F)**

0306-250 Assembly Language Programming for Computer Engineers

An introduction to the fundamental organization, assembly language programming, and input/output techniques of a modern microprocessor system. This course will cover 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 modules that emphasize communication with parallel and serial I/O devices will be considered. The Motorola MC68000 microprocessor family of devices will be used in most class examples and all required programming projects. (0601-242 or equivalent) **Class 4, Credit 4 (S)**

0306-341 Introduction to Digital Systems for Computer Engineers

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 combinatorial and sequential systems will consider the use of standard modules such as decoders, encoders, multiplexers, shifters, ROMs, PLAs, adders, registers, and counters. The laboratory will provide more insight into the physical and circuit aspects of the design and implementation of digital systems using commercial state-of-the-art SSI, MSI, and LSI components. (1016-265 concurrently) **Class 3, Lab 3, Credit 4 (W)**

0306-361 Modeling of Linear Systems

This course provides an introduction to mathematical modeling of linear systems. Time domain models: homogeneous first- and second-order systems, simultaneous systems and linear algebra method of solution, nonhomogeneous systems. Frequency-domain models: systems functions, Laplace and Fourier transforms and inverse transform. Overview of digital simulation. Mechanical and electrical systems will be studied; assignments will make use of Advanced Continuous Simulation Language (ACSL). (1016-306) **Class 4, Credit 4 (S)**

0306-452 Linear Control Systems

This course provides a comprehensive introduction to the essential theories and techniques for the analysis and design of continuous linear systems. The modeling and control of dynamic systems will be studied using the frequency domain approach and the state space approach. Students will be required to verify their linear control system design projects using computer simulation techniques. (0301-352, 1016-306, 0306-361) **Class 4, Credit 4 (F, W)**

0306-550 Computer Organization

This course provides the understanding of the information transfer and transformations which occur in a computer with emphasis on the relations between computer architecture and organization. Topics to 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, SR)**

0306-551 Computer Architecture

This course 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.**Class 4, Credit 4 (F, W)**

0306-553 Digital Control Systems Design

This course deals with the design of linear control systems using signals that are sampled in time and quantized in amplitude. The classical transform methods are first described and then applied to illustrative design examples. This course will focus on the topics of the modern state space approach for designing control systems directly in the discrete time domain. Laboratory projects on the analysis and design of microprocessor-based digital control systems will be assigned. (0306-452; 0306-560 concurrently) **Class 3, Lab 3, Credit 4 (S, SR)**

0306-560 Interface and Digital Electronics

Introduction to some common transducers, transformations from raw measured quantity to transducer output. Instrumentation amplifiers, active filters, analog switching for applications in multiplexors, and sample and hold circuits. The analog-to-digital and digital-to-analog conversions processes. Logic families including TTL, ECL, MOS, and their interfaces to each other. (Fourth-year status in Computer Engineering)**Class 3, Lab 3, Credit 4 (F, W)**

0306-561 Digital System Design for Computer Engineers

This course 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. It covers the MSI/LSI modules, PALs, and EPROMs and their use in design. Design for testability is emphasized. (0306-341, 0306-560)**Class 3, Credit 3 (S, SR)**

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 NMOS and 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 Corporation design tools for circuit simulation and for the design of circuit layouts will be stressed. Laboratory design projects will be required.**Class 4, Credit 4 (F, S, SR)**

0306-655 Projects in Computer Engineering

Several detailed projects involving the design of hardware and software will be posed to exercise the students' engineering design creativity and ability to integrate concepts from throughout the curriculum. Some lectures will be presented on real time programming techniques such as interrupt handlers, multitasking concepts, process synchronization, response time considerations, input noise reduction, and debugging techniques. Other topics will also be presented. (Fifth-year standing in Computer Engineering)**Class 3, Lab 3, Credit 4 (F, W)**

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 normal 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**

0306-694 Data and Computer Communications

This course provides a unified view of the broad field of data and computer communications. Emphasis will be 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 will be discussed. The topology, access control, and performance of various types of local area networks will be studied in detail. (Fifth-year standing in Computer Engineering or permission of instructor)**Class 4, Credit 4 (S)**

Technical Electives

0306-620 Design Automation of Digital Systems

Design automation deals with the use of computers as a tool or aid in the design and manufacturing of digital systems. Topics covered will include systematic methods for digital design; the VHDL hardware description language; simulation techniques at system level, register-transfer level, and logic element level; partitioning of digital systems; placement; routing; and design rule checking. (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 Integration (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. Basic requirements of a clocking system and a general clocking strategy for timing design in both static and dynamic CMOS circuits will be 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 Corporation design tools will be required in laboratory projects leading to the design, fabrication, and testing of an integrated circuit device.**Class 4, Credit 4 (W, S)**

0306-661 Engineering Design of Software

An advanced course moving the student beyond computer programming to the engineering of software. Design of software from an engineering perspective, based on software construction from reusable software components. Methods for predicting, measuring, and controlling a software artifact's time and space characteristics. Mathematical models of software and their analysis, including call graph models and flow graph models. Software metrics and their uses, including size metrics and complexity metrics. Software projects will be required. (0601-243, 0603-325, 0601-450) **Class 4, Credit 4 (F, W)**

0306-662 Concurrent and Embedded Software Design

Methods for designing concurrent software, which consists of many cooperating processes, and embedded software, which senses and controls variables in the external environment. Alternative techniques for constructing concurrent and embedded software, employing tasks, cyclic executives, and reusable software components. Mathematical models of concurrent software and their analysis, including Petri net models and rate monotonic scheduling theory. Software projects will be required. (0603-440, 0306-250, 0306-560, 0306-661).**Class 4, Credit 4 (S)**

0306-683 Document Image Processing

This course is suitable for both undergraduate and graduate students interested in document image processing. Several topics will be covered in the field, including input scanning, output printing, and image processing. Interpolation techniques for scaling and resolution conversion will be discussed. Rotation, edge extraction, halftoning, and compression of digital images will be covered. Feature extraction and recognition of image characters will be described. The course will provide a framework for showing the relationships among these various topics in electronic document processing. **Class 4, Credit 4 (S)**

0306-699 Independent Study

The purpose of this course is to allow senior-level undergraduate and first-year 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 must be approved by both the faculty member supervising the independent study and by the department head. (Permission of the supervising faculty member and the department head required.)**Credit variable 1-4**

ELECTRICAL ENGINEERING

0301-203 Electrical Engineering Freshman Seminar

This course is designed to give the entering first-year student an overview of electrical engineering and to help integrate the incoming student into the RIT EE community. Topics to be discussed include the electrical engineering course of study at RIT, the cooperative work experience, an overview of RIT facilities, and career options in electrical engineering. In addition this course will give the student an opportunity to interact with EE faculty, upper division students, and other first-year EE students. **Credit 1 (F)**

0301-240 Introduction to Digital Systems

This course introduces students to the basic components used in digital systems. It is also 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, S, Ext. day F)**

0301-310 Numerical Methods

This course introduces the student to the potential of the digital computer for solving engineering problems. In addition, it is designed to further hone the students skill in the proper use of the C programming language. Algorithmic topics include solving linear, nonlinear and transcendental equations; solving systems of linear equations; interpolation and numerical differentiation; numerical integration; curve fitting and data smoothing using the method of least squares; and systems of ordinary differential equations. Advanced topics in the course will include an introduction to data structures and to techniques for handling and operating on large arrays of data. The course will also introduce the student to the use of application software such as MatLab for the solution of engineering problems. (0301-345 or equivalent) **Class 3, Credit 3 (W, SR, Ext. day S)**

0301-330 Seminar in C Programming

This course introduces the C programming language to those who already have learned some other language (Fortran, Pascal). It will introduce the standard C variable types, operators, expressions, control structures, and standard C input/output. Additional C topics, including pointers and arrays and file input/output, will also be presented. The student will be introduced to the C preprocessor and to the use of header files. Weekly programming exercises will be used to augment classwork. Students will be encouraged to work either on the RIT VAX system or on personal computers. **Class 2, Credit 1 (F, W, S, Ext. day W)**

0301-345 C Programming for Engineers

Introduction to computer programming using the C programming language on the RITVAX system and on personal computers. The course 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. Flow charting will be covered, and programming models will include straight line, branching, and looping programs. Students will be introduced to C data types, variables, operators, expressions, and standard C control structures. C functions will be studied thoroughly, and the student will learn additional C features such as pointers, arrays, structures, and unions. Throughout the course the student will do a wide variety of computer programming exercises. (0301-365) **Class 4, Credit 4 (F, SR, Ext. day W)**

0301-351 Circuit Analysis I

Covers the fundamentals of DC circuit analysis, starting with the definition of voltage, current, resistance, power, and energy. Linearity and superposition, together with Kirchhoff'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 of RL and RC circuits to step inputs is established. In preparation for the study of electronics, the ideal operational amplifier is discussed and basic inverting and non-inverting amplifier circuits are analyzed. (1017-313 or equivalent) **Class 4, Credit 4 (F, S, SR, Ext. day S)**

0301-352 Circuit Analysis 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 and 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. (0301-351) **Class 3, Credit 3 (F, W, Ext. day F)**

0301-362 Introduction to Electrical Engineering

This course is for non-majors. Its goal is to introduce the basic concepts of electrical circuits, including AC and DC analysis, network theorems, and RCL circuits. Design of simple amplifiers, data conversion, and an introduction to electromechanical devices is included in the course. **Class 3, Lab 2, Credit 4 (S, SR)**

0301-365 Introduction to Microcomputers

Introductory course on microcomputers. Begins with computer architecture, including detailed discussion of the memory unit and the central processing unit, its registers, and their functions. This is followed by a study of computer arithmetic, logic operations, number systems, and codes. Computer programming is introduced at the machine assembly language levels with emphasis on computer instruction sets and addressing modes. Flow charts for straight line, branching, and looping programs are studied. Effective programming techniques are compared. Concepts of input/output are studied in detail. Emphasis is placed on program-controlled I/O. The course includes extensive hands-on exercises. (0301-240) **Class 4, Lab 2, Credit 4 (W, S, Ext. day W)**

0301-380 Electrical Engineering Lab I

This laboratory course has been designed to accompany the lectures of 0301-351 (Circuits I). It will introduce the student to the use of the oscilloscope and other common laboratory instruments. It is also designed to introduce the student to the use of engineering workstations in the design process for both analog and digital electronic circuits. (0301-240; corequisite 0301-351). **Credit 1 (F, S, SR, Ext. day S)**

0301-390 Electrical Engineering Lab II

This laboratory course has been designed to accompany the lectures of both 0301-352 (Circuits II) and 0301-441 (Electronics I). It will continue exposure of students to common laboratory instruments and to the structure of electronic design. The use of the engineering workstations in the design process is emphasized. The design, simulation, construction, and evaluation of a single-stage electronic amplifier is required. (0301-380; corequisite 0301-441). **Credit 1 (F, W, Ext. day S)**

0301-395 Electrical Engineering Lab III

This laboratory course has been designed to accompany the lectures of both 0301-453 (Linear Systems I) and 0301-442 (Electronics II). It continues the integration of the engineering workstation into the electronic design program. The design, simulation, construction, and evaluation of a multistage amplifier is required. The evaluation will include DC operating points, transient response, and steady-state frequency response. (0301-390; corequisite 0301-442). **Credit 1 (S, SR, Ext. day F)**

0301-441 Electronics I

Introduction to electronics and the basic principles of small signal analysis of circuits with non-linear components. The course covers the use of ideal operational amplifiers in non-linear 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. The course is 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 is on developing skills required for circuit design. (0301-351, 380) **Class 3, Credit 3 (F, W, Ext. day S)**

0301-442 Electronics II

Continuation of 0301-441. 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. (0301-352, 441)**Class 3, Credit 3 (S, SR, Ext. day F)**

0301-453 Linear Systems I (Continuous)

This course provides the foundations of signal and system analysis, including signal and system description and modeling. Topics covered 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. (0301-352, 1016-306, 1016-420)**Class 4, Credit 4 (S, SR, Ext. day F)**

0301-455 Linear Systems for Microelectronics

This course is intended 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. (The course cannot be used by EE majors as a substitute for 0301-453.) (1016-306, 0301-352)**Class 4, Credit 4 (S, SR)**

0301-471 Electromagnetic Fields I

The primary objective is to study electrostatic and magnetostatic fields and the physical laws that govern their behavior. At the same time, analytical techniques are developed that serve as a good foundation for solving electromagnetic problems. The following topics are discussed: review of vector algebra, vector calculus and the 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 and forces; solution of electrostatic problems-Poisson's and Laplace's equations, method 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. (1016-324) **Class 4, Credit 4 (S, SR, Ext. day S)**

0301-472 Electromagnetic Fields II

The primary objective is to study the propagation, reflection, and transmission of electromagnetic waves in unbounded regions and in guiding structures such as two-conductor transmission lines and rectangular waveguides. The following topics are discussed: Faraday's law of electromagnetic induction; time varying fields and Maxwell's equations, boundary conditions, and the wave equations; uniform plane waves in free space and in conductive regions; polarization-linear, circular, and elliptical; the Poynting theorem and electromagnetic power; wave reflection, and transmission at normal incidence from plane boundaries-multiple dielectric interfaces, the complex reflection coefficient, and wave impedance; oblique incidence at plane dielectric boundaries-perpendicular and parallel polarization; TE and TM waves in rectangular waveguides-propagation and dispersion characteristics, attenuation losses, power transmission. The laboratory portion of the course discusses the theory of 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. A few experiments are conducted to illustrate fundamental wave propagation and reflection concepts. (0301-471) **Class 4, Lab 2, Credit 4 (F, W, Ext. day F)**

0301-513 Introduction to Automatic Control

This is a first course in the study of linear control systems and their physical behavior, including stability and transient response. This is approached through the classical methods of the Laplace domain. Topics include transfer function models of physical systems, signal flow graph, 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, designs using root locus, and frequency response techniques. Students are expected to use computer-aided design packages (ACSL, CTRL-C, etc.) in both class assignments and in the laboratory projects. (0301-554)**Class 3, Lab 3, Credit 4 (S, SR, Ext. day F)**

0301-521 Introduction to Photonics

A course that introduces application of the principles and practices of modern optics to problems in information processing and transmission systems. Topics include a review of electromagnetic wave propagation, geometric optics, optical polarization, interference and diffraction, Fourier optics, and a discussion of topics from contemporary optics. (0301-453, 472)**Class 4, Credit 4 (S, SR)**

0301-531 Electromechanical Energy Conversion

This course provides 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. (0301-352) **Class 3, Lab 3, Credit 4 (F, W, Ext. day S)**

0301-534 Introduction to Communication Systems

This course 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, 0301-453)**Class 4, Credit 4 (S, SR, Ext. day W)**

0301-544 Semiconductor Electronics

The objective of this course is to teach students the physical mechanisms that govern 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. The course emphasizes the relationships between the physical and structural parameters of these devices and their electrical performance. (0301-442)**Class 4, Credit 4 (F, W, Ext. day W)**

0301-545 Digital Electronics

The objective of this course is to study the principles of digital electronic circuits with emphasis on MOS (CMOS in particular) and their use in logic circuits. It is expected to serve 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 will introduce the student to fabrication of integrated circuits, simulation of digital circuits, and design of basic logic circuits using workstations and software packages. (0301-240, 544) **Class 3, Lab 3, Credit 4 (S, SR, Ext. day S)**

0301-554 Linear Systems II (Discrete)

Topics covered 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. (0301-453)**Class 4, Credit 4 (F, W, Ext. day 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. The course will develop 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 of the course, 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, SR)**

0301-610 Analog Electronic Design

This course is designed to enhance the students skills in designing analog circuits. Subjects covered include non-ideal characteristics of op-amps, of op-amp applications, A/D and D/A conversion, multipliers and modulators, phase-locked loop, frequency synthesis, and audio power amplifiers. The course will meet in the classroom three hours each week and three hours in the laboratory. The laboratory time will be used to discuss and troubleshoot circuits. Students will be 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 Control Systems

This course adds to the analytical skills developed in 0301-513 and 0301-554 and applies them to sampled data systems and digital control systems. The stress in this course 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. (0301-513, 554) **Class 3, Lab 3, Credit 4 (F, W)**

0301-621 Microwave Engineering

The primary objective is to study the theory and design of microwave components and circuits. The course begins with a review of basic EM theory, TEM waves in transmission lines, and TE and TM waves in rectangular waveguides (topics covered in 0301-472). The following are discussed in this course: 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; waveguide and coaxial line filters, and waveguide frequency meters; microwave integrated circuit high pass and band pass filters; ferrite components such as the isolator and the circulator. The laboratory portion of the course illustrates the various microwave component design and microwave measurement techniques using state-of-the-art equipment. Also required is a design project on the design of a microwave component. (0301-472) **Class 3, Lab 3, Credit 4 (W)**

301-622 Antenna Design

This is 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 will be 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; non-uniform 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 will require a report and a presentation with a demonstration. (0301-472) **Class 3, Lab 3, Credit 4 (S)**

0301-650 Design of Digital Systems

This course deals with the design of both synchronous and asynchronous digital systems. The accent is on design methodologies for final implementation on programmable logic devices. Design techniques are based on top-down design using ASM charts and bubble diagrams along with microprogramming applications. Design strategies for testability are discussed along with their impact on performance. The practical aspects of component interconnection (crosstalk, noise, transmission line effects) with effects on performance are also surveyed. The laboratory portion of the course consists of two distinct projects proposed, designed, implemented, and tested by the student. The design laboratory is supported by the SUN4 workstations and the VALID design software. (0301-240, 0301-365) **Class 3, Lab 2, Credit 4 (F, W, S)**

0301-651 ASIC Design

A technical elective course that will introduce students to the fundamental principles of Application Specific I.C. (ASIC) design. Both circuit design and system design will be covered. The students 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 (VHDL) will be included. (0301-650) **Class 4, Credit 4 (S)**

0301-665 Microcomputer-Based Systems 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 interrupts, will be considered. Special attention will be 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 will be examined. (0301-365) **Class 3, Lab 3, Credit 4 (F, SR)**

0301-666 32-Bit Microcomputer Systems

This course will cover 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. (0301-365) **Class 3, Lab 3, Credit 4 (W, S)**

0301-670 Introduction to Microelectronics

An 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 will 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, I.C. Processing Laboratory, in which students actually do process wafers in the clean room and fabricate and test integrated circuits. (0301-544) **Class 4, Credit 4 (SR, F)**

0301-672 Optical Devices and Systems

This is an introductory course in applied optics. Course objectives are to review fundamentals of geometrical and physical optics, including lenses, interference, diffraction; introduce devices employed in modern engineering optics such as lasers, detectors, holograms, acousto-optic and electro-optic devices; and apply optical techniques and concepts to the acquisition and transfer of information as defined by the traditional areas of communications and signal processing. The laboratory component of the course includes experiments selected from the following topics: lenses and Fourier transform optics, optical heterodyning, holography, electro-optic effect, Gaussian beams, photodetectors. (0301-472 concurrently) **Class 3, Lab 3, Credit 4 (F, W)**

0301-674 Fiber Optics: Theory and Applications

This is an introductory course in fiber optics. The course begins with a review of communication systems and lightwave fundamentals. This is followed by the study of dielectric waveguides and optical fibers, light emitting diodes (leds), laser diodes, and photodetectors (pin and a.p.d). The course 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 of the course includes experiments selected from the following 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. (0301-472)**Class 3, Lab 3, Credit 4 (S)**

0301-677 Digital Filters and 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. Course 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 functions 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 (W)**

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 and 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 will cover key aspects of the structure of present-day digital communication networks. (0301-534)**Class 4, Credit 4 (S)**

0301-693 Digital Data Communications

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 tradeoffs, and a discussion of digital telephony. (0301-534)**Class 4, Credit 4 (W, S)**

0301-694 Information Theory and Coding

The 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)**

0301-699 Senior Design Project

A design project is undertaken by the student either individually or as a member of a design team. Well-written documentation in the form of a project report is required. Projects that are interdisciplinary in nature are especially encouraged, and in such cases dual advisors are provided. Permission of the faculty advisor is necessary for registration. (Fifth-year standing)**Class 4, Credit 4 (F, W, S)**

INDUSTRIAL AND MANUFACTURING ENGINEERING

The following courses are required, except as noted, of Industrial Engineering students

0303-201 Introduction to Industrial Engineering

An introductory course in industrial engineering for first-year students. The course describes engineering in an overall sense and industrial engineering in particular. It includes an overview of some of the engineering sciences used in industrial engineering, including general principles of problem solving and approximations, the SI system, engineering graphics, engineering economy, statistics, ergonomics, and engineering design. The laboratory portion of the course covers principles of technical sketching, introduction to computer applications in terms of word processing, spreadsheets, CAD, etc., and group exercises in creative problem solving in the context of engineering design. **Class 3, Lab 1, Credit 4 (F)**

0303-202 Computing for Engineering

A first course in computer programming for engineers. The course involves extensive development of programming skills required in the engineering disciplines. 'C' language will be taught. **Class 4, Credit 4 (W)**

0303-203 Freshman Seminar

This course is designed to give the first-year student an overview of engineering and to help integrate the incoming student into the RITIME community. Topics to be discussed include the industrial and manufacturing engineering course of study at RIT, the cooperative work experience, an overview of RIT facilities, and career options in engineering. In addition, this course will give the student an opportunity to interact with IME faculty, upper-division students, and other first-year IME students. **Credit 1 (F)**

0303-301 Computer Tools for Increased Productivity

This course is designed to introduce students to personal computers and expose them to a range of available computer software tools. Students will learn how to use software to improve their productivity in all the courses that follow. (0303-202 or consent of instructor) **Class 2, Credit 2 (W)**

0303-401 Introduction to Operations Research I

An introduction to the 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. (1016-328 or permission of instructor) **Class 4, Credit 4 (F)**

0303-402 Introduction to Operations Research II

A survey of elementary mathematical models within the field of systems and industrial engineering. Areas of study include queuing theory, network analysis, and inventory theory. (1016-351, 1016-306 or permission of instructor) **Class 4, Credit 4 (F)**

0303-415, 516 Human Factors I, II

A two-course sequence in human factors/ergonomics with emphasis on industrial ergonomics as applied to the design of workplaces, procedures, processes, and products. The first course focuses on physiological/biomechanical and anthropometric issues of human performance. The second course focuses on issues relating to human information processing. Both courses are taught from a systems perspective to give the engineering student an appreciation of the capabilities and limits of human performance in the context of a task-operator-machine environment system. Topics include significant problems such as repetitive motion and materials handling injuries and the design of work systems that not only comply with OSHA requirements but are also productive. (1016-351 or permission of instructor) **Class 3, Lab 2, Credit 4 (F-516, S-415)**

0303-420 Work Measurement and Analysis I

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, various techniques for generating time standards (time study, MOST, etc.), and design of workstations. **Class 3, Lab 2, Credit 4 (F)**

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. The course introduces computer-aided drafting tools as well as state-of-the-art computer-aided layout design packages. (0303-401 or permission of instructor)**Class 3, Lab 2, Credit 4 (S)**

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. Professional elective. (EIEI-511 or permission of instructor)**Class 4, Credit 4**

0303-481 Management Theory and Practice

Development of the fundamental principles of the industrial enterprise. Internal organization as well as general economic conditions are considered. Emphasis is placed on the role of behavior science. (Permission of instructor)**Class 4, Credit 4 (S)**

0303-482 Production Control I

A basic course in production control emphasizing the systems approach. Topics covered 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. The SLAM simulation language is emphasized. (0303-202, 1016-351 or equivalent)**Class 4, Credit 4 (F)**

0303-504 Introduction to Operations Research III

A course intended to provide 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. (0303-401, 402 or permission of instructor)**Class 4, Credit 4**

0303-505 Simulation Modeling Techniques

This course is intended to increase simulation modeling skills primarily in the areas of network and discrete event simulations. Emphasis will be placed on methods of model construction, design of simulation experiments, model validation and output data analysis. Student will utilize these techniques to analyze the performance of productions systems. Professional elective. (0303-503, 1016-352 or permission of instructor)**Class 4, Credit 4**

0303-510, 511 Applied Statistics I, II

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, reliability, analysis of variance, and regression. (1016-351, 352)**Class 4, Credit 4 (F-510, S-511)**

0303-512 Reliability

This course deals with concepts and techniques of analysis useful in measuring systems reliability. Topics include probability distributions, component reliability, system reliability, and reliability models. Emphasis will be placed on failure data analysis model development. Students will utilize the techniques to study reliability, availability, and maintainability of systems. Professional elective. (0303-510, 511, or permission of instructor)**Class 4, Credit 4**

0303-520 Engineering Economics

This course covers economic analytical techniques that relate to decision making in an engineering design context. Topics covered include time value of money, methods of comparing alternatives, depreciation and depletion, income tax consideration, replacement, retirement and obsolescence, and capital budgeting. (1016-351 or permission of instructor)**Class 4, Credit 4 (F)**

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. Case studies are used, and students will participate in group design exercises. This course serves as a lead-in to 0303-560 Project Design. (Fourth-year status)**Class 4, Credit 4 (S)**

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 I.E. standing or permission of instructor)**Class 4, Credit 4**

0303-545 Mathematical Techniques of Systems 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. (Fifth-year I. E. standing or permission of instructor) Professional elective. **Class 4, Credit 4**

0303-550 Safety Engineering

To acquaint student with practical aspects of safety engineering. Students will acquire a working knowledge of legal and technical aspects of safety. Topics will include OSHA, Consumer Product Safety Commission, and the NIOSH Workplace Guidelines. Students will also be exposed to research methodology and ways of evaluating safety programs and related research. Reference sources will be outlined. Professional elective. **Class 4, Credit 4**

0303-560 Project Design

A design course oriented to the solution of on-site industrial engineering problems. Each student group will attempt to define, analyze, design, and implement a solution to 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. (Permission of instructor) Professional elective. **Class variable, Credit variable**

0303-625 Concepts in Manufacturing

An introductory course in computer-aided manufacturing. Topics include computer-aided design, group technology, process planning, adaptive control, programmable automation, numerical computer control, robotics, and computer-integrated manufacturing. Professional elective. (Permission of instructor) **Class 4, Credit 4**

0303-630 Computer-Aided Manufacturing

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-aided manufacturing. Physical simulations of real-world systems such as automated storage and retrieval systems, material handling systems, flexible manufacturing systems using robots. Topics include real-time programming, interface electronics, and microprocessor-based data acquisition systems and programmable controllers. (0303-503, permission of instructor)**Class 3, Lab 3, Credit 4 (Sp)**

0303-690 Seminar in Computer Integrated Manufacturing

This course is designed to provide a broad overview of current technology and management practice and trends related to the evolving factory of the future. It is designed as a multi-disciplinary offering for upper-division undergraduate and graduate students enrolled in any RIT program. The course follows a 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 3, Credit 3**

MECHANICAL ENGINEERING

The prerequisites are listed after each course description. A course which does not list 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

This course is designed to give the entering first-year student an overview of mechanical engineering and to help integrate the incoming student into the RIT community. Topics to be 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 will give the student an opportunity to interact with the faculty, upper division students, and other first-year students.

Credit 1 (F, W)

0304-211 Introduction to Graphics

The freshman course is designed to introduce the student to engineering in general and also to develop fundamental skills in engineering graphics communications. The course is intended for students with little or no engineering drawing. Students with experience in high school or the equivalent may take a qualifying examination for an exemption from this course. The course work conforms to ANSI standards. **Class 2, Lab 2, Credit 3 (F, W)**

0304-311 Computer Aided Design

This one-quarter course teaches design drafting that concentrates on computer graphic drawing techniques; geometric dimensioning and tolerancing; and production piece part and assembly drawing requirements. The last portion of the course is devoted to a project. The student learns to convert functional requirements to production drawing callouts. The course includes instruction in isometric sketching of part applications. (0304-211) **Class 2, Lab 2, Credit 3 (W, S)**

0304-331 Mechanics I

This course is intended 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 indeterminate problems, torsion, and bending. (Prerequisite: 1017-311; corequisite: 1016-305) **Class 4, Credit 4 (F)**

0304-332 Mechanics II

This course is meant for students majoring in industrial engineering. Topics include dynamics of particles and rigid bodies with an introduction to mechanical vibrations, kinematics and kinetics of particles and rigid bodies, work, energy, impulse momentum, and vibrations. Emphasis is on problem solving. (0304-331) **Class 4, Credit 4 (S)**

0304-335 Elements of Statics

This two-credit-hour course is intended as an introduction to the principles of statics for non-mechanical engineering students with a view to providing adequate background for a subsequent course in dynamics. This basic course treats the equilibrium of particles and rigid bodies under the action of forces. Topics include forces, couples, equilibrium, and friction. (Prerequisite: 1017-311; corequisite: 1016-253) **Class 2, Credit 2 (W, S)**

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 covered include concepts of force and moment, trusses, frames, machines, shear force and bending moment diagrams and equations, friction, fluid statics, centroids and moments of inertia. (Prerequisite: 1016-252; corequisite: 1017-311) **Class 4, Credit 4 (F, S)**

0304-342 Problem Solving with Computers

This course introduces students to VAX/VMS utilities such as a text editor (EVE), Fortran language-sensitive editor (LSE), electronic mail (MAIL), phone (PHONE), and notes conferencing (NOTES). Fundamentals of algorithm development and programming using structured VAX-Fortran are presented. Techniques include extensive use of function and subroutine subprograms with adjustable arrays, IF-THEN-ELSE, Indexed DO, and DO-WHILE structures. Students are taught personal computer tools such as a spreadsheet (Excel), symbolic computation system (Mathematica), and word processing (Word). These utilities and tools support the development of students' problem-solving skills. Students are asked to solve open-ended problems for which they need to make reasonable assumptions, apply a variety of heuristics to successfully refine their solutions, and learn to validate the solutions they obtain. **Class 2, Lab 2, Credit 3 (W, S)**

0304-343 Materials Processing

This course involves 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

This course deals with the structure and properties of metallic, organic, and ceramic materials as related to structural imperfections, atom movements, and phase changes. The intent of the course is to develop a basic understanding of the structure/properties relationship in materials and their behavior in service environments. (1011-208)**Class 3, Lab 2, Credit 4 (W, S)**

0304-347 Mechanics of Materials

This is a basic course in the fundamental principles of the mechanics of deformable media including stress, strain, deflections, and the relationships between them. The basic loadings of tension, compression, shear, torsion, and bending are also included. Engineering Mechanics Lab (0304-348) is to be taken concurrently with this course. (0304-336)**Class 4, Credit 4 (F, S)**

0304-348 Mechanics of Materials Laboratory

A *required* laboratory course taken concurrently with 0304-347. It 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 (F, S)**

0304-349 Elements of Dynamics

This is a basic course for non-mechanical engineering students in the fundamentals of dynamics of particles and rigid bodies. Topics include kinematics and kinetics of particles and rigid bodies, work, and energy. (0304-331 or 0304-335)**Class 3, Credit 3 (S, Sr)**

0304-359 Dynamics

This is 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 (F, W)**

0304-413 Thermodynamics

This is 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

This course includes the physical characteristics of a fluid: density, stress, pressure, viscosity, temperature, vapor pressure, compressibility. Descriptions of flows: Lagrangian and Eulerian; stream lines, path lines, streak lines. Classification of flows. Fluid statics: hydrostatic pressure at a point, pressure field in a static fluid, manometry, forces on submerged surfaces, buoyancy, standard and adiabatic atmospheres. Flow fields and fundamental laws: systems and control volumes, Reynolds Transport theorem, integral control volume analysis of basic equations for stationary and moving control volumes. Inviscid Bernoulli and the Engineering Bernoulli equation, some applications. Incompressible flow in pipes; laminar and turbulent flows, separation phenomenon. Dimensional analysis: Buckingham's pi-theorem, similitude, model studies. (0304-413; corequisite 0304-416)**Class 4, Credit 4 (S, SR)**

0304-416 Thermal Fluid Science and Energy Lab I

This laboratory course provides reinforcement for Thermodynamics (0304-413) and Fluid Mechanics (0304-415) through homework assignments and laboratory exercises. There are four homework and four laboratory exercises, including the Rankine cycle steam power plant, vapor

compression refrigeration cycle, Reynolds pipe flow, and centrifugal pumps. (0304-413; corequisite 0304-415) **Lab 2, Credit 1 (S, SR)**

0304-431 Thermal Sciences for Electrical Engineers

Basic concepts of thermodynamics and heat transfer are applied to electrical/microelectronic engineering systems. In thermodynamics, the conservation of mass and energy equations for closed and open systems are applied to a variety of engineering problems. Topics include properties of pure substances, ideal gas law, processes, cycles, and second law of thermodynamics. In heat transfer, three basic modes of heat transfer—conduction, convection, and radiation—are introduced using the concept of equivalent thermal resistance. Thermal network solution techniques are employed to analyze practical heat transfer problems encountered in electrical engineering. Correlations for Nusselt number for natural and forced convective heat transfer in different situations are introduced. Cooling of different electrical and microelectronic components is discussed (1017-312) **Class 4, Credit 4 (TBA)**

0304-437 Introduction to Machine Design

The analysis and theory of machine design and applications to systems design problems; particular emphasis on the design and analysis of machine elements. A discussion of engineering professionalism and ethics is also included. (0304-347, 348) **Class 4, Credit 4 (F, W)**

0304-440 Numerical Methods

This course involves a study of the numerical methods for modeling and solving engineering problems using computers and interpreting and analyzing the numerical results obtained. Topics include roots of algebraic and transcendental equations, solutions of homogeneous and non-homogeneous systems of linear algebraic equations, numerical integration and differentiation, and ordinary differential equations. Applications will be taken from the student's background in statics, strength of materials, dynamics, mathematics and thermodynamics. Students are expected to write a number of programs. (0304-342 or equivalent computer experience, 1016-318, and third-year standing) **Class 4, Credit 4 (F, W)**

0304-441 Computer Tools

This course will give students hands-on experience with a microcomputer-based spreadsheet (Excel), a computer algebra system (Mathematica), and VAX/VMS utilities such as the EVE editor, MAIL, NOTES, and PHONE. It must be taken concurrently with 0304-440, Numerical Methods, by students who transfer into the Mechanical Engineering Program with transfer credit for 0304-342, Problem Solving with Computers. **Lab 2, Credit 1 (F)**

0304-460 Introduction to Environmental Engineering

This course is intended to provide a broad introduction to the major topic areas of environmental engineering. Topics include an introduction to environmental problems, water resources, air resources, solid waste, hazardous waste, and environmental management. (Third-year standing) **Class 4, Credit 4 (S, SR)**

0304-464 Design for Manufacture

In this course the student learns how to design parts for economical manufacture and how to design assemblies with the optimum number of parts. It is a project-based course and includes lectures on the creative process. The course uses both manual and software techniques to calculate assembly design efficiencies and software techniques to determine part and part tooling costs. (Third-year standing or instructor's approval) **Class 4, Credit 4 (S, SR)**

0304-514 Heat Transfer I

This is a basic course in the fundamentals of heat transfer by conduction, convection, and radiation, together with applications to typical engineering systems. Topics covered 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, 0304-415) **Class 4, Credit 4 (F, W)**

0304-518 Advanced Computational Techniques

Numerical Methods, 0304-440, is extended to cover 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, SR)**

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 ACSL simulation software. (0304-359, 1016-306, 0301-362; corequisite 0304-545) **Class 4, Credit 4 (F, W)**

0304-545 System Dynamics Laboratory

This required laboratory course is designed to give the student experiment-based learning opportunities in system parameter and response characterization, data acquisition, and data analysis. A 'system' is defined as *any* collection of components or subassemblies that behave in a time-dependent manner. Typical systems encountered in this laboratory will be of mechanical, electrical, and electromechanical composition. 0304-545 gives the student opportunities to experimentally test and evaluate systems modeling, analysis, and design procedures learned in 0304-543. (Corequisite 0304-543) **Lab 2, Credit 1 (F, W)**

0304-550 Transport Phenomena

This is 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 Fluid Science and Energy Lab II

This is a companion laboratory course for Transport Phenomena (0304-550). It consists of four experiments and includes use of some fluid dynamic software. The experiments cover subsonic wind tunnel, laser doppler anemometer, boundary layer theory, and an experiment involving temperature sensors. Students get hands-on experience with TODOR and ASYST. (0304-545, 0304-550) **Lab 2, Credit 1 (S, SR)**

0304-560 Introduction to Aerospace Engineering

This course 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. (0304-415, 0304-359) **Class 4, Credit 4 (F or W)**

0304-599 Independent Study

This is a student project course encompassing both analytical and experimental work. (Fourth- or fifth-year standing) **Class variable, Credit variable (F, W, S, SR)**

0304-630 Senior Design Project I

This is 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 first course, student teams develop their proposed final design of a mechanical system after identifying possible alternative concepts. Their final design must be supported by sound engineering analyses and by engineering drawings necessary to build a prototype. (Fifth-year standing) **Class 4, Credit 4 (F, W)**

0304-631 Senior Design Project II

This is 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 final design previously developed. Nonworking 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

This is a companion laboratory course for 0304-671 and 0304-675. It illustrates 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 will be simulated on digital computers and investigated experimentally. Structural analysis and design evaluation will also be simulated where appropriate. (0304-560; corequisite 0304-671, 0304-675)**Lab 2, Credit 1 (S or SR)**

Technical Electives

All technical elective courses have a minimum of 25 percent engineering design content. These are offered at least every other year. Students shall have completed at least two co-op blocks before taking any technical electives.

0304-605 Applications in Fluid Mechanics

This course deals with specific design-oriented applications of fluid mechanics. The course will cover one advanced fluid mechanics topic such as: (a) hydrodynamics, (b) dispersion and diffusion in the environment, (c) two-phase flows, or other as determined by need or interest of the faculty and/or students. Students are required to design, and sometimes to build, a prototype. Use of computers is encouraged in the design process. (0304-440, 0304-550)**Class 4, Credit 4 (TBA)**

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 will be presented. A design project will be required.**Class 4, Credit 4 (TBA)**

0304-615 Robotics

This is 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 4, Credit 4 (F, W)**

0304-618 Computer-Aided Engineering and Design

This course 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; that is, solids modeling, finite elements, dynamic analyses, etc. The student will use 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 will be presented. A design project is selected from one or more of the topics covered. (0304-437, 440, 543)**Class 3, Lab 2, Credit 4 (S)**

0304-620 Introduction to Optimal Design

This course is an introduction to some basic optimization techniques for engineering design synthesis. Topics covered include basic concepts, the general problem statement, necessary conditions of optimization, numerical techniques for unconstrained optimization, constrained optimization through unconstrained optimization, and direct methods. Numerical solutions are obtained by interfacing with available software. A design project is required. (0304-437, 0304-440, 0304-543) **Class 4, Credit 4 (F, W)**

0304-635 Heat Transfer II

The course 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 are studied. Design aspects of heat transfer equipment are introduced. A major design project is undertaken by the students. (0304-440, 0304-514)**Class 4, Credit 4 (S, SR)**

0304-640 Internal Combustion Engines and Air Quality

This course will provide an in-depth look at mobile source emissions, their environmental impacts, and their control. Topics include impacts of mobile sources, engine types and cycles, the combustion process, fuels, emissions modeling and measurement, exhaust gas analysis, and emission control systems. (0304-460, 514 and 1011-213 or equivalent)**Class 4, Credit 4 (S, SR)**

0304-641 Stationary Source Emissions and Controls

This course will provide an in-depth look at the major classes of stationary source emissions and the equipment presently utilized to control them. Topics will include area and point-source definition and examples, particulates, general control of gases and vapors, oxides of sulfur and nitrogen, ozone and photochemical smog, and an introduction to air toxics. (0304-460, 514, 550 and 1011-273 or equivalent) **Class 4, Credit 4 (F, W)**

0304-642 Air Pollution Dispersion Modeling

This course will provide an introduction to air pollution meteorology and the fundamentals of dispersion modeling. Topics will 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, and 550; corequisite 0304-518) **Class 4, Credit 4, (F, W)**

0304-643 Control Systems

This course introduces the student to the study of linear control systems. The behavior, design, and use of control systems in augmenting engineering system performance is emphasized. Topics include system and control system characterization in time and frequency domains, stability criteria, steady-state error, feedback control, and controller design. This is accomplished through classical methods that employ the use of Laplace transforms, block diagrams, root-locus determination, and Nyquist and Bode diagrams. A companion laboratory will provide students with significant hands-on analysis and design experience. (0304-543, 0304-545) **Class 3, Lab 2, Credit 4 (S) (alternate years)**

0304-652 Fluid Mechanics of Turbomachinery

This course 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. It includes a major design project. (0304-415) **Class 4, Credit 4 (F, W)**

0304-658 Engineering Vibrations

This is a course on the theory of mechanical vibrations with an emphasis on design applications and instrumentation. Fourier analysis techniques, numerical and experimental 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; and harmonic and transient-forced motion, such as 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, 0304-545) **Class 3, Lab 2, Credit 4 (F, W)**

0304-660 Refrigeration and Air Conditioning

This is a basic course in the principles and applications of refrigeration and air conditioning involving mechanical vapor compression and absorption refrigeration cycles, associated hardware, psychrometrics, 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, SR)**

0304-671 Aerostructures

A course in 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. (0304-437, 0304-518) **Class 4, Credit 4 (S or SR)**

0304-672 Dynamics of Machinery

This course is 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, SR)**

0304-675 Aerodynamics

This course 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 or SR)**

0304-678 Propulsion

This course covers the fundamentals of propulsion, including the basic operating principles and design methods for flight vehicle propulsion systems. Topics include air-breathing engines (turbojets, ramjets, turboprops, and turbofans), as well as liquid and solid propellant chemical rockets. (0304-514 and 0304-550 or 0304-560) **Class 4, Credit 4 (F or W)**

0304-682 Flight Dynamics

This course deals with 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 (F or W)**

0304-694 Stress Analysis

This course extends the student's theoretical, numerical, and experimental base of knowledge of stressed mechanical components covered in Mechanics of Materials (0304-347), Mechanics of Materials Lab (0304-348), and Advanced Computational Techniques (0304-518). The governing state properties; the definitions and relationships of stress, strain, and deformations; and the underlying assumptions and results of basic strength of materials are reviewed in much finer 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 fundamentals of the finite element method presented in 0304-518 are extended to more complex design-oriented problems and demonstrated using commercial finite programs (Super Sap, and/or NASTRAN, and/or ANSYS). Experimental methods are presented beyond those covered in 0304-348, with topics including strain gages, photoelasticity, and brittle coating. A design project is assigned in which the student generally employs numerical and/or experimental methods. (0304-437, 0304-440) **Class 4, Credit 4 (S, SR) (alternate years)**

0304-698 Independent Study Design Project

This is a design-oriented independent study requiring a major design project. (Senior standing) **Credit 4**

Free Elective Courses

Typically at least three electives from the list are offered every year

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 will be presented. **Class 4, Credit 4 (TBA)**

0304-637 Laser Engineering

Laser Engineering studies the applications of lasers as engineering tools. Background physics relevant to the operation of a laser and the interaction of light with matter are given. Safety regulations are discussed and specific applications in industry are covered. (1017-313) **Class 4, Credit 4 (S) (alternate years)**

0304-685 Advanced Strength of Materials

This course is a continuation of Engineering Mechanics (0304-347) and also serves as a bridge to graduate courses in mechanics (e.g., Continuum Mechanics, Theory of Plates and Shells). Contents: statically indeterminate problems for beams; frames; continuous beams; beams of variable cross-section; beams on elastic foundations; torsion; limit analysis; energy methods for beams, curved bars, and frames; stability; rotating discs; introduction to composite materials. (0304-437) **Class 4, Credit 4 (TBA)**

0304-687 Engineering Economy

This course deals with the study of cost concepts; nominal and effective interest rates; and selection of investment alternatives based on present, annual, and future worth methods. Effects of various methods of depreciation and impact of taxes on investments are also presented. (Fifth-year standing) **Class 4, Credit 4 (S)**

MICROELECTRONIC ENGINEERING

0305-201 Introduction to Microelectronics

Introduction to the fabrication of silicon-based resistors, diodes, transistors, and integrated circuits (ICs). Ohm's Law, resistive circuits, current-voltage (I-V) behavior of devices. Silicon structure and electronic properties. Processing steps required to fabricate ICs. Laboratory includes measurement of I-V characteristics and basics of the photolithographic process. A five-week CAD design experience includes schematic capture, simulation, breadboarding, layout design, processing, and testing. **Class 3, Lab 3, Credit 4 (F)**

0305-215 Introduction to Microelectronics --Transfer

Combines 0305-201 and 0305-350 into 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 maskmaking, source characterization, resist characterization, and stepper operation. (1011-212) **Class 3, Lab 3, Credit 4 (F, S)**

0305-350 Integrated Circuit Technology

An introduction to the physics, chemistry and materials of integrated circuit fabrication, with an emphasis on manufacturing methods and process control. Laboratory includes experiments in materials evaluations, in-process characterization, and device testing. Students design, build, and test integrated circuits. (0305-201) **Class 3, Lab 3, Credit 4 (S)**

0305-460 Semiconductor Devices I

A course that introduces the student to the theoretical fundamentals of semiconductor materials and devices. Topics include crystal structures, Bragg reflection and dispersion relation in crystalline solids, electronic motion in crystals, density of electronic states function, statistical physics, carrier statistics in semiconductors, current and continuity equations, recombination-generation of carriers, pn junction diode and metal-semiconductor contacts. Device design and SPICE models for these devices will be investigated. (1017-314, 0305-350, 530) **Class 4, Lab 0, Credit 4 (S, SR)**

0305-514 Design of Experiments

An introduction to experimental design concepts for microelectronic engineering application. Topics include analysis of variance, screening designs, response surface designs, and design robustness. Students will utilize statistical software packages (RS1) to analyze case studies and design optimal experiments. (1016-314) **Class 4, Lab 0, Credit 4 (F, W)**

0305-520 VLSI Design for Process Engineers

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 basic geometrical layout, design rule checking, schematic capture, electrical simulation and layout versus schematic checking. Standard cell libraries, cell placement, and routing. This course will emphasize the relationship between the process and design rules and between the process and simulation model parameters. Actual chips produced by MOSIS will be used to evaluate previous designs. (0305-560 or 0301-645, 0305-350, and 0301-442) **Class 4, Credit 4 (S, SR)**

0305-530 Electromagnetic Fields I

A study of electrostatics and magnetostatics important to the understanding of the physics of semiconductor devices and microelectronic processing. (1016-328, 1017-313) **Class 4, Credit 4 (F, W)**

0305-540 Electromagnetic Fields II

A study of time varying electromagnetic fields important to optical and electrical systems. Topics include Maxwell's equations; wave equations; electromagnetic propagation in free space and guided structures; concepts of reflection, transmission, and matching. (0305-530) **Class 3, Lab 3, Credit 4 (S, SR)**

0305-560 Semiconductor Devices II

An introduction to the physical mechanisms that govern the operation of bipolar junction transistors, metal-oxide semiconductor (MOS) capacitors, MOS field-effect transistors, and related devices. Special emphasis is given to the relation between the structural parameters of these devices and their electrical characteristics. Device design and SPICE models for these devices will be investigated. (0305-460) **Class 4, Lab 0, Credit 4 (F, W)**

0305-563 Microlithography I

A course covering the chemical aspects of microlithography and resist processes. The chemistry of positive (novalac-based) and negative (crosslinking) resist systems will be studied, along with processing technologies and methods of process optimization. Concentration will be on single-layer resist materials and processing for optical lithography. Material characterization will be studied through experimental design techniques. (0305-221, 350, 514) **Class 3, Lab 0, Credit 3, (S, SR)**

0305-573 Microlithography I Laboratory

Laboratory to be taken concurrently with 0305-563. Topics emphasize optical lithography and single-layer resist materials. Material characterization will be studied through experimental design techniques. (0305-221, 530, 514) **Class 0, Lab 3, Credit 1 (S, SR)**

0305-599 Independent Study

A supervised investigation within a microelectronic area of student interest. (Permission of instructor) **Class variable, Credit variable**

0305-632 Microelectronic Engineering

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 4, Lab 0, Credit 4 (F, W)**

0305-643 Thin Film Processes

A selection of topics related to thin film materials and processes important to the manufacture of integrated circuits, including chemical vapor deposition, plasma etching, physical vapor deposition (sputtering), and rapid thermal processing. Students design processes and model them using SUPREM and DEPICT. Laboratory includes analytical characterization techniques such as emission spectroscopy, EDAX, ellipsometry, reflectometry, and interferometry. (0305-514, 350) **Class 3, Lab 3, Credit 4 (S, SR)**

0305-645 Microelectronics

A microelectronics manufacturing course. Topics include computer integrated manufacturing (MESA), scheduling, data base query, statistical process control, costing, inventory control, and other manufacturing topics. Students design manufacturing processes and compare simulations with real factory operation. Advanced processes for CMOS microelectronic devices, including gate stack design, and sub micron device design, including side wall spacers and salicide formation. Device test design. (0305-632) **Class 3, Lab 3, Credit 4 (F, W)**

0305-650 Integrated Circuit Processing Lab

A laboratory course in which students complete the design, electrical simulation, process simulation, fabrication, and testing of an integrated circuit. Topics include laboratory safety, design, maskmaking, stepper job design, process design, capacitance-voltage measurements, and MOS and BJT device fabrication. (0305-632) **Class 2, Lab 6, Credit 4 (F, W)**

0305-660 Seminar/Research

A capstone design experience for microelectronic engineering seniors. Students propose a project and carry it through to completion, including a technical presentation at the annual department conference, a poster presentation, and a written paper following the IEEE format for conference papers. (0305-650) **Class 2, Lab 6, Credit 4 (S)**

0305-665 Microlithography II

A course covering advanced resist systems for optical lithography, including anti-reflective coatings, bi-layer resists, tri-layer resists, and silylation. Electron beam lithography, x-ray lithography, and deep-UV lithography will also be covered. Technologies will be studied from both chemical and physical standpoints. Process characterization will be 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 will be studied. This course will make use of optical concepts as applied to lithographic systems. Fresnel diffraction, Fraunhofer diffraction, and Fourier optics will be utilized to understand diffraction-limited imaging processes and optimization. Topics include illumination, lens parameters, image assessment, resolution, phase-masking, and resist interactions. Lithographic systems will be designed and optimized through use of modeling and simulation packages. (0301-455; 0305-665, 675; 2051-525) **Class 3, Lab 3, Credit 4 (S)**

0305-675 Microlithography IILaboratory

Laboratory to be taken concurrently with 0305-665. Topics emphasize multiple layer processes, including anti-reflective coatings, contrast enhancement, deep-UV bi-layer, and silicon resist processes. Process characterization will be studied through experimental design techniques. (0305-563, 573) **Class 0, Lab 3, Credit 0 (F, W)**

IMAGING ARTS AND SCIENCES COURSES

School of Art and Design

- Graphic Design
- Foundation
- Interior Design
- Packaging Design
- Illustration
- Medical Illustration
- Painting
- Printmaking
- Industrial Design
- Art History

School of American Crafts

- Ceramics and Ceramic Sculpture
- Glass
- Metalcrafts and Jewelry
- Weaving and textile Design
- Woodworking and Furniture Design

School of Photographic Arts and Sciences

- Fine Art Photography
- Biomedical Photography
- Film/Video
- Professional Photographic Illustration
- Photo Systems Management
- Imaging and Photographic Technology

Center for Imaging Science

- Imaging Science

School of Printing Management and Sciences

COLLEGE OF IMAGING ARTS AND SCIENCES

Margaret O. Lucas, Ph.D., Dean

The College of Imaging Arts and Sciences encompasses the School of Art and Design, the School for American Crafts, the School of Photographic Arts and Sciences, the School of Printing Management and Sciences, and the Center for Imaging Science. Students from nearly every state and many foreign countries are enrolled in the five schools

Visits to the campus and the college are encouraged. Please contact the Admissions Office

THE SCHOOL OF ART AND DESIGN

The School of Art and Design enrolls approximately 1,000 students in programs leading to the following degrees.

Associate (AAS): graphic design, illustration, interior design, painting, printmaking, industrial design

Bachelor of Fine Arts (BFA): graphic design, illustration, industrial design, interior design, medical illustration, painting, printmaking

Master of Science for Teachers (MST): art education, graphic design, industrial design, interior design, painting, printmaking

Master of Fine Arts (MFA): computer graphics design, graphic design, industrial design, interior design, medical illustration, painting, printmaking

THE SCHOOL FOR AMERICAN CRAFTS

The School for American Crafts offers to select students crafts programs leading to the following degrees.

ROCHESTER INSTITUTE OF TECHNOLOGY

Associate (AAS): ceramics and ceramic sculpture, glass, metalcrafts and jewelry, weaving and textile design, woodworking and furniture design

Associate in Occupational Studies (AOS): woodworking and furniture design

Bachelor of Fine Arts (BFA): ceramics and ceramic sculpture, glass, metalcrafts and jewelry, weaving and textile design, woodworking and furniture design

Master of Science for Teachers (MST): ceramics and ceramic sculpture, glass, metalcrafts and jewelry, weaving and textile design, woodworking and furniture design

Master of Fine Arts (MFA): ceramics and ceramic sculpture, glass, metalcrafts and jewelry, weaving and textile design, woodworking and furniture design

THE SCHOOL OF PHOTOGRAPHIC ARTS AND SCIENCES

More than 800 students are enrolled in the School of Photographic Arts and Sciences, which offers programs leading to the following degrees

Bachelor of Science (BS): biomedical photographic communications, film/video, imaging systems management, imaging and photographic technology, photographic marketing management (joint program with the College of Business)

Bachelor of Fine Arts (BFA): professional photographic illustration with major options in advertising photography, photojournalism, and fine art photography

Master of Fine Arts (MFA): imaging arts with concentrations in photography, computer animation, and museum studies

THE SCHOOL OF PRINTING MANAGEMENT AND SCIENCES

The School of Printing Management and Sciences has approximately 400 students, enrolled in the following degree programs.

Bachelor of Science (BS): printing, newspaper operations management, printing systems, printing and applied computer science

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

THE CENTER FOR IMAGING SCIENCE

RIT offers the only imaging science program in the country. Students learn the application of physics, computer science, chemistry, and mathematics to the formation, recording, manipulation, and perception of images. Degrees offered include the following

Bachelor of Science (BS): imaging science

Master of Science (MS): imaging science, color science

Doctor of Philosophy (Ph.D.): imaging science

SCHOOL OF ART AND DESIGN

GRAPHIC DESIGN

2010-301, 302, 303 Introduction to Graphic Design

Sequential course in graphic design includes one full day and one half day of the core experience. *Full day:* Introduction to graphic design and visual communications through formal and perceptual understanding. Includes visual aesthetics, form, structure, concept development, semiotics, Gestalt principles, visual organizational systems, technology and media, and the working relationship between perceptual design principles and communication concepts. Relationships of typography, computer graphics, production, and other fields are included. *Half day:* Introduction to computer graphic design methods. Students will learn the technical aspects of vector drawing, raster graphics, and page layout software. Elements of typography and production will be stressed. (Foundation program or equivalent required) Prerequisite for major in Graphic Design. **Lab 9, Credit 4 (offered every year)**

2010-401 Typography in Graphic Design (Junior Major, Fall)

Explores visual typography, in both its theoretical and practical aspects. Assignments are geared to applying and exploring the possibilities inherent in the theoretical principles introduced, and they allow the student to focus on meaning, aesthetics, and functionality in typographic design. **Lab 6, Credit 3 (offered every year)**

2010-402 Imagery in Graphic Design (Junior Major, Fall)

Creative problem-solving experiences will focus on the selection, generation, and use of imagery in graphic design. The relationship of typography to imagery, layout, and the use of color will also be stressed. Concept development will be emphasized as an aspect of visual communication. **Lab 6, Credit 3 (offered every year)**

2010-403 Symbols in Graphic Design (Junior Major, Winter)

Course provides students with opportunities to think about and develop designs to express the essence of a company, product, or service through elements such as pictographs, logos, and logotypes applicable to a range of communication tools. **Lab 6, Credit 3 (offered every year)**

2010-404 Graphic Design for Publications (Junior Major, Winter)

Creative problem-solving experiences will focus on publication design, with applications ranging from magazine layouts to booklet design. Technical considerations such as copyfitting and type specification will be covered as well as organizational structures such as grids, formatting, and sequential design. Concept development, design aesthetics, and the interaction between type and image will be stressed. **Lab 6, Credit 3 (offered every year)**

2010-405 Information Graphics (Junior Major, Spring)

Course provides students opportunities for developing approaches to factual information to be presented in schematic or tabular forms; i.e., charts, maps, tables, diagrams. Emphasis is on arriving at fresh, persuasive solutions and on the selection of typographic and graphic elements appropriate to the context in which they are to be presented. **Lab 6, Credit 3 (offered every year)**

2010-406 Packaging and Environmental Graphics (Junior Major, Spring)

Creative problem-solving experiences will focus on the graphic design aspects of packaging, signage, and architectural graphics. In addition to three-dimensional considerations, the projects assigned will offer opportunities for interaction with the environment. Innovation in choice of materials as well as in concept and design will be encouraged. Effective use of both typography and imagery will be expected. **Lab 6, Credit 3 (offered every year)**

2010-411, 412, 413 Graphic Design Elective

An elective providing the opportunity to carry on problem solving in graphic design. Each quarter concentrates on a specific design topic of study (such as desktop publishing, design of self-promotional materials, typographic forms). **Lab 6, Credit 3 Elective, (offered every quarter)**

2010-501 Career Skills and Professional Practices (Senior Major)

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. **Lab 6, Credit 3 (offered every year)**

2010-502 Corporate Design (Senior Major)

This course is based on solving one problem that has many components—the development of a visual identity program for a Fortune 500 company. The project consists of analysis of the company, goals statement for the program, design of a mark, signature, colors, letterhead, envelope, business cards, and the design standards manual with explanatory copy. **Lab 6, Credit 3 (offered every year)**

2010-503 Design History (Senior Major)

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 critiques. **Lab 6, Credit 3 (offered every year)**

2010-504 Graphic Systems (Senior Major)

To investigate and apply principles, concepts, and creativity to graphic systems. Research, concept development, process, application, and presentation will be emphasized. Teamwork and individual work will be integrated into the projects. All students must meet the project and evaluation requirements in order to complete the course. **Lab 6, Credit 3 (offered every year)**

2010-505 Advertising Design (Senior Major)

Advanced creative problem-solving experiences relating to advertising design and developing a selling tool. Course content and project will include business/billing procedures, evaluation of assignments, ethics, research, development of acquired material, production estimates and specifications, due dates, purchasing, and record keeping of all jobs and campaigns. **Lab 6, Credit 3 (offered every year)**

2010-506 Concept and Symbolism (Senior Major)

Advanced creative problem-solving experiences emphasizing getting your point across visually. Two projects are involved. The first is a pair of bookjackets, which must be done from two different points of view—one positive and one negative. The concepts must be developed and symbolism used to convey the two different and specific messages. The second project is a promotional piece for a paper company intended for designers and art directors who specify paper. The concepts and symbolism used must be very innovative and 'design' conscious, yet must emphasize specific characteristics and qualities of paper. **Lab 6, Credit 3 (offered every year)**

2010-507 Design Marketing Relationships (Senior Major)

This course deals with the relationship between marketing and graphic design. It is not a marketing course to teach professional marketing skills and practices, but is directed at teaching the graphic designer basic skills and terminology. The aim of the course is to bring into play marketing concepts with design practice, focusing on short- and long-term marketing and design projects. When possible, specific firms are contacted and engaged as client/consultants. **Lab 6, Credit 3 (offered every year)**

2010-508 Photography in Graphic Design (Senior Major)

Advanced creative problem-solving experiences that emphasize learning and exercising skills in the design of projects using typography with photography. The relationship between type and photo is examined in order to strengthen control over the communication through design. **Lab 6, Credit 3 (offered every year)**

2010-509 Design Specifications (Senior Major)

Advanced creative problem-solving experiences that deal with the development of design concepts to meet budget specifications, develop estimates for job/client by working with printers, paper reps, illustrators, photographers, etc. **Lab 6, Credit 3 (offered every year)**

2010-510 Design Application (Senior Major)

Advanced creative problem-solving experiences that focus on preparations for the design job market. Projects could include work with local clients, a self-promotional booklet (designed and printed), resume revision, portfolio development, and practice interviews. Interaction, discussion, and student presentations are also part of this course. **Lab 6, Credit 3 (offered every year)**

2010-511 Advanced Information Graphics (Senior Major)

Advanced creative problem-solving experiences that investigate how to communicate simple and complex amounts of information. The student will learn to analyze data and other forms of information before transforming it into useful visual form. In this course the student may develop charts, graphs, time lines, maps, or technical drawings to impart this information. **Lab 6, Credit 3 (offered on sufficient demand)**

2010-512 Communication Design (Senior Major)

New opportunities are available to graphic designers that did not exist just a few years ago. During the quarter, students will be introduced to the ideas, concepts, uses, and general principles of interactive media on the computer. The course will explore several forms of logic and how they can be used in this design process. The course will include several projects to develop the student's understanding of software, logic, and aesthetic considerations in this field. The student will be expected to complete assigned readings and projects. **Lab 6, Credit 3, (offered every year)**

2010-513 Senior Project (Senior Major, Spring)

Advanced creative problem-solving experiences relating to visual communication imagery in the form of a self-designed project. This will be based on a strong emphasis of formal design values and their utilization for the communication of ideas and information. The project will be reviewed by the faculty mentor, and modifications may be made based on consultation with the student. The project may be thought of as a senior thesis project. **Lab 6, Credit 3, (offered every year)**

FOUNDATION

2013-205, 206, 207 Creative Sources

This course is designed to make students aware of themselves, their experiences, and their environment as tools for creative problem solving. This will be accomplished through lectures, individual and group assignments, demonstrations, and guest speakers. **Class 1, Lab 1, Credit 2 (offered each year)**

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 9, Credit 4 (offered each year)**

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 (offered each year)**

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 6, Credit 3 (offered each year)**

2013-261, 262, 263 Drawing Crafts

Drawing in variety of media. Introduction to line, form, and color as elements of pictorial and object description and presentation. Drawing systems utilizing perspective, visualization, and spatial illusion. **Lab 6, Credit 3 (offered each year)**

INTERIOR DESIGN

2015-305 Architectural Drafting (Sophomore Major)

An introduction to interior design through architectural drafting. **Lab 6, Credit 3**

2015-306 Perspective Rendering (Sophomore Major)

An introduction to residential interior design and perspective rendering. **Lab 6, Credit 3**

2015-307 Introduction to Interior Design (Sophomore Major)

An introduction to interior design with emphasis on basic process, spacial relationships, design conceptualization, and development. **Lab 6, Credit 3**

2015-308 Computer-Aided Design Applications (Sophomore Major)

An introduction to the use of the computer as a tool in the interior design process. Use of the computer is required. **Lab 3, Credit 1**

2015-309 Interior Design Model Building (Sophomore Major)

An introduction to interior design conceptually through model making. **Lab 3, Credit 1**

2015-310 Human Dimension Applications (Sophomore Major)

Introductory applications of human dimension related to interior space and its design. **Lab 3, Credit 1**

2015-404 Hospitality Design (Junior Major)

The applications of design methods and skills to the design of interior space for hospitality use. **Lab 6, Credit 3**

2015-405 Applications of Color and Light (Junior Major)

Introduction to color and light for spacial development. **Lab 6, Credit 3**

2015-406 Retail Design (Junior Major)

Introduction to designing interior space for retail use. **Lab 6, Credit 3**

2015-407 Materials and Processes for Interior Design (Junior Major)

Introduction of materials and processes for interior design. **Lab 6, Credit 3**

2015-408 Office Design and Planning (Junior Major)

Introduction to interior design and planning for office use. **Lab 6, Credit 3**

2015-409 Interior Specifications (Junior Major)

Introduction to specifications with emphasis on planning, construction documents, textiles, finishes, testing standards, and liability. **Lab 6, 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

Lab 6, Credit 3 (offered each year), Elective

2015-504 Multi-purpose, Multi-storage Design (Senior Major)

The application of design methods and skills to professional level projects in interior design. **Lab 6, Credit 3**

2015-505 Codes and Regulations (Senior Major)

Application projects concerned with building codes, regulations, fire safety, public safety and health, barrier-free design, and Americans with Disabilities Act. **Lab 6, Credit 3**

2015-506 Environmental Control Applications (Senior Major)

Application projects involving plumbing, heating, ventilation, electrical, vertical transportation, and acoustic concerns. **Lab 6, Credit 3**

2015-507 Health Care Design (Senior Major)

The application of design, methods, and skills to professional level projects focusing on health care facilities. **Lab 6, Credit 3**

2015-508 Interior Design Business Practices (Senior Major)

An introduction to professional practices with emphasis on business formation, design marketing, legal and ethical responsibilities. **Lab 6, Credit 3**

2015-509 Career Planning (Senior Major)

Development of a resume, portfolio, and job search techniques with a focus on career planning.

Lab 6, Credit 3

2015-510 Working Drawings (Senior Major)

Professional level interior design projects with an emphasis on the construction sequence and construction documentation. **Lab 6, Credit 3**

2015-511 Special Projects (Senior Major)

Special projects in interior design emphasizing communication skills, theory, and methods for the professional. **Lab 6, Credit 3**

2015-512 20th Century Interior Design (Senior Major)

Application of theoretical base to current design problems, issues, philosophy, and evolution of interior design in the 20th century. **Lab 6, Credit 3**

PACKAGING DESIGN

2017-501, 502, 503 Packaging Design III (Senior Major)

The course will further investigate analysis and visual translation of package form and function, package structure, production processes, package trends, construction, materials, and package graphics. A strong emphasis will be placed on preparation of a portfolio. **Lab 9, Credit 4 (offered each year)**

ILLUSTRATION COURSES

2019-304 Anatomical Figure Drawing (Sophomore Major)

This course will help students correlate underlying osseous and muscular anatomy with surface form and structure. Instruction will also emphasize gesture, proportion, and balance. Course work will ask students to use their figure drawing skills while solving illustration assignments. **Lab 6, Credit 3**

2019-305 Desktop Illustration I (Sophomore Major)

Emphasis on layout and spacial relationships between typographic and illustrative elements. Course work will provide exposure to computer concepts needed as the basis for future explorations. **Lab 3, Credit 1**

2019-306 Heads, Hands, Facial Expression (Sophomore Major)

Models and photographic references will be used to help students learn the structure, proportion, and forms of the head, face, and hands. Building on their understanding of these structures, students will apply their observational skills to manipulate gesture and posture to create expression and character. Course work will introduce a variety of line illustration techniques. **Lab 6, Credit 3**

2019-307 Reference Photography (Sophomore Major)

Students will use the 35mm camera as a tool for recording light, texture, value, and form. Course work will include: photographic design and composition, camera operation, lighting conditions, processing, and developing. The primary goal is to introduce the use of the camera as a visual source of information for the illustrator. **Lab 3, Credit 1**

2019-308 The Figure and the Environment (Sophomore Major)

Students will use knowledge and skills gained from the preceding figure, design, and photographic courses to create illustrations describing figures engaged in various activities in various environments. Research projects may include people at leisure or engaged in sports, manual labor tasks, and everyday activities. Media exploration will concentrate on color and mixed media techniques. **Lab 6, Credit 3**

2019-309 Desktop Illustration II (Sophomore Major)

Continued development of the skills begun in Desktop Illustration I by introducing advanced paint and layout applications. Instruction will nurture further development and exploration of spacial relationships among illustrative, graphic, and typographic elements as solutions to communication problems. **Lab 3, Credit 1**

2019-405 The Figure in Advertising Illustration (Junior Major)

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 The Graphic Elements of Illustration (Junior Major)

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 will also 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 (Junior Major)

This course 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 will be created by piecing together many different sources. **Class 6, Credit 3**

2019-408 Publishing Your Illustrations (Junior Major)

During this quarter we focus on the use of illustration in the book publishing field, and we start by looking at the children's book and the history of the use of illustration in children's educational materials. We will discuss methods of production that have impact on the preparation of illustrations, and we will discuss the use of color separations and the organization of text and picture. This quarter we may look at special areas including the illustrated novel and the pop-up book. All aspects of publishing, and the techniques used in the field, will be our subject. **Class 6, Credit 3**

2019-409 Symbolism in Editorial Illustration (Junior Major)

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 and the Editorial Statement (Junior Major)

The illustrator works from texts and develops concepts and statement 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**

2019-501 The Illustrator as Journalist (Senior Major)

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 student 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. **Lab 6, Credit 3**

2019-505 A Contemporary History of Illustration (Senior Major)

Students will be 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 will incorporate ideas embodied in these and other contemporary art trends. Lectures and illustrated talks will compare contemporary art and illustration history. **Class 6, Credit 3**

2019-506 Beginning Computer Techniques for Illustration (Senior Major)

This course focuses on the computer as the primary tool in developing illustrations for specific assignments. Adobe Illustrator, Adobe Photoshop, and Design Studio will be used to illustrate specific assignments. The emphasis will be on a creative investigation of the computer and software as tools in the development of illustrative concepts. **Class 6, Credit 3**

2019-507 Illustration for Books (Senior Major)

A course designed to explore 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 as a Promotional Tool (Senior Major)

This course takes an in-depth look at using illustration for advertising and promotional campaigns. We will also take a look at the business of marketing oneself as an illustrator. We will develop examples of illustration as advertising and view examples by masters in this field. Lectures will 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**

2019-509 Computer Illustration (Senior Major)

This course will look at the ability of the illustrator to take a subject and exploit image processing techniques to generate many variations expediently. The student will use sketches, and photo reference for research, and provide a longer sequence of illustrations dealing with a specific subject. The emphasis is on attitude and creative thinking in developing portfolio pieces that show a personal interest. **Class 6, Credit 3**

2019-510 Personal Focus in Illustration (Senior Major)

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 and Media (Senior Major)

During this quarter we will look at the use of alternative techniques for the illustrator, including dimensional materials and electronic programs. We will also look 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 will round out the applications studies in this section of Senior Illustration. **Class 6, Credit 3**

2019-512 Contemporary Computer Issues (Senior Major)

Students will use the computer to develop portfolio pieces that investigate topical subjects that look clearly at issues of the day, including political, cultural, economic, and technical issues. In addition students will lay out their resume during this quarter. **Class 6, Credit 3**

MEDICAL ILLUSTRATION

2020-401 Medical Illustration Applications (Junior Major)

An in-depth study of carbon dust, charcoal, and pastel techniques developed for medical illustration. Concentration will be on detailed illustrations of human anatomy as a preparation for future courses in anatomical and surgical illustration. **Lab 6, Credit 3**

2020-405 Anatomic Drawing I (Junior Major)

Students will be assigned projects to reinforce their knowledge of anatomy while collaborating on dissection and illustration from the cadaver. Problems will include oncology from cross sections and x-rays in preparation for surgical and medical/legal art. Mixed media will be encouraged. **Lab 6, Credit 3**

2020-406 Anatomic Illustration: Wet Media (Junior Major)

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**

2020-407 Computer Applications in Anatomic Illustration (Junior Major)

Advanced application of computer hardware and software to create illustrations in support of anatomical instruction. Course work will emphasize translating on-site drawings from student dissections into digital illustrations. **Lab 4, Credit 2**

2020-408 Anatomic Drawing II (Junior Major)

Building on experience gained in Anatomic Drawing I, students will be assigned projects to reinforce their knowledge of anatomy while collaborating on dissection and illustration from the cadaver. Problems will include oncology from cross sections and x-rays in preparation for surgical and medical/legal art. Mixed media will be encouraged. **Lab 4, Credit 2**

2020-409 Medical Illustration: Mixed Media (Junior Major)

Development of range and mastery of airbrush and mixed media illustration techniques. Course work emphasizes creating illustrations aimed at a variety of medical illustration markets, including medical/legal, editorial, and advertising **Lab 6, Credit 3**

2020-430 Medical Illustration Gross Anatomy

Dissection and study of the human body is presented with such topics as developmental comparative and applied anatomy. Emphasis is directed toward osteology, radiographic anatomy. Required of all students in the medical illustration program, offered through the University of Rochester Medical Center, with a tuition surcharge

2020-501 Advanced Medical Illustration (Senior Major)

Advanced medical illustration techniques. Graphic design related to illustrative and photographic practice. Lab sessions to be scheduled in operating room facilities. Jointly sponsored by RIT and the University of Rochester. **Lab 6, Credit 3 (offered each year)**

2020-506-01 Computer Animation for Medical Instruction (Senior Major)

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**

2020-507-01 Marketing and Business Practices in Medical Illustration (Senior Major)

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 will cover professional ethics, copyrights, contracts, and client/illustrator negotiations. **Lab 6, Credit 3**

2020-508-01 Medical Illustration Portfolio (ASenior Major)

Students will receive individual assessments of their current portfolio from faculty. Course work will support construction of 'exit' portfolios reflecting each student's strengths and interest. Traditional two-dimensional and electronic portfolios will be constructed. **Lab 6, Credit 3**

2020-551-01 Scientific Illustration (Junior Major)

Translation of on-site drawings into ink illustrations designed to aid in scientific instruction. Assignments will include illustrating zoological, entomological, botanical, and anthropological subjects. Course work will include layout and design of typographic, graphic, and illustrative elements into mechanical art that complies with 'line printing' requirements. **Lab 6, Credit 3**

2020-551-02 Computer Applications in Scientific Illustration (Junior Major)

Introduction to hardware and software applications for layout and typographic design and creation of line and continuous tone illustrations. Course explores combining drawing and digital imaging as tools for designing illustrations in support of scientific and biomedical instruction. **Lab 4, Credit 2**

2020-551-03 Surgical Drawing and Illustration II (Senior Major)

Students will observe surgical procedures in local operating suites. Assignments will require translating their sketches and research into illustrations designed to instruct physicians or the lay public. Illustrations are designed to be reproduced for audio-visual use and as illustrative components of interactive computer presentations. Watercolor, airbrush, photographs, and paint software techniques will be used to execute final solutions. **Lab 18, Credit 6**

PAINTING COURSES

2021-305 Introduction to Painting

Emphasis will be on painting and the objective mastery of form, space, and expression from a variety of sources, including the human figure. Emphasis on basic techniques, materials, and concepts for further study in painting and in the fine arts. Introduction to the materials and

techniques of permanent painting media. Preparation and execution in both direct and indirect painting methods. Safe handling of artists' materials is stressed. **Lab 6, Credit 3**

2021-306, 308, 310 Fine Arts Drawing

Emphasis will be on drawing and the objective mastery of form, space, and expression from a variety of sources, including the human figure. Emphasis on basic techniques, materials, and concepts for further study in the fine arts. **Lab 3, Credit 1**

2021-307 Introduction to Printmaking

Emphasis will be on printmaking and the objective mastery of form, space, and expression from a variety of sources, including the human figure. Emphasis on basic techniques, materials, and concepts for further study in printmaking and the fine arts. Introduction to the materials and techniques of permanent printmaking media. Preparation and execution in both direct and indirect painting methods. Safe handling of artists' materials is stressed. **Lab 6, Credit 3**

2021-309 Introduction to Sculpture

Emphasis will be on sculpture and the objective mastery of form, space, and expression from a variety of sources, including the human figure. Emphasis on basic techniques, materials, and concepts for further study in sculpture and in the fine arts. Introduction to the materials and techniques of permanent three-dimensional media. Preparation and execution in both direct and indirect painting methods. **Lab 6, Credit 3**

2021-320 Color

One-quarter course dealing with the examination of basic color phenomena by visual comparison. Study the differences between light and pigment. Class problems exploring such relationships as intensity, vibration, temperature, after-image, spacial effects and image-ground distortion. **Class 3, Lab 3, Credit 3 (offered each year)**

2021-401, 402, 403 Painting (Junior Major)

Second year of painting in a three-year degree sequence. Development of mastery of painting media and the experience of drawing. Emphasis placed upon individual solutions and expression. **Lab 12, Credit 6 (offered each year)**

2021-411, 412, 413 Painting

An elective providing the opportunity for exploration of personal expression through a painting medium. **Lab 6, Credit 3 (offered each year), Elective**

2021-450 Drawing Problems

Study of traditional and contemporary means of developing form and space in drawing. Individual drawing projects exploring drawing as a conceptual tool or as a fine art medium. **Lab 6, Credit 3 (offered each year)**

2021-501, 502, 503 Painting (Senior Major)

The third year of advanced painting 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 18, Credit 9 (offered each year)**

2021-511, 512, 513 Painting

An elective that provides further exploration of personal expressive styles through a painting media. **Lab 6, Credit 3 (offered on sufficient demand), Elective**

PRINTMAKING COURSES

2022-401, 402, 403 Printmaking (Junior Major)

A three quarter sequence in printmaking. Specific technical assignments, individual growth and development through personal statements is stressed in lithography, intaglio and relief printing. Expansion and development in combined and complex print forms are encouraged. A limited edition portfolio project is developed with the participation of all students. **Lab 12, Credit 6 (offered each year)**

2022-411, 412, 413 Printmaking

An elective providing the opportunity to explore personal statements through one of the following: lithography, etching, woodcut, papermaking. **Lab 6, Credit 3 (offered each year),**

Elective

2022-501, 502, 503 Printmaking (Senior Major)

Continuation of third-year printmaking. Expanding the technical involvement in paper making, photo etching and photo litho. Opportunity is presented for involvement in developing a more concentrated and personal art form through any singular technique or combination. A limited edition portfolio project is developed with the participation of all students. Encouragement is offered for students to exhibit professionally in regional and national exhibitions. Emphasis is placed on preparing a strong professional body of prints. **Lab 18, Credit 9 (offered each year)**

2022-511, 512, 513 Printmaking

An elective that provides further exploration of printmaking with emphasis on personal statement **Lab 6, Credit 3 (offered on sufficient demand)**

INDUSTRIAL DESIGN

2035-305 Layout Systems (Sophomore Major)

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. **Lab 6, Credit 3**

2035-306 Technical Drawing (Sophomore Major)

An introduction to drafting in the field of industrial and packaging design. Emphasis is on basic skills in orthographic drawing, O-Datum and decimal, inch dimensioning, and engineering drawings. **Lab 6, Credit 3**

2035-307 Graphic Visualization (Sophomore Major)

Sketching and rendering techniques are developed through exercises that also promote abilities to visualize three-dimensional forms in two-dimensional representations. **Lab 6, Credit 3**

2035-308 Soft Model Making (Sophomore Major)

Development of mock-up building skills as an introduction to the fields of industrial and packaging design. Emphasis is on basic skills necessary for three-dimensional design conceptualization and development. **Lab 3, Credit 1**

2035-309 Hard Model Making (Sophomore Major)

Development of finished model building skills as an introduction to the fields of industrial and packaging design. Emphasis is on advanced skills and processes necessary for three-dimensional design conceptualization and development. **Lab 3, Credit 1**

2035-310 Computer-Aided Design Applications

An introduction to the use of the computer as a tool in the design process. Use of the computer is required. **Lab 6, Credit 3**

2035-320 Graphic Visualization

Graphic visualization techniques for the development and presentation of concepts for three-dimensional designs. Familiarization with various media in developing and improving graphic communication skills of value to the designer. **Lab 6, Credit 3 (offered on sufficient demand)**

2035-405 Materials and Processes Applications (Junior Major)

The acquisition of a technical and theoretical base in industrial design through a formal introduction to materials and processes. **Lab 6, Credit 3**

2035-406 Consumer Product Design I (Junior Major)

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. **Lab 6, Credit 3**

2035-407 Human Factors Applications (Junior Major)

The acquisition of a technical base in human factors for industrial design, emphasizing function and safety. **Lab 6, Credit 3**

2035-408 Equipment Design (Junior Major)

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. **Lab 6, Credit 3**

2035-409 Product Style (Junior Major)

The application of style, fashion, and graphics to product form, storage, and distribution. **Lab 6, Credit 3**

2035-410 Consumer Product Design II (Junior Major)

The application of communicative and problem-solving skills to comprehensive design projects. Project emphasis on the consideration of style and fashion in determination of product form. **Lab 6, Credit 3**

2035-411, 412, 413 Industrial Design Elective

An elective that provides basic instruction in three dimensional computer graphics applications for designers. **Lab 6, Credit 3, Elective**

2035-505 20th Century Designers (Senior Major)

Design issues and ethics are explored through examination of biographical material. Selected 20th century designers are reviewed and discussed. **Lab 6, Credit 3**

2035-506 Design Collaborative (Senior Major)

Advanced product development in conjunction with a corporate design program providing technical information, marketing concerns, and outside review of students' work. **Lab 6, Credit 3**

2035-507 Advanced Product Design (Senior Major)

The application of design methods, universal design principles, and team skills to professional-level projects in industrial design. **Lab 6, Credit 3**

2035-508 Furniture Design (Senior Major)

Experience in the design of furniture for a defined market is acquired through a project exercise involving industry collaboration. **Lab 6, Credit 3**

2035-509 Furniture Research and Development (Senior Major)

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. **Lab 6, Credit 3**

2035-510 Professional Practice I (Senior Major)

A review and study of design practices, including contracts, agreements, billings, and business procedures. Resume, portfolio development, and employment possibilities are also explored. **Lab 6, Credit 3**

2035-511 Product Development (Senior Major)

A special student-interest project in industrial design, usually focused on the areas of sports/recreation products or toys. **Lab 6, Credit 3**

2035-512 Advanced Product Design (Senior Major)

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. **Lab 6, Credit 3**

2035-513 Professional Practice II (Senior Major)

Resume and portfolio completion with informational interviewing and employment advising. **Lab 6, Credit 3**

ART HISTORY

2039-225, 226, 227 Art and 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 (offered each year)**

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 will provide a foundation for individual decisions on planning and designing to complement and enhance present and future environments. **Class 3, Credit 3 (offered each year)**

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 (offered each year)**

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 (offered each year)**

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 (offered each year)**

2039-340 Symbols and 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. The course is designed to help the artist, designer, and craftsperson produce more effective visual communication. **Class 3, Credit 3 (offered each year)**

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 (offered each year)**

2039-360 18th and 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 (offered each year)**

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 (offered each year)**

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 (offered each year)**

2039-390 Native American Art

This course surveys 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, changes with European contact, and contemporary expressions-are examined by culture area. Consideration is also 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 (offered each year)**

2039-430 Dada and 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 will be analyzed in paintings, literary works, films, and objects. **Class 3, Credit 3 (offered each year)**

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 (offered each year)**

2039-450 Pop Art and Pop Culture

This course will explore the social, cultural, and political context within which this movement of the 1960s developed. Emphasis will be on artists in New York and Britain. Lectures, discussions, and films will comprise the course content. **Class 3, Credit 3 (offered each year)**

2039-460 Media Advertising and Consciousness

The function of this course is to provide a discourse on the interaction of media and advertising through both historical and theoretical means. The historical part of the course will deal with the social impact of industry on 'modern life' at the turn of the century. The theoretical part of the course will discuss the impact of advertising and media on social consciousness. **Class 3, Credit 3 (offered each year)**

2039-566 Special Topics

Consideration of special art historical themes, areas, and topics not covered in regular courses. **Class 3, Credit 3 (offered each year)**

SCHOOL FOR AMERICAN CRAFTS

CERAMICS AND CERAMIC SCULPTURE

2040-200 Ceramics Materials and Processes (Freshman Major)

The focus of study deals with a personal view of functional ceramic ware. Techniques presented include wheel throwing, hand building, glazing, decorating, and kiln firing. The history of pottery and ceramics sculpture as well as clay and glaze chemistry is offered. **Lab 15, Credit 5 (offered each year)**

2040-251, 252, 253 Ceramics Elective

An elementary course in design and techniques in ceramics. Each quarter different techniques are taught including wheel, hand building, glaze, and decorating. **Lab 6, Credit 3 (offered each year)**

2040-300 Ceramics Materials and Processes (Sophomore Major)

Ceramic projects challenge the student to develop conceptual attitudes and widen the scope of creativity. Projects undertaken provide training and experience in a variety of hand-forming/wheel-throwing techniques and firing methods. **Lab 15, Credit 5 (offered each year)**

2040-400 Ceramics Materials and Processes (Junior Major)

Personal interpretation of the issues in contemporary ceramics will be investigated. Each student will develop a proposal to be approved by the faculty. The proposal will enhance self expression and a personal direction in clay. **Lab 15, Credit 5 (offered each year)**

2040-500 Ceramics Techniques and Thesis

(Senior Major) Sequential course for three quarters focusing on thesis development of a body of work that reflects self expression, and a personal direction in clay. This research and thesis project will stress a high level of aesthetic content and skilled execution. **Lab 24, Credit 8 (offered each year)**

GLASS

2041-200 Glass Materials and Processes (Freshman Major)

A basic survey course of the properties, techniques and technology of glass, plus an overview of glass history. Individuals are encouraged to participate in a variety of hot and cold glass techniques: blowing basic shapes, stemware, color applications, stained/leaded glass, lamination, polishing, sand casting, and slumping/fusing. Basic knowledge of technique lays the foundation for concept development. **Lab 15, Credit 5 (offered each year)**

2041-251, 252, 253 Glass Elective

A survey course emphasizing furnace glassblowing and stained glass as a 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. **Lab 6, Credit 3 (offered each year)**

2041-300 Glass Materials and Processes (Sophomore Major)

Techniques of stationary/multi-sectional mold blowing, color overlay, graphal, and latticino are examples of continued emphasis on blown glass. Neon bending, sealing and bombarding; gravity casting, pate-de-verre, engraving, fabrication and architectural stained glass are offered. In-depth history of glass and the decorative arts, plus practical chemistry of glass, batching and LEC will be learned. **Lab 15, Credit 5 (offered each year)**

2041-400 Glass Materials and Processes (Junior Major)

Design projects from decorative arts companies are undertaken. Knowledge of glass studio design/construction, equipment and business practices is acquired. The journeyman's series piece is planned, designed and executed. Techniques of enameling, electroforming and advanced casting processes are investigated. The conceptualization process is further developed through spacial/environmental projects. **Lab 15, Credit 5 (offered each year)**

2041-500 Glass Techniques and Thesis (Senior Major)

Based upon the three previous years of investigation, the senior-level glass student will present a proposal which will be offered as evidence of qualification for the baccalaureate degree. The senior

will present a resume, portfolio and a research paper related to his/her exhibition at the end of the academic year. **Lab 24, Credit 8 (offered each year)**

2041-520 Stained Glass

An elective relating advanced individual exploration using structural elements of color design and visual expression. Fabricating techniques involve cutting, shaping, soldering, leading, foiling, glazing stained glass. **Lab 6, Credit 3 (offered on sufficient demand)**

METALCRAFT AND JEWELRY

2042-200 Metalcrafts Materials and Processes (Freshman Major)

Sequential course for three quarters, introducing basic exercises in the use of equipment and metalcrafts techniques through hollowware and jewelry design in various metals. Included will be the discussion of metal design utilizing the techniques of fabrication, forging, raising and basic gem setting. **Lab 15, Credit 5 (offered each year)**

2042-251, 252, 253 Metalcrafts Elective

An elective course providing an opportunity for introductory study in metals in the area of either hollowware or jewelry. **Lab 6, Credit 3 (offered each year)**

2042-300 Metalcrafts Materials and Processes (Sophomore Major)

Sequential course for three quarters, introducing gold work, repousse and chasing and moldmaking. Analysis of design and production problems relating to hollowware and jewelry. **Lab 15, Credit 5 (offered each year)**

2042-400 Metalcrafts Materials and Processes (Junior Major)

Sequential course for three quarters, introducing flatware, spinning and machine tool processes. Introduction to industrial manufacture and advanced gem setting. **Lab 15, Credit 5 (offered each year)**

2042-500 Metalcrafts Techniques and Thesis (Senior Major)

Sequential course for three quarters, providing individual research in technique and design. A final presentation, to include a resume, photographs and renderings of work, is required. **Lab 24, Credit 8 (offered each year)**

WEAVING AND TEXTILE DESIGN

2043-200 Textile Materials and Processes (Freshman Major)

Sequential course for three quarters, providing fundamentals of fabric design, yarn calculation, and pattern drafting. Analysis of equipment and problems. Practice in basic weaves. Experiments in design and weaving of sample warps of drapery, linens, upholstery, and suiting fabrics. Study of qualities and color combinations of various yarns. Yardage weaving. Printing procedures; silk screen techniques. **Lab 15, Credit 5 (offered each year)**

2043-251, 252, 253 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. **Lab 6, Credit 3 (offered every year or alternate year)**

2043-300 Textile Materials and Processes (Sophomore Major)

Advanced weaving processes with problems related to design will be studied. Use of multi-harness weaving, basic computer knitting, Brother Knitting Machines, basic garment sewing constructions, and experimentation with various textile processes will be explored. A journeyman study is the culminating experience. **Lab 15, Credit 5 (offered each year)**

2043-400 Textile Materials and Processes (Junior Major)

Analysis of fabric development, using handweaving and computerized AVL and Macomber looms, will be provided. Explores surface design using hand- and computer-generated designs for various printing processes. The designing of specific projects and industrial and architectural art forms, including pricing, papers, and reports. **Lab 15, Credit 5 (offered each year)**

2043-500 Textile Techniques and Thesis (Senior Major)

Development of new directions. A senior thesis of creative work and a written report is required. Development of a professional resume and business letters. **Lab 24, Credit 8 (offered each year)**

2043-520 Business Practices for the Craftsperson

Fundamental craft business practices, including setting up a business, basic record keeping, banking, pricing, government regulations, insurance, marketing, and studying operations. **Class 3, Credit 3 (offered every other year)**

WOODWORKING AND FURNITURE DESIGN

2044-200 Woodworking Materials and Processes (Freshman Major)

Sequential course for three quarters, covering function and care of hand and machine woodworking tools. Wood as a material: history, kinds, qualities, sources. Fundamental techniques of wood fabrication, including basic joinery, turning, and finishing. **Lab 15, Credit 5 (offered each year)**

2044-220 Woodworking Materials and Processes (Freshman AOS Major)

A sequential course for three quarters covering the fundamental techniques and aesthetics of woodworking. Topics covered include the care and use of hand and machine 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. **Lab 18, Credit 5 (offered each year)**

2044-231, 232, 233 Technical Drawing (AOS Major)

A sequential course for three quarters covering basic drafting technique as it is used for purposes of both design and presentation. Topics covered include lettering, use of instruments, dimensioning, basic layout techniques and formats, orthographic projection, sectioning, auxiliary views, axonometric drawing, perspective sketching and visualization, measured perspective and presentation techniques. **Lab 3, Credit 2 (offered each year)**

2044-251, 252, 253 Wood Elective

An elementary course in design and techniques in woodworking. Hand and power tools will assist in the making of small scale wood objects. **Lab 6, Credit 3 (offered each year)**

2044-300 Woodworking Materials and Processes (Sophomore Major)

Sequential course for three quarters, covering advanced design, layout and construction. Plywood construction, chairmaking and chest of drawers technique. Historical development of furniture; papers and reports. **Lab 15, Credit 5 (offered each year)**

2044-320 Woodworking Materials and Processes (Sophomore AOS Major)

A sequential course for three quarters covering advanced topics of woodworking. This is an intensive studio course focusing on both aesthetic and technical problems. Topics include the use of man-made materials, drawer and solid wood carcass construction, issues related to production work and student initiation of specific interest projects. The course includes a machine maintenance program. **Lab 24, Credit 7 (offered each year)**

2044-331, 332, 333 Furniture History (AOS Major)

A sequential course for three quarters covering a survey of the history of furniture from Egyptian times to the present. There is particular attention given to the social, functional, technological, and cultural background of furniture use and production. The lives, works and influence of known furniture designers and craftspeople will be emphasized. The course will include lectures, independent study, reports, and designing furniture based on historical models. **Lab 3, Credit 2 (offered each year)**

2044-341, 342, 343 Wood Professional Practices (AOS Major)

A sequential course for three quarters covering topics associated with the profession of woodworking. These include employment options, portfolio, resume writing, business cards and stationery, marketing, customer relations, contracts and other legal issues, record keeping, banking, insurance, taxes, location and layout of a shop and electrical and machinery considerations. The course will include lectures, independent study, assigned studio visits, papers, reports, and guest speakers. **Lab 3, Credit 2 (offered each year)**

2044-400 Woodworking Materials and Processes (Junior Major)

Sequential course for three quarters covering advanced concepts in furniture and woodworking, drawer construction, wood sculpture, and veneering. Emphasis will be placed on enlarging student's vocabulary of form. **Lab 15, Credit 5 (offered each year)**

2044-500 Woodworking Techniques and Thesis (Senior Major)

Sequential course for three quarters, allowing each student, with approval of the instructors, to specialize in that branch of woodworking/furniture design that he/she intends to pursue following graduation. The thesis, culminating in the final quarter, consists of a body of work including at least one commissioned piece, and a complete business promotion package including a portfolio, resume, and stationery. **Lab 24, Credit 8 (offered each year)**

2044, 41, 42, 43, 44-498 Professional Studio

Internship

This internship is designed to give qualified students and professionals the opportunity to spend one or two quarters in the personal studio of a faculty member from the School for American Crafts in order to gain practical experience in the day-to-day operation of a professional studio. Selection of applicants will be based on background, portfolios, and interviews. 40 hour week, Credit 8 (offered by special approvals)

SCHOOL OF PHOTOGRAPHIC ARTS AND SCIENCES

All courses in the School of Photographic Arts and Sciences are offered at least once annually, except as noted.

FINE ART PHOTOGRAPHY

2060-257 Still Photography

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 1, 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 of 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. (JPHA-257 or a working knowledge of developing film and making blackand-white enlargements) **Class 1, 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 blackand-white photographs. (JPHA-257 or a working knowledge of developing film and making enlargements; permission of instructor) **Class 1, Lab 6, Credit 3**

2060-301, 302, 303 History of 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 postmodernism. **Class 3, Credit 3 per quarter**

2060-311, 312, 313 Introduction to Fine Art Photography

The meaning and practice of photography in a fine art context will be discussed by the faculty. Students will 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 will be surveyed in slide presentations. The courses may be supplemented by field trips to museums, galleries, and artists' studios. The sequence of courses provides a 30-week framework for the student to: (311-10 weeks) define their point of view or purpose and begin to explore their subject matter and/or theme with faculty and class feedback

(312-10 weeks) more fully explore and/or modify the theme with classroom critiques, individual meetings with the faculty, and application of new techniques, materials, or methods of presentation.

(313-10 weeks) produce a portfolio of work that resolves philosophical, aesthetic, technical and/or content issues raised by class critiques during the previous two quarters and produce a succinctly written 'artist's statement' to accompany the visual work. (2067-201, 202 or suitable portfolio)
Credit 4

2060-324 Photo Media Survey

Students will experiment with image combinations and alterations such as collage, montage, hand coloring, xerox, hand-coated emulsions, etc. Lectures will introduce historical perspective on artists using these techniques and also will feature demonstrations of various imaging systems and their integration. **Class 1, Lab 4, Credit 3**

2060-334 Introduction to Computer Graphics for Photographic Imagemaking

Introduction to computers and computer graphics emphasizing their use in photographic imagemaking. Course utilizes basic graphics and photographic manipulation programs to introduce

important concepts in computers and computer-based imagemaking. Integration of tools to student's own artistic process is emphasized. (2060-257)**Class 3, Lab 2, Credit 4**

2060-401, 402, 403 Photography as a Fine Art I

The major emphasis is placed on the individuals 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 per quarter**

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 to be 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 will prepare an oral debate or a written term paper. **Class 2, Credit 2 per quarter**

2060-501, 502, 503 Photography as a Fine Art II

Emphasis is placed on the students 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 students work. (2060-403) **Class 4, Credit 4 per quarter**

2060-550, 551, 552 Special Topics Workshop

Topics of current or special interest designed to broaden and intensify the student's ability to use photography as a means of communication and expression. **Class 1-2, Lab 4-15, Credit 3-9**

2060-554 Gallery Management Display

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, 557, 558 Photo Media Workshop

Photo Media Workshop emphasizes visual problem solving utilizing alternative photographic processes. The first quarter features work with emulsions on various surfaces; the second deals with visual books; and the third quarter covers generative systems including electrostatic, offset printing and other methods of altering images. The course is best when taken in order, but students may join in at any quarter. (2060-324) **Class 2, Lab 4, Credit 4**

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 Photographics : Processing, Display, and Storage

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 1-9**

BIOMEDICAL PHOTOGRAPHY

2061-001 Biomedical Freshman Seminar

Freshman seminar is designed to assist students with issues that are of major importance in their first year at RIT. It will investigate how to learn, set goals, and stay motivated and include other issues of importance to young students beginning their career at RIT. Additionally the course will

investigate areas of specific interest to hospital and scientific photographers, such as ethics and animal rights. **Class 1, Credit 0**

2061-201, 202, 203 Biomedical Photography I

Basic photography course for biomedical photographers with emphasis on theory, craftsmanship and visual communication. Patient photography, close-up and other photography as a foundation for future biomedical photography. Class 4, Lab 4, Studio 4, Credit 6

2061-211 Survey of Biomedical Photography

Career opportunities, typical biomedical photography settings, types of photography performed. Ethical, professional, and personal relationships with patients, physicians, research and staff personnel. **Class 1, Credit 1 (S only)**

2061-301, 302, 303 Biomedical Photography II

Further study and practice of theory and principles used in biomedical photography, including photomacrography, photomicrography, hospital photography techniques, dental and ophthalmic, biological field studies. (2061-203) **Class 2, Lab 10, Credit 5**

2061-312, 313 Preparation of Biomedical Visuals

A two-quarter sequence studying the basic principles of effective visual communication. Assignments are designed to emphasize the appropriate techniques for producing visuals that exhibit strong design, both mechanically and with the aid of a computer. The emphasis will be on using computer technology for visual presentation. (2061-203, 0602-200, 2076-213) **Class 2, Lab 2, Credit 3**

2061-354 Basic Ophthalmic Photography

This course will investigate proper patient, camera, and photographic techniques in ophthalmic photography. Diagnostic evaluation of ocular anatomy and physiology utilizing special cameras will be presented. (2061-300 series or permission of instructor) **Class 2, Lab 4, Credit 4**

2061-357 Principles & Techniques of Photomacrography

A condensed course in principles of photomacrography. It will examine 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 will be evaluated in theory and practice. (Second year or higher photographic status) **Class 1, Lab 6, Credit 4**

2061-359 Basic Photomicrography

The course is a concentrated basic introduction to the principles of microscopy, photo micrography, and microtechnique with lectures, demonstrations, and projects. Morning lectures are followed by an extensive hands-on lab for the remainder of the day. The labs are practical applications of the topics discussed in lecture. **Class 5, Lab 30, Credit 4 (SU)**

2061-401 AV Production I

Design, creation, and presentation of 35mm slide and 35mm slide/tape productions as applied to medical and scientific needs. Planning, researching, 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. Students explore a variety of specialized photographic techniques and a variety of philosophies. Assignments are performed which are similar to those encountered in biomedical and research institutes. (2061-303; basic color course) **Class 2, Lab 6, Credit 4**

2061-464 Computerized Presentation Graphics

The course introduces the student to the current technology of presentation graphic production. The development of high-quality presentation is an essential skill for the future visual media specialist. With the use of state-of-the-art computer graphics stations, the student will be able to produce 25mm film recorded slides, overhead transparencies, color prints, and B & W stats for use in a variety of presentations. Each student also learns the basic principles of presentations so that

he or she has a basis for making visual presentation-related decisions. (Third- or fourth-year status or permission of instructor) **Class 2, Lab 4, Credit 4**

2061-499 Co-op

This course is designed to provide biomedical photographic communications students with on-the-job experience. The student will seek and acquire a school-approved co-op position in the health care industry. The working environment will provide the forum for learning more about the student's chosen career. A final interview with the co-op coordinator will assist 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 in Photography

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**

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**

FILM/VIDEO

2065-101 Film/Video Freshman Seminar

The subject of this course is the film/video freshman. Filmmaking is a collaborative 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 I

A fundamental course in 16 mm 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 will be in 16mm (non-sync) format. Students furnish film, tape, and processing. Equipment is furnished by the department. **Class 3, Lab 4, Credit 5**

2065-202 Film/Production II

A foundation course in editing theory and practice for motion pictures. Emphasis will be on identification and concerns of a variety of approaches to the edited image. The student will edit VHS format taped projects designed to address specific editorial concerns. Students will provide videotape; equipment is furnished by the department **Class 3, Lab 4, Credit 5**

2065-203 Film/Video Production III

This is the third course of three for freshman film/video students. This course introduces the nature and importance of the sound component in creating cinematic works. Students will be exposed to a variety of possible treatments of sound using historical and contemporary examples in cinema. Students will engage in the creation of soundtracks that are rich, complex, and meaningful. They will learn the processes, equipment, and techniques, and creative and efficient strategies, for multi-track 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. This course is also essential for students who wish to pursue sound-related careers in film and video. (Film/Video Production I and Film/Video Production II) **Class 3, Lab 4, Credit 5**

2065-221 Materials and Processes of the Moving Image I

This course is primarily designed to familiarize the student with the basic technical concepts of film- and videomaking. Students will gain an understanding of the technical theory required to work in these media. **Credit 2 (F)**

2065-222 Film Language

A screenings and readings course designed to give the student the opportunity to trace the development of the techniques and forms in what now constitutes the classic cinema. **Credit 2**

2065-223 Creative Processes

A discipline-specific follow-up to the more general theories of Creative Processes I. The course varies in its approach from year to year; i.e., one year it may take the whole quarter to study one film. **Credit 2**

2065-243 Introduction to Portable Video I

A basic course for novices. 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. 1/2" beta equipment, including editing facilities, is provided by RIT. Students must purchase a minimum of two 60-minute, 1/2" video cassettes.

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 JPHF-243 to the design and realization of mature narrative imagery. Progress is supervised by the instructor through regular screenings and conferences with the student. (2065-243) **Class 3, Lab 3, Credit 4 (W)**

2065-311 Video Tools and Technology

An intensive tools and technology course that will allow the student to work in the 3/4" video format. The course will examine the technical concerns of single-system portable video production and off-line editing. Production skills in camera work, editing, and sound recording will be covered. (2065-203) **Credit 5 (F)**

2065-317 Production Workshop: Documentary I

Students produce short documentary projects in either 16mm film or 3/4" video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio, or multi-media. Students are encouraged to experiment with individual style and while producing their own work also serve as production planning team and production crew for all other projects. Students complete projects for presentation at public departmental screenings or may plan and shoot more ambitious projects to be completed the following quarter in Production Workshop: Documentary II. (2065-411 or 2065-311) **Class 2, Lab 4, Credit 4 (W)**

2065-318 Production Workshop: Documentary II

Students produce short documentary projects in either 16mm film or 3/4" video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio, or multi-media. Students are encouraged to experiment with individual style and while producing their own work also serve as production planning team and production crew for all other projects. Students complete projects that were begun during the quarter or during the previous quarter in Production Workshop: Documentary I for presentation at public departmental screenings. (2065-411 or 2065-311) **Class 2, Lab 4, Credit 4 (W)**

2065-321 Materials and Processes of the Moving Image II

A technical survey of the tools and materials used in video production. (2065-202, 2065-221) **Lec. 2, Credit 2 (F)**

2065-327 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 16mm film or 3/4" video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio, or multi-media. 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. (2065-411 or 2065-311 or consent of the instructor) **Credits 4**

2065-328 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 16mm film or 3/4" video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio, or multi-media. 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. (2065-411 or 2065-311 or consent of the instructor) **Credits 4**

2065-331 Introduction to Animation and Graphic Film Production I

An introduction to the techniques and practices of graphic and animated film production. This course 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 will illustrate each technique. Proficiency in drawing is required. No prerequisites. **Class 3, Lab 2, Credit 4 (F)**

2065-332 Advanced Animation Tools

This course in animation techniques and tools is designed to provide 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 will be explored in depth. These techniques will include animation stand as well as three-dimensional animation execution. Students will work independently and in group situations and participate in all phases of animated film production. Students will 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 will illustrate a variety of different techniques, style, and production concerns and practices. Proficiency in drawing **isnot** required. (Introduction to Animation I) **Lab 3, Credit 4**

2065-333 Animation and Graphic Film Production

This course 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 Production Workshop: Fiction I

Students produce short fictional projects in either 16mm film or 3/4" video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio, or multi-media. Students are encouraged to experiment with individual style, and while producing their own work, they 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. (2065-411 or 2065-311 or consent of the instructor) **Credits 4**

2065-338 Production Workshop: Fiction II

Students produce short fictional projects in either 16mm film or 3/4" video, depending on their prerequisites, or, with consent of the instructor, they may work in any medium appropriate to their experience and resources, such as still photo, painting, animation, comic strip, performance, radio, or multi-media. Students are encouraged to experiment with individual style, and while producing their own work, they 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. (2065-411 or 2065-311 or consent of the instructor) **Credits 4**

2065-342 Writing for Film and Video I

This course explores the writing of non-fiction 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 non-fiction 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 and Video II

Continuation of 2065-342. (2065-342 or consent of instructor) **Class 2, Lab 3, Credit 3 (S)**

2065-345 Acting for Film and Video

A course in basic acting technique with emphasis on the special problems peculiar to film and video production. The class is taught in conjunction with 2065-347 (Directing the Actor). Class meetings are organized around the presentation of scenes prepared by student actors and directors. **Credit 3**

2065-347 Directing the Actor

A course in basic directorial techniques with emphasis on the special problems peculiar to film and video production. Class meetings are organized around the presentation of scenes prepared by student directors. **Studio 4, Class 1, Credit 3**

2065-354 The Business of Film and Video

This course 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 will be 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 will be used as exercises for student problem-solving activities. **Credit 3**

2065-356, 357, 358 History and Aesthetics

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 and the European Perspective

This course 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 will 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 will be provided. Students interested in receiving history/critical studies credit will research topics in film archives, museums, and libraries, conduct interviews with artists, and write papers. These students will also participate in aspects of production experience to complement their general understanding of the medium. All students will be exposed to the rich history of the animated film in the Netherlands, as well as in other European countries. This history includes both traditional and experimental forms. Students will meet important Dutch artists in special workshops and studio demonstrations, and weekly screenings of Dutch and international animated films will take place. Field trips around Holland and to other European locations are planned. Other activities include trips to art museums, special film programs, and explorations of Dutch culture. Most people in Holland speak English, and the course will be conducted in English. This course is open to undergraduates and graduates, with or without production experience. For majors or nonmajors. All students earn 6 credits. RIT students have the opportunity to earn up to 3 credits additional in the Fall Quarter following their return from the Netherlands for post-production or for continued scholarly research. **Credit 6-9**

2065-364 Film Theory and Criticism

A historical survey of film theory will be offered along with the analysis of films using specific critical methodologies. This course will provide the student with the viewing and discussion skills necessary to understand film as a fine art. **Lecture 3, Credit 3**

2065-370 Film and Video in Paris Summer Course

This course provides students with the opportunity to creatively explore and experience film and video production for six weeks in Paris, France. Students will study the rich history and prehistory

of French (and European) cinema. Study will include 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 Française and the Videotheque of Paris, and library research. Both traditional and experimental French cinema will be examined. Equipment will be provided. Students will produce works in either or both 16mm film and 1/2" video formats. This course is open to undergraduates and graduates, majors and nonmajors, with or without production experience.

Credit 6

2065-373 Visual Anthropology

We see others as we imagine them to be, in terms of *our* values, not as they see themselves. This course examines ways in which we can understand and represent the reality of others through visual media, across the boundaries of culture, gender, and race. It considers *how* and *why* visual media can be used to represent, or to distort, the world around us. (Sophomore standing)

Credit 3 (S)

2065-374 Seminar in International Film History

This seminar examines selected, varying film topics in a wider socio-historical context. Seminar themes change each year and may include topics such as post-war German film, films of the Holocaust, Japanese film, surrealist and magic realist film, Soviet film, Native Americans on film, etc. Students are expected to participate actively in the course, via class presentations and discussions. **Credit 3**

2065-398 Community Service

This course allows the student to take film or video production experience to the community. Community organizations and groups will 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 will help the student evaluate the production and the experience. (Film/Video Production III) **Credit 4**

2065-413 Senior Project Seminar

A required course for third-year film/video majors and the prerequisite for 2065-501, Senior Project. Students will discuss and generate a written plan for their senior film and/or video projects and will select an adviser from among the film/video faculty. (2065-432) **Class 1, Credit 1 (S)**

2065-421 Materials and Processes of the Moving Image III

The course introduces the student to 16mm film technology and production systems that apply to other media production as well. (2065-202, 321) **Class 1, Lab 2, Credit 2 (F)**

2065-427 Introduction to Computer Animation

This course provides an introduction to animation created through the use of a digital computer, rather than with traditional motion picture techniques. A survey of various computer animation hardware/software combinations precedes actual production of animated sequences, both with and without sound, which are then recorded on computer disk, motion picture film, or video. (2065-331)

Class 3, Lab 4, Credit 5 (W)

2065-431 Introduction to 16mm Sync. Sound Production

An introduction to all aspects of professional film production. Students produce short projects while learning basic shooting and editorial procedures and equipment handling and maintenance. **Class 3, Lab 4, Credit 5**

2065-437 Advanced Animation Workshop I

Students are given the opportunity to produce, either singly or in small groups, a motion picture with sound using an animation technique or combination of techniques of their own choosing. Students may elect to take this course for one or two quarters, depending upon the dimensions of the project. (2065-427) **Lab 4, Credit 4**

2065-438 Advanced Animation Workshop 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**

2065-444 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

This course is directed towards experimentation and exploration with single-frame motion image making. Students will engage in creative conceptual and experimental investigation and processes to discover new expressions and techniques. This activity will not be 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 will also be an opportunity for students to involve acquired skills from other disciplines in the research and actualization of their experimental work. Students will study past experimental animated works; 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. Students will engage in self-directed exploration and experimentation which may culminate in finished works within the quarter's time or may extend into the following quarter in the Animation Production Workshop. **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. **Lec. 1, Lab 2, Credit 3 (F)**

2065-462 Advanced Sound Recording

Continuing the work in 2065-452 to include the decision level in the employment of various sound equipment and including more complex work in multi-track recording and mixing. (2065-452 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. (2065-321)**Class 3, Credit 3**

2065-498 Film/Video Internship

This course is designed to provide the students with on-the-job experience in the field of film/video. The student will seek and acquire a school-approved internship position in a business or industry. The working environment will provide the forum for learning more about the student's chosen career. A final interview with the internship coordinator will assist 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)**

2065-501 Senior Production I (Film/Video)

Continuation of the introduction to business and legal factors begun in the basic film and video production activities. The course assists the student in detailed budgeting and shooting, script preparation and breakdown. Final project shooting begins this quarter. (2065-433)**Class 1, Lab 6, Credit 6 (F)**

2065-502 Senior Production II (Film/Video)

Continuing the senior project shooting phase to completion. Production teams meet as sections with faculty whose experience matches the kind of production involved. (2065-501)**Class 1, Lab 6, Credit 6 (W)**

2065-503 Senior Production III

This course 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 in Film/Video

A seminar approach offered on demand when adequate numbers of students and faculty desire to investigate specialized topics not normally offered in the regular curriculum. Available to upper-level students. **Credit variable**

2065-599 Independent Study

A student-proposed advanced project sponsored by an instructor. Approval of the proposal by the department chairperson and the director of the school. Available to upper-level students with a GPA of 3.0 or greater. **Credit variable (F, W, S, SU)**

PROFESSIONAL PHOTOGRAPHIC ILLUSTRATION

PLEASE NOTE: The curriculum for the first and second years is being revised. Some of the courses listed will be changed. Final information was unavailable at the time of this printing. Please call the department for updated information, 716-475-2762

2067-200 Photography I-JPHL/JPHA (Summer transfer)

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 majors in Applied Photography and Fine Arts Photography, which will assist the student in making vocational decisions and in understanding visual communications. During the first two quarters, the curriculum emphasizes craft and visual problem solving coupled with the development of a creative and personal approach to the medium. The third quarter continues the attitudes of the previous quarters, addresses the practical application of personal creativity, and allows the student to concentrate in an area of interest from an offering of courses established by the department. **Class 4, Studio 4, Lab 4, Credit 7**

2067-206, 207 Creative Problems

This course is designed to make students aware of their own creative problem solving potential. Emphasis is placed on students' personal environments, enthusiasms and experiences. Attention is given to individual thinking and seeing. This will be accomplished through lectures and individual group assignments. **Class 3, Credit 3**

2067-208 Introduction to Color

A one-quarter course introducing color as a new element in making photographs. The course will offer a theoretical, technical and aesthetic foundation in color photography. The student will gain familiarity with the materials through shooting assignments. Emphasis will be placed on developing printing skills. **Class 2, Lab 4, Credit 3**

2067-263 Studio Light

A lighting workshop course that uses visual exercises to teach students how to evaluate light conditions outside and control and reproduce those conditions in the studio. (2067-201, 202) **Class 2, Critique 2, Studio 4, Lab 4, Credit 5**

2067-268 Visual Images: Source /Resource

This course will consider ideas and modes of thinking that can influence the creation of pictures. It is designed around several thematic issues that will 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 will be 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. **Credit 5**

2067-273 Visual Inquiry

Where do ideas come from, and how do you help them along? How do you solve visual problems, assignments, questions, 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 will be used as a forum for drawing, writing, collages, photographs, and other things. We will analyze the process we take in order to solve problems (visual and other types). We will start with simple posed questions (curiosities) and evolve them into useful solved answers (photographs). **Credit 5**

2067-278 The Spiritual/Mystical Image

The objective of this course is to guide 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 the Applied and Fine Art Concentrations

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 will have the opportunity to work with diverse faculty from these specialties. (2067-201, 202) **Credit 5**

2067-300 Photography II, BFA Transfer

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. **Credit 15 (SU)**

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**

2067-311 Colloquia

A lecture/presentation offering the specific interests and passions of the faculty. The range is academically wide and varied. (Second-year status) **Class 1, Credit 1 (W)**

2067-363 Zone System and the Fine Print

A one-quarter introduction to the fundamentals of the Zone System & 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 and Copywriting

A study of art direction and copywriting with emphasis on conceptual thinking as it applies to the photographic image. Some emphasis will be placed on basic hand skills, i.e.; layout, type rendering, and paste-up. Marketing principles and career possibilities will be covered. (Photo student or permission of instructor) **Credit 5**

2067-373 Non-traditional Photographic Illustration

This course is 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**

2067-378 Photojournalism: Color Seminar

An exploration of the aesthetic and technical evolution of color in photojournalism. Students will research the work of contemporary photojournalists, experiment with a variety of color films to identify potential applications, and complete a series of shooting assignments. A personal portfolio of color photographs will be produced by the students. (Second-, third-, or fourth-year status) **Credit 5**

2067-379 Photojournalism for Newspapers

This course is for students in or curious about a career in newspaper photojournalism. The content will be both theoretical and practical. Students will be required to shoot according to newspaper standards and needs on a weekly basis. In addition, students will have the opportunity to shadow photographers and editors from the Gannett Newspapers. Shooting sports, spot news, features, and special essays will be part of the course. Special processing and printing skills will be covered as well as specialized camera and lens handling techniques. This is an excellent opportunity for

those seeking to improve portfolio for newspaper internship possibilities. (Permission of instructor)
Credit 5

2067-388 Picture Editing and Layout Design

A course about image selection, usage, and design for the printed page. Using images from sources other than your own photographs, we will 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 scalping, proportion, and sizing will be related to page design. We will discuss typography and its function with photos, including captions and block text. Students will lay out a number of assignments from single pages to essays of varying length. A variety of picture sources will be used. A student need not use his/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 will be covered. The curriculum will emphasize 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 to be explored. The field trip to the dive site is at student expense. In lieu of the field trip a special project with student/teacher agreement can substitute for it. (2067-201, 202, 208; must be certified Open Water Diver; instructor approval required) **Credit 5**

2067-401, 402 Photojournalism I

Photojournalism is taught in a broad and eclectic manner. Areas covered are press photography, documentary photography, editorial photography and corporate photography. The course seeks to broaden the communication skills of photographer and editor in creating and presenting meaningful images about the world in which we live. Issues that pertain to the 'single moment' and the long-term photo essay are explored. Students are encouraged to seek their 'voice' and engage in a personal voyage of discovery. Specific skills covered are camera and lens handling; film and format choices; lighting, both found and fabricated; special processing skills; advanced printing skills (color and black and white); and working on location. The course introduces issues of research and story idea generation as well as the ethical considerations of a photojournalist. An introduction to the graphic arts and issues of picture editing, page design, and the use of language (text) and photos are introduced. Students seeking a career in press photography are encouraged to seek internship possibilities with publications. **Credit 5**

2067-411, 412 Advertising Photography

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 will be covered. (2067-302)

Class 4, Studio 5, Credit 5

2067-422 Professional Operations and Management

A one-quarter business survey course for all applied photo department students. This course will cover the basic business concepts necessary for the operation of a small studio or free-lance business on a practical level. Job search methods, self-promotion, bookkeeping, and legal aspects of business will be addressed. (Advertising Photo or by instructors permission) **Lecture 4, Credit 4**

2067-453 On Location Photo

This course will cover the techniques and equipment necessary to complete an 'on location' assignment for a corporate report, brochure, or audiovisual presentation. Students will be encouraged to meet professional standards while developing a strong personal point of view. (2067-302 or equivalent) **Credit 5 (SU)**

2067-454 Introduction to Electronic Still Photography

Hands-on activities will permit each student to discover the applications of electronic photography. In addition to studio/location/laboratory exercises, there will be presentations on the basics of the technologies in use, inter-disciplinary integration of the communications and graphic arts fields, and an introduction to 'hard copy' output devices. Students will be expected to capture images using

both still video and silver halide cameras, digitize selected images, process digital images, create picture files, and participate in the creation of a class electronic project. **Class 2, Lab 4, Credit 5**

2067-457 Propaganda and 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
The examination of photographs and films that have very often shaped our view of the world. The positive and negative effects of such images. The period from the Crimean War to the present will be covered. Special emphasis will be 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, will be studied, some of which are 'faked' photographs. A larger question to be studied is 'Why were these photographs faked?' Included in lectures will be the historical and cultural forces behind the work. (No prerequisites) **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 will 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 The 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 will be dealt with such as public and personal events, cultural, social, personal and intercultural symbols. The course will cover the written word and its effect and influence on the photograph. Layout and presentation, and their effect on the audience the work is designed to serve will be included. (2067-302, or permission of instructor) **Credit 7 (SU)**

2067-462 Portrait Photography I

Lectures will be 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—will be discussed and demonstrated. Students will work primarily with studio strobes and will be encouraged through weekly assignments and critiques to apply what they've learned. (2067-301 or equivalent) **Credit 4**

2067-463 Advanced Portraiture

This course 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 Advanced Portrait Photography

This course 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. (2067-463 or equivalent) **Lec. 2, Studio 4, Credit 4 (S only)**

2067-468 Advanced Still Life

This course introduces the student to advanced concepts of visual communication and studio techniques. Students will be encouraged to work on projects in which they have a significant interest. Assignment content will be open to student input. Work will be shown to various audiences for criticism and experience. Evaluation of these criticisms will be an important part of the experience. The tools and techniques of studio still-life photography will be discussed and demonstrated as appropriate. (Photojournalism I or Advertising I or permission of instructor) **Class 2, Critique 2, Studio 5, Credit 5**

2067-469 Environmental Portraiture

A course involving the selection of various persons as subjects and learning of their skills and specialties. The student will interview subjects, define what they do and where they do it, and design a photograph that shows the viewer the subject's job or avocation and the environment in which the subject operates. **Class 1, Critique 2, Studio/Location 4, Credit 5**

2067-470 Studio Photo/Still Life

The focus of the course is the still life as a medium for creative expression and visual experimentation. Assignments will cover a range of professional experiences particular to advertising and editorial still-life photography. They will 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 may also be taken as a photo elective. (Third-year status or permission of instructor)**Credit 7 (SU)**

2067-473 Portfolio Development (Photojournalists, Documentary and Editorial Photographers)

This course is designed for third- and fourth-year students who are ready to present themselves and their work to potential employers. Weekly assignments will be designed to move the students closer to their stated goals. To begin this course students must be able to answer two career related questions: what is it they wish to do, and where do they wish to do it?**Credit 5**

2067-474 Studio Skills (Non-studio majors)

A 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**

2067-480 Studio Photo/People

An introductory study of people photography, this course focuses on the development of the photographic and psychological skills of the studio photographer. Assignments will cover a range of professional experiences particular to advertising and editorial people photography. They will include the selection and direction of models, orchestration of the tangible and intangible studio environments, as well as studio lighting, camera techniques and business practices particular to people photography. This course is an alternate to the second quarter of the Advertising I core course and may also be taken as a photo elective. (Third-year status or permission of instructor)**Credit 7 (SU)**

2067-488 People Illustration/Studio

An advanced study of people photography, this course focuses on the 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 will be the subjects of lectures, demonstrations, and assignments. Many of the course assignments are open-ended, which gives the student freedom to generate independent projects. (2067-411, 412 or permission of the instructor)**Credit 5**

2067-493 Problems and Projects in Still Life: A Collaboration

The primary focus of this course is the still life as a medium for creative expression and visual experimentation. The tools and techniques particular to the still-life photographer will be 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--will be discussed, demonstrated, and applied to assignments. Projects will be in a practical vein, relating to actual typical problems that are part of a working studio's daily life. Assignments will investigate the overlapping relationships of fine-art, editorial, and commercial still-life photography. Large- and small-format cameras may be used; assignments will be done both in and out of the studio. **Credit 5**

2067-498 Picture Researching

An introductory course surveying current practices, procedures, techniques, and resources 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 will be produced by each student. (Third- or fourth-year status)**Credit 5**

2067-501, 502 Photojournalism II

Photojournalism II is a continuation of PJ I 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 will encourage and help 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 will work specifically with color transparency materials and the requisite knowledge of color correction techniques under various lighting situations. Students will 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 will help with the development of a mature portfolio relative to a student's particular focus. **Class 4, Field 5, 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 Electronic 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. (2067-454 or permission of the instructor) **Class 2, Lab 3+, Credit 4**

2067-563 Senior Thesis/Photo and Design

A course to bring together graphic design and photography students. The students will be 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 will set up during the sixth or seventh week of the winter quarter. Enrollment will be limited. (Fourth-year status and permission of instructor) **Credit 5**

2067-564 Advanced Color Seminar

This is a portfolio preparation course. It concentrates 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 non-specific in nature, allowing the student the freedom of his or her own direction. As part of the course requirements, each student will choose an appropriate portfolio format and will begin 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)**

2067-573 Macintosh Workstation Installation and Maintenance (Mac I.M.)

This course will train students to install and maintain Macintosh-based imaging workstations. Selected components of hardware and software maintenance will be taught. Students will 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 will be included. (Survey of Computer Science 0602-200, Beginning Electronic Photography 2067 2067-454, Instructor approval [significant experience with Macintosh]) **Lecture/Lab 4, Credit 3**

2067-574 Portfolio Seminar/ Illustration

This course will provide an opportunity to reshoot and refine existing ideas, create new images, and develop self-promotion materials. Emphasis will be placed 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 for discussion. Students will have an opportunity to share their work with professional designers, art directors, and photographers. **Credit 5**

2065-588 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/her portfolio format. A completed mini-portfolio is required for successful completion of the course. (Completion of People Illustration/Studio, a

similar course, or instructor's permission [by portfolio review]). **Critique/Lecture 2, Lab 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. **Class, Credit variable**

PHOTO SYSTEMS MANAGEMENT

2068-364 Survey of Production Processing and Finishing

Provides the non-photographic processing and finishing major with an opportunity to become knowledgeable in the operational procedures and services of a processing and finishing laboratory. **Class 2, Lab 3, Credit 2 (S)**

2068-400 Basic Photo Lab Operations

A 10-week summer course that provides an opportunity for students of disciplines other than photography or business to gain an understanding of all aspects of the modern photo laboratory. Course is organized to allow the student to take Materials and Processes of Photography (2076-210) concurrently. **Class 6, Lab 18, Credit 12 (SU)**

2068-401, 402, 403 Basic Photo Lab Operations I, II, III

An introduction to the concepts of automated film processing, in black-and-white and color. Theoretical concepts of film processing as well as practical production concepts will be explored and practiced in the laboratory. The concepts of semi-automatic production printers, their set-up, production control, and operation will be practiced in a production environment. The flexibility and capability of enlargers for use in custom production will be covered, along with the production of duplicate slides and internegatives. **Class 2, Lab 6, Credit 4 (F, W, S)**

2068-421 Photo Process Control

Analytical methods of studying photographic processes; methods of obtaining data about processes, including chemical and physical factors; methods of making process adjustments, including automatic control methods. **Class 2, Lab 6, Credit 4 (F)**

2068-423 Applied 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 will include the use of such statistical tools as process capability studies, conformance to specification analysis, control charts, and attribute and acceptance sampling plans, as well as the use of nonparametric techniques for the subjective evaluation of image quality. Although many of the topics covered are statistically based, attention is given to the ingredients necessary for a successful company-wide quality control program. **Class 2, Lab 2, Credit 3**

2068-499 Co-op

This course is designed to provide the student with industry experience in the photo processing and imaging industry. Department staff will assist the student with placement. **Credit 0 (F, W, S, SU)**

2068-501, 502 Advanced Photo Lab Operations I, II

This two-course sequence offered during the senior year gives the student the opportunity to become familiar with the operation and control of automated photo processing equipment in a production environment. The course will also include the training and supervision aspects of operating a photo processing installation. (2068-400 or 2068-403) **Class 2, Lab 6, Credit 4 (F, W, S, SU)**

2068-511 Photo Lab Materials

This senior-year course offers the student the opportunity to study the factors that go into the refurbishing or building of photo processing installations. The maintenance of equipment no longer manufacturer-supported will also be covered. (2068-401, 402, 403) **Lab 2, Credit 2 (F, W, S)**

2068-513 Finishing and Lab Operations Management

This course is designed to provide the student with the background knowledge necessary to plan, set up, and operate a photo processing laboratory. Included in this course will be a study of

production methods, work flow, equipment, and personnel utilization. Production line costing methods will be discussed, along with monitoring procedures for quality, waste, and cost control. (Permission of the instructor) **Class 4, Credit 4 (S)**

2068-550, 551, 552, 553 Special Topics in Photographic Processing and Finishing Management

A seminar approach offered on demand when adequate numbers of students and a faculty member agree to study a subject not normally offered. **Credit variable (F, W, S, SU)**

2068-561, 562, 563 Advanced Production Processing and Finishing

This course, taken during the last year of study, provides the student with an opportunity to study in depth, on an independent basis, those areas of processing and finishing the student finds most interesting. This course may also be used to strengthen those areas of interest in which the student feels a weakness. **Credit 4**

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 (F, W, S, SU)**

IMAGING AND PHOTOGRAPHIC TECHNOLOGY

2076-200 Photography I-JPHT/JPHB (Summer transfer)

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

A study of the fundamentals of photography with emphasis on the development of the needed creativity, craftsmanship, theory and visual communications to undertake advanced study in the medium. The theory and technical aspects are taught as they relate to solving photographic problems. **Class 4, Studio 4, Lab 4, Credit 7**

2076-210 Materials and Processes of Photography

An intensive 10-week summer course for students entering a transfer program in Biomedical Photographic Communications or Imaging and Photographic Technology. This course 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 and 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**

2076-221, 222, 223 Survey of Imaging and Photographic Technology

This course is designed to provide students with information concerning career opportunities within the field of imaging and photographic technology and subdivisions of specialization, and includes presentations by experienced professionals representing a variety of positions. **Class 1, Credit 1**

2076-301 Photographic Sensitometry

Principles of sensitometric methods as applied to the selection and use of photographic emulsions. Problems in exposure processing, densitometry, and data interpretation will be addressed. The characteristics of commercially available sensitometers and densitometers will also be reviewed. The laboratory work will consist of practical comparisons of currently marketed photographic materials upon which the student is required to prepare written and oral reports. (2076-213) **Class 2, Lab 3, Credit 3**

2076-302 Technical Photographic Chemistry

The basic chemistry of black-and-white and selected color processes is presented. Developer, short stop, fixation, bleaching and reversal are investigated. Student-designed investigations are carried out. Technical notebook and report preparation are required.**Class 2, Lab 3, Credit 3**

2076-303 Photographic Optics

The principles of geometrical optics as applied to image formation, lens types, lens aberrations, lens testing, and optical instruments, including the human eye, and radiometric applications to optical systems. (1016-204, 1017-211, 212, 271, 272)**Class 2, Lab 3, Credit 3**

2076-311 Color Photo Design

The 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

This course provides an introduction to color theory and the exploration of color processes utilizing practical laboratory procedures and photographic color reproduction processes. This will support 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 will be discussed and demonstrated in the laboratory. Topics covered include light sources, radiometry, spectrophotometry, color order systems, and reproduction of color. (2076-321 or equivalent)**Class 2, Lab 4, Credit 4**

2076-321 Applied Computing for Technical Photography

Current time-sharing computer facilities will be introduced. Introductory material on programming will be presented. Programming assignments will be required. (Limited to Imaging and Photographic Technology students or by the permission of the instructor)**Class 2, Credit 3**

2076-356 Portrait Retouching

The study and application of different techniques, materials and processes used in portrait retouching of negatives and prints. Projects making use of these techniques, materials and processes will be required. **Class 2, Lab 4, Credit 3**

2076-357 Commercial Retouching

The study and application of the techniques, materials and processes used in commercial retouching. Projects making use of these techniques, materials and processes will be required. **Class 1, Lab 4, Credit 3**

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**

2076-401 Imaging Systems Design

Study of the hardware and software needed to effectively design computer graphic images. Workstation labs will provide hands-on experience with MS-DOS and Mac computer platforms. (2076-203) **Class 2, Lab 2, Credit 3**

2076-454 Holography I

This course is intended to be an introduction to holography theory and techniques. Lectures and demonstrations will cover the materials, processes, and applications of the fundamental types of holograms. Labs will give hands-on experience with the construction and playback of transmission, reflection, and focused image hologram types. (Algebra and physics)**Class 2, Lab 4, Credit 4**

2076-455 Applications of Holography

This course is designed to give 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. **Credit 4**

2076-458 Architectural Photography

An image-making course for advanced students with a specific interest in interior and exterior architectural photography. Assignments are designed to emphasize the development and exploration of professional attitudes and techniques while providing a comprehensive study of the subject. All required work will be on color transparency materials. (2067-302, 2076-312 or permission of the instructor) **Class 3, Credit 9 (SU only)**

2076-461, 462, 463 Photoinstrumentation Applications Seminar

The student will be 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 1/2, Lab 4, Credit 4**

2076-464 Reversal Color Printing

A one-quarter course on reversal color printing procedures, printing and processing. The student will gain proficiency in using reversal print material. (2076-312 or permission of the instructor) **Class 1, Lab 4, Credit 3**

2076-468 Introduction to Dye Transfer

An introduction to the dye transfer process using pan matrix film with emphasis on the understanding of its theoretical principles, and on the mastery of basic transfer techniques. This includes the preparation of transfer prints from the students color negatives. (2076-312 or equivalent) **Class 1, Lab 6, Credit 4**

2076-470 Summer Nature Photography

Students will 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 will be required to spend several hours per week shooting in natural environments. (Photo I or permission of instructor) **Credit 6 (SU only)**

2076-471, 472, 473 Nature Photography

Students will 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 will be required to spend a minimum of several hours per week shooting in natural environments. (2076-201, 202, 203 or instructor permission) **Class 4, Field 4, Credit 4**

2076-479 Introduction to Scientific and Technical Applications of Photography

Introduction to special or unusual methods particularly useful in technical, scientific, or research photography. Emphasis on the students 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, 482, 483 Advanced Color Printing I, II, 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) **Lecture 1, Lab 6, Credit 4**

2076-486 Photographic Scanning Systems

The student will receive instruction and make 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 will be demonstrated and used. Primary emphasis will be 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) **Lec. 2, Lab 4, Credit 4**

2076-487 Special Effects Photography

A course designed for practicing photographers and students in which photographic effects beyond those encountered in every-day situations in illustrative, commercial and advertising photography are discussed and practiced. Among the topics to be covered are stroboscopic, peripheral, scanning, high-speed flash, matte box, and combination flash/tungsten photographic techniques. (For upper-division SPAS students) **Lec. 2, Studio 4, Credit 4**

2076-491 Introduction to Digital Image Processing

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 will be covered. Applications such as contrast enhancement, edge sharpening and smoothing will be included. (2076-210, 213, and 321 or 0602-208) **Class 2, Lab 4, Credit 4**

2076-499 Co-op

This course is designed to provide students with on-the-job experience in the field of imaging and photographic technology. The student will seek and acquire a school-approved co-op position in business or industry. The working environment will provide the forum for learning more about the student's chosen career. A final interview with the co-op coordinator will assist the student in evaluating the experience. **Credit 0**

2076-501 Introduction to Research

This course leads to a completed proposal in preparation for the Senior Project (2076-502). It guides the students in preparing formal proposals for their projects, including selection of topics, searching the literature, and proposal evaluation. **Class 1, Credit 1**

2076-502 Research Project

Investigation of a topic in the area of applied, technical, or scientific photography, involving camera and/or laboratory work, evaluation, oral presentation of the results, and a written report in a standard format. (2076-501) **Class 1, Lab 4, Credit 3**

2076-503 Survey of Nonconventional Imaging

A survey of imaging methods and imaging systems not normally encountered in other technical photography courses, including UV, IR, 3D, holography, electrophotography, x-ray, and non-silver applications. (For upper-division 2076 students; others with permission of the instructor) **Class 1 1/2, Lab 3, Credit 3**

2076-511 High-Speed/Time-Lapse Photography

This is a course in 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 in Imaging and Photographic Technology

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 Photography 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 of design and photographic controls will be important. Most photographs will be 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)**

2076-562 Managing Quality in the Graphic Arts and Photographic Industries

The tasks and responsibilities of management in creating a company-wide quality improvement environment are addressed with an emphasis on the unique challenges in the graphic arts and photographic industries. The specific requirements of planning, control, and improvement of quality are discussed with regard to such topics as mass inspection measurement, statistical process control, employee participation, quality costs, training, and vendor certification, among others. Case studies of companies and organizations currently undergoing a quality transformation will be reviewed. **Class 3, Credit 3**

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 or permission of instructor) **Class 2, Lab 4, Credit 4**

2076-599 Independent Study

A student-proposed advanced project sponsored by a faculty member. Approval of the proposal by the department chairman and the school director required. Available to upper-level students with a GPA of 3.0 or higher. **Credit variable**

CENTER FOR IMAGING SCIENCE

All courses in the Center for Imaging Science are offered at least once annually, except as noted

IMAGING SCIENCE

2051-200 Principles of Imaging Science

This course is offered during Summer Quarter to students who wish to transfer to the Imaging Science BS degree program at the sophomore level. Prerequisites for the course include one year each of physics, calculus and chemistry (with lab) at the college level. Topics include basic materials and methods of imaging science, an introduction to RITs computer system and the C language. Laboratory experiments include image sampling and quantization, optical imaging, densitometry and sensitometry. **Credit 8**

2051-201 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, Lab 3, Credit 3**

2051-202 Introduction to Imaging Systems

Survey of the features of several imaging systems, including optical systems, radar, sonar, x-ray, holography, etc. (2051-201, 211) **Class 2, Credit 2**

2051-203 Introduction to Imaging Science

Introduction to Imaging Science continues the work begun in 2051-201, 202, introducing students to several non-conventional imaging systems. The student designs and performs an independent project. **Class 2, Lab 2, Credit 2**

2051-211 C Programming for Imaging Science

An introductory-level course in computer programming techniques to solve problems in imaging science. The student will be introduced to the VAX/VMS operating system on UNIX (Decultrix) C programming language and shown how to use these to implement such computational techniques as numerical integration, root finding, and simple image processing. **Class 3, Credit 3**

2051-302 Geometrical Optics

An introduction to the characteristics of optical components and optical imaging systems; refracting and reflecting surfaces and components; stops, pupils, and the propagation of energy through optical systems. Discussion of lenses, cameras, collimators, telescopes, and other instruments. Limitations on system performance. (1016-252, 2051-203 or permission of instructor) **Class 3, Lab 3, Credit 4**

2051-303 Physical Optics

An introduction to the principles of wave optics. Topics include one- and two-dimensional vibrations; wave motion; superposition of waves; polarization; interference and interferometry; single, double, and multiple slit diffraction; and coherence. (1016-252, 2051-203, or permission of instructor) **Class 3, Lab 3, Credit 4**

2051-313 Interaction Between Light and Matter

This course emphasizes the interaction of electromagnetic energy with various states of matter. This includes 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**

2051-401 Radiometry

This course considers 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**

2051-402 Vision, Color and Psychophysics

An intensive course covering aspects of the human visual system, psychophysics, and colorimetry which are fundamental to the field of imaging science. Topics include: spatial vision, temporal vision, color vision, machine 'vision,' psychophysical techniques, scaling, and colorimetry. (2051-401) **Class 3, Lab 3, Credit 4**

2051-403 Macroscopic Imaging Systems Analysis

This course consolidates the understanding gained in the previous three courses in this series (2051-313, 401, 402), and develops a general description for the way in which the macroscopic (large-scale) input/output properties may be defined and related. Image input/output variables are developed which are relevant for black-and-white and color imaging systems, for continuous and discrete imagery, for hard copy and soft display. Understanding of how these variables are related to the basic parameters used in image processing is developed. Methodology examples are given for chemical, optical and electronic imaging systems, and input/output models are derived for a selection of these systems. (2051-402) **Class 3, Credit 3**

2051-412 Statistics I

An introduction to the theory and application of statistical methods; events and sample spaces; fundamental probability concepts; mathematical foundations of discrete probability functions and continuous probability density functions; moments and moment generating functions as a means for studying the properties of probability functions; central tendency and dispersion of probability functions. Fundamental examples of random processes encountered in imaging systems are used to illustrate the mathematical and statistical techniques developed. Programming assignments are required. (Junior status in CIS) **Class 4, Credit 4**

2051-413 Statistics II

Introductory hypothesis testing of means and variances is developed in the context of evaluation of experimental objectives. Linear regression analysis, techniques of analysis of variance, regression models. Analysis of variance is then developed as a general experimental tool. Methods of experimental error propagation are developed. Programming assignments are required, and statistical software packages are presented. Advanced topics such as spline fitting, simplex analysis, and principal components are discussed. (2051-412) **Class 4, Credit 4**

2051-461, 462, 463 Digital Image Processing

The principles, techniques and applications of digital image processing are introduced. The course considers formation of digital images, sampling and quantization, image input/output devices, image statistics and descriptors (e.g. histograms). Geometrical, point, neighborhood, and global mathematical operations on digital images will be considered, including kernel operators and discrete convolution. Other mathematical representations of discrete image information will be introduced, including the discrete Fourier transform. Applications of image processing will be described. Emphasis is placed on implementation of image operations. (2051-211, 1016-331) **Class 3, Credit 3**

2051-501 Technical Communication and Research Practices

This course is designed to develop 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 2051-502, 503. (Matriculation in 2051/JIMG) **Class 3, Credit 3**

2051-502, 503 Senior Project

Students perform the independent research project defined in 2051-501 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 the spring quarter. **Class 3, Credit 3**

2051-511 Imaging Systems Analysis

An analytical approach to evaluating imaging systems using linear systems theory. The concepts of convolution and Fourier methods and the use of frequency analysis and Fourier methods are emphasized. (1016-306, 331) **Class 3, Credit 3**

2051-512 Advanced Imaging Systems Analysis

This course is a continuation of 2051-511 and extends 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. (2051-511) **Class 3, Credit 3**

2051-513 Quantum Limitations of Imaging Processes

The effects of random variations in collected radiant energy and/or detector response on image quality; characterizing stochastic processes and noise; film graininess and granularity; propagation of quantum effects through a linear system to the image. (2051-512)**Class 3, Credit 3**

2051-525 Optics for Microelectronics

An introduction to the principles of optics that forms the basis for further study in the field. Topics include one- and two-dimensional vibrations, wave motion, superposition of waves, interference and interferometry, single, double, and multiple slit diffraction, and polarization. Lenses, mirrors, prisms, diffraction gratings, lasers, and other radiation sources are described as fundamental components in optical systems. Characteristics of optical components and their combination into instrument and imaging systems will also be introduced. (1017-313 and general familiarity with elementary calculus and trigonometry) **Class 3, Lab 3, Credit 4**

2051-550, 551, 552, 553 Special Topics in Imaging

Topics of special interest, varying from quarter to quarter, selected from the field of imaging science and not currently offered in the division's curriculum. Specific topics are announced in advance. (Not offered each quarter. Consult director of the Center for Imaging Science)**Class, Credit variable**

2051-562 Electro-Optics I

The wave theory of light and related phenomena. Topics addressed are: electromagnetic theory and Maxwell's equations, vector waves, diffraction, coherent imaging, holography, interference and thin films. (2051-302, 303)**Class 3, Credit 3**

2051-563 Electro-Optics II

Topics addressed: vector waves; propagation of light through uniform and crystalline media; optical activity; electro-optic, magneto-optic, and acousto-optic interactions; optical waveguides, and lasers. (2051-562) **Class 3, Lab 3, Credit 4**

2051-564 Optical Instrumentation

The geometrical theory of image formation through optical systems and applications to optical instrumentation. Topics addressed are paraxial optics of axisymmetric systems, cardinal points, pupils and stops, propagation of energy through lens systems, types of lenses and optical elements (refracting and reflecting prisms, gradient index lenses, special purpose lenses), optical instruments, aberrations in optical images. (2051-302, 303)**Class 3, Credit 3**

2051-599 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**

SCHOOL OF PRINTING MANAGEMENT AND SCIENCES

All courses in the School of Printing Management and Sciences are offered at least once annually, except as noted.

(JPRM) 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**

MANAGEMENT COURSES

2080-211, 212, 213 Newspaper Seminar I, II, III

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 will include the technological and management considerations unique to newspaper production. This course will also serve as an introduction to the technology and procedures applied in the Newspaper Production Laboratory (NewsLab), that will play a major role in the other required newspaper courses. **Class 1, Credit 1 (each quarter)**

2080-301 Printing Financial Controls

Plant accounting systems covered as a tool for improving production management decisions. Topics include accounting's general philosophy and structure, inventory, equipment, job cost, standard cost and analysis of variance, budgeting and control techniques. **Class 4, Credit 4**

2080-302 Printing Planning Concepts

A required professional course designed to provide the student with the basic principles of price determination as it relates to marketing. Special emphasis on estimating will link those marketing concepts with practice to arrive at a selling price for printed materials. Class discussions, readings and problems will be directed toward a better understanding of the relationship of marketing and planning in a printing environment. **Class 4, Credit 4**

2080-311 Standard Software Packages

An introduction to software available at RIT on both the VAX/VMS system and on microcomputers housed in various locations on campus. Emphasis is on use of electronic mail, word processing, spreadsheets, desktop publishing, and communications software to generate, analyze, and present information relevant to the printing industry. **Class 2, Credit 2**

2080-312 Technical Writing I

A review of writing skills; an analysis of the purpose, problem, and audience of specific writing tasks. Consideration of the principles, techniques, organization, and appropriate format, style, tone, and word choice to achieve a desired writing purpose. Lectures presenting new material and reviewing assignments; and in-class writing, critiquing, and rewriting. (English Composition, 0502-220) **Class 2, Credit 2**

2080-313 Technical Writing II

Discussion of fundamentals of modern technical and business writing: brief review of writing skills, audience analysis, and discussion, and selection of appropriate style, tone, and format. Discussion of research techniques, documentation, and presentation of a formal technical report. (2080-312) **Class 2, Credit 2**

2080-319 Electronic Communications in the Printing and Publishing Industries I

Presentation of an overview of electronic communication theory and its application to the publishing industry. The course 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 4**

2080-357 Magazine Writing and 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 will be devoted mainly to writing techniques, and the second week to the design techniques. **Class 3, Credit 3 (SU)**

2080-371 Estimating Practice

A detailed study of the practice of estimating that will provide 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 will be analyzed to determine their importance in the pricing structure of printed materials. (2080302) **Class 4, Credit 4**

2080-376 Introduction to Magazine Publishing and Management

A survey course designed to give the student insights into the editorial, production, management, fulfillment and distribution processes vital to the success of any magazine. Leaders from the magazine publishing industry are invited to present 3-hour guest lectures on a major aspect of their profession. Graduates of the printing program who have attained prominence within the industry are often guest speakers, encouraging interaction between current and former students. **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**

2080-384 Electronic Printing Standards

A study of existing and emerging standards for the representation, creation, manipulation, storage, retrieval, translation, and output of documents and publications. Lab projects will be assigned regularly and will be presented in the form of problems to be solved by the students using software tools provided by the instructor. Students will be expected to have command of a programming language such as BASIC, Pascal, Modula-2, or C. (0602-208 or equivalent) **Class 3, Credit 3, Open Lab**

2080-387 Supervision in the Graphic Arts

This course is designed to enable the student to meet the social, employee and management needs in the manning of a graphic arts operation. 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

Required for third-year students in the JPRP program to 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 concepts courses. The purpose is to facilitate applications of management theory in career-related situations. This course 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 5, Credit 3**

2080-421 Labor Relations in Graphic Arts

A study of the organization of the United States labor force through the impact of national legislation and the construction of the same by United States Supreme Court and National Labor Relations Board decisions. Study includes rights of employees, their free choice of representation, duty of fair representation, right to strike, and future modification of the field. **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 Co-op

This course is designed to provide students with on-the-job experience in the graphic communications industry. The student will seek and acquire a school-approved co-op position in business or industry. The working environment will provide the forum for learning more about career choices within the industry and give the student the opportunity to test his or her skills in a competitive environment. A final report on the students work experiences must be submitted to the co-op coordinator. **Credit 0**

2080-501 Legal Problems in Publishing

A comprehensive review of United States Supreme Court decisions as they relate to the unique rights granted to the graphic arts industry. Cases cover Article I, Section 8 of the United States Constitution and the First and other amendments. **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 are used to conduct this course. Subject to be covered is announced in advance. **Credit variable**

2080-581 Legal and Ethical Conduct of Printing Businesses

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, co-workers and themselves. **Class 4, Credit 4**

2080-582 Management of Training in the Graphic Arts Industry

Students examine the role 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. (2081-416) **Class 3, Credit 3**

2080-587 Establishing a Graphic Arts Operation

This is an elective course for seniors only with permission of the instructor. The course is a study of the problems to be encountered in the establishment of a graphic arts operation. Students will organize their own printing-related operation as they study general planning, financing, physical requirements for operation, sales and merchandising, general management and operational problems. The purpose of the offering is to coordinate students activities with a focus on the benefits and burdens of the responsibility of establishing a graphic arts business. (Senior status with instructor permission) **Class 3, Credit 3**

2080-591 Sales in the 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. This course aims at benefiting 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**

TECHNICAL COURSES

2081-201 Printing Processes Concepts

This required professional course is designed to give students a broad overview of the underlying concepts and scientific principles that are common to both the printing process and press systems. Class sessions will consist of lectures, including films and videotape presentations. Outside assignments will consist of reading assigned portions of textbooks, vendor literature and journal articles relative to the lecture topics. **Class 4, Credit 4**

2081-202 Concepts of Design and Typography

This is an introductory course designed to acquaint students with the principles of two areas: 1) printing design; 2) typography. Extensive use of slides, overhead materials, handouts and, where appropriate, movies and videotapes will be shown. **Class 4, Credit 4**

2081-203 Prepress Imaging Concepts

This required professional course is designed to give students a broad overview of the underlying concepts and scientific principles that are common to image generation, capture, processing, storage display and transfer technologies used in the graphic arts industry. Class sessions will consist of lectures interspersed with films and other audiovisual aids. Homework assignments will consist of reading assigned portions of textbooks, vendor literature, and journal articles related to the lecture topics. In addition, written assignments consisting of paraphrasing of relevant technical articles will be required. **Class 4, Credit 4**

2081-225 Design and Typographic Fundamentals

This is an introductory course designed to provide students with the underlying principles of two graphic arts disciplines—printing design and typography. Extensive use of slides, overhead transparencies, handouts and other audio-visual materials are combined with lab assignments on Macintosh computers. **Class 2, Lab 3, Credit 3**

2081-254 Introduction to Printing

An overview of the printing processes from design to the finished product. Laboratory experience for students to design and print a project consistent with their professional interests. Class lectures, demonstrations and hands-on lab experiences. **Class 2, Lab 3, Credit 3**

2081-256 Principles of Copy Preparation

A basic course involving fundamental methods and techniques of copy preparation. It stresses the assembly of copy for various printing specialty areas and compares their likenesses and differences. Lectures cover all aspects of copy as used in making the 'mechanical' and how the 'mechanical' relates to the entire production system. **Class 2, Lab 3, Credit 3**

2081-306 Newspaper Design

A study of the methods of designing modern newspaper pages; a look at a variety of front page design methods as well as inside pages; placement of editorial content and ads; problems involved in designing section pages and special pages and editions; the standard format vs. the tabloid format; page sizes, column widths, and space between columns; how a computer can be used in creating designs for newspaper pages. **Class 2, Lab 3, Credit 3**

2081-307 Newspaper Production I

A study of the methods of producing a newspaper by the use of photocomposition systems and the offset process. Students organize a staff, design a newspaper, set type, paste up pages, go to camera, 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 photocomposition methods and the offset process. A continuation of 2081-320, in more depth, with special emphasis on pre-press 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 and 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**

2081-317 Print-Finishing and Distribution

Most printed products must be finished into a marketable form and distributed by various means. Print-finishing may be done in-line on web presses or in a conventional bindery. Planning for such post-press operations requires extensive knowledge from design to the finished product. This course is designed as an introduction to pre-press planning for print-finishing and distribution. The emphasis is on cost-effective planning and management, familiarization with the mechanical limitations in print production and on modern tools and methods in distribution technologies. **Class 3, Credit 3**

2081-354 Newspaper Composition

This is an elective course in electronic prepress systems for the newspaper industry. Topics covered include editorial and pagination systems, photographic scanners, imagesetters, and other technologies pertaining to newspaper prepress. Laboratory exercises are designed to augment the lectures. (2081-202, 203) **Class 2, Lab 3, Credit 3**

2081-356 Copy Preparation

Preparation of copy for camera, working from layouts, making analysis of requirements; pasteup techniques, methods of pre-separation mechanicals, 'keyline' mechanicals, use of photographic and typographic copy. Relation to production is stressed by shooting copy on camera, stripping and proofing; proper instructional specification writing. Design and production of individual 4-color; process pre-separation. (2081-201, 202, 203) **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

An introductory course to the skills of bookbinding and contemporary preservation procedures used to save our printed heritage. Content will cover methods and techniques used in hand bookbinding, including sewing, adhesive binding, gilding and boxmaking. Basic conservation skills are taught. Library binding and end-use requirements of bound products are studied and tested in order to obtain thorough knowledge of the physical requirements of bound books. Course is designed for those who value good craftsmanship and have an interest in binding books. No prerequisite is required. However, a good dexterity is desired. Students should bring several books of their own for rebinding. **Class 3, Credit 3**

2081-361 Introduction to Book Production

A course designed to introduce 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

A course 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. (2081-202; offered once each year) **Class 2, Lab 3, Credit 3**

2081-364 Flexographic Process

A fundamental course based on the principles and practices of the flexographic printing process. Continues on from the basic information given in 2081-201. 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 and substrates. (2081-201 or 2081-254)**Class 2, Lab 3, Credit 3**

2081-366 Techniques of Image Assembly

An introductory course in black-and-white and color-image assembly. Lab projects are assigned with the purpose of covering a wide variety of layouts requiring different techniques and often the creation of necessary contact or duplicating films of the roomlight variety. In addition to standard practices the student also works with the latest model line-up tables and a Micromodifier for spreads and chokes and receives basic instruction in electronic page make-up (Autoprep 5000). Other automated pre-press imposition systems are covered in the form of slide-lectures. (2081-203) **Class 2, Lab 3, Credit 3**

2081-367 Lithographic Process

This course builds upon the material encountered in 2081-201. More detailed discussion is made of the equipment and materials that make the lithographic process. Topics include press, the image carrier and its chemistry, inks and fountain solutions. (2081-201 or 2081-254)**Class 2, Lab 3, Credit 3**

2081-368 Screen Printing Process

This course is designed to acquaint 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; also including 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. (2081-201 or 2081-254)**Class 2, Lab 3, Credit 3**

2081-372 The Printed Book in America

A course which 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

This course 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 new perspective for today's graphic artisan and book printer. **Class 2, Lab 6, Credit 4**

2081-374 Electronic Composition Systems

An elective course in photocomposition. Formatting and code structures are utilized for typographic problems. Specialized typesetting hardware and software are analyzed for electronic composition systems with digital type storage. (2081-202, 203)**Class 2, Lab 3, Credit 3**

2081-378 Properties of Paper

This course begins with a discussion on papermaking fibers, pulping procedures, and papermaking machines and proceeds to show how they affect paper properties and printing characteristics. Laboratory experiences include stock preparation, making paper and paperboard, sizing and coating paper, physical and optical testing of paper and paper identification.**Class 3, Lab 2, Credit 3**

2081-381 Applications of Typographic Concepts

An elective course that allows the students to apply the concepts of typography to practical applications. By utilizing the equipment of the typographic laboratory, each student will be expected to produce finished typographic projects. The intent of this course is to build confidence in students and sharpen their ability to judge and produce works of a typographic nature. (2081-202)**Class 2, Lab 3, Credit 3**

2081-382 Applications of Printing Design Concepts

An elective course that introduces students to the application of traditional rendering techniques and computer-aided technology as tools for creating visual solutions to printing design problems. Emphasis is placed on the arrangement of typographic and pictorial elements to illustrate and expand on the concepts gained from the prerequisite course. (2081-202)**Class 2, Lab 3, Credit 3**

2081-386 Gravure Process

Building upon concepts of the gravure process learned in 2081-201, this course expands on the theories and practices of the gravure process. The course includes both cylinder imaging and press work and involves information on related techniques, equipment, materials and supplies. The course is conducted by means of lectures, class discussions, demonstration and laboratory exercises involving chemical etching of cylinders, helio engraving of cylinders, and four-color printing on a four-unit web press. (2081-201 or 2081-254)**Class 2, Lab 3, Credit 3**

2081-401 Image Capture and Analysis for Graphic Reproduction

Course objectives: 1) to introduce students to the theory and practice of image capture methodology for graphic reproduction of monochrome images; 2) to provide students with opportunities to perform fundamental lab experiments, using conventional photographic and desktop systems, to promote understandings of their operations and provide data for analysis; 3) to provide students with opportunities to develop problem-solving and analytical skills using practical and scientific techniques to assess printability of monochrome images. (2081-203)**Lab 3, Lec. 2, 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 pre-press systems. (2081-401 or 2081-563)**Class 2, Lab 3, Credit 3**

2081-411 Circulation and Mailroom

A study of the organization and functions of newspaper circulation departments. An overview of equipment and techniques used in modern newspaper mailrooms. A study of readership and how it relates to newspaper circulation. **Class 3, Credit 3**

2081-414 Web Offset

An analytical study of the technological development 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 the Graphic Arts

A study of what quality is and the importance of quality control in printing. Emphasis will be on how elementary statistics, management commitment and participation, and graphic arts "know-how" offer sensible approaches to quality control in printing. Topics include the conceptual aspect of quality and quality printing, defect detection versus defect prevention, establishment of the process capability via sampling and statistics, the use of statistical process control (SPC) tools, management role in creating quality environment, densitometry for measurement, ANSI standards on color printing, use of quality control devices for process control, and case studies on planning and implementing quality improvement programs in various printing environments. (1016-319)**Class 3, Credit 3**

2081-454 Print Finishing Management

Planning for successful print finishing requires in-depth knowledge of production phases from design through pre-press planning, press, bindery and distribution. This course 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. (2081-317)**Class 2, Lab 3, Credit 3**

2081-458 Ink and 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 get into greater depth in all phases of flexographic technology. Students perform all operations necessary to print a large variety of substrates on all lab presses. (2081-364) **Class 2, Lab 6, Credit 4**

2081-467 Lithographic Press Problems

An advanced course in the theory, practice, and problems of offset presswork. Further development of technical knowledge of materials and equipment. Practice in running process color work. (2081-367) **Class 2, Lab 6, Credit 4**

2081-468 Screen Printing II

Further study of the theory and practice of screen printing that will include such topics as experiments with fabric in screen making, stretching screen fabrics on one or more of the tensioning devices, stencil films and the effect they have on a finished product, study of the inks and substrates common to the screen printer. Areas of concentration with this course may be one of the following: flat-bed cycling presses; automatic cylinder screen printing press; container press capable of printing cylinders, conicals, ovals and flat objects; GSP Graphix 2 for making positives from masking materials or cut stencils; and ultra violet curing inks common to the screen printing industry. (2081-368) **Class 2, Lab 3, Credit 3**

2081-474 Electronic Composition Workshop

An advanced course in the area of composition. The emphasis is upon developing an in-depth understanding of the various aspects of a composition system. An individualized term project is selected by the student, with instructor permission, and an oral and written presentation is made upon completion. The course is conducted by lecture, discussion, and supervised laboratory assignments with individualized projects. (2081-374 and instructor's permission) **Class 2, Lab 6, Credit 4**

2081-481 Development of Printing Types

Historical development, identification, and classification. A lecture course that looks at the historical development of the type- faces that we use every day. Classification methods are discussed and analyzed. With slides, we look at representative typefaces, learn their visual characteristics for identification, who the designers are and the foundries, etc., that created them. (2081-381) **Class 3, Credit 3**

2081-482 Layout and 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 rough to comprehensive layout. The laboratory problems incorporate traditional rendering techniques with desktop electronic publishing output to produce presentation pieces. (2081-382) **Class 2, Lab 6, Credit 4**

2081-486 Advanced Gravure

Building upon 2081-366, 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. Course 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

This course presents and investigates technological topics which 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**

2081-561 Foundations of Desktop Prepress Technology

This course teaches 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, the

algorithms used to convert PostScript programs into physical images. Students who take this course will 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. (2081-203)**Class 2, Lab 3, Credit 3**

2081-562 Color Perception and Measurement in the Graphic Arts

Addresses principles of human color perception and studies the correlations between subjective quality ratings and objective measurements such as densitometry, filter-colorimetry, and spectrophotometry. Class sessions are combination of lectures, discussions, and labs. In addition, guest lecturers and video tapes will also be utilized. (2081-416)**Class 2, Lab 3, Credit 3**

2081-563 Reproduction Photography

An intensive course designed for the photography major with the emphasis placed on the problems involved in achieving optimum tone reproduction from their photographs. A general understanding of the printing industry, basic printing processes, line and halftone photography, tone reproduction and image assembly techniques are covered through lecture and laboratory experiences.**Class 2, Lab 3, Credit 3**

2081-572 Electronic Color Imaging and Color Control

An analytical study of color reproduction systems will give data to consistently produce good-quality color reproduction. Requirements and capabilities of electronic pre-press integrated color systems will be 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**

2081-573 Typographic Workshop

Allows students to create and solve typographic problems of their own choice. Complete freedom is given and experimentation is encouraged, giving students opportunities to meet their own objectives and satisfaction. **Class 2, Lab 6, Credit 4**

2081-574 Electronic Publishing

Course objectives: 1) to introduce the student to the rapidly evolving concepts, technologies and practices in electronic publishing; 2) to provide the student with opportunities to perform fundamental experiments with electronic publishing technology and to discover its application within the printing and publishing industries. (2081-203 Prepress Imaging Concepts, 2081-561 Desktop Prepress Systems) **Lab 3, Lecture 2, Credit 3**

2081-577 Test Targets and Their Evaluation for Graphic Arts Imaging

Students will study theories and practices of test targets to help characterize components and, thereafter, to optimize the color reproduction process. Emphasis will be placed on understanding and choosing appropriate test targets, such as microlines and halftone patterns, for characterization and determination of control settings among devices. (2081-340 Lithographic Process and 2081-510 Color Perception and Measurement or instructor's approval) **Lecture 2, Lab 3, Credit 3**

COLLEGE OF LIBERAL ARTS COURSES

Criminal Justice

Economics

Professional and Technical Communication

Social Work

Liberal Arts Courses:

Language

Literature

Science and Humanities

Fine Arts

History

Science, Technology, and Society

Philosophy

Behavioral Science

Anthropology

Psychology

Sociology

Social Sciences

Economics

Political Science

Service Courses

COLLEGE OF LIBERAL ARTS

Dr. William J. Daniels, Dean

While the College of Liberal Arts offers degree programs in criminal justice, economics, social work, professional and technical communication, as well as the technical and liberal studies option (all described in the following pages), it plays another role at RIT that affects the education of every student.

The courses that all students take in the College of Liberal Arts provide a comprehensive education that develops their potential as intellectually aware and responsible human beings. Liberal arts courses form the foundation for students' entire educational experience. Liberal education is distinguishable from professional education in that its purpose is not to nurture specifically professional knowledge or skills, but rather each student's capabilities as a thinking, creating, and responsible person.

The program aims to:

- Develop the ability to think rationally, read critically, and speak and write cogently and clearly;
- Develop the ability to analyze issues, question assumptions, investigate problems, and seek solutions;
- Develop understanding of aesthetic values and their relevance;
- Expand intellectual horizons by acquaintance with the western heritage;
- Develop awareness of how the past inevitably affects the present and future;
- Promote understanding of our society and how it interrelates with and is indebted to other cultures, thereby liberating the student from narrow provincialism;
- Acquaint students with knowledge of the basic principles and dynamics of individual and group behavior in the many areas of human interaction;
- Develop understanding of the nature of ethical values;
- Develop awareness of the social, ecological, and ethical consequences of technology and foster a sense of responsibility to self and society;
- Develop the ability to bring together varied insights and methods of analysis for the purpose of better understanding complex human and social problems

These goals are fostered throughout a student's education at RIT by the liberal arts curriculum, which offers each student the opportunity to acquire these abilities and understandings through courses in the humanities and social sciences. (See page 10 for specific requirements.) In addition to regular courses a student may engage in independent studies. These are planned by both student and instructor and provide an opportunity for the student to develop initiative and imagination in a flexible program of study.

CRIMINAL JUSTICE

Major Required Courses

0501-201 The Criminal Justice System

The principles of the criminal justice system; administration and management within various agencies, including the relationship of the police to the courts; the courts to the probation, correction, and parole functions. Consideration will also be given to specific problems within the branches of the criminal justice system. **Class 3, Credit 4 (offered annually)**

0501-203 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. This course may also be taken as a Liberal Arts elective. **Class 3, Credit 4 (offered annually)**

0501-204 Public Administration

The course presents the principles of management and organizational theory as they relate to public agencies in general and criminal justice agencies in particular. Case studies, as well as descriptive information concerning the classic issues involved in the administering of public institutions, will be offered to the student. (0501-201)(Sophomore or Junior status)**Class 3, Credit 4 (offered annually)**

0501-207 Corrections

The course is designed to introduce the student to the basic organizations of the correctional system, their functions and performance. Prisons and jails, as well as probation and parole agencies, will be discussed within the context of historical and contemporary philosophy. Attention will also be 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 will be surveyed. (0501-201)**Class 3, Credit 4 (offered annually)**

0501-301 Concepts in Criminal Law

The subject matter of this course consists of an introduction to the fundamental principles upon which substantive criminal law is based. The basic characteristics and requirements of criminal conduct are examined. Included in the scope of this course are the following topics: the nature of criminal conduct, the meaning of criminal mental state, the requirement of concurrence between action and intent, and the requirement of legal causation. The elements of the principal defenses to criminal liability, such as insanity, entrapment, and self-defense, are also discussed. (0501-201)(Sophomore status) **Class 3, Credit 4 (offered annually)**

0501-303 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 the community, police organization and community control mechanisms. (0501-201) (Junior status) **Class 3, Credit 4 (offered annually)**

0501-309 Juvenile Justice

The philosophical, historical, and operational aspects of the juvenile justice system; evaluation of the social and personal factors related to juvenile delinquency; the role of police, the courts, corrections and community programs in delinquency prevention, control, and treatment. May also be taken as a Liberal Arts elective. **Class 3, Credit 4 (offered annually)**

0501-401 Scientific Methodology

This course provides a foundation in the uses of quantitative social science research methods with special reference to utilization of data bases and examples from criminal justice, human services and public policy. Stress will be on deducting hypotheses from theoretical frameworks,

identification of the relationships among variables, establishment models, creation of null hypothesis, quantitative methods of data collection and analysis using both parametric and nonparametric methods. Research methods presented range from traditional questionnaires to computer based information and techniques. (Junior status, two math and computer course requirements) **Class 3, Credit 4 (offered annually)**

0501-403, 404 Field Experience and Field Seminar

This course is an internship practicum for all pre-service criminal justice students. The course is designed to give the student first-hand experience in the field of criminal justice in an appropriate organization which meets the needs of the students career objectives. Students will be closely supervised at selected organizations developing their pre-professional skills while learning the organization's programs and methods. The student also will be required to attend a seminar which will run concurrently with field work. (0501-401, Senior status)**Class variable, Credit 4 each (F, W)**

0501-411 Seminar in Corrections

This course is a sequel to Corrections. It presents a critical evaluation of the contemporary correctional programs in the United States. Programs discussed include: jails, prisons, probation, parole, halfway houses, study release, work release, prison furloughs and various community-based correctional techniques. Emphasis is placed upon the theories of penology and rehabilitation, which provide direction to the correction system today, and the theoretical positions which may affect the future corrections. (0501-201, 207)**Class 3, Credit 4 (offered annually)**

0501-456 The Judicial Process

Judicial Process is designed to provide the student with an overview of the structure and function of the federal and state court systems. Emphasis will be placed on the relationship between the federal and state courts, judicial review, judicial decision making, and the courts as interpreters of constitutional rights. This course is part of the Liberal Arts American Politics Concentration and also may be take as a Liberal Arts elective. (0501-201 required of 0501 students; 0513-211 or 0513 215 required of concentration students) **Class 3, Credit 4 (offered annually)**

0501-514 Planning and Change in the Criminal Justice System

It is the objective of this offering to expose the student to issues of planning within the criminal justice system. Police, courts and corrections will be discussed in view of current and proposed changes. The planning of change will be emphasized with regard to organizational issues. In addition, attention will be given to surveying various strategies for accomplishing change. This course is designed to give the advanced student the opportunity to intensely scrutinize the prospective shape of the criminal justice system. (0501-204) (Senior status)**Class 3, Credit 4 (offered annually)**

0501-526 Seminar in Law Enforcement

A critical analysis of some of the current issues, problems and concerns in the area of law enforcement; emphasis on basic police functions in regard to the courts, corrections and the community. Conflicts between theory and practice are examined and analyzed, and future trends in law enforcement will be explored. (0501-303) (Junior status)**Class 3, Credit 4 (offered annually)**

0501-528 Etiology of Crime

This course is 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 will undertake a historical review of criminality theory and progress to present-day concerns of both etiological origins. (0501-201, 203)**Class 3, Credit 4 (offered annually)**

0501-541 Research Methods in Criminal Justice

Through lecture, discussion, and activities associated with a research project, the techniques and methods of data collection and analysis are presented. Students will acquire the skills necessary to conduct criminal justice research and the ability to prepare a formal research/evaluation report. The required research projecpr typically include data gathering and coding procedures, entry of the data to a file on the VAX/VMS, the use of application software (e.g., SPSS, MINITAB, DATAPLOT), and preparation of a final report. (0501-401)**Class variable, Credit 4 (offered annually)**

PROFESSIONAL ELECTIVES

0501-206 Administrative Concepts in Law Enforcement

The course is intended to provide the student with an overview of the fundamental concepts of organization and administration, and to provide also the criteria and/or standards by which municipal police agencies may be evaluated or improved administratively. (0501-203, 303) (0501 Sophomore status or higher) **Class 3, Credit 4 (offered occasionally)**

0501-302 Organized Crime

This course provides a critical assessment of the structures of organized crime, its historical development, and the areas in which organized crime operates. Special emphasis will be placed upon how the character of organized crime has changed during the last 30 years, including the movement of organized crime into a variety of legitimate business enterprises. In addition current enforcement strategies will be studied and evaluated. (0501-201, 203) (0501 Sophomore status or higher) **Class 3, Credit 4 (offered occasionally)**

0501-306 Para-Legals

The course deals with criminal and civil law, matrimonial law, legal research, counseling, problem solving techniques, and lawyers' ethics as well as a study of community resources available to assist the client. (0501-201) (0501 Junior or Senior status) **Class 3, Credit 4 (offered periodically)**

0501-307 Investigative Techniques

The course examines the investigative function and process in the public and private sectors, which would include the history and theory of criminal investigation, crime scene searches, collection and presentation of physical evidence, the obtaining of testimony and confessions, scientific laboratory methods and the admissibility of evidence in a court of law. (0501-303) **Class 3, Credit 4 (offered periodically)**

0501-405 Major Issues in the Criminal Justice System

This course will focus on contemporary issues and topics not otherwise distinctly incorporated in established criminal justice courses. The course will concentrate 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. (0501 Junior or Senior status) **Class 3, Credit 4 (offered periodically)**

0501-406 Computer Application in Criminal Justice

This course is designed to introduce students to the use of computer-related terminology, historical, current and potential uses of computers, the classification and the use of various types of computer application programs on both super mini- and micro-computers. Standard application software packages and computer hardware systems will be discussed as they can be utilized in criminal justice settings. In addition, students will have practical experience that will include the use of text processing, data base and spreadsheet software commonly used in criminal justice agencies and academic settings. **Class 3, Credit 4 (offered annually)**

0501-409 Legal Rights of Convicted Offenders

This course is designed to present 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. The course is 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. (0501 Junior or Senior status) **Class 3, Credit 4 (offered periodically)**

0501-410 Management in Criminal Justice

This course 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 which have been effective in business, industry, and government, with the intention of discussing their applicability throughout the criminal justice system. (0501-204 or permission of the instructor) (0501 Junior or Senior status) **Class 3, Credit 4**

0501-412 Social Control of Deviant Behavior

Designed as 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 will be on that type of behavior which elicits societal response in the form of criminal or civil action and on deviance from the perspective of the deviant who may be placed under some form of legalized social control. (0501-201, 203) (0501 Junior or Senior status) **Class 3, Credit 4 (offered periodically)**

0501-413 Civil Disobedience and 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. (0501-201, 203) (0501 Junior or Senior status) **Class 3, Credit 4 (offered periodically)**

0501-415 Domestic Violence

This course is designed for social work students, criminal justice students, and professionals who are interested in examining the problems related to domestic conflict and violence. Included will be a study of the dynamics of violence as reflected in child abuse, incest, marital rape, spouse and parental abuse, and violence among siblings. (0501 third year or higher) **Credit 4 (offered periodically)**

0501-416 Forensic Photographic Evidence

Basic photographic techniques applicable to the law enforcement profession or other investigative applications. The course will cover photographic fundamentals as they apply to the investigative photographer. This will lead to the more involved techniques of the police and fire photographer. Topics include photographing homicides and other deaths, tool mark and document photography, court presentations, surveillance and identification photography, and arson investigation. (0501 third year or higher) **Class 3, Credit 4 (offered annually)**

0501-452 Advanced Research Topics

The course is intended for students interested in research applications beyond basic scientific analysis and design. Included in the course will be advanced statistical techniques of criminal justice data and qualitative field methods. The course will require three projects. 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 will be included in this assignment. The course will be in seminar format and will include case discussion and method critiques. Only students who have taken scientific methodology and research methods should apply to this course. **Class 3, Credit 4.**

0501-457 Constitutional Law

This course has been designed to provide 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. This course is part of the Liberal Arts American Politics Concentration and also may be taken as a Liberal Arts elective. (0501-201, 301 and Junior or Senior status required of 0501 students; 0513-211 or 0513-215 required of concentration students) **Class 3, Credit 4 (offered annually)**

0501-505 White Collar Crime

An examination of the extent and character of white collar crime with special emphasis upon business and professional deviance. (0501-201, 203) (0501 third year or higher) **Class 3, Credit 4 (offered occasionally)**

0501-506 Evidence

This course is designed to provide the student with an awareness of what types of evidence are admissible in a criminal trial. The course 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. The course 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. (0501-201) (0501 second year or higher)**Class 3, Credit 4 (offered periodically)**

0501-507 Computer Crime

This course 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. (0501 third year or higher)**Class 3, Credit 4 (offered periodically)**

0501-510 Counseling in the Criminal Justice System

This course is designed to instruct the student in the various accepted contemporary dynamics of interviewing and counseling criminal justice and related human service clients. Issues to be discussed will revolve around counseling and supervision strategies and conflicts among agencies, between administrators and staff, and clients. This course will present both the practical and theoretical aspects of these issues as well as devote attention to surveying prospective counseling strategies for accomplishing desired behavioral change. (0501-201) (0501 third year or higher)**Class 3, Credit 4 (offered periodically)**

0501-511 Alternatives to Incarceration

The course analyzes possible sentencing options available to the criminal courts as well as pre-adjudicatory alternatives for both adults and juvenile offenders. The variety of dispositions evaluated include: probation, parole, halfway houses, work-release, study-release, prison furloughs, pre-trial release, pre-probation alternatives (fines, suspended sentences, conditional discharge, and a variety of diversion programs). Special emphasis is placed on a critical evaluation of the alternatives as they compare to the more traditional methods of handling offenders. Field trips and guest lecturers from non-traditional programs are typically included in the course. (0501-207, 411) (0501 third year or higher)**Class 3, Credit 4 (offered occasionally)**

0501-516 Court Administration

A course designed to explore the management aspects of the court and court process. There is a focus on the structure of the several levels of court that typically exist in modern urban America. Related to this structure are the various other criminal justice agencies that interact with the court at various stages of the process. In addition, operational problems such as the bail process, record keeping, jury service and selection methods, and calendar management will receive significant attention. (0501 fourth year)**Class 3, Credit 4 (offered occasionally)**

0501-517 Comparative Criminal Law

The course examines, in a comparative analysis, the criminal system and the penal methods of Europe and the United States. Major emphasis will be 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. (0501-201) (0501 third year or higher)**Class 3, Credit 4 (offered periodically)**

0501-518 Criminal Justice/Community Relations

This course 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 will be on intergroup responsibilities in exploring strategies to reduce conflict in the solving of public problems within the sphere of the criminal justice system. (0501-201) (0501 third year or higher)**Class 3, Credit 4 (offered occasionally)**

0501-520 Sentencing Process

This course is intended to provide the student with a broad overview of the law of sentencing and the alternatives presently available in this area. Emphasis will be placed on the traditional methods

of punishment now available in the courts, including, but not necessarily restricted to: fines, imprisonment, probation and suspended sentences. The course will also look to the power of the court in exercising its discretion in the sentencing process. (0501-201, 207, 304) (0501 Senior status) **Class 3, Credit 4 (offered on sufficient demand)**

0501-522 Victimless Crime and the Law

The course is designed to familiarize the student with many of the implications and ramifications of efforts to control 'victimless' crimes. Course discussions concentrate on the illegal activity associated with prostitution, gambling, homosexuality, drug use, and pornography. In this course the social, moral, legal, and practical consequences of legalizing such activities are examined and evaluated. (0501-201, 203, 301) (0501 Junior or Senior status) **Class 3, Credit 4 (offered occasionally)**

0501-523 Crime and Violence

This course 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. (0501-201) (0501 Junior or Senior status) **Class 3, Credit 4 (offered occasionally)**

0501-527 Seminar in Law

This course will focus on the nature, function, and limits of the rule of law. Attention will be paid to areas of substantive and procedural criminal law to illustrate the nature and limits of the idea of law. Readings will draw from both the classical and modern view of law. (0501-301, 304) (0501 Senior status) **Class 3, Credit 4 (offered occasionally)**

0501-529 Physical Security and Safety

The course 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. (0501-201) (0501 Junior or Senior status) **Class 3, Credit 4 (offered occasionally)**

0501-530 Women and Crime

This course will deal 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. The course also will examine the role of women as law enforcement officers, judges, lawyers, and correctional officers in the criminal justice system. (0501 Junior or Senior status) **Class 3, Credit 4 (offered periodically)**

0501-532 Retail Security

This course provides an analysis of major security problems found within retail operations. Subjects examined include internal and external theft prevention and detection, shoplifting techniques, the use of undercover personnel and shopping services, security audit, and training of security and non-security personnel. Warehousing and cargo controls are examined. Emphasis will be placed upon methods, techniques, and programs to protect assets. (0501 Junior or Senior status) **Class 3, Credit 4 (offered occasionally)**

0501-535 Security Management

This course will focus on the management skills required in the security function and the corresponding administrative, legal and technical problems. Emphasis will be given to purchasing, cost benefit analysis, proprietary versus contract guard forces, personnel management and the relationship between security and non-security employees, and security awareness training programs. (0501 Junior or Senior status) **Class 3, Credit 4 (offered occasionally)**

0501-536 Seminar in Security

This course, designed for seniors completing criminal justice degree requirements with a concentration in security, will focus 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. (0501 Junior or Senior status) **Class 3, Credit 4 (offered occasionally)**

0501-537 Legal Aspects of Security

An examination of the federal and state case law and statutory provisions that regulate the private security field. The distinction between public and private enforcement; as well as the possible criminal and civil liabilities of private security personnel under the law of Willful Torts including: false arrest and imprisonment, nuisance, defamation, and invasion of privacy. (0501 Junior or Senior status) **Class 3, Credit 4 (offered occasionally)**

0501-542 Advanced Research Topics

This course is intended for students interested in research applications beyond basic scientific analysis and design. Included in the course will be advanced statistical techniques of criminal justice data and qualitative field methods. The course will require three projects. 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 will be included in this assignment. The course will be in seminar format and will include case discussion and method critiques. Only students who have taken scientific methodology and research methods should apply to this course. **Class 3, 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 (offered annually)**

ECONOMICS

The following courses are required for the BS degree. See listings under Service Course area for full course descriptions, unless otherwise indicated

0511-301 Principles of Economics I

0511-302 Principles of Economics II

0530-310 Managerial Economics

A further elaboration of the elementary principles of economic analysis in Principles I and II. Particular emphasis will be placed on the application of these principles to the decision-making process of the firm. (0511-302) **Class 3, Credit 4 (offered annually)**

0530-410 Applied Econometrics I

This course is designed to provide students in the economics program with an opportunity to develop their skills in applied regression analysis. This course will cover 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. (0530-302, 0106-330, 1016-226) **Class 3, Credit 4 (offered annually)**

0530-411 Applied Econometrics II

This course introduces students to one of the major functions contemporary economists perform-economic forecasting. Students will be exposed to alternative theories and the manner in which economists in both the private and public sector use these frameworks of analysis, data, and quantitative methods to generate economic forecasts. (0530-410) **Class 3, Credit 4 (offered occasionally)**

0530-460 Math Methods: Economics

This course develops the mathematical skills used by the applied economist in computer-based research. Exercises and research projects for the course will be chosen to illustrate the kind of problems actually dealt with by the contemporary applied economist. (0511-302, 1016-226) **Class 3, Credit 4 (offered occasionally)**

0530-501 Monetary Analysis and Policy

This course is the study of monetary behavior and the role of monetary institutions in the modern economy. The course 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. The course will conclude with an

evaluation of the neo-Keynesian and Monetarist positions. This course may also be taken as a Liberal Arts elective. (0511-302 or equivalent)**Class 3, Credit 4 (offered annually)**

0530-505 Intermediate Microeconomic Theory

This course helps develop the tools of analysis utilized in contemporary economics to study the process of price formulation in a capitalist society. Topics covered in the course include the theories of consumer behavior, cost and production, alternative market structures, and the pricing of factors of production. This course may also be taken as a Liberal Arts elective. (0511-302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0530-506 Intermediate Macroeconomic Theory

The central question of macroeconomics is the determination of output, employment and prices. This course develops models which incorporate behavioral assumptions concerning consumption, investment, and the role of money and their relationship to macroeconomic variables. This course may also be taken as a Liberal Arts elective. (0511-302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0530-510 International Trade and Finance

This course introduces the students to the theory and the practical issues of the export/import markets, the international flow of capital, and international investment decisions. In addition, the students study the foreign-exchange and the Eurodollar markets and the investment opportunities in them. The role of multi-national corporations in international trade and finance is also discussed. (0511-301 and 0511-302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0530-520 Industrial Organization

This course is the study of the structure, conduct, and performance of contemporary American industry. The course 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. (0511-302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0530-550 Seminar in Applied Economics

A senior-level course emphasizing applications of economic analysis and quantitative methods to economic decision making. Cases will be drawn from both the private and public sectors of the economy. (Limited to BS in economics and economics degree seniors) **Class 3, Credit 4 (offered occasionally)**

PROFESSIONAL AND TECHNICAL COMMUNICATION

The following courses are offered by the Professional and Technical Communication Department. See listings under Language and Literature for full course descriptions, unless otherwise indicated

0535-200 Foundations of Communication

This course is first an introduction to the theoretical and conceptual underpinnings of oral, visual, and written communication. The course introduces basic communication models, the role of language in communication, symbols and symbolmaking, issues of audience analysis, and the development of different modes of discourse. Foundations also explores the history of communication. Finally, the course introduces students to basic research in communications studies. **Class 3, Credit 4**

0535-210 Interpersonal Communication

Analysis and application of the major theories of interpersonal communication in various situations. The course 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. **Class 3, Credit 4 (offered occasionally)**

0535-230 Written Argument

This course seeks to develop in students the language and reasoning skills necessary to create responsible and effective written arguments. Required course. (0502-220) **Class 3, Credit 4 (offered annually)**

0535-310 Conference Techniques

Basic theories of conference techniques including leadership, participation, types, and functions of public and private conferences and their evaluations. Student participation in training, problem solving, and informational-developmental conferences. Required course. (0535-200)**Class 3, Credit 4 (offered quarterly)**

0535-324 Interviewing

This course 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. **Class 3, Credit 4 (offered occasionally)**

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. The course focuses on empirical methods and leads to the development of a research project proposal. (0535-200, 210, 221, 310) **Class 3, Credit 4 (offered annually)**

0535-316 Qualitative Research Methods

This course will provide instruction and practice in methods necessary to design original research projects in a) critical, b) historical, and c) biographical communication studies. (0535-200, 210, 221, 310) **Class 3, Credit 4 (offered annually)**

0535-415 Organizational Communication

This course 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. (0535-305) **Class 3, Credit 4 (offered occasionally)**

0535-420 Advanced Public Speaking

This course blends classical and modern public address theory in an attempt to produce the speaker who is both wise and eloquent. The course 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. (0535-221) **Class 3, 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. This course is a professional elective for 0535 students. (0535-200, 230) **Class 3, Credit 4, (offered annually)**

0535-425 Teleconferencing Communication Management

This course 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. (0602-200, 0535-310) **Class 3, Credit 4 (offered occasionally)**

0535-445 Theories of Communication

This course is 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 will be covered. Required course. (0535-200, 210) **Class 3, Credit 4 (offered annually)**

0535-450 Visual Communication

This course examines communication processes and principles that use the visual mode. Through a survey of the 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 the aesthetic, technical, or skills approach. Discussion will primarily depend on, but will not be limited to, the photographic image. Required course. (0535-200, 210) **Class 3, Credit 4 (offered annually)**

0535-452 Uses and 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. (0535-482)**Class 3, Credit 4 (offered occasionally)**

0535-480 Human Communication

This course is an overview of the field of communication, including the contexts of interpersonal, group, mass, and public communication. This course is part of the Language Concentration and may also be taken as an elective. (0502-220 or equivalent)**Class 4, Credit 4 (offered annually)**

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. This course is part of the Language Concentration and may also be taken as an elective. (0502-220 or equivalent)**Class 3, Credit 4 (offered annually)**

0535-482 Mass Communication

An introduction to the study of the mass media. The focus of the course is on the history, development, and law and regulation of the mass media in the United States. Required course for 0535 students. This course is part of the Language Concentration and may also be taken as an elective. (0535-200)**Class 3, Credit 4 (offered annually)**

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. This course is part of the Language Concentration and may also be taken as an elective. (0502-220 or equivalent)**Class 4, Credit 4 (offered annually)**

0535-490 Persuasion and 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 0535 students. This course is part of the Peace Studies Concentration and also may be taken as an elective. (0535-481)**Class 3, 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. **Class 3, Credit 4 (offered occasionally)**

0535-520 Intercultural Communication

This course is 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. (0535-200)**Class 3, Credit 4 (offered occasionally)**

0535-525 Special Topics in Communication

A focused, in-depth study and analysis of a selected advanced topic in communication and associated issues. Specific topic will vary according to faculty assigned and will be published when the course is offered. Topics include: semiotics, public relations, communication technologies, gender differences in communication, legal communication, rhetoric of race relations, group dynamics, speechwriting, and censorship and propaganda. Professional elective. (For junior and senior PTC students; non-PTC students must receive permission of the instructor) (0535-200)**Class 3, Credit 4 (offered occasionally)**

0535-532 Professional Writing

This course develops in the student those professional writing skills necessary to the composition of in-house journals or newsletters; press releases; trade journals/books; speeches; general-interest writing; and ghost writing. Students enrolling in the course should have command of clear and logical standard written English prose. Required course. (0535-200, 230)**Class 3, Credit 4 (offered annually)**

0535-550 Film and Society

An inquiry concerning the relationship between motion pictures and society that will use historical, humanistic, and social science research to achieve an understanding of movies as a social force,

industry, and art form. Professional elective. (0535-482)**Class 3, Credit 4 (offered occasionally)**

0535-595 Senior Thesis in Communication

Senior Thesis is a guided research seminar culminating in a major project that brings communication studies and substantive work in the technical studies area together. The course focuses on designing, conducting, and completing an independent research project. The progress of each project will be shared with the class for discussion and critiques. Required course. (0535-410, 411, 445) **Class 3, Credit 4 (offered annually)**

SOCIAL WORK

Core Courses

0516-210 The Professional Social Work Role

This course explores social work as a profession, the various fields in which social workers practice, and the differing philosophies of human services and social work approaches. Also covered are strategies for developing self-awareness and professional self-assessment. **Class 3, Credit 4 (F, W)**

0516-212 Self-Awareness in the Helping Role

This course helps to develop 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/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. **Class 3, Credit 4 (F,W)**

0515-218 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 matriculated quarter and will be expected to utilize the RIT VAX computer system immediately in other courses. Expected formats for word-processed assignments in other social work courses are covered. Course contents include basic DCL commands, the VAXNOTES conference system, electronic mail, the EVE editor, wordprocessing using WordPerfect, INTERNET communication between universities, and using communication software between personal computers and the VAX. **Class 1, Credit 2**

0516-302 History of Social Welfare

This course is designed to acquaint 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 will examine 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. **Class 3, Credit 4 (F, S)**

0516-305 Structure and 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. Course also will explore organization theory as it applies to the structure of these services, as well as major patterns and sources of funding. (0516-302 or concurrent) **Class 3, Credit 4 (F)**

0516-354, 355 Human Behavior and the Social Environment I, II

This two-course sequence is designed to give students a basic knowledge of human development over the entire life cycle. Students will study the biological, psychological, social, and environmental aspects of development during the prenatal period, infancy, childhood, adolescence, young adulthood, middle adulthood, and later adulthood. This individual development will be placed in the context of the developmental family life cycle and the ecological perspective of social work practice. Attention will be given to effects of racism, poverty, and discrimination on the development of individuals in our society. Changing gender roles, sexism, and sexual orientation will be discussed extensively. Attention will also be given to human diversity and to differences in sexual orientation in the second course.

The two courses in the sequence form the foundation on which future courses in the curriculum build and, with these courses, form the knowledge base for the social work practice courses. The

conceptual approach used includes ecological systems theory and the family life cycle model.

Class 3, Credit 4 (F, W)

0516-357 Mental Health and Mental Illness From a Social Work Perspective

This course is designed to give 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 will be included. Students will be given a general understanding of our current mental health systems. The medical model and alternative systems of diagnosis are considered. (0516-354, 355, 0514-210)**Class 3, Credit 4 (S)**

0516-405 The Family from a Social Work Perspective

This course is designed to give the social work student a basic understanding of the family as client. Students will 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 will also learn about changes which 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. (0516-354, 355 or concurrent)**Class 3, Credit 4 (W)**

0516-435 Computer Applications to Social Work Research

Introduction to the methodology of research in behavioral and social sciences. Emphasis will be 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. (0240-361, 1016-301, 302, 303) **Class 3, Credit 4 (S)**

0516-456 Group Theory in Social Work

This course covers 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. The course provides the knowledge and initial experiential base for the development of practice skills in working with groups. (Third-year standing)**Class 3, Credit 4 (F, W)**

0516-465 Assessing Community Needs

Students will learn about communities and will study assessment techniques for identifying the strengths and weaknesses of services provided within a community. Topics covered include program evaluation, quality assurance procedures, and community networking. Attention will be given to programs for minority groups, the disabled, the elderly, youth, persons with mental health problems, and other special populations. (0516-405, 456, third-year standing)**Class 3, Credit 4 (S)**

0516-475 Interviewing and the Helping Relationship

This course is the first in a three-year course sequence (including 0516-505, 550) offered concurrently with laboratory or field instruction dealing with generalist social work practice. All three courses emphasize the differential use of social work techniques (e.g., interviewing skills, assessment, datacollection and problem-solving) and interventive skills in a variety of client systems. Through lectures, discussions, reading, lab simulations, and case analysis, it is the overall objective of the sequence to provide 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. (0516-405, 456) **Class 3, Credit 4 (S)**

0516-505 Assessment and Problem Solving

See 0516-475 (0516-435, 465, 475; corequisite with 0516-506, 535, 552)**Class 3, 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. (0516-435, 465, 475; corequisite with 0516-505, 527, 535)**Field 300, Credit 5 (F)**

0516-535 Advanced Social Work Research

This is the first of a two-course sequence in which students will conduct research on one or more aspects of professional social work practice during their concurrent field experience. Students will use information learned from their first social work computer research course and their statistics courses. The continued use of the computer as a research tool will be studied, with emphasis on the application of MINITAB and SPSS-X. Specific research designs and statistical analyses applicable to data generated during field-work experience will be reviewed. Major focus will be on idiographic 'single subject' design research and a review of quantitative research, Chi-square, PPMCC, Spearman's rho, T-test, ANOVA, and qualitative analyses popular in social work research. (0240-361)**Class 3, Credit 2 (F)**

0516-540 Evaluation of Practice

This is the second of a two-course sequence and will be built on material learned in Advanced Social Work Research and its prerequisite. Students will learn about baseline assessments, the ethics of research, and experimental research. They will also learn about report writing, grant writing, and the politics of research. Also, concerns and issues in research with special populations and cross-cultural research will be explored. (0240-361)**Class 3, Credit 2 (W)**

0516-550 Social Intervention

See 0516-475 (0516-505, 506, 535, 552; corequisite with 0516-551, 553)**Class 3, Credit 4 (W)**

0516-551 Field Instruction II

See 0516-506 (0516-505, 506, 535, 552; corequisite with 0516-540, 550, 553)**Field 300, Credit 5 (W)**

0516-552 Field Seminar I

This is a practicum seminar taken during the first quarter of field instruction. Students and instructor will discuss topics related to field experiences and concerns. The seminar will study the supervisory process and topics to be analyzed will 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 pre-field course content and the concurrently taken courses. (0516-435, 465, 475; corequisite with 505, 506, 535)**Class 3, Credit 4 (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, this course will focus on students' experiential and professional needs. Community service agency management issues will be explored; for example, the management of human resources through supervision, 'accountability' and 'termination' issues, and how they relate to agency morale and human service delivery.

The seminar is taken concurrently with Field Instruction II, 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 will be made by faculty to ensure that students in the field education sequence successfully integrate course content and objectives. (0516-505, 506, 535, 552; corequisite with 0516-540, 550, 551)**Class 3, Credit 4 (W)**

0516-595 Policy and Planning Processes

Course will explore 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. (Third-year standing)**Class 3, Credit 4 (S)**

0516-598 Professional Seminar

For social work students who have completed field instruction. Purpose of this course is to serve as a capstone in the student's social work education and to facilitate 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, using a primary, secondary, and tertiary prevention approach for a specifically shown target population at-risk and underserved populations. (0516-550, 551, 553) **Class 3, Credit 4 (S)**

PROFESSIONAL ELECTIVE COURSES

0516-314 The Social Worker as Advocate

This course will examine 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 will be related to examining techniques for achieving change. (Third-year standing) **Class 3, Credit 4 (offered on sufficient demand)**

0516-321 Alcoholism: Interventive Skills and 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 will be included. (Third-year standing) **Class 3, Credit 2 or 4 (every other year)**

0516-330 Rural Social Services

The course will identify the historical development, cultural makeup, family lifestyles, and work habits of the nation's migrant population and the rural poor. The course will examine and critically analyze the differences between migrants and the rural poor and compare them to the characteristics of the urban poor found in contemporary American cities. The course considers governmental rural policies and service-delivery systems directed to the rural areas which 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. (Third-year standing) **Class 3, Credit 4 (offered on sufficient demand)**

0516-340 Deafness: Fundamental Aspects

This course is designed to provide 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. (Third-year standing) **Class 3, Credit 4 (offered every other year)**

0516-342 Deafness: Intervention Strategies

The purpose of this course is to 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. (Third-year standing) **Class 3, Credit 4 (every other year)**

0516-360 Social Work with the Disabled

This course provides an examination of the psychosocial aspects of disabilities. The course 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/his needs. Interventive strategies and critical times for intervention by the social worker are examined. (Third-year standing) **Class 3, Credit 4 (offered on sufficient demand)**

0516-370 Child Protective Services

This course examines the concepts and knowledge base of child abuse and neglect. Topics will 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. (Third-year standing)**Class 3, Credit 4 (offered on sufficient demand)**

0516-380 Social Work and the Law

This course provides the student with the opportunity to develop a workable vocabulary and understanding of some of the basic legislative processes and laws that affect the practice of social work. Focus centers around significant issues and points of law that have affected the delivery of services. (Third-year standing)**Class 3, Credit 4 (offered on sufficient demand)**

0516-440 Alcohol and 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 nondrinkers. These effects can be carried from generation to generation in complex ways. This course provides a comprehensive look at alcoholism as a family issue. This 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 will also be discussed. (Third-year standing)**Class 3, Credit 2 or 4 offered every year)**

0516-441 Alcoholism and Human Sexuality

This course is designed to provide the student with a basic understanding of human sexuality and its relationship to alcohol abuse and chemical dependency. It will give the student exposure to skills needed to take a sexual history in an alcoholism treatment facility and to referral sources for the patient. (Third-year standing)**Class 3, Credit 2 or 4 (offered every other year)**

0516-442 Poly Addiction

This course is designed to give 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 will also take into consideration ACOAs and EAP and the assessment, treatment, evaluation, and consequent training required of professionals in the field. (Third-year standing)**Class 3, Credit 2 or 4 (offered every other year)**

0516-455 Contemporary Issues in Social Work

This course is designed to offer students an opportunity to examine and discuss contemporary issues in the field of social work. Course content will vary from quarter to quarter depending on current issues and student interest. Areas related to expressed student interest, family expertise, and developments in the field will be examined. (Third-year standing)**Class 3, Credit 4 (offered on sufficient demand)**

0516-509 Services for Children and Their Families

This course is designed to give 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 will be 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 will also be considered. (Third-year standing)**Class 3, Credit 4 (every other year)**

0516-512 Advanced Intervention with Individuals

This course 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 will be made of case studies and role playing to further develop the students' skills in this area. (Third-year standing)**Class 3, Credit 4 (offered on sufficient demand)**

0516-513 Advanced Intervention with Families

This course is for students who have completed the practice sequence and field instruction, and have learned the theories and concepts of generalist social work intervention. This course 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. (Third-year standing)**Class 3, Credit 4 (offered on sufficient demand)**

0516-522 Advanced Intervention in Communities

This course 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. The course will investigate specific applications of community intervention theory to political influence processes, coalition, neighborhood associations, and regionalization. (Third-year standing)**Class 3, Credit 4 (offered on sufficient demand)**

0516-523 Advanced Intervention with Groups

This course examines social treatment as one form of group work practice. There are different service procedures and approaches which may be applied to client groups, and each may have utility in pursuing distinct service objectives. The course will investigate the scope, techniques, and functions of generalist social work practice in such diverse settings as social service agencies, business, correctional institutions, and communities. (Third-year standing)**Class 3, Credit 4 (offered on sufficient demand)**

0516-525 Grant Writing

This course is designed to provide the student with a series of readings and experiential exercises necessary for writing a grant proposal. Focus will be on funding sources which provide money for social welfare programs and for research into social work. (Third-year standing)**Class 3, Credit 4 (offered on sufficient demand)**

0516-536 Aging and Society

This course considers concepts, issues, and research techniques in the behavioral and biological aspects of aging. It examines the interaction of group processes in the family and community which influence society's attitudes toward the aging process. It further examines the culture, environmental, and institutional changes as they relate to an increasing population of older people. (Third-year standing) (May also be taken for liberal arts elective credit under 0515-508)**Class 3, Credit 4 (offered on sufficient demand)**

0516-537 Social Policy and the Aging

This course is organized around 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. (Third-year standing) (May also be taken for liberal arts elective credit. See 0515-515.)**Class 3, Credit 4 (offered on sufficient demand)**

0516-538 Family Violence

This course is designed to acquaint social work students and practitioners with the problem of family violence. The causes and dynamics of various forms of violence in the family will be 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 will be included. (Third-year standing) **Class 3, Credit 4 (offered every other year)**

0516-539 Services for the Aging

This course deals with the variety of existing community-based services available for the elderly. The course also examines the tactics, assessment, coordination, and evaluation of various direct and indirect services for the elderly. Particular attention will be given to such service groups as nursing homes, home health care, mental health, and other formal and informal support systems. (Third-year standing) **Class 3, Credit 4 (offered on sufficient demand)**

0516-599 Independent Study

A combined student/faculty effort on a chosen topic beyond the normal course selections. It provides the self-motivated student with a creative orientation, the opportunity to develop an autonomous and personal sense of academic growth, and achievement. Independent Study may include independent work in an agency setting or other field work away from the Rochester area. **Credit variable (F, W, S, SR)**

LIBERAL ARTS COURSES
LANGUAGE

0502-220 English Composition

This course develops the language skills needed to write effectively. It should be taken in the freshman year. **Class 3, Credit 4 (offered quarterly)**

0502-443 Written Argument

This course seeks to develop in students the language and reasoning skills necessary to create responsible and effective written arguments. It is part of the Language Communication Concentration and may also be taken as an elective. (0502-220 or equivalent) **Class 3, Credit 4 (offered annually)**

0502-444 Technical Writing

This course develops in students those skills necessary for completing technical writing tasks, such as instructional memos; letters of inquiry; reports (trip, progress/status, accident, research, feasibility); problem analyses; specifications; flow charts; technical manuals. Students enrolling in Technical Writing should have command of clear and logical standard written English prose. This course is part of the Language Concentration and may also be taken as an elective. (0502-220 or equivalent) **Class 3, Credit 4 (offered annually)**

0502-445 History of the 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. This course is designed for anyone who is curious about the English language. This course is part of the Language Concentration and also may be taken as an elective. (0502-220 or equivalent) **Class 3, Credit 4 (offered annually)**

0502-446 Advanced Technical Writing

This course develops in students those skills necessary for designing, writing, and editing long technical documents, such as final reports and manuals. Special emphasis is given to computer-designed graphics and page layout. Students enrolling should have command of concise English prose. (This course will be taught with a Macintosh microcomputer.) This course is part of the language concentration and may also be taken as an elective. (0502-220 or equivalent) **Class 3, Credit 4 (offered annually)**

0502-448 The English Language: Contemporary Structure

This course introduces students to the morphology and syntax of contemporary English. Students will develop a grammar sufficient for describing the basic structures of the English language, and they will examine a variety of social and regional dialects of contemporary English. In doing so, they will learn basic principles of grammatical description and consider the uses-and the abuses--of prescriptive grammars. The course is recommended for anyone who has either a professional or a personal interest in understanding how English works. It is part of the Language Communication Concentration and may also be taken as an elective. (0502-220) **Class 3, Credit 4**

0502-449 Worlds of Writing

This course 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. This course includes reading assignments that introduce issues, ideas, problems, and personalities from a particular field to readers who are not themselves specialists in that field. It also includes writing assignments in which each student introduces topics from his or her own field to readers unfamiliar with the field. This course is part of the Language Concentration and may also be taken as an elective. **Class 3, Credit 4**

0502-450 Advanced Composition

This course 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. This course is part of the Language Concentration and may also be taken as an elective. (0502-220 or equivalent) **Class 3, Credit 4 (offered annually)**

0502-516 Creative Writing/Poetry

An exploration of the techniques of writing poetry in both open and closed forms. (0502-220 or equivalent) **Class 3, Credit 4 (offered annually)**

0502-517 News Writing

Practicum in basic techniques of news writing and gathering for the daily press. Emphases will be primarily on writing for the print media and on frequent writing against a deadline. **Class 3, Credit 4 (offered occasionally)**

0502-518 Creative Writing/Prose Fiction

An exploration of some of the most important contemporary techniques of prose fiction in the short story form. This is a writing elective for the Professional and Technical Communication Program and also may be taken as a liberal arts elective. (0502-220 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0502-519 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 will be given an opportunity to explore in depth a literary genre, subject, or theme chosen by the individual student in conference with the instructor. The acceptability of the students project will be determined on the basis of its intrinsic literary merit and its potential value to the students development as a writer. (0502-220 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0502-524 Communication and Documentary Film

An examination of the documentary film and video as case studies in communication media. The course focuses on film techniques used as argument, persuasion, propaganda, and reconstruction of reality. Such elements as director, subject, shooting style, and editing techniques will be analyzed in terms of message, purpose and audience. **Class 3, Credit 4 (offered annually)**

0503-400, 440-41 American Sign Language I, II, III

This course presents 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 the linguistic structure of ASL and the nature of signing as a linguistic modality. These courses are not part of any concentration. **Class 3, Credit 4 (offered annually)**

0503-405, 445-50, 498 Beginning Arabic I, II, III, IV, V, VI, VII, VIII

This sequence of courses is 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 material and examiners accredited by NASILP. These courses will introduce students with no prior exposure to the language to modern standard Arabic. Arabic I will introduce the phonology and script. Throughout, the emphasis will be on acquiring oral skills. Arabic II, III, and IV are part of the Foreign Language/Culture Concentration and may also be taken as electives. (Permission of the foreign language coordinator) **Class 2, Credit 4 (offered annually)**

0503-408, 451-57 Beginning Chinese I, II, III, IV, V, VI, VII, VIII

This sequence of courses is 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 material and examiners accredited by NASILP. These courses will introduce students with no prior exposure to the language to elementary spoken Mandarin. The Chinese writing system will be introduced in Chinese III. Courses II and III are part of the Foreign Language/Culture Concentration and may also be taken as electives. (Permission of the foreign language coordinator) **Class 2, Credit 4 (offered annually)**

0503-435, 464, 465 Beginning French I, II, III

This sequence of courses is designed to give 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. Besides language, students will also study contemporary life and culture in the French-speaking countries. These courses are part of the Foreign Language/Culture Concentration and may also be taken as electives. **Class 4, Credit 4 (offered annually)**

0503-466, 467, 468 Intermediate French I, II, III

This sequence of courses at the intermediate level is designed to give students more advanced practice in the skills of speaking, reading, comprehension, and writing French. The courses also include segments of the use of French for business. Besides language, students will study contemporary life and culture through a variety of carefully selected readings. Although these

courses are part of a six-course sequence, they may be taken separately. This intermediate sequence is part of the language requirement for International Business majors.**Class 4, Credit 4**

0503-412, 472, 473 Beginning German I, II, III

This sequence of courses is designed to give students with no prior exposure to the language a sound basic knowledge of German as it is spoken and written today. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in the German-speaking countries. Courses II and III are part of the Foreign Language/Culture Concentration and may also be taken as electives.**Class 4, Credit 4 (offered annually)**

0503-474, 475, 476 Intermediate German I, II, III

This sequence of courses at the intermediate level is designed to give students advanced practice in the skills of speaking, reading, comprehension, and writing German. The courses also include segments of the use of German for business. Besides language, students will study contemporary life and culture through a variety of carefully selected readings. Although these courses are part of a six-course sequence, they may be taken separately. This intermediate sequence is part of the language requirement for International Business majors.**Class 3, Credit 4**

0503-420, 480-86 Beginning Japanese I, II, III, IV, V, VI, VII, VIII

This sequence of courses is 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 material and examiners accredited by NASILP. These courses will introduce students with no prior exposure to the language to elementary spoken Japanese. The Japanese writing system will be introduced in Japanese III. Courses II and III are part of the Foreign Language/Culture Concentration and may also be taken as electives. (Permission of the foreign language coordinator)**Class 2, Credit 4 (offered annually)**

0503-430, 490, 491 Beginning Spanish I, II, III

This sequence of courses is designed to give students with no prior exposure to the language a sound basic knowledge of Spanish as it is spoken and written today. A strong emphasis is placed on speaking and reading skills. Besides language, students will also study contemporary life and culture in the Spanish-speaking countries. Courses II and III are part of the Foreign Language/Culture Concentration and may also be taken as electives.**Class 4, Credit 4 (offered annually)**

0503-492, 493, 494 Intermediate Spanish I, II, III

This sequence of courses at the intermediate level is designed to give students more advanced practice in the skills of speaking, reading, comprehension, and writing Spanish. The courses also include segments of the use of Spanish for business. Besides language, students will study contemporary life and culture through a variety of carefully selected readings. Although these courses are part of a six-course sequence, they may be taken separately. This intermediate sequence is part of the language requirement for International Business majors.**Class 4, Credit 4**

LITERATURE

0504-332 Literature

The students study some of the great literary works of our culture to enrich their lives and reinforce their analytical abilities. The students read representative poems, dramas, and narratives drawn from the Ancient, Medieval-Renaissance, and Modern Periods.**Class 3, Credit 4 (offered quarterly)**

0504-440 Drama/Theatre

Drama/Theatre studies drama as a genre and theatre as a performing art. Intensive study of at least one major playwright or period complements a general survey of drama/theatre from ancient Greece to modern Broadway. This course is part of the Literature Concentration and may also be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered annually)**

0504-441 The Art of Poetry

This course emphasizes the enjoyment and study of poetry with primary attention to major poetry in English. This course is part of the Literature Concentration and may also be taken as an elective. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-442 Short Story

The course is 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. The course is part of the Literature Concentration and may also be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered annually)**

0504-443 The Novel

The Novel provides 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. This course is part of the Literature Concentration and may also be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered annually)**

0504-444 Film as Literature

This course 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. This course is a non-technical, non-chronological study of film with a balance of roughly 50% literature and 50% film. This course is part of the Literature Concentration and may also be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered annually)**

0504-445 Great Authors

This course provides extended study of the works of specific great authors (listed in the course titles that follow). Students can take any section of this course as part of the Literature Concentration or as an elective. Additional sections also can be taken for the Literature Concentration or elective credit. Detailed descriptions, objectives, and content/methods appear under each subtitle (0504-332 or equivalent)**Class 3, Credit 4 (offered annually)**

0504-445 Great Authors: Mark Twain and the American Dream

The course will consist 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. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-445 Great Authors: Ibsen --Drama and Film

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. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-445 Great Authors: Chaucer and His Times

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. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-445 Great Authors: Jonathan Swift and the Age of Satire

Vicious satirical writings of Jonathan Swift and other early 18th century authors will be read and analyzed focusing on the intrigue and scandals marking the political and religious environment of the age. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-445 Great Authors: Henry James

This course will survey the writings of Henry James and examine his use of the 'international theme'; his treatment of the relations between men and women; his fictional patterns of initiation, manipulation, and corruption; and his interest in the 'psychological novel.' We will also examine James's contributions to literary theory and his experiments with literary form. (0504-332 or equivalent)**Class 3, Credit 4**

0504-445 Great Authors: James Joyce

Careful study of three of James Joyce's major works: *Dubliners*, *A Portrait of the Artist as a Young Man*, and *Ulysses*. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-445 Great Authors: Shakespeare --Tragedy and Romance

A generous sample of Shakespeare's tragic and romantic plays is investigated to reveal literary excellence and theatrical power. Reference is made to his poems; to the sources of his plays; to the world of Shakespeare's time, its intellectual preconceptions, political stresses, and religious rivalries; and to the theatre and its traditions. This course is part of the Literature Concentration and also may be taken as an elective. (GLLL-332 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-445 Great Authors: Shakespeare --Comedy and History

Several of Shakespeare's comedy and history plays are read and analyzed to reveal their literary excellence and theatrical power. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-445 Great Authors: Dostoevsky

A study in the style, themes, and purposes of one of the world's greatest novelists. At least one long novel will be read, along with several shorter works. The writer will be studied in the context of nineteenth-century Russia and for the implications his works and life continue to have for twentieth-century Western culture. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-445 Great Authors: Tolstoy

A study in the style, themes, and purposes of one of the world's greatest novelists. At least one long novel will be read, along with several shorter works. The writer will be studied in the context of nineteenth-century Russia and for the implications his works and life continue to have for twentieth-century Western culture. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-445 Great Authors:Walt Whitman

In 1967 the Nobel Laureate poet Pablo Neruda said, 'We live in a Whitmanesque Age.' We shall attempt to see Whitman as the 'representative man' of his time and to assess the validity of his claim that he initiated the poetry of democracy. We shall also consider his living and influential presence in our time. We shall 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. This course is part of the Literature Concentration and also may be taken as an elective. (0504-322 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-446 Modern Literature

The course provides extended study of works written in the 20th century (the particular genres or topics are listed in the titles that follow). Students can take any section of this course as part of the Literature Concentration or as an elective. Additional sections also may be taken for concentration or elective credit. Detailed descriptions, objectives, and content/methods appear under each subtitle. (0504-332 or equivalent)**Class 3, Credit 4 (offered annually)**

0504-446 Modern Literature: Modern Poetry

A close examination of the poems of important English and American poets of the 19th and 20th centuries, including several living poets. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0504-446 Modern Literature: 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. This course is part of the Literature Concentration and the

Foreign Language/Culture Concentration and also may be taken as an elective. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topic

The course provides extended study of special topics in literature (the particular topics will be listed in the subtitles). Students can take any section of this course as part of the Literature Concentration or as an elective. Additional sections also can be taken for concentration or elective credit. Detailed descriptions, objectives, and content/methods appear under each subtitle. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topic: Technology in American Literature

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. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topics: 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. This course is part of the Literature Concentration and Perspectives on Religion Concentration and also may be taken as an elective. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topic: 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. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topic: The Epic

Advanced study of great representative works in the epic mode. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topic: Viking Myth and 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. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topic: Black Literature Before 1920

This course 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. This course is part of the Literature Concentration and the Minority Relations Concentration. It also may be taken as an elective. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topic: Black Literature after 1920

This course traces the literary contributions of selected black writers in the various genres from the Harlem Renaissance to the present day. This course is part of the Literature Concentration and the Minority Relations Concentration. It also may be taken as an elective. (0504-332) **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topic: The American Spirit in Literature

This is 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. This course is part of the Literature Concentration and also may be taken as an elective. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topic: Multi-Cultural North American Literature

"A teeming nation of nations" is Walt Whitman's description of America. Such diversity has not always been represented in American literature. This course recognizes ethnic, racial, class, and gender differences in the shaping of American literary tradition. In reading, for example, Asian, African, Jewish, Hispanic, and Native American literature, the emphasis is on the complexity and contradictions of a multicultural tradition as well as on a democratic spirit of inclusion rather than exclusion. This course is part of the Literature Concentration and may also be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0504-447 Literature Topic: Tolkien and Mythlore

J. R. R. Tolkien's major works will be analyzed to see how fantasy and myth are significant vehicles for dealing with major issues of our contemporary world. Tolkien's mythlore will be 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. This course is part of the Literature Concentration and may also be taken as an elective. (0504-332) **Class 3, Credit 4 (offered occasionally)**

0504-480 Women in Literature

This course concentrates on literature by women about women primarily from the early 19th century to the present. The course 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. This course is part of the Women's Studies Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0504-481 Literature of War and Peace

This course gives students an awareness of the different views on war and peace in world literature and cinematic works. This course is part of the Peace Studies Concentration, but also may be taken as an elective. (0504-332 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0504-484 Literature and Religion

A literature course which explores the complexity of religious experience, both personal and culture, as it is portrayed by writers from biblical times to our own day. The literature will be supplemented by readings from such disciplines as psychology, philosophy, history, and theology. This course is part of the Perspectives on Religion Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0504-516 Literature and Society

Selected works by writers such as Sophocles, Dante, Dickens, Camus, and Vonnegut as important works of art that reflect the human condition and implicitly prophesy against particular evils in attitudes or institutions of their times. **Class 3, Credit 4 (offered occasionally)**

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 will be on both technical and aesthetic aspects of the films. **Class 3, Credit 4 (offered annually)**

SCIENCE AND HUMANITIES

FINE ARTS

0505-213 Fine Arts: Visual Arts

The course will 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 3, Credit 4 (offered quarterly)**

0505-214 Fine Arts: Musical Arts

An introduction to music as a fine art. The course is designed to develop skills in listening, evaluation, and analysis through an examination of music's forms, constituent elements, and stylistic and historical development. **Class 3, Credit 4 (offered quarterly)**

0505-215 Fine Arts: Film Arts

This course will 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 3, Credit 4 (offered annually)**

0505-441 American Architecture

A survey of American architecture from the seventeenth century to the present. Stress will be placed on a visual as well as historical and social analysis. This course is part of the American Artistic Experience Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

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 will be placed upon the question of what makes music distinctively American.' This course is part of the American Artistic Experience Concentration and the Music Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0505-443 Images of American Life

This course examines 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. This course is part of the American Artistic Experience Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0505-444 American Painting

A survey of the style and meaning in American paintings from the colonial limners to contemporary artists. It will center on what distinguishes painting of the colonies and of the United States from its European counterpart. This course is part of the American Artistic Experience Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0505-445 Issues in American Art

The purpose of this course is to offer the student a comprehensive overview of American attitudes and philosophies as they have shaped and been embodied in our artistic heritage. Emphasis will be placed on American art from 1850 to the present. This course is part of the American Artistic Experience Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0505-446 American Film

This course will develop an understanding of theories, styles, and trends in American film through a historical and sociological study of the medium. This course is part of the American Artistic Experience Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0505-447 The American Musical Theatre

This course will survey the development of American opera and the American musical theatre, highlighting representative works, composers, librettists, and performers of both the cultivated and vernacular traditions.' This course is part of the American Artistic Experience Concentration and the Music Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0505-448 20th Century American Music

This course will survey both the cultivated and vernacular traditions of American music in the 20th century, taking into account its political, social, and historical frameworks. The course is part of the American Artistic Experience Concentration and the Music Concentration and may also be taken as an elective. **Class 3, Credit 4 (offered annually)**

0505-449 Music Theory I

This course is designed 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 will be given to the analysis of form and style. This course is part of the Music Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0505-450 Music and the Stage

This course will survey the development of opera and the American musical theatre, highlighting representative works, composers, librettists, and performers. This course is part of the Music Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0505-451 Music Performance

This course involves 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 will prepare significant musical compositions for public performance. Credit: one hour per quarter. A total of four such credits may count as a Liberal Arts elective. This course is part of the Music Concentration and also may be taken as an elective. **Class 1, Credit 1 (offered quarterly)**

0505-452 Special Topics in American Art

This course will be a critical examination of issues and/or artistic developments in American art. The topic may have been briefly covered in another concentration course. This course can provide 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, or criticism and theory, or other topics dealing with American painting, sculpture, architecture, music, and film. The course is part of the American Artistic Concentration and may also be taken as an elective. Prerequisites, if any, are determined by the instructor. **Class 3, Credit 4 (offered occasionally)**

0505-453 Theatre in the United States

This course is a broad survey of theatre 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. It will emphasize the native and multicultural features of our theatre's development, while taking due note of the influences from Europe. It will also introduce students to some of the impulses, both traditional and avant garde, that have characterized the American theatre since mid-century. This course is part of the American Artistic Concentration and may also be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0505-480 Women and the Visual Arts

This course examines the image of women in the visual arts and the role of women as image makers. Major topics to be covered 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. This course is part of the Women's Studies Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0505-481 Oriental Art

A survey outlining the development of art in India, China, Japan and examining the philosophical circumstances that distinguish Eastern artistic traditions. There will be opportunity for each student to pursue special interests in depth. This course is part of the Foreign Language/Culture Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0505-482 Beethoven

This course introduces 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, it focuses on the development of the 'Dionysian' personality in Beethoven's compositions and the creation of the sublime in music. This course is part of the Foreign Language/Culture Concentration and the Music Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0505-483 Bach and the Baroque

This course is devoted to 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 will be 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.' This course is part of the Foreign Language/Culture Concentration and the Music Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0505-484 Romanticism in Music

This course surveys the rise of German Romanticism from Beethoven to Strauss in the context of the development of 19th century musical styles in general. The course is part of the German

Language Culture Concentration and the Music Concentration and may also be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0505-485 Music Theory II

This course is designed 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 will be placed on the development of individual musical skills. This course is part of the Music Concentration and may also be taken as an elective. (0505-449)**Class 3, Credit 4 (offered occasionally)**

0505-501 Craftsmanship in Gothic Art

A survey of religious and secular art in Europe from about 1100 to 1500 A.D. and its antecedents. Media to be studied include manuscript illumination, sumptuous objects, and church architecture (including associated sculpture, mosaics, paintings, and stained glass).**Class 3, Credit 4 (offered occasionally)**

0505-509 Impressionism to Analytical Cubism

This course deals with the historical and stylistic aspects of the avant-garde painters of the second half of the 19th century and the first decade of the 20th century. It traces the struggles of these artists to break away from the traditional forms of expression and to attain a new vision of reality. **Class 3, Credit 4 (offered occasionally)**

0505-512 Master Drawings Since the Renaissance

A study of drawings from the 15th to the 20th centuries, including the work by Leonardo da Vinci, Michelangelo, Durer, Rembrandt, and Picasso. **Class 3, Credit 4 (offered occasionally)**

0505-514 Cubism to the Present

An investigation into modern man's struggle to preserve his identity in our fast developing technological world as reflected in the vitality and diversity of today's visual arts. Differences and similarities with art forms of earlier eras and other cultures also will be discussed. **Class 3, Credit 4 (offered occasionally)**

0505-519 Rembrandt Van Rijn: His Art and Times

A study of the life, art, and times of the Baroque master. Emphasis will be placed on his stylistic evolution, his relation to his society and to the Baroque style, and on his humanistic world view. **Class 3, Credit 4 (offered occasionally)**

0505-520 Picasso

The life and work of one of the most influential artists of our century. **Class 3, Credit 4 (offered occasionally)**

0505-530 Art and Human Values

This course investigates the nature and value of the arts and their relation to other areas of human activity such as religion, economics, science and technology, and personal freedom. **Class 3, Credit 4 (offered occasionally)**

0505-532 African Tribal Art

After an investigation of the world of 'primitive' man and the function of art in a tribal environment, this course will focus on preliterate societies of sub-Saharan Africa. **Class 3, Credit 4 (offered occasionally)**

0505-534 Renaissance and Baroque Art

This course examines the stylistic development of painting in Europe from 1420 to 1650. The Renaissance style will be analyzed and studied through the works of painters, with emphasis placed on stylistic evolution through the 15th century and the classical synthesis created in the high Renaissance. Mannerist and Early Baroque paintings will be discussed from the point of view of the Renaissance style to investigate concepts of stylistic continuity, evolution, and change. Paintings also will be discussed within their culture and political contexts. **Class 3, Credit 4 (offered occasionally)**

0506-483 The Biblical Tradition

An examination of Judaism and Christianity as they are presented in the Old and New Testaments. This course is part of the Perspectives on Religion Concentration and may also be taken as an elective. **Class 3, Credit 4 (offered annually)**

0506-484 Introduction to the New Testament

This course is designed to provide 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, will be applied. This course is part of the Perspectives on Religion Concentration and may also be taken as an elective. **Class 3, Credit 4 (offered annually)**

HISTORY

0507-301 History: Modern America

This course examines the political, social, cultural, and economic development of the American people in the modern period. Studies the United States in its foreign relations. **Class 3, 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 Twentieth Century, which played major roles in shaping our contemporary world. **Class 3, Credit 4 (offered quarterly)**

0507-440 United States Social and Intellectual History

This course will examine 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 which structure their lives sheds light on the dynamic forces which shape American history and help to explain the present. Instead of detailing day-to-day chronology, this study will highlight the sweep of major trends and movements over longer periods of the American experience. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

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. This course is part of the History concentration and also the Global Studies Concentration, and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-442 The Contemporary Middle East

This course 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. This course is part of the History Concentration, the International Relations Concentration, and the Foreign Language Culture Concentration. It also may be taken as an elective. (0507-301 or 302 or equivalent for the History Concentration; 0513-211 or 215 or equivalent for the International Relations Concentration) **Class 3, Credit 4 (offered annually)**

0507-443 European Social Intellectual History Since 1600

An analysis of social events and intellectual movements in Europe since 1600. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-444 Strategy and Diplomacy: Europe, 1871 -1945

This course 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. This course is part of the History Concentration and the International Relations Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-445 Modern Latin America

This course surveys the historical development of the Hispanic and Portuguese areas of the Americas from independence to the mid-twentieth century. The movement towards independence,

the problems that emerged during the nineteenth century of forming unified nations, and the problems of modernization in the twentieth century are all covered. The histories of selected countries are used to illustrate these issues. This course is part of the History Concentration and also the Foreign Language/Culture Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

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. This course is part of the History Concentration and the Global Studies Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-447 The United States Since 1945

An analysis of the major themes characterizing postWorld War II United States history. The course aims to investigate the specific characteristics of America as a modern state. Selected themes will have an intellectual, cultural, and political history focus. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-448 The 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. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-449 The 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. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-450 Europe of the Dictators: 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. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-451 United States Community History

Students will study the lives of Americans in various communities (such as families, working, ethnic, and political communities) from 1850 to the present. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-452 Race and Society

A social, historical, political, religious, and anthropological appraisal of the factors which have produced the differences between social appearances and social attainments of the world's population. Primary emphasis will be placed upon the fact that such differences are not sufficient reason for believing that there are underlying disparities or innate capacities among races. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-453 United States-Latin America Diplomatic Relations

The emphasis in this course will be on analyzing the United States' relations with Latin America from independence to the present. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-454 Crime, Violence, and Urban Crisis

This course will analyze 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. The course will be a comparative study on America's and the world's problems of violence, crime, and urban crisis. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-455 The Italian American Experience

Examines the history and culture of the 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. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0507-456 The United States and The Third World Revolutions in the 20th Century

One of the dominant features of the 20th century has been the revolution of rising expectations in the countries of the Third World. This course will study the underlying causes of these revolutions and the reaction of the United States government to this revolutionary ferment in Latin America, Asia and Africa. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0507-457 The History of Popular Culture in America

American myths, icons, heroes, and institutions as represented in American popular culture from the late nineteenth century to the present. Examine the history of popular entertainment and the mass media in the United States. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0507-458 Civil Liberties in American History

The course will teach the history of civil liberties in America. Emphasis will be placed on the current state of civil liberties. Students will make philosophical as well as historical analyses of cases. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-459 Social Justice and the Constitution in American History

This course will analyze how well the Constitution has met the social and political expectations of citizens. Emphasis will be on analyzing Supreme Court cases that explain the current state of social justice. This is a companion course to 0507-532, Civil Liberties in American History. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-460 Revolutionary Leaders in Latin America

In this course three movements will be studied: the rise of Juan Peron in Argentina in the 1940s, Fidel Castro's revolution in Cuba; and Salvador Allendés electoral victory in Chile in 1970. By studying these three 'revolutionary' movements, it is hoped that the student will come to an understanding of the historical perspective and nature of social discontent in Latin America. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

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. This course is part of the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent)**Class 3, Credit 4 (offered occasionally)**

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. This course is part of the Women's Studies concentration and the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent)**Class 3, Credit 4 (offered annually)**

0507-483 Christianity in the West

This course traces the development of Christian thought in the broad historical context of Western Civilization. It 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. This course is part of the Perspectives on Religion Concentration and the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-485 Foundations of Asian Civilizations

This course is primarily a study of the Confucian/Buddhist world in East Asia with the focus on China and Japan, their origins and cultural characteristics. This course is part of the Foreign Language/Culture Concentration and the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-486 China and Japan in the 20th Century

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. This course is part of the Foreign Language/ Culture Concentration and the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-487 History of Chinese Communism

An analysis of the main characteristics of Chinese Communism, its native roots, Marxist/Leninist elements, and Maoist innovations. The course also will examine 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 will be examined. This course is part of the Foreign Language/ Culture Concentration and the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-488 Modern Germany

A study of Germany in the 19th and 20th centuries. This course will begin with the unification of Germany in 1871 and trace the political evolution of the nation to the present. Special emphasis will be placed on the rise of Nazism. Pertinent social and cultural factors will be considered as well. This course is part of the History Concentration, the International Relations Concentration, and the Foreign Language/Culture Concentration. It also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-489 Japan in the 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. This course is part of the Foreign Language/Culture Concentration and the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-490 History of Mexico

The historical development of Mexico, including the colonial period, independence movement, the liberal-conservative class, and the revolution of 1910. This course is part of the Foreign Language/Culture Concentration and the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered alternate years)**

0507-491 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. This course is part of the Minority Relations Concentration and the History Concentration and also may be used as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-492 Selected Problems in Black History

A seminar approach to the thought of key black leaders (Washington, Garvey, King) and the study of civil rights and black-power movements. This course is part of the Minority Relations Concentration and the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered occasionally)**

0507-493 History of Social Discrimination

A study of the discriminatory practices, present and historical, found in the United States. To include the cultural values and problems of acculturation for the American Indian, Black, Puerto Rican, Chicano, Asian, women, and religious groups, with emphasis on its implication to social work. This course is part of the Minority Relations Concentration and the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-494 The Immigrant in American History

This course 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. This course is part of the Minority Relations Concentration and the History Concentration and also may be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-495 Black Civil Rights in the 20th Century

This course examines the social and legal history of civil rights in the U.S. with particular attention to the demonstrations of the 1950s and 1960s and the philosophy of the Rev. Dr. Martin Luther King Jr. Finally, it will compare his views with those of the recent Black Power Movement. This course is part of the Minority Studies Concentration and the History Concentration and may also be taken as an elective. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-496 Survey of African History

This course is designed to provide an overview of African history and politics in three phases: pre-colonial times, colonialism, and the post-colonial era. It is part of the History Concentration, Global Studies Concentration, and Minority Relations Concentration. (0507-301 or 302 or equivalent) **Class 3, Credit 4 (offered annually)**

0507-507 World at War 1914-45

This course aims to give continuity (interpretation of cause and effect relationships) to the major developments of the period 1914-45. The course notes the impact of classical liberal economic theories in a period of rapid mechanization and industrialization. Rising social expectations in the period of exploding democratic and later social liberalism are observed in their relationship to revolution and reaction. This course considers the causes of World War I and examines the military operations in some detail. **Class 3, Credit 4 (offered occasionally)**

0507-530 19th Century American Diplomatic History

An examination of American diplomacy from the early years of American independence to the emergence of the United States as a world power. The War of 1812, Monroe Doctrine, and Manifest Destiny are among the topics considered. **Class 3, Credit 4 (offered annually)**

0507-550 The Ascent of Man

The course is a multidisciplinary study in societal, historical, intellectual, technological, and scientific perspectives of man's development from prehistoric times to the present. The course is partially based on the television series, 'The Ascent of Man,' created and narrated by J. Bronowski. **Class 3, Credit 4 (offered occasionally)**

0507-552 War and Crises, 1945-Present

World backdrop for American foreign policy and relations from 1945 to the present, dealing with the Greek Civil War, the Chinese Civil War, the Korean War, the American assumption of Western leadership in the Cold War, economic warfare, the Cuban crisis, war in Southeast Asia, the roles of Presidents Truman to Reagan, detente, multinational business, the press, and crises in the Middle East. Background is developed for decisions of the 1990s. **Class 3, Credit 4 (offered occasionally)**

0507-557 Communism, Fascism, and Democracy in Their Theoretical Foundations

A political and historical appraisal of these philosophies. Emphasis is placed upon the claims they make with regard to the individual and the state and the changes they demand for the future. **Class 3, Credit 4 (offered occasionally)**

Science, Technology, and Society

0508-211 Science, Technology, and Values

This course explores the concepts and effects of science and technology in society, analyzes the relationship between science and technology, examines how each has come to play a major role today, and looks at how science and technology have 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 3, Credit 4 (offered quarterly)**

0508-440 History of Science

This course presents a study of the origins, nature, and development of Western science, and its social, economic, and cultural context. This course is part of the Social Impacts of Science and Technology Concentration and also may be taken as an elective.**Class 3, Credit 4 (offered annually)**

0508-441 Science and Technology Policy

This course will examine 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. This course is part of the Social Impacts of Science and Technology Concentration and also may be taken as an elective.**Class 3, Credit 4 (offered annually)**

0508-442 History of American Technology

This course presents an examination of the cultural context of American technology and its influence on American social, economic, political, and cultural institutions. This course is part of the Social Impacts of Science and Technology Concentration and also may be taken as an elective.**Class 3, Credit 4 (offered annually)**

0508-443 Face of the Land

This course is a case study in the relationship of technology and society, focusing on the interaction of land, people and technology. By considering the natural landforms of the United States and other countries as appropriate, students will 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. This course is part of the Social Impacts of Science and Technology Concentration and also may be taken as an elective.**Class 3, Credit 4 (offered annually)**

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 will study several interactions between technology and the world in which we live. We will investigate how various technologies developed and compare the expected effects of the new technologies with the actual results. This course is part of the Social Impacts of Science and Technology Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0508-445 Biomedical Issues in Science and Society

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. This course is part of the Social Impacts of Science and Technology Concentration and also may be taken as an elective.**Class 3, Credit 4 (offered annually)**

0508-446 Makers of Modern Science

This course is designed to help 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. This course is part of the Social Impacts of Science and Technology Concentration and also may be taken as an elective.**Class 3, Credit 4 (offered annually)**

0508-447 Special Topics in the Social Impacts of Science and Technology

This course will be offered periodically in the Social Impacts of Science and Technology Concentration. Topic and specific content and methods will vary from year to year or term to term. The course will allow examination of a special problem or area relevant to the other courses in this area of study. It also may be taken as an elective.**Class 3, Credit 4 (offered occasionally)**

0508-481 Introduction to Environmental Studies

This course seeks to make students aware of the environmental consequences of modern technology by investigating to what degree various technological systems conflict with the basic

ecological principles. This course is part of the Environmental Studies Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0508-482 Energy and the Environment

In this course we will look at the current situation, 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 will 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 will look especially at the role of government policy in the energy area. This course is part of the Environmental Studies Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

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. This course is part of the Environmental Studies Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

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. The purpose of this course is to study the consequences of major environmental legislation and regulations and to examine the actions of both citizens and the corporate sector as they comply with these laws. The course also will focus on the economic and social implications and value of environmental regulation and enforcement and will identify current developments in the area. This is a concentration course in the Environmental Studies Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

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 will aid in understanding some of the current energy conflicts and debates. This course is part of the Environmental Studies Concentration and may also be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0508-486 Modern Warfare Technology and Arms Control Problems

In this course we will study the importance of science and technology to defense matters. We investigate 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. However, we shall also see how scientists, by providing their expertise, have been able to influence national security and attempts to control arms. This course is part of the Peace Studies Concentration and the Social Impacts of Science and Technology Concentration. It also may be used as an elective. **Class 3, Credit 4 (offered annually)**

0508-487 Special Topics in Environmental Studies

This course will be offered periodically in the Environmental Studies Concentration. Topic and specific content and methods will vary from year to year or term to term. The course will allow examination of a special problem or area relevant to the other courses in this area of study. It also may be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0508-503 Technology and the Individual

A study of the effects on the life of the individual due to the acceleration of technological change. **Class 3, Credit 4 (offered occasionally)**

0508-506 Space, Time and 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. **Class 3, Credit 4 (offered occasionally)**

0508-507 Community Energy Planning

This course is designed to allow 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 3, Credit 4 (offered occasionally)**

0508-512 Science as a Humanity

A telecourse designed to present the way of the humanist and reveal it as commanding more of the hidden potential of the individual, and to present science as an expression of the human spirit that commands more of the hidden potential of nature. Science is presented as one lifestyle—a human one based on the need for understanding, and not for the sake of progress, survival, or upgrading one's position in the world. **Class varies, Credit 4 (offered on sufficient demand)**

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 3, Credit 4 (offered occasionally)**

0508-515 Community Environmental Issues

This course will explore 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 in this course will be on events and issues relating primarily to Monroe County, the topics are prevalent in any community in the United States today. The intent of the course is to allow the student to learn 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 3, Credit 4**

PHILOSOPHY

0509-210 Philosophy: Selected Issues

An introduction to some of the major problems, methods, and insights of philosophy with readings from both classical and contemporary sources. **Class 3, Credit 4 (offered quarterly)**

0509-211 Philosophy: Ethics

An introduction to moral philosophy through an analysis, comparison, and evaluation of some main theories that have been offered as systematic ways of making moral decisions, and through discussions of contemporary moral problems. **Class 3, 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 3, Credit 4 (offered quarterly)**

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. This course is part of the Philosophy Concentration and the Perspectives on Religion Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0509-441 Logic

An introduction to the basic principles of logic. The main emphasis will be on symbolic, or formal logic, but some attention may be paid to informal logic as well. This course is part of the Philosophy Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0509-442 Aesthetics

This course will introduce students to thinking philosophically about the nature of art and its relation to other human experiences. Among the topics considered will be: the aesthetic experience, the relation between morality and art, ugliness in art, and truth in art. This course is part of the

Philosophy Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

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. This course is part of the Philosophy Concentration 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 3, Credit 4 (offered annually)**

0509-444 The Great Thinkers

This course will introduce the student to the thought of some of those philosophers who have been most influential in the history of ideas. An attempt will be made to cover in some depth the works of one or more of those 'great thinkers.' It is hoped that 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. The course is part of the Philosophy Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0509-445 Social and Political Philosophy

An examination of some of the main problems of social and political philosophy through an 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. This course is part of the Philosophy Concentration and also may be taken as an elective. (At least one prior course in philosophy, political science, or sociology) **Class 3, Credit 4 (offered annually)**

0509-446 Philosophy of Law

This course is 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. This course is part of the Philosophy Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0509-447 Contemporary Moral Problems

This course will present moral issues which arise in the professions and other areas of technical expertise. These problems in applied ethics will be 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 will apply moral theory to one of a number of professional areas, such as business, communications, medicine and bioethics, public policy, and technology. This course is part of the Philosophy Concentration and also may be taken as an elective. (0509-211) **Class 3, Credit 4 (offered annually)**

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. This course is part of the Peace Studies Concentration and Philosophy Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0509-449 Special Topics in Philosophy

This course will be 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. This course is part of the Philosophy Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0509-450 Undergraduate Seminar in Philosophy

This course will examine some area of philosophy at an advanced undergraduate level. The area examined will probably 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. This course is part of the Philosophy Concentration and also may be taken as an elective. (Two courses in philosophy, or permission of the instructor) **Class 3, Credit 4 (offered occasionally)**

BEHAVIORAL SCIENCE

ANTHROPOLOGY

0510-210 Cultural Anthropology

This course is 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 3, Credit 4 (offered quarterly)**

0510-440 Culture in Crisis

The Chinese proverb 'may you be cursed to live in interesting times' sets the tone for this course. Change in all subsystems of human culture is the hallmark of the 20th century. The stress and strain that accompany change challenge every traditional way of life in the world today. From peasant revolutions and millenarian movements, to the feminist activism of the past generation, causes and consequences are explored in historical and cross- cultural perspective. This course is part of the Social Change in a Technological Society Concentration and also may be taken as an elective. (0510-210 or 0515-210) **Class 3, Credit 4 (offered annually)**

0510-441 American Culture: The Anthropology of Us

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. This course is 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 3, Credit 4 (offered occasionally)**

0510-483 The Anthropology of Religion

This course is designed to provide 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 will be studied from a cross-cultural, anthropological perspective. Emphasis will be on primitive and peasant societies. This course is part of the Perspectives on Religion Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered occasionally)**

0510-501 Anthropological Research Methods: Explorations in Subcultural Diversity

This course is designed to expose students from a variety of backgrounds to an alternative means of understanding human behavior through the methods of the cultural anthropologist and to demonstrate that variations in cultural patterning exist in our presumably homogeneous society. The primary emphasis in the course will be 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 3, Credit 4 (offered occasionally)**

0510-502 American Culture: The Archaeology of Us

American history and contemporary American society are examined through the only unexpurgated record of our behavior, the material remains. This course 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 3, 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 twentieth century. The dynamics of intergroup relations will have a profound impact on American economic, social, political, and cultural life in the twenty-first century. The course approaches diversity as an asset; an individual's appreciation for this diversity depends upon replacing a monocultural 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 will be used in order to assist students in understanding and adjusting to diversity. **Class 3, Credit 4 (offered annually)**

PSYCHOLOGY

0514-210 Introduction to Psychology

This course is designed to introduce the student to the scope and methodology of psychology. Topics will include: aims and methods, sensation and perception, learning and memory, emotion

and motivation, normal and abnormal personality, and social psychology. **Class 3, Credit 4 (offered quarterly)**

0514-440 Childhood and Adolescence

This course 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. This course is part of the Psychology Concentration and also may be taken as an elective. (0514-210 or equivalent) **Class 3, Credit 4 (offered annually)**

0514-441 Growth Psychology

This course examines the major assumptions, theories, and implications of 'growth' or humanistic psychology. In the course, students will 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. This course is part of the Psychology Concentration and also may be taken as an elective. (0514-210 or equivalent) **Class 3, Credit 4 (offered annually)**

0514-442 Adulthood and Aging

This course 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. This course is part of the Psychology Concentration and also may be taken as an elective. (0514-210 or equivalent) **Class 3, Credit 4 (offered annually)**

0514-443 Learning and Memory

This course focuses on the environmental forces that are responsible for the outcome of human development. It studies how learning shapes and changes individuals almost from the moment they are born and how it continues to be all pervasive throughout their lives. It examines the complexity of memory process, which is an essential element of learning and learning theories and their applications in real-life situations. This course is part of the Psychology Concentration and also may be taken as an elective. (0514-210 or equivalent) **Class 3, Credit 4 (offered annually)**

0514-444 Social Psychology

This course will attempt to give 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. This course is part of the Psychology Concentration and also may be taken as an elective. (0514-210 or equivalent) **Class 3, Credit 4 (offered annually)**

0514-445 Psychology of Perception

This course covers topics of all sense modalities with emphasis on visual perception. It 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. This course is part of the Psychology Concentration and also may be taken as an elective. (0514-210 or equivalent) **Class 3, Credit 4 (offered annually)**

0514-446 Psychology of Personality

This course 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. This course is part of the Psychology Concentration and also may be used as an elective. (0514-210 or equivalent) **Class 3, Credit 4 (offered annually)**

0514-447 Abnormal Psychology

This course 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. This course is part of the Psychology Concentration and also may be used as an elective. (0514-210 or equivalent) **Class 3, Credit 4 (offered annually)**

0514-448 Industrial Psychology

Consideration of principles and application of, and current research in, industrial psychology, with particular reference to personnel selection, training, motivation, morale, performance appraisal, leadership, and communication. This course is part of the Psychology Concentration and also may be taken as an elective. (0514-210 or equivalent)**Class 3, Credit 4 (offered annually)**

0514-449 Behavior Modification

This course will teach you the skills of changing your behavior by controlling your environment and the consequences of your behavior. This course is part of the Psychology Concentration and also may be taken as an elective. (0514-210 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0514-450 Psychology of Altered States of Consciousness

This course will cover such topics as the specialized consciousness in the two halves of the brain, dreaming, hypnosis, meditation, systematic relaxation, and parapsychology. The course format will combine discussion and demonstration. This course is part of the Psychology Concentration and also may be taken as an elective (0514-210 or equivalent)**Class 3, Credit 4**

0514-451 Psychology of Motivation

The course surveys basic motivational concepts and provides a fair representation of many different areas of motivational research, relating these to each other where possible. This course is part of the Psychology Concentration and may also be taken as an elective. (0514-210 or equivalent) **Class 3, 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. (0514-210 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0514-480 Psychology of Women

This course examines the relevance and applicability of present psychological theory and research to the understanding of the development and behavior of women. Major topics covered include: psychological and biological sex differences, psychological theories of women's development, the relationship between female personality development and various sociocultural factors, women's place in society, women and their bodies, and women and mental health. This course is part of the Women's Studies Concentration and also may be taken as an elective.**Class 3, Credit 4 (offered annually)**

0514-483 Social Psychology of Religion

This course examines religions as cultures which, 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. It will examine the way religions use education, ritual, rewards, punishment, symbols, and other mechanisms of social control and cohesion formation to build and nurture their flocks. In addition it will examine the ways in which religious organizations and their individual members reconcile conflicts between religious and secular norms, world views, loyalties, and problem-solving strategies. Finally it will suggest 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. This course is part of the Perspectives on Religion Concentration and also may be taken as an elective.**Class 3, Credit 4 (offered annually)**

0514-504 Attitude Formation and Persuasion Techniques

The course will focus on current theories of attitude formation, and seek 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 3, Credit 4 (offered occasionally)**

0514-515 Psychology of Human Adjustment

This course will teach you the skills of coping with a variety of everyday experiences. Particular attention will be given to the areas of self validation, interpersonal tactics, and interpersonal relations. (0514-210 or equivalent)**Class 3, Credit 4 (offered occasionally)**

0514-517 Death and 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. (0514-210 or equivalent) **Class 3, Credit 4 (offered annually)**

0514-521 Psychology and Politics

This course 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. (0514-210 or equivalent) **Class 3, Credit 4 (offered occasionally)**

SOCIOLOGY

0515-210 Foundations of Sociology

This course 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 3, Credit 4 (offered quarterly)**

0515-441 The Changing American Family

This sociology course examines contemporary patterns in the courtship, marital, and family systems of the United States with special reference to gender role definitions, participation in the workplace, and variations in social class. This course is part of the Social Change in a Technological Society Concentration and also may be taken as an elective. (0515-210 or 0510-210) **Class 3, Credit 4 (offered annually)**

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. It also examines the issues of neighborhoods, subareas, ghetto enclaves, metropolitan regions, urban social and political structures, problems, services, and planning. This course is part of the Social Change in a Technological Society Concentration and also may be taken as an elective. (0515-210 or 0510-210) **Class 3, Credit 4 (offered annually)**

0515-443 Sociology of Work

This sociology course analyzes the essential properties of work, its structure, the group processes involved in it, and its social meaning. The course treats work as emerging, like other social realities, out of social relationships between individuals and groups. It looks at ways in which people can develop a positive self-regard or a sense of alienation in their occupations and professions and various types of work organizations. It also considers leisure as a complement to work. This course is part of the Social Change in a Technological Society Concentration and also may be taken as an elective. (0515-210 or 0510-210 or instructors permission) **Class 3, Credit 4 (offered annually)**

0515-444 Social Change

Few people need to be more prepared to deal with social change than professionals in technical fields. In this culture, technology is often at the center of change and technical people are expected not only to cope with change but to help guide it. The purpose of this course is to help students understand and deal with change rather than to simply react to it. This course is 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 3, Credit 4 (offered annually)**

0515-446 Sociology of Health

This course is 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 will be 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. This course is 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 3, Credit 4 (offered annually)**

0515-447 Women in Contemporary U.S. Society

This sociology course will examine three major social institutions which shape the lives of women in contemporary U.S. society: the family, the workplace, and political structure. This course is part of the Social Change in a Technological Society Concentration and the Women's Studies

Concentration, and also may be taken as an elective. (0515-210 or 0510-210)**Class 3, Credit 4 (offered annually)**

0515-448 Minority Group Relations

This course will deal 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 will be analyzed as forms of conflict resolution. This course is part of the Social Change in a Technological Society Concentration and the Minority Group Relations Concentration, and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0515-449 Population and Society

Study of demographic variables of mortality, fertility, and migration as they affect the rise and quality of population. This course is part of the Social Change in a Technological Society Concentration and also may be taken as an elective. (0515-210 or 0510-210)**Class 3, Credit 4 (offered annually)**

0515-482 African American Culture

This course is designed to analyze past, present, and future social policies, programs, and practices from their actual and predictable effects on black people. These analyses and solutions will 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. The course is designed to present a systematic means of facilitating change in people's attitudes and behaviors. This course is part of the Minority Relations Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0515-483 Hispanic American Culture

This course offers 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 will be 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 will be specifically selected for analysis. The course will help students to better understand the problems faced by Hispanic Americans by looking at specific socio-economic indicators such as: their access to health care, job opportunities, educational institutions, and the degree to which Hispanics have 'progressed' in the U.S. This course is part of the Minority Relations Concentration and also may be taken as an elective. **Class 3, Credit 4 (offered annually)**

0515-506 Social Inequality

This is a survey course that will examine different dimensions of stratification in the U.S. and elsewhere. Explanations for the existence of inequality will be addressed at individual, group, and institutional levels. **Class 3, Credit 4 (offered occasionally)**

0515-507 Complex Organizations

This course analyzes the structure and dynamics of a wide variety of social organizations (government bureaucracies, corporations, and voluntary groups). Topics discussed will include theories of organization, organizational processes, technological impact, and organizational change and development. An examination of the internal operation of large organizations will include sources of power and authority, modes of communication, division of labor as well as tension, stress, and strain. **Class 3, Credit 4 (offered occasionally)**

0515-508 Aging and Society

This course considers concepts, issues, and research techniques in the behavioral and biological aspects of aging. It examines the interaction of group processes in the family and community which influence society's attitudes toward the aging process. It further examines the cultural, environmental, and institutional changes as they relate to an increasing population of older people. **Class 3, Credit 4 (offered annually)**

0515-509 Social Policy

An examination of social policy formulation in a variety of contexts from local government to national government. Special attention will be given to the strategies, choices, and priorities in the

formulation of social policy. The course will deal with historical development of social policies including the issues of health, aging, poverty, family, and children. The course also will examine the question of how social values and economy influence policy development. **Class 3, Credit 4 (offered occasionally)**

0515-510 Juvenile Justice

The philosophical, historical, and operational aspects of the juvenile justice system; evaluation of the social and personal factors related to juvenile delinquency; the role of police, the courts, corrections, and community programs in delinquency prevention, control, and treatment. **Class 3, Credit 4 (offered annually)**

0515-513 Criminology

A survey of the field of criminology with emphasis on major forms of contemporary crime, definition of crimes and criminality, the extent of crime, criminal typologies, and fundamental aspects of the social control of crime. **Class 3, Credit 4 (offered annually)**

0515-515 Social Policy and the Aging

This course will be organized around culture and values as context for policy formulation. Special attention will be given to the process of policy analysis and implementation. Several specific policy areas will be examined: social security and income maintenance; health and long-term care; work and retirement; social services and the aging network; housing and living arrangements for the elderly; and the role of the family and the elderly. **Class 3, Credit 4 (offered annually)**

0515-524 Applied Sociology

This course is an effort to provide 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 3, Credit 4 (offered annually)**

0515-529 Deaf Culture in America

This course is an introductory survey of culture among various groups of deaf people in the United States. Students will study the scholarly literature dealing with these groups and will have contact with member of this community. This study will familiarize 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 3, Credit 4 (offered annually)**

0515-569 Human Sexuality

This course is designed to be sex positive in its approach to the study of human sexual behavior. It will focus 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 will be examined and clarified. **Class 3 + 2 hr. weekly seminar, Credit 4 (offered biannually)**

SOCIAL SCIENCE
ECONOMICS

0511-440 Urban Economics and Public Policy

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 which explain the location behavior of consumers and businesses in cities. The second part of the course is issue oriented, applying the insights gained in the first part to a number of urban problems. This course is part of the Economics Concentration and also may be taken as an elective. (0511-301) **Class 3, Credit 4 (offered annually)**

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. This course is part of the Economics Concentration and also may be taken as an elective. (0511-301)**Class 3, Credit 4 (offered annually)**

0511-442 Contemporary International Economic Problems

This course aims to prepare 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 the course is basically a theory course in economics, the applied aspects of international trade and finance are emphasized. This course is part of the Economics Concentration and also may be taken as an elective. (0511-301) **Class 3, Credit 4 (offered annually)**

0511-443 Current American Macroeconomic Problems

This course is 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. This course is part of the Economics Concentration and also may be taken as an elective. (0511-301)**Class 3, Credit 4 (offered annually)**

0511-444 Public Finance

This course is 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. This course is part of the Economics Concentration and also may be taken as an elective. (0511-301) **Class 3, Credit 4 (offered annually)**

0511-445 Survey of Economic Thought

This course is a survey of the various schools of thought which have developed in economics from the late eighteenth century up to the present. Representative economists from each of the major schools (Classical, Marxian, Neo-Classical, Keynesian, Monetarist, etc.) are studied. This course is part of the Economics Concentration and also may be taken as an elective. (0511-301)**Class 3, Credit 4 (offered annually)**

0511-446 Economics, Public Policy, and Competition

This course is 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. This course is part of the Economics Concentration and also may be taken as an elective. (0511-301)**Class 3, Credit 4 (offered annually)**

0511-448 Economics of Less Developed Countries

This course introduces students 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. This course is part of the Global Studies Concentration and the Economics Concentration and also may be taken as an elective. (0511-301)**Class 3, Credit 4 (offered annually)**

0511-449 Comparative Economic Systems

This course provides a comparative analysis of different economic systems. The three major economic systems to be studied are the Capitalist Mode of Production, the Planned Economy, and the Mixed Economy. The student will study the economic decision-making process in each system including the economic structure, operation, and relative efficiency in achieving its macroeconomic goals. Upon completion of this course, the student will be able to critically evaluate each economic system, recognize the advantages and disadvantages of each, and propose general policy recommendations to improve each system's relative efficiency. This course is part of the Global Studies Concentration and the Economic Concentration and also may be taken as an elective. (0511-301) **Class 3, Credit 4 (offered occasionally)**

0511-450 Benefit-Cost Analysis

This course 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. It is part of the Economics Concentration and also may be taken as an elective. (0511-301) **Class 3, Credit 4 (offered annually)**

0511-451 Forensic Economics

Forensic economics is the application of economics to the law. A major subset of this discipline involves the determination of economic damages resulting from personal injury and wrongful death. More recently, forensic economists have been involved in measuring damages arising from malpractice claims, division of marital property in divorce cases, and the determination of damages resulting from loss of employment. In addition, a major obstacle faced by the forensic economists involves the methodological issues in determining damages. Analysis of these and other issues will be the foundation of this course. This course is part of the Economics Concentration and also may be taken as an elective. (0511-301) **Class 3, Credit 4 (offered annually)**

0511-480 The Economic Role of Women

This course is intended to analyze the economic role of women in today's society. This analysis 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 3, Credit 4 (offered on sufficient demand)**

0511-481 Environmental Economics

The course will examine 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. This course is part of the Environmental Studies Concentration and the Economics Concentration and also may be taken as an elective. (0511-301) **Class 3, Credit 4 (offered annually)**

POLITICAL SCIENCE

0513-211 American Politics

This course is a study of the American national political system, its theoretical foundations and institutions, and the contemporary issues which confront it. **Class 3, Credit 4 (offered quarterly)**

0513-215 Political Decision Making

This course examines major ideological concepts and how these are operationalized through the political processes of various governmental structures. **Class 3, Credit 4 (offered quarterly)**

0513-440 International Relations

This course critically analyzes 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. This course is part of the International Relations Concentration, the Global Studies Concentration, the Peace Studies Concentration and also may be taken as an elective. (0513-211 or 0513-215 or equivalent) **Class 3, Credit 4 (offered annually)**

0513-441 Politics in China

This course is designed to provide the students with the political dynamics of the People's Republic of China. Major emphasis will be given to the historical background, major aspects of the political systems, and the foreign relations of China. This course is part of the International Relations Concentration and the Foreign Language/Culture Study Concentration and also may be taken as an elective. (0513-211 or 0513-215) **Class 3, Credit 4 (offered annually)**

0513-442 Government and Politics of Russia and the C.I.S .

This course provides an analysis of the politics and governmental systems in Russia and the former republics of the Soviet Union that now comprise the Commonwealth of Independent States (C.I.S.). Emphasis will be on the dynamics of political, economic, and social change, as well as political leadership and contemporary issues. This course is part of the International Relations Concentration and also may be taken as an elective. (0513-211 or 0513-215 or equivalent)**Class 3, Credit 4 (offered annually)**

0513-443 Foreign Policy of Russia and the C.I.S .

This course critically examines fundamental elements of the foreign policy of Russia and the Commonwealth of Independent States (C.I.S.) from the Soviet era to the present. Special emphasis will be 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 inter-commonwealth. This course is part of the International Relations Concentration and also may be taken as an elective. (0513-211 or 0513-215)**Class 3, Credit 4 (offered annually)**

0513-444 The Cold War

This course is 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. This course is part of the International Relations Concentration and also may be taken as an elective. (0513-211 or 0513-215 or equivalent) **Class 3, Credit 4 (offered annually)**

0513-445 Comparative Politics

This course 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. This course is part of the International Relations Concentration, the American Politics Concentration, and the Global Studies Concentration, and also may be used as an elective. **Class 3, Credit 4 (offered annually)**

0513-450 State and Local Politics

This course is a study of politics and government on the state and local levels, and the relationships between these levels and the federal government. It will illustrate differences in state governments by comparing other states to New York, and will use the Rochester area for comparisons with local governments found elsewhere. This course is part of the American Politics Concentration and also may be taken as an elective. (0513-211 or 0513-215 or equivalent)**Class 3, Credit 4 (offered annually)**

0513-451 The Legislative Process

This course examines the role of the legislature in the U.S. political process. The primary emphasis will be the study of the U.S. Congress, but some attention also will be directed to state legislatures. Topics to be studied include elections, party organization, committees, interest group activities, and executive-legislative relations. This course is part of the American Politics Concentration and also may be taken as an elective. (0513-211 or 0513-215 or equivalent)**Class 3, Credit 4 (offered annually)**

0513-452 The American Presidency

This course is a study of the role of the presidency in the American political system. Among the topics to be 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. This course is part of the American Politics Concentration and also may be taken as an elective. (0513-211 or 0513-215 or equivalent)**Class 3, Credit 4 (offered annually)**

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. This course is part of the American Politics Concentration and the International Relations Concentration and also may be taken as an elective. (0513-211 or 0513-215 or equivalent) **Class 3, Credit 4 (offered annually)**

0513-454 Political Parties and 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. Its overall emphasis is on the degree to which parties perform or fail to perform as links between citizens and government. This course is part of the American Politics Concentration and also may be taken as an elective. (0513-211 or 0513-215 or equivalent)**Class 3, Credit 4 (offered annually)**

0513-455 Politics and Public Policy

This is a course in the politics of the policy process. The basic questions of the course are: 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? This course is part of the American Politics Concentration and also may be taken as an elective (0513-211 or 0513-215 or equivalent)**Class 3, Credit 4 (offered annually)**

0513-456 The Judicial Process

This course examines the structure and function of the state and federal courts in the American political system. This course is part of the American Politics Concentration and also may be taken as an elective. (0513-211 or 0513-215)**Class 3, Credit 4 (offered annually)**

0513-457 Constitutional Law

This course has been designed to provide 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. This course is part of the American Politics Concentration and also may be taken as an elective. **Class 3, Credit 4**

0513-502 Politics of Developing Countries

Since World War II more than 100 new countries have joined the global political system and they are searching for appropriate political means to serve their societies' ends. In addition, many older and established countries have been struggling to adjust their political arrangements to cope more effectively with modern problems. Several elements are involved in this complex process: social mobilization, economic development, and political modernization. This course will focus on the political problems of the developing countries which occupy roughly the southern half of the earth's land mass. **Class 3, Credit 4 (offered occasionally)**

0513-504 20th Century America

An examination of the major political, social, and economic developments affecting the United States in the 20th century. Emphasis will be placed upon the reactions of the various presidential administrations to conditions in both the domestic and foreign fields.**Class 3, Credit 4 (offered occasionally)**

0513-514 Theories of 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 3, Credit 4 (offered occasionally)**

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 findings in a paper or project. While the content and focus of the seminar will change from year to year, it will always direct student 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 1, Credit 2 (offered quarterly)**

Independent Study

A student may register for an independent study project subject to the approval of the faculty sponsor, student's department, the academic committee of the College of Liberal Arts and the dean of the College of Liberal Arts and providing that she or he has a minimum GPA of 2.7 at time of application. An independent study project is not a substitute for a course. It enables the

interested student and his or her faculty sponsor to coordinate their efforts on subjects and topics that range beyond the normal sequence of course selection. **Credit variable (offered annually)**

SERVICE COURSES

Service courses are required courses offered by the College of Liberal Arts for specific professional departments. These courses may not be taken for Liberal Arts credit

0519-201, 202, 203 History of Airpower

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. **Class 1 (201, Credit 1); (202, Credit 2); (203, Credit 1) (offered annually)**

0513-401 National Security Forces in Contemporary American Society 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) **Class 4, Credit 5 (offered annually)**

0513-402 National Security Forces in Contemporary American Society 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) **Class 3, Credit 4 (offered annually)**

0520-201 Seminar: Academic Fields of Study (Tech. and Lib. Studies)

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. **Class 1, Credit 1 (offered annually)**

0502-301, 302 College Writing I, II

This course sequence develops minimal college-level writing competencies. The credits earned, however, may not comprise part of the students normal Liberal Arts curriculum. Furthermore, this sequence may not be substituted for English Composition. **Class 1, Credit 1 (offered quarterly)**

0535-310 Conference Techniques

Basic theories of conference techniques including leadership, participation, types, and functions of public and private conferences and their evaluation. Student participation in training, problem solving, and informational/developmental conferences. **Class 4, Credit 4 (offered annually)**

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. **Class 3, Credit 4 (offered annually)**

0502-404 Communication with the Handicapped

An examination of the communication difficulties with the handicapped: specifically the deaf, blind, and others with physical handicaps. To include interpersonal, family, social, and rehabilitation modes of communication. (0514-210) **Class 3, Credit 4 (offered occasionally)**

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 3, Credit 4 (offered quarterly)**

0511-302 Principles of Economics II

This 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. **Class 3, Credit 4 (offered quarterly)**

0518-200 Basic Communications

Students will gain an understanding of deafness, plus basic skills which will permit communication with a segment of the deaf population. **Class 3, Credit 4 (offered on sufficient demand)**

0518-201, 202, 203 Manual Communication I, II, III

A course designed to provide the student with the basic vocabulary of frequently used signs and the American manual alphabet. **Class 3, Credit 4 (offered on sufficient demand)**

COLLEGE OF SCIENCE COURSES

Biology
Chemistry
Mathematics
Physics
General Science
Allied Health Sciences
Clinical Chemistry
Materials Science and Engineering

COLLEGE OF SCIENCE

Dr. Mary-Beth Krogh-Jespersen, 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, 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 90 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 and friend.

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

The College of Science was built in 1968. In addition to an auditorium and nine classrooms, there are 22 teaching laboratories and 16 research laboratories that provide space for laboratory course work and student research projects. Some of the facilities within the building have specialized purposes. For example, we have a laser-optics laboratory, an animal care facility, a diagnostic medical imaging laboratory, a plasma etching laboratory, three greenhouses, an electronics laboratory, a nuclear magnetic resonance laboratory, and an electron microscope center. All of these facilities are used by 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

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 or permission of instructor) **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, 206, 207 General Biology Laboratory

Laboratory work to complement the lecture material of General Biology (1001-201, 202, 203). The experiments are designed to illustrate concepts, develop laboratory skills and techniques, and improve ability to make, record and interpret observations. (Corequisite (1001-201, 202, 203) **Lab 3, Credit 1 (F, W, 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)**

1001-301 Invertebrate Zoology

Biology of invertebrate animals with emphasis on phylogeny and functional morphology. (One year of general biology or permission of instructor) **Class 3, Lab 3, Credit 4 (Not offered in 1994 -95)**

1001-302 Vertebrate Zoology

Morphology, physiology, behavior, classification, and ecology of chordates. (One year of general biology) **Class 3, Lab 3, Credit 4 (Not offered in 1994 -95)**

1001-303 Comparative Vertebrate Anatomy

A comparative study of the organ systems of representative members of the vertebrates with emphasis on structural changes which occur during evolution. (1001-305, 306) **Class 3, Lab 6, Credit 5 (Offered upon sufficient request)**

1001-304 Botany

Distribution of the major groups of plants and their adaptations to their particular environment. (One year of general biology or permission of instructor) **Class 3, Lab 3, Credit 4 (W)**

1001-305 Physiology and Anatomy

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. (One year of general biology or permission of instructor for non-science majors) **Class 4, Lab 3, Credit 5 (W)**

1001-306 Physiology and Anatomy

An integrated approach to the structure and function of the gastrointestinal, cardiovascular, immunological, respiratory, excretory and reproductive systems with an emphasis on the maintenance of homeostasis. Laboratory exercises include histological examinations, anatomical dissections and physiological experiments using human subjects. (1001-305 or permission of instructor) **Class 4, Lab 3, Credit 5 (S)**

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. (One year of general biology 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. (One year of general biology or equivalent) **Class 4, Lab 0, Credit 4 (F)**

1001-320 Histology

Detailed microscopic studies on the structure and function of normal human tissues. (One year of general biology; 1001-305, 306, recommended)**Class 3, Lab 3, Credit 4 (F)**

1001-330 Small Animal Laboratory Techniques

A course designed to prepare the student for small animal handling, biological administrations and preparations, minor surgery and autopsies. (3rd-, 4th-, 5th-year status and permission of instructor)**Class 1, Lab 3, Credit 3 (S)**

1001-340 General Ecology

Introduction to ecosystem ecology stressing the dynamic interrelationships of plant and animal communities with their environments. A study to include such ecological concepts as energy flow and trophic levels in natural communities, plant responses and animal behavior, population dynamics, bio-geography and representative ecosystems. (One year of general biology)**Class 3, Lab 3, Credit 4 (F)**

1001-350 Molecular Biology

The study of structure, function, and organization of proteins, nucleic acids and other biological macromolecules. (One year of general biology, 1013-233, second- or third-year status) **Class 3, Lab 3, Credit 4 (W)**

1001-360 Horticulture

A basic introduction to horticulture with a study of the interconnections of plants, gardens and their environment and discussion relating to applications of principles to indoor and outdoor gardening.**Class 3, Lab 3, Credit 4 (Not offered in 1994 -95)**

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 2 (F, W, S)**

1001-380 Human Gross Anatomy

This course is designed to expose 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 2, Lab 6, Credit 4 (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. (One year of General Biology or equivalent)**Class 3, Lab 0, Credit 3 (Not offered in 1994-95)**

1001-402, 702 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. (One year of general biology)**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 Introductory Microbiology

Introduction to microorganisms and their importance. Principles of structure, metabolic diversity, taxonomy, environmental microbiology, and infectious diseases of procaryotes will be discussed. Basic laboratory techniques, microscopy, staining, bacterial identification, and food testing. (1001-350, one year of general biology and one year of organic chemistry)**Class 3, Lab 4, Credit 5 (F, W)**

1001-407 Microbial and Viral Genetics

The study of the molecular genetics of bacteria, bacteriophages, fungi, and eucaryotic viruses. (1001-350, 421; 1013-334) **Class 3, Lab 3, Credit 4 (S)**

1001-415 Functional Biology of Invertebrate Animals

A study of the unifying features of the functional anatomy, physiology, and behavior of invertebrates. Emphasis is placed 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 (F)**

1001-417 Industrial Microbiology

Practical applications of yeasts, fungi and bacteria in industrial fermentations. Industrial aspects of fermentor design, pilot plant operations, strain development, and recovery of fermentation end products. Microbiology, biochemistry and engineering of large-scale processes. (1001-404 and one biochemistry course) **Class 3, Lab 3, Credit 4 (S)**

1001-420 Plant Ecology

A consideration of the nature and variation of plant communities with a discussion of factors which limit, maintain, and modify communities both locally and regionally. Laboratories will involve field studies of various plant communities and the gathering and analysis of data. (1001-340) **Class 3, Lab 3, Credit 4 (Not offered in 1994 -95)**

1001-421 Genetics

Introduction to the principles of inheritance; the study of genes and chromosomes at molecular, cellular, organismal, and population levels. (1001-203) **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. (One year of General Biology or equivalent) **Class 3, Lab 3, Credit 4 (Not offered in 1994-95)**

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. (One year of introductory biology or permission of instructor) **Class 2, Credit 4 (W)**

1001-430 Radiation Biology

Effects of radiation upon living tissue, both harmful and beneficial. 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, Lab 3, Credit 4 (Not offered in 1994-95)**

1001-431 Histological Techniques

Preparation of plant and animal tissues on slide mounts. Techniques in paraffin and frozen sectioning. Sectioning on the rotary and sliding microtomes and multiple staining techniques. (One year of general biology) **Class 1, Lab 4, Credit 3 (Not offered in 1994 -95)**

1001-442 Hybridoma Techniques

Designed to acquaint each student with the basic methods employed in the production of hybridoma cell lines and monoclonal antibodies. To include preparation of viable cell suspensions, cell culture fusion techniques, cloning, and monoclonal antibody production and characterization. (1001-445) **Lab 3, 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. (One year of general biology) **Class 2, Lab 3, Credit 4 (W)**

1001-446 Plant Tissue and Cell Culture

Study of the techniques and applications of plant organ, tissues, and cell culture in vitro, with emphasis on plant regeneration and protoplast manipulation. (One year of general biology) **Class 2, Lab 3, Credit 4 (S)**

1001-450 Genetic Engineering

Introduction to the theoretical basis, laboratory techniques, and applications of gene manipulation. (1001-350) **Class 3, Lab 6, Credit 5 (W)**

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 0, Credit 3 (S)**

1001-460 Basic Pathology

Introduction to pathophysiology and its consequences, basic mechanisms of disease from the clinical perspective, pathologic processes with clinical correlations. (One year of general biology or equivalent required; 1001-305, 306 strongly recommended) **Class 3, Lab 0, Credit 3 (S)**

1001-471 Freshwater Ecology

A study of the physics, chemistry and biology of inland waters. The course will emphasize the physical and chemical properties of water and how these properties affect the associated biological communities. Planktonic, benthic and littoral communities will be considered. Field trips to streams and lakes will be 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 (Not offered in 1994 -95)**

1001-473 Marine Biology

The biology of marine life, with emphasis on the roles that marine plants and animals assume in their environmental situations, 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)**

1001-490 Transmission Electron Microscopy

A lecture/laboratory course covering operation, maintenance and calibration of transmission electron microscopes; preparation of biological, chemical and physical specimens for the transmission electron microscope; black-and-white photographic darkroom techniques. (Fourth- or fifth-year status and permission of instructor) **Class 1, Lab 6, Credit 4 (Not offered in 1994 -95)**

1001-491 Scanning Electron Microscopy

A lecture/laboratory course covering operation, maintenance and calibration of scanning electron microscopes; preparation of biological, chemical and physical specimens for the scanning electron microscope; black-and-white photographic darkroom techniques. (Third-, fourth- or fifth-year status) **Class 1, Lab 6, Credit 4**

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 (F, S)**

1001-559 Special Topics: Biology

Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have 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. This course will generally be used to enable an individual to pursue studies of existing knowledge available in the literature. (One year of general biology) **Class variable, Credit variable (F, W, S)**

NOTE: The following courses can be used to satisfy the RIT Sciences and Mathematics General Education requirement

1004-210 Microbiology in Health and 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. This course includes discussions of cellular biology, skeletal, muscular, nervous, and endocrine systems.**Class 3, Lab 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, Lab 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 3, 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 3, 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 (F, S)**

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)**

CHEMISTRY

NOTE: 1011 courses, except 1011-309, may not be taken by chemistry or polymer chemistry majors.

1008-253 Quantitative Analysis I

Designed for chemistry/polymer chemistry majors. Includes topics on experimental statistics, equilibrium (acid-base, buffer, polyprotic acids, complex ions, redox), electrochemistry, and spectrophotometry. (Corequisite 1008-266) (1010-252) **Class 4, Credit 4 (offered every year) (S)**

1008-265 Quantitative Analysis I Lab

Designed for chemistry/polymer chemistry majors to complement General Chemistry II (1010-252). Experiments involve quantitative methods such as experimental statistics, spectroscopy, volumetric analyses, and kinetics. (Corequisite 1010-252) (1010-251, 1010-255)**Lab 4, Credit 1 (offered every year) (W)**

1008-266 Quantitative Analysis II Lab

Designed for chemistry/polymer chemistry majors to complement Quantitative Analysis (1008-253). Experiments involve quantitative methods such as experimental statistics, spectroscopy, volumetric analyses, potentiometry, electrogravimetric determinations, redox titration, and Gran Plot. (Corequisite 1010-253) (1016-252, 1008-265) **Lab 6 Credit 2 (offered every year) (S)**

1008-265 Quantitative Analysis I Laboratory

Experimental techniques include using the analytic balance, calibration of glassware, gravimetric determinations, titrations of weak acids and bases, multi-endpoint titrations, iodometric and EDTA

titrations, and Gran plots. Emphasis on record keeping and report writing. (Corequisites 1008-261 and 1010-252) **Lab 4, Credit 1 (offered every year) (W)**

1008-266 Quantitative Analysis II Laboratory

Experimental techniques include potentiometric and photometric determinations and titrations, electrogravimetric analysis, determination of equilibrium constant (weak acids). Emphasis on record keeping and report writing. (Corequisite 1008-262) (1008-261, 265, 1010-252) **Lab 6, Credit 2 (offered every year) (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 equivalent) **Class 3, Credit 3 (offered every year) (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 (offered every year) (S, SR)**

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 (offered every year) (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) (1010-262 or 1011-217 or equivalent) **Lab 4, Credit 1 (offered every year) (S, SR)**

1008-620 Building Scientific Apparatus

Basic skills associated with the construction of scientific laboratory apparatus, some of which is not commercially available, will be covered: machine shop skills, working with glass, vacuum technology, optics, and electronics. Special emphasis will be placed on function-structure relationship between an instrument and its intended use. Several references on construction techniques will be provided and information about current manufacturers and suppliers of necessary components will be given. (Corequisite 1018-621) (1014-441, 1017-212, 213 or 312, 313) **Class 3, Credit 3 (offered upon sufficient request)**

1009-334 Biochemistry

Introduction to biological chemistry. An in-depth survey of the molecular organization, physiological functions and bio-energetic principles of the molecular components of cells, amino acids, proteins, enzymes, carbohydrates, lipids, and nucleic acids. Emphasis is on the structure-function relationships, solution behavior, and metabolism of biomolecules. (1013-233) **Class 4, Credit 4 (offered every year) (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 advisor) **Class variable, Credit variable (offered every year) (F, W, S, SR)**

1010-200 Chemical 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 (offered every year) (F)**

1010-230 Introduction to Co-op/Chemistry Career Seminar

Exploration of cooperative education opportunities with practice in writing letters of application and resumes and in interviewing techniques. Careers related to chemistry and polymer chemistry will

be discussed, and career information resources at RIT will be utilized. **Class 1, Credit 1 (offered every year) (F)**

1010-251 General Chemistry I

Designed for chemistry/polymer chemistry majors. Includes topics on measurement, atomic theory, periodicity, moles and stoichiometry, solutions, titrations, redox reactions, energy relationships, gas laws, kinetic theory of gases, and LeChatelier's principle. (Corequisite 1010-255) **Class 3, Recitation 1, Credit 4 (offered every year) (F)**

1010-252 General Chemistry II

Designed for chemistry/polymer chemistry 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. (Corequisites 1008-265) (1010-251) **Class 3, Recitation 1, Credit 4 (offered every year) (W)**

1010-255 General Chemistry I Laboratory

Designed for chemistry/polymer chemistry 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 (offered every year) (F)**

1010-401 Chemical Literature

Instruction will be given on the use of chemical literature resources such as *Chemical Abstracts*, *Science Citation Index*, *Beilstein*, *Current Contents*, and computerized information retrieval. Students will 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), and preparing visuals, abstracts, and letters of transmittal. **Class 2, Credit 2 (offered every year) (F-X*, W)**

1010-499-01 Chemistry Co-op

Cooperative education experience for undergraduate chemistry students. **Credit 0 (Offered every quarter)**

1010-499-07 Graduate Chemistry Co-op

Cooperative education experience for graduate chemistry students. **Credit 0 (Offered every quarter)**

1010-541, 542, 543 Chemistry Research

Faculty-directed student projects or research usually involving laboratory work and/or calculations that would be considered original. (Permission of research advisor) **Class variable, Credit variable (offered every year) (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 Independent Study: Chemistry

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. (Permission of independent study advisor) **Class variable, Credit variable (offered every year) (F, W, S, SU)**

NOTE: 1011 courses, except 1011-309, may not be taken by chemistry or polymer chemistry majors.

1011-201 Survey of General Chemistry

One quarter survey of general chemistry for non-science majors with no previous background in chemistry. Fundamentals of matter and energy, the atomic theory, chemical structure and bonding, ionic species and solutions, and acid-base chemistry are covered. (Corequisite 1011-205) **Class 3, Credit 3 (offered every year) (F)**

*X, extended day (after 5 p.m.)

1011-202 Survey of Organic Chemistry

One quarter survey of the fundamentals of organic chemistry that are essential for an understanding of biological molecules, biochemistry, and the basics of polymer chemistry. Topics covered include alkanes, alkenes, alkynes, aromatics, alcohols, ethers, aldehydes, ketones, carboxylic acids and derivatives, amines, and addition and condensation polymers. (Corequisite 1011-207) (1011-201 or equivalent) **Class 3, Credit 3 (offered every year) (W)**

1011-203 Biochemistry I

Structure and reactions of the major classes of biomolecules are studied. Topics include amino acids and proteins, lipids, carbohydrates and nucleic acids. (1011-202 or equivalent) **Class 4, Credit 4 (offered every year) (S)**

1011-204 Biochemistry II

The fundamentals of the metabolism of major classes of biomolecules are covered. Topics include biochemical energetics; the metabolism of carbohydrates, lipids and proteins; and the functions of nucleic acids. (1011-203 or equivalent) **Class 4, Credit 4 (offered every year) (F)**

1011-205 Chemistry 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 (offered every year) (F, W)**

1011-206 Chemistry 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 (offered every year) (W, S)**

1011-207 Introduction to Organic Chemistry Laboratory

An introduction to organic laboratory techniques. Methods of separating, purifying, and characterizing organic compounds are covered. (Corequisite 1011-202 or 213) (1011-205) **Lab 3, Credit 1 (offered every year) (W, S)**

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 (offered every year) (F, W)**

1011-209 College Chemistry II

A continuation of 1011-208. Topics include chemical equilibrium, properties of acids and bases, aqueous equilibria, free energy, entropy and equilibrium, electrochemistry, nuclear chemistry and the chemistry of metals. (1011-208) **Class 4, Credit 4 (offered every year) (S)**

1011-211 Chemical 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 and chemical analysis; gases; acids and bases. (Corequisite 1011-205) **Class 3, Credit 3 (offered every year) (F, W)**

1011-212 Chemical Principles II

Problem-solving applications of chemical principles. Topics include thermodynamics and equilibrium, oxidation-reduction, and chemical kinetics. (Corequisite 1011-206) (1011-211) **Class 3, Credit 3 (offered every year) (W, S)**

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 will include spectroscopy, organometallics, polymers, and biomolecules. (Corequisite 1011-207) (SCHG-212) **Class 3, Credit 3 (offered every year) (S)**

1011-215 General and 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 (offered every year) (F)**

1011-216 General and 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 (offered every year) (W)**

1011-217 General and 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 (offered every year) (S)**

1011-227 General and 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, a redox titration contest, enzyme catalysis, 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 (offered every year) (S)**

1011-271 Fundamentals of Chemistry

Introduction to basic concepts of chemistry, assuming no prior experience. Topics include atomic theory, chemical bonding, stoichiometry, states of matter, and the periodic table. (Corequisite 1011-205) **Class 3, Credit 3 (offered every year) (F, W)**

1011-272 Chemistry of Water and Waste Water

Chemistry of water analyses, including solids, pH, alkalinity, acidity, chloride, phosphate, BOD, COD, nitrogen, metals, radioactivity, residual chlorine and chlorine demand. Polymers will also be covered. (Corequisite 1011-276) (1011-271 or equivalent) **Class 3, Credit 3 (offered every year) (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). (1011-271) (Corequisite 1011-277) **Class 3, Credit 3 (offered every year) (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 will be covered. (1011-271 or equivalent) **Lab 3, Credit 1 (offered every year) (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) **Lab 3, Credit 1 (offered every year) (W, S)**

1011-281 Chemical Foundations I

Basic concepts of general chemistry including measurement, atomic theory, chemical bonding, stoichiometry, the liquid and solid states, properties of water. (1016-204) **Class 3, Recitation 1, Credit 4 (offered every year) (W)**

1011-282 Chemical Foundations II

Basic concepts of general chemistry including solutions, colligative properties, acid-base theory, pH, titrations, oxidation-reduction, organic functional groups, addition and condensation polymers. (1011-281) **Class 3, Recitation 1, Credit 4 (offered every year) (S)**

1011-289 Contemporary Science: Chemistry

This course examines a broad range of contemporary scientific topics with a chemical basis. These may include nuclear power, sources of energy, air and water pollution, medicines and drugs in addition to the chemical laws and structure of the atom. **Class 4, Credit 4 (F, W, S)**

1011-309 Glassblowing Techniques

This course is designed to introduce and train each student in small-scale scientific glassblowing techniques. Proficiency will be 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)**

1013-231, 232 Organic Chemistry

Survey of the structure, nomenclature, reactions, and synthesis of the major functional groups. Mechanisms of main classes of reactions are discussed. (Corequisites 1013-235, 236) (1011-216 or 212 or 209) **Class 3, Credit 3 (offered every year) (231-F; 232-W)**

1013-233 Organic Chemistry

Structure, nomenclature, reactions, and properties of the important classes of bio-organic molecules (carbohydrates, lipids, amino acids, proteins, and nucleic acids) are covered in depth. Emphasis is on structure and reactivity in relation to biochemical processes. (Corequisite 1013-237) (1013-232) **Class 3, Credit 3 (offered every year) (S)**

1013-235, 236, 237 Organic Chemistry Laboratory

Laboratory work emphasizes techniques, preparations, and analyses. 1013-237 emphasizes reactions and properties of biomonomers and polymers. (Corequisites 1013-231, 232, 233) **Lab 3, Credit 1 (offered every year) (235-F; 236-W; 237-S)**

1013-431 Organic Chemistry I

A rigorous survey of the reactions of major organic functional groups, emphasizing alkanes, alkenes, alkyl halides, and alkynes. Stereochemistry is also included. (Corequisite 1013-435) (1010-252) **Class 3, Credit 3 (offered every year) (S, SU)**

1013-432 Organic Chemistry II

A continued survey of reactions of major organic functional groups, including aromatic compounds, alcohols, ethers, aldehydes, and ketones. Organometallics and spectral analysis (IR, UV, NMR) are also included. (Corequisite 1013-436) (1013-431) **Class 3, Credit 3 (offered every year) (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 (offered every year) (S, SU)**

1013-435 Preparative Organic Chemistry I Laboratory

Designed for chemistry and polymer chemistry majors to complement 1013-431, Organic Chemistry I. Synthesis, purification, and characterization of organic compounds will be conducted. (Corequisite 1013-431) (1010-252) **Lab 4, Credit 1 (offered every year) (S, SR)**

1013-436 Preparative Organic Chemistry II Laboratory

Designed for chemistry and polymer chemistry 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 (offered every year) (F, W)**

1013-437 Systematic Identification of Organic Compounds

A laboratory course utilizing synthesis, and chemical and spectral (IR, NMR, 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 (offered every year) (S, SU)**

1013-601 Organic Chemistry of Polymers

The chemistry of high molecular weight organic polymers and their properties are introduced and discussed in depth. Mechanisms of step-growth and chain-growth polymerization reactions, polymer reactions and degradations are studied. (1013-433)**Class 4, Credit 4 (F-X*)**

1014-301 Introduction to Polymer Technology

Survey of polymer science, including terminology, synthesis, structures, properties, applications and processing techniques of commercially significant polymers. (General Chemistry, 1016-251)**Class 2, Credit 2 (offered every year) (F)**

1014-340 Introduction to Physical Chemistry

Properties of gases, kinetic theory of gases, energy and the First Law; thermochemistry; entropy and the Second and Third Laws; introduction to Helmholtz and Gibbs free energy, gas equilibrium. (1010-252, 1016-252, 1017-311)**Class 3, Credit 3 (offered every year) (F, W)**

1014-441 Chemical Thermodynamics

Review of the thermodynamic laws; criteria for equilibrium and spontaneity; chemical equilibrium; phase rule; equilibrium in ideal and non-ideal solutions; electrochemistry. (Should be taken concurrently with 1014-445.) (1014-340)**Class 3, Credit 3 (offered every year) (S, SU-X*)**

1014-442 Quantum Chemistry

Introduction to quantum mechanics and spectroscopy, radioactivity; Planck's law; photoelectric effect; the Bohr atom; deBroglie, Schrödinger, and Heisenberg theories; eigenvalue/eigenfunction equations; variation and perturbation theory; quantum statistics; Heitler-London theory of covalent bonds; selection rules and spectroscopy. (Should be taken concurrently with 1014-446.) (1016-306, 1014-441)**Class 3, Credit 3 (offered every year) (F, W-X*)**

1014-443 Chemical Kinetics

Kinetic molecular theory; transport properties of gases; chemical kinetics; surface chemistry; photochemical kinetics; irreversible processes in solution. (Should be taken concurrently with 1014-447.) (1014-441)**Class 3, Credit 3 (offered every year) (S-X*, SU)**

1014-445 Chemical Thermodynamics Laboratory

Introduction to physical chemistry laboratory; chemical thermodynamics and equilibrium. (Should be taken concurrently with 1014-441.)**Lab 3, Credit 1 (offered every year) (S, SU-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 (offered every year) (F, W-X*)**

1014-447 Chemical Kinetics Laboratory

Laboratory experiments in chemical dynamics. (Should be taken concurrently with 1014-443.)**Lab 3, Credit 1 (offered every year) (S-X*, SU)**

1014-602 Physical Chemistry of Polymers

Study of the theoretical and experimental aspects of polymer characterization. In addition, theoretical considerations of the configuration of polymer chains and statistical thermodynamics of polymer solutions will be related to experimental results. (1014-443)**Class 4, Credit 4 (offered every year) (S-X*)**

1014-603 Structure-Property Relationships in Polymers

An introduction to the microstructure and morphology of amorphous and semicrystalline polymeric systems and their influence on thermomechanical, optical, and electronic properties of polymers. Topics include viscoelasticity and composites. (1013-601 or 1014-602)**Class 4, Credit 4 (F-X*)**

1014-604 Characterization of High Polymers

Study of experimental techniques for characterizing polymer composition, molecular weight, thermal stability, morphology, and thermo-mechanical properties. (1014-301)**Lab 6, Credit 2 (offered alternate years; next offering 1994 -95) (S)**

1014-605 Synthesis of High Polymers

Experiments on condensation, free radical, ring opening, and ionic polymerizations and polymer modification. (1013-437)**Lab 6, Credit 2 (offered alternate years; next offering 1995 -96) (F)**

1014-730 Magnetic Resonance Imaging

This course introduces the principles of magnetic resonance imaging (MRI) at a level understandable by both the scientist and non-scientist. The course begins with the basics of nuclear magnetic resonance, the foundation of MRI. Magnetic resonance imaging techniques and instrumentation will be explained. Emphasis will be placed on understanding the imaging process. A discussion of information available for water proton content images of body parts and tissue types will be presented. Future directions of MRI will be presented. (1017-311, 312, 313 or 1017-211, 212, 213) **Class 4, Credit 4 (W-X*)**

1014-740 Basics of Pulsed NMR

An introduction to the principles of pulsed nuclear magnetic resonance (NMR) spectroscopy. Lectures on instrumentation, pulse sequences, Fourier transforms, and artifacts will be presented. (1008-311) **Class 1, Credit 1 (offered every year) (F)**

**X, extended day (after 5 p.m.)*

1008-711 Instrumental Analysis

Theory, applications, and limitations of selected instrumental methods in qualitative, quantitative, and structural analysis. Topics covered include nuclear magnetic resonance, electrochemistry, surface methods and other modern instrumental methods. (1014-340, 1013-432) **Class 3, Credit 3 (offered every year) (F, W-X*)**

1008-720 Instrumental Analysis Laboratory

Lab accompanying 1008-711. Experiments include AA, FT-IR, HPLC, GC/MS, electrochemistry, and thermal analysis. Problem solving and experimental design are emphasized. **Lab 6, Credit 2 (offered every year) (F-X*, W)**

1009-702 Biochemistry: Biomolecular Conformation and Dynamics

Introduction to biological chemistry. Chemical structures, reactions, molecular organization and physiological functions of the molecular components of cells; amino acids, proteins, enzymes, enzyme kinetics, co-enzymes, biochemical thermodynamics, carbohydrates and lipids, membrane structure, and function. Emphasis is on the structure-function relationships of biomolecules, their solution behavior and dynamics. (1013-433, 1014-340 or 1009-334) **Class 3, Credit 3 (offered every year) (F, W)**

1009-703 Biochemistry: Metabolism

Bioenergetics principles; catabolism of carbohydrates, fatty acids and amino acids; photosynthesis, biosynthesis of carbohydrates, lipids, and nitrogenous compounds; metabolic diseases. (1009-702 or 1009-334) **Class 3, Credit 3 (offered every year) (F, W)**

1009-704 Biochemistry: Nucleic Acids and Molecular Genetics

The biochemistry of inheritance, expression of genetic information, protein biosynthesis. Biochemical aspects of viral and bacterial infection. (SCHB-702 or 1009-334) **Class 3, Credit 3 (offered every year) (S-X*)**

1009-705 Biochemistry--Experimental Techniques

An introduction to the theory and practice of modern experimental biochemical methods. Proteins and nucleic acids will be isolated and characterized by centrifugation, chromatography, and electrophoresis. Enzyme kinetics and quantitative analysis of biomolecules will be studied by UV-visible and fluorescent spectrophotometry. (1009-702) **Lab 6, Lecture 1, Credit 3 (S)**

1010-772 Special Topics

Advanced courses which are of current interest and/or logical continuations of the course already being offered. These courses are structured as ordinary courses and will have specified prerequisites, contact hours and examination procedures. Recent courses taught as Special Topics include Nuclear Chemistry, Polymer Morphology, Advanced Chromatographic Methods, and Applications of Computer Interfacing. **Class variable, Credit variable (offered every year)**

1010-870 Chemistry Seminar Credit 1 (offered every year)

1010-877 External Research

Industrial internship research. **Credit 1-16 (offered every year)**

1010-879-99 Continuation of Thesis

Credit 0 or 1

1010-879 Research and Thesis Guidance

Hours and credits to be arranged. Chemical research in a field chosen by the candidate, subject to approval of the department head and advisor. **Credit variable (offered every year)**

1010-899 Independent Study: Chemistry Credit variable (offered every year)

1012-762 Inorganic Chemistry I: Periodicity and Reactivity

For the common elements, mastery of chemical reactions will be required that describe their isolation, characteristic chemical reactivities, large-volume industrial processes, and environmental impacts. Relationships between the reactivities of neighboring elements will be elucidated and justified according to current theories. Nomenclature and isomerism are included. (1013-433, 1014-442) **Class 4, Credit 4 (offered every year) (S, SU-X*)**

1012-763 Inorganic Chemistry II: Isomerism, Symmetry, and Bonding

This course provides an in-depth view of how bonding theories endeavor to account for and predict the physical properties (e.g., color, magnetism, stability, chemical potential, electrical conductivity, and others) of a wide variety of inorganic compounds. Applications of bonding to current research are included. (1012-762 or permission of instructor) **Class 4, Credit 4 (offered every year) (F, W-X*)**

1012-764 Inorganic Chemistry III: Physical Methods and Applications

This course introduces the more sophisticated tools with which an inorganic chemist investigates inorganic materials. These physical methods, with the bond theories from 1012-763, are applied to inorganic reactions that exemplify the similarities and differences for the elements in each family of the periodic table. (1012-763) **Class 4, Credit 4 (offered every year) (S)**

1012-765 Preparative Inorganic Chemistry

The complexity of many inorganic 'building blocks' requires a detailed understanding of inorganic theory, special handling precautions, and special methods to investigate inorganic products. Different areas of the periodic table, new synthetic methods, and new characterization techniques are examined. (Corequisite 1012-763) (1012-762 or permission of instructor) **Lab 8, Credit 2 (offered every year) (F, W-X*)**

1013-730 Chemical Toxicology

This course provides a comprehensive introduction to the basic science of toxicology, with emphasis on a) basic principles, methods of approach and applications of toxicological data; b) types and mechanisms of toxic injury produced in major mammalian organ systems; and c) characteristics and effects of major classes of environmentally and occupationally significant toxicants. (College biology and chemistry, some biochemistry helpful, or permission of instructor) **Class 4, Credit 4 (offered alternate years; next offering 1994 -95) (W)**

1013-736 Spectrometric Identification of Organic Compounds

Theory and application of proton and carbon and 2-D nuclear magnetic resonance, infrared, mass spectrometry, and ultraviolet spectra as applied to organic structure determination. (1013-433) **Class 4, Credit 4 (offered every year) (W)**

1013-737 Advanced Organic Chemistry

Several of the following advanced topics in organic chemistry are covered: polyfunctional compounds, modern synthetic methods, anion chemistry, stereospecific syntheses, protecting group chemistry, total synthesis, with strong emphasis on recent chemical literature. (1013-433) **Class 4, Credit 4 (offered every year) (F)**

1013-739 Advanced Organic Chemistry

Selected topics in physical organic chemistry including: techniques for elucidation of mechanism (kinetic, linear free, energy relationships, isotope effects), molecular orbital theory, electrocyclic reactions. (1013-433, 1014-443) **Class 4, Credit 4 (offered alternate years; next offering 1995-96) (S)**

1013-832 Stereochemistry

Advanced treatment of steric relationships, conformational analysis and stereoisomerism in organic compounds. (1013-433, 1014-433) **Class 4, Credit 4 (offered upon sufficient request)**

1013-833 Heterocyclic Chemistry

This course will contain a general treatment of heterocyclic chemistry. Syntheses and relative reactivities of heterocyclic compounds as demonstrated by their chemical reactions. (1013-433)

Class 4, Credit 4 (offered upon sufficient request) (F)

1014-741 Advanced Chemical Thermodynamics

A study of the basic fundamentals of thermodynamics, including an introduction to statistical mechanics, and their use in deriving the interrelationships of thermodynamic functions.

Thermodynamic properties of gases will be calculated based on spectroscopic data. Theory of solutions and phase equilibria are discussed. (1014-443, 1016-306)**Class 4, Credit 4 (offered alternate years; next offering 1995 -96) (W)**

*X, extended day (after 5 p.m.)

1014-742 Survey of Physical Chemistry

A study of the fundamental principles of physical chemistry for clinical chemistry and biotechnology students. Kinetic-molecular theory, quantum mechanics, spectroscopy, thermodynamics and kinetics are presented in application to the life sciences. Not acceptable for BS in chemistry.**Class 3, Credit 3 (offered alternate years; next offering 1995 -96) (W)**

1014-743 Advanced Chemical Kinetics

Methods of investigating the kinetics of chemical reactions and the theories used to interpret their results. Focus on homogeneous reactions in gas and liquid phases. Discussions of references from recent chemical literature. (1014-443)**Class 4, Credit 4 (offered alternate years; next offering 1994-95) (W)**

1014-744 Advanced Quantum Mechanics

Review of basic quantum theory and models. Variation and perturbation methods; atomic and molecular orbital theory; emphasis on relationship of spectroscopy and quantum chemistry. (1014-442) **Class 4, Credit 4 (offered alternate years; next offering 1995 -96) (S)**

1014-747 Principles of Magnetic Resonance

A series of lectures designed to introduce the principles of magnetic resonance spectroscopies with emphasis on pulsed nuclear magnetic resonance (NMR) spectroscopy. Topics covered include classical and quantum mechanical theory, Fourier transform techniques, pulse sequences, instrumentation, instrumental techniques, and modern applications such as 2D-NMR and solid state NMR. (1014-443; 1014P-648)**Class 4, Credit 4 (offered every year) (S)**

MATHEMATICS

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. **Class 4, Credit 4 (F, W, S)**

1016-204 College Algebra and 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 (offered every year) (F, W, S)**

1016-210, 211 First-Year Seminar

210: Orientation program for entering applied statistics, applied mathematics and computational mathematics majors. Several 2-3 week modules introducing students to various non-traditional areas of mathematics; brief orientation to co-op

211: A continuation of 210 including an introduction to co-op with cover letter and resume writing. Additional mathematical and statistical topics will be discussed. A technical report is required.

Class 1, Credit 1 (offered every year) (210-F; 211-W)

1016-214, 215 Elementary Calculus I, II

214: Introduction to the study of differential calculus. The following topics will be 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)

215: 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 (offered every year) (214-W, S; 215-S)**

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 (offered every year) (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 (offered every year) (F, W, S)**

1016-226 Calculus for Management Science

A course stressing applications of calculus concepts to solving problems in business and economics. Topics include the limit concept; differentiation and integration of algebraic, logarithmic, exponential, and multivariate functions. (1016-225)**Class 4, Credit 4 (offered every year) (F, W, S)**

1016-228 Analytic Geometry

A course covering topics in analytical geometry such as slopes, lines, and conic sections. Also additional topics in polar coordinates, determinants, parametric equations, trigonometry, and two- and three-dimensional vectors. (1016-204)**Class 4, Credit 4 (W, S)**

1016-241, 242 Calculus and Analytic Geometry

241: A study of pre-calculus topics needed to succeed in learning calculus combined with the course material covered in 1016-251. (Three years of high school mathematics)

242: 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 (241-F, W; 242-W)**

1016-251, 252, 253 Calculus I, II, III

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 divided as follows:

251: Two-dimensional analytic geometry, functions, limits, continuity, the derivative and its formulas, and applications of the derivative. (Three years of high school mathematics)

252: Anti-derivatives by various methods, the definite integral with applications to calculation of area, arc length, volumes of revolution, etc., transcendental functions, numerical integration. (1016-251)

253: Improper integrals, formal limits of sequences, infinite series, Taylor series, polar coordinates, conic sections. (1016-252)

Class 4, Credit 4 (offered every year) (251-F, W, SR; 252-F, W, S, SR; 253-F, W, S, SR)

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 will be 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 (W, S)**

1016-265 Discrete Mathematics I

An introduction to discrete mathematics with applications in computer science and mathematics with an emphasis on proof techniques. It covers the basics of combinatorics, sets, functions, the natural numbers, and the integers modulo n . (Sophomore standing)**Class 4, Credit 4 (offered every year) (F, W, S)**

1016-266 Discrete Mathematics II

A continuation of discrete mathematics with applications in computer science and operations research. It covers finite state machines, relations, graphs, trees, optimization, and matching. NOTE: The course may not be taken for credit if credit is to be earned in 1016-467. (1016-265)
Class 4, Credit 4 (W, S)

1016-267 Introduction to Probability Models

An introduction to discrete and continuous random variables; probability density and distribution functions; expected value and variance of random variables; and applications of probabilistic concepts to elementary queuing models. (1016-266 and 1019-421 or equivalent)
Class 4, Credit 4 (offered upon sufficient request)

1016-289 Contemporary Science: Mathematics

A basic survey of mathematical structures as well as an introduction to problem solving. Topics will be chosen from foundations of mathematics, algebra, topology, number theory, graph theory, probability and statistics. These structures will be examined as they occur naturally in modern settings. NOTE: Not acceptable for science credit for College of Science majors.
Class 4, Credit 4 (offered every year) (F, W, S)

1016-301 Introductory Statistical Methods I

An elementary introduction to the topics of descriptive analysis and probability. (Corequisite 1016-311)
Class 3, Credit 3 (offered every year) (F)

1016-302 Introductory Statistical Methods II

An elementary, concept-oriented introduction to the topics of inferential statistics and survey sampling methodology. Most of the calculations will be done by computer. (Corequisite 1016-312)
Class 3, Credit 3 (offered every year) (W)

1016-303 Introductory Statistical Methods III

An elementary introduction to the topics of analysis of variance, regression, and forecasting. (Corequisite 1016-313)
Class 3, Credit 3 (offered every year) (S)

1016-305 Calculus IV

A continuation of 1016-253 treating 3-dimensional analytic geometry and vector algebra, partial derivatives, multiple integrals and applications. (1016-253, or may be taken concurrently)
Class 4, Credit 4 (offered every year) (F, W, S, SR)

1016-306 Differential Equations I

This course provides 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 of Runge Kutta, vibrating systems, Laplace transforms. (1016-305)
Class 4, Credit 4 (offered every year) (F, W, S, SR)

1016-307 Differential Equations II

Second quarter course in ordinary differential equations which includes power series solutions to ordinary differential equations about ordinary and regular singular points; Legendre's equations; Bessel's equations; hypergeometric equation; Picard's theorem; solution of systems of linear differential equations; phase plane analysis and stability. (1016-306)
Class 4, Credit 4 (offered upon sufficient request)

1016-309 Elementary Statistics I

An introduction to elementary techniques of statistical description and inference. Topics include descriptive statistics, probability, estimation of parameters, hypothesis testing, and simple linear regression. The statistical software package MINITAB will be used to introduce students to the use of computers in statistical analysis. NOTE: This course may not be taken for credit if credit is to be earned in 1016-314 or 319. (1016-204 or equivalent)
Class 4, Credit 4 (offered every year) (W, S, SR)

1016-311 Introductory Statistical Methods I Laboratory

Lab course to reinforce the concepts in the Introductory Statistical Methods I lecture course. Minitab will be used as a tool for data analysis. (Corequisite 1016-301)
Class 2, Credit 1 (offered every year) (F)

1016-312 Introductory Statistical Methods II Laboratory

Lab course to reinforce concepts in the Introductory Statistical Methods II lecture course. SPSS will be used as a tool for data analysis. (Corequisite 1016-302)**Class 2, Credit 1 (offered every year) (W)**

1016-313 Introductory Statistical Methods III Laboratory

Lab course to reinforce the concepts in the Introductory Statistical Methods III lecture course. SPSS will be used as a tool for data analysis. (Corequisite 1016-303)**Class 2, Credit 1 (offered every year) (S)**

1016-314 Statistics

Basic statistical concepts for engineers and scientists covering descriptive statistics, probability, and inference. Calculus will be used where appropriate and one of the software packages, RS/1 or MINITAB, will be incorporated. NOTE: This course may not be taken for credit if credit is to be earned in 1016-309 or 319. (1016-253)**Class 4, Credit 4 (offered every year) (W)**

1016-318 Matrices and Boundary Value Problems

This course provides an introduction to matrix algebra and boundary value problems. Topics will 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. (1016-306)**Class 4, Credit 4 (offered every year) (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 introduce students to the use of computers in statistical analysis. NOTE: This course may not be taken for credit if credit is to be earned in 1016-309 or 314.(1016-204)**Class 4, Credit 4 (offered every year) (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 will be used to reinforce these techniques. (1016-309 or 1016-319 or equivalent)**Class 4, Credit 4 (offered upon request)**

1016-324 Vector Calculus

An introduction to vector calculus. Topics include gradient, divergence, and curl; line and surface integrals; independence of path; divergence theorem; Stokes' theorem; and a discussion of applications in engineering. NOTE: This course may not be taken for credit if credit is to be earned in 1016-328. (1016-306)**Class 3, Credit 3 (offered every year) (F)**

1016-328 Engineering Mathematics

This course provides 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. NOTE: This course may not be taken for credit if credit is to be earned in 1016-324. (1016-306)**Class 4, Credit 4 (offered every year) (S, SU)**

1016-331 Matrix Algebra

An introduction to the basic concepts of linear algebra, with an emphasis on matrix manipulation. Topics will 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 will be interspersed throughout the course. (1016-306)**Class 4, Credit 4 (offered every year) (W, S)**

1016-351 Probability and Statistics I

Discrete and continuous probability models, random variables, probability density and distribution functions, mathematical expectation, measures of central tendency and dispersion, central limit theorem, and descriptive and inferential statistics. (1016-253)**Class 4, Credit 4 (offered every year) (F, W, S, SU)**

1016-352 Probability and Statistics II

Basic statistical concepts, sampling theory, hypothesis testing, confidence intervals, and nonparametric methods. A statistical software package will be used for data analysis. (Corequisite 1016-305) (1016-351) **Class 4, Credit 4 (offered every year) (W, S)**

1016-353 Applied Statistics

Topics in simple linear regression, an introduction to analysis of variance and the use of statistical software packages. (1016-352) **Class 4, Credit 4, (offered every year) (W, 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 extensive 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 (offered every year) (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 (offered every year) (S)**

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 will be used for data analysis. (1016-352) **Class 4, Credit 4 (offered every year) (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)**

1016-379 Data Analysis I Laboratory

A computer laboratory course designed to reinforce the concepts of 1016-319: Data Analysis I. The statistical software package Minitab will be used. The focus of this course is on statistical analysis of data with business applications. (1016-309 or 1016-319 or equivalent). **Class 3, Credit 2 (offered each year) (W, S)**

1016-380 Data Analysis IILaboratory

A computer laboratory course designed to reinforce the concepts of 1016-320: Data Analysis II. Statistical software such as Minitab, SPSS, or SAS will be used, and spreadsheet software such as Lotus or Excel may also be used. The focus of this course is on statistical analysis and model building using data with business applications. (1016-320 or equivalent). **Class 3, Credit 2 (offered each year) (S, F)**

1016-399 Co-op Seminar

Exploration of cooperative education opportunities; practice in writing letters of application; resume writing; and interviewing procedures. **Class 1, Credit 0 (offered every year) (W)**

1016-411, 412 Real Variables

411: 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)

412: A continuation of 1016-411 which concentrates on integration; definition of integral-its existence and its properties, improper integrals, infinite series, sequences and power series. (1016-411)

Class 4, Credit 4 (offered every year) (411-F, W; 412-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 (offered every year) (F, W)**

1016-432 Linear Algebra

A further development of the basic concepts of linear algebra, including orthogonality. Topics will include similarity, linear transformations, diagonalization, inner products, Gram-Schmidt, quadratic forms, and various numerical techniques. Several applications of these ideas will also be presented. (1016-331)**Class 4, Credit 4 (offered every year) (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. (1016-306, 331)**Class 4, Credit 4 (offered every year) (W, S)**

1016-451, 452 Mathematical Statistics I, II

451: Brief review of basic probability concepts and distribution theory; mathematical properties of distributions needed for statistical inference. (1016-352)

452: 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 (offered every year) (451-W; 452-S)**

1016-454 Nonparametric Statistics

This course provides 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 will be used for data analysis. (1016-352)**Class 4, Credit 4 (offered every year) (F)**

1016-457 Research Sampling Techniques

This course 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 will be used for data analysis. (1016-353)**Class 4, Credit 4 (offered upon sufficient request)**

1016-461 Mathematical Modelling

The course will explore problem solving, formulation of the mathematical model from physical considerations, solution of the mathematical problem, testing the model and interpretation of results. Problems will be selected from the physical sciences, engineering and economics. (1016-306, 352, 331)**Class 4, Credit 4 (offered every year) (F)**

1016-465 Linear Programming

A presentation of the general linear programming problem. A review of pertinent matrix theory, convex sets and systems of linear inequalities; the simplex method of solution; artificial bases; duality, parametric programming; and applications. (1016-432)**Class 4, Credit 4 (offered every year) (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 every year) (S)**

1016-467 Theory of Graphs and 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 (offered every year) (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 every year) (S)**

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 will be investigated. **Class 4, Credit 4 (offered upon sufficient request)**

1016-501, 502 Advanced Differential Equations

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, 512 Numerical Analysis

511: Numerical techniques for the solution of non-linear equations, interpolation, differentiation, integration, initial value problems. (1016-306, 0602-207 or 220)

512: Numerical techniques that treat systems of equations, eigenvalue problems, boundary value problems, splines, additional topics at the discretion of the instructor. (1016-511 or permission of the instructor)

Class 4, Credit 4 (offered every year) (511-F, W; 512-S)

1016-521 Topics in Probability and Statistics

Selected topics in applied probability and statistics to meet the needs and interest of the students. (1016-305, 352 or permission of instructor)**Class 4, Credit 4 (offered upon sufficient request)**

1016-524 An 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 will be used for data analysis. (1016-353)

Class 4, Credit 4 (offered upon sufficient request)

1016-525 Stochastic Processes

This course will explore Poisson processes and Markov chains with an emphasis on applications. Extensive use will be made of conditional probability and conditional expectation. Further topics, such as renewal processes, Brownian motion, queuing models and reliability will be discussed as time allows. (1016-331, 351, or permission of instructor)**Class 4, Credit 4 (offered upon sufficient request)**

1016-531, 532 Abstract Algebra

531: 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)

532: The basic theory of rings, integral domains, ideals and fields $GF(p^n)$, 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 (offered every year) (531-F, W; 532-S, SR)

1016-541 Actuarial Mathematics I

This course is designed to study challenging problems whose solutions require a combination of skills that one acquires in a typical mathematics-based curriculum. It synthesizes basic, essential problem-solving ideas and techniques as they apply to various areas, such as actuarial mathematics. (1016-432 or consent of instructor)**Class 2, Credit 2 (offered every year) (F, W)**

1016-542 Actuarial Mathematics II

This course is designed to study challenging problems in probability and statistics whose solutions require a combination of skills that one acquires in a typical mathematical statistics curriculum. It synthesizes basic, essential problem-solving ideas and techniques as they apply to various areas, such as actuarial mathematics. (1016-451 or consent of instructor)**Class 2, Credit 2 (offered every year) (F, W)**

1016-543 Actuarial Mathematics III

This course is designed to study challenging problems in applied statistical methods whose solutions require a combination of skills that one acquires in a typical mathematical statistics curriculum. It synthesizes basic, essential problem-solving ideas and techniques as they apply to various areas, such as actuarial mathematics. (1016-542 or consent of instructor)**Class 2, Credit 2 (offered every year) (S)**

1016-544 Actuarial Mathematics IV

This course is designed to 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, students will enhance their mathematical background for upper-division courses, graduate school, and for such exams as the GRE, actuarial exams, etc. (1016-465 or consent of instructor)**Class 2, Credit 2 (offered every year) (S)**

1016-545 Actuarial Mathematics V

This course is designed to study challenging problems in numerical methods whose solutions require a combination of skills that one acquires in a typical mathematical statistics curriculum. It synthesizes basic, essential problem-solving ideas and techniques as they apply to various areas, such as actuarial mathematics. (1016-511 or consent of instructor)**Class 2, Credit 2 (offered every year) (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

This course 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 (offered every year) (W)**

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 will be used for data analysis. (1016-354, 331)**Class 4, Credit 4 (offered upon sufficient request)**

1016-559 Special Topics: Mathematics

Course 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)**

1016-561, 562 Complex Analysis I, II

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)**

1016-565 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 Non-Linear Optimization Theory

The theory of optimization of non-linear 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, 572 Topology

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 Independent Study: Math

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 and not taught in regularly offered courses. **Class variable, Credit variable (offered every year)**

1016-620 The Fourier Transform

This course provides 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 (offered every year) (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 (offered every year) (F, W, S)**

1019-422 Solutions of 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 (offered every year) (F, W, S)**

1019-423 Linear Mathematics for Technologists

An introduction to aspects of linear mathematics, both finite and infinite dimensional. Topics include matrices and determinants, a survey of power series, Fourier series, and Fourier transforms. (1019-422 or equivalent) **Class 4, Credit 4 (offered every year) (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 will present a formal written or oral report on some topic of interest at the end of the course. **Class 1, Lab 2, Credit 1 (offered every year) (F)**

1017-201, 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)**

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 (offered every year) (F, W, S)**

1017-212 College Physics II

Heat and thermodynamics, fluids, wave motion, sound. (1017-211) (See 1017-272 for lab) **Class 3, Credit 3 (offered every year) (F, W, S)**

1017-213 College Physics III

Geometrical and wave optics, electricity and circuits, magnetism, some elements of modern physics. (1017-211) (1017-212 is highly recommended) (See 1017-273 for lab) **Class 3, Credit 3 (offered every year) (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, Milky Way system, external galaxies, cosmology. **Class 3, Credit 3 (may be taken before or after 1017-235) (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 will be emphasized. **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. **Class 3, Credit 3 (may be taken before or after 1017-230) (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 will be emphasized. **Class 2, Credit 1 (S)**

1017-250 Fundamentals of Radiation

An introduction to ionizing radiation. This will include the different kinds of radiation and their properties. The effects of radiation, how it can be detected, and its applications will also be discussed. This is a distance learning course. (Competency in algebra) **Class 4, Credit 4 (offered every year upon sufficient request)**

1017-271 College Physics Laboratory I

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in 1017-211) **Lab 2, Credit 1 (offered every year) (F, W, S)**

1017-272 College Physics Laboratory II

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in 1017-212) (1017-271) **Lab 2, Credit 1 (offered every year) (F, W, S)**

1017-273 College Physics Laboratory III

This laboratory course includes experiments related to the principles and theories discussed in corresponding lectures. (Credit or coregistration in 1017-213) (1017-271)**Lab 2, Credit 1 (offered every year) (F, W, S)**

1017-289 Contemporary Science: Physics

Introductory science for non-science students. One or more topics such as astronomy, space exploration, relativity, nuclear energy, and lasers are discussed and explained simply, 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 reinforce the material given in demonstration lectures and audiovisual presentations. NOTE: Not available for science credit for College of Science majors.**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 (W, 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 a particle and of a rigid body, work and energy, momentum and impulse, rotational motion, gravitation. (Credit or coregistration in 1016-252) (See 1017-371 for three-hour lab, 1017-375 for two-hour lab) **Class 4, Credit 4 (offered every year) (F, W, S)**

1017-312 University Physics II

Oscillatory motion, fluids and elastic properties, heat and thermodynamics, wave motion, sound, geometrical and physical optics. (Credit or coregistration 1016-253) (1017-311) (See 1017-372 for three-hour lab, 1017-376 for two-hour lab) **Class 4, Credit 4 (offered every year) (F, W, S)**

1017-313 University Physics III

Electrostatics, Gauss' law, electric field and potential, dielectrics, dc circuits, magnetic fields, Ampere's law, Faraday's law, inductance and capacitance. (Coregistration or credit in 1016-253) (1017-311, 312) (See 1017-373 for three-hour lab, 1017-377 for two-hour lab) **Class 4, Credit 4 (offered every year) (F, W, S)**

1017-314 Introduction to Modern 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 (offered every year) (F, W, S)**

1017-315 Introduction to Semiconductor Physics

Kinetic theory of gases and transport phenomena; Drudé'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. (1016-306, 1017-314) **Class 4, Credit 4 (offered every year) (W, offered upon sufficient request) (S)**

1017-317 Introduction to Computational Physics with FORTRAN Applications

An introduction to techniques of computational physics including: numerical differentiation, integration, solutions of the equations of Newtonian mechanics, and error propagation. FORTRAN programming including: type, conditional, and format statements; loops, subscripted variables, intrinsic functions, subprograms, reading from and writing to files. Introduction to the mainframe (VAX) environment. (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. (1017-312, 313, 372, 373)**Class 3, Lab 3, Credit 4 (offered every year) (F, transfer students only; W)**

1017-331 Introduction to Electricity and Electronics

Fundamentals of electricity; construction and measurements of electrical and electronic circuits encountered in a scientific laboratory. (Two quarters of college-level physics)**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. (1017-311, 312, 313, 314)**Class 2, Credit 1 (offered every year) (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 (offered every year) (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 (offered every year) (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 (offered every year) (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 (offered every year) (S)**

1017-358 Nuclear Medicine Physics and 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 (SR)**

1017-361 Ultrasonic Physics

A course in 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 (offered every year) (F)**

1017-371 University Physics Laboratory I

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in 1017-311) (See 1017-375 for a two-hour lab)

Lab 3, Credit 1 (offered every year) (W)

1017-372 University Physics Laboratory II

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in 1017-312) (1017-371) (See 1017-376 for a two-hour lab)

Lab 3, Credit 1 (offered every year) (S)

1017-373 University Physics Laboratory III

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in 1017-313) (1017-371, 372) (See 1017-377 for a two-hour lab)

Lab 3, Credit 1 (offered every year) (F)

1017-374 Modern Physics Laboratory

Basic experiments representative of the experimental foundations of modern quantum physics, such as: photoelectric effect; Franck-Hertz experiment; X-ray diffraction; optical diffraction and interference; atomic spectroscopy; electron microscopy; nuclear spectroscopy; radioactive half-life; Millikan oil drop; black-body radiation. Students enrolled in 1017-315 may include experiments in semiconductor solid state physics. (1017-314, SPS-321)

Lab 3, Credit 1 (offered every year) (S)

1017-375 University Physics Laboratory I

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in 1017-311) (This course recommended for all students in the University Physics lectures who are not required to take a three-hr. lab)

Lab 2, Credit 1 (offered every year) (F, W, S)

1017-376 University Physics Laboratory II

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in 1017-312) (1017-375 or 371) (This course recommended for all students in the University Physics lectures who are not required to take a three-hr. lab)

Lab 2, Credit 1 (offered every year) (F, W, S)

1017-377 University Physics Laboratory III

This laboratory course includes experiments related to the principles and theories discussed in the corresponding lectures. (Credit or coregistration in 1017-313) (1017-375 or 371) (This course recommended for all students in the University Physics lectures who are not required to take a three-hr. lab)

Lab 2, Credit 1 (offered every year) (F, W, S)

1017-401, 402 Intermediate Mechanics I, II

401: 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)

402: 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 (offered every year) (401-F; 402-S)

1017-411, 412 Electricity and Magnetism I, II

Electric and magnetic fields using vector methods, Gauss law, theory of dielectrics, Ampere's law and Faraday's law, vector potential, displacement current, Maxwells equations, wave propagation in dielectrics and conductors; production and propagation of radiation. (1016-306; 1017-312, 313, 480, 481)

Class 4, Credit 4 (offered every year) (411-F, 412-S)

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. (1016-306; 1017-312, 313)

Class 4, Credit 4 (offered every year) (F)

1017-421, 422 Experimental Physics

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 5, credit 3 (offered every year) (421-F; 422-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, 321)**Class 3, Lab 3, Credit 4 (offered every year) (S)**

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 non-linear 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 S)**

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 S)**

1017-455 Optical Physics

Physical optics including interference, diffraction, and polarization. Brief introduction to modern optics. (1016-305; 1017-312, 313, 480)**Class 4, Credit 4 (offered every year) (F)**

1017-480, 481 Theoretical Physics I, II

480: 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)

481: 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, electrostatics, and modern physics. (1017-480)**Class 4, Credit 4 (offered every year) (480-F; 481-S)**

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 (offered every year) (F)**

1017-522 Introduction to Quantum Mechanics

A study of the concepts and mathematical structure of non-relativistic quantum mechanics. Exact and approximate techniques for solving the Schrödinger equation are presented for various systems. (1017-315, 402, 412, 455, 480, 481)**Class 4, Credit 4 (offered every year) (S)**

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 (offered every year) (F)**

1017-540 Astronomical Instrumentation and 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 0925-362 and permission of instructor)**Class 3, Credit 3 (offered upon sufficient request) (F or S)**

1017-541, 542, 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 the instructor)**Class variable, Credit variable (offered every year)**

1017-550, 551 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 (offered every year) (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)**

1017-559 Special Topics: Physics

Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specific prerequisites, contact hours and examination procedures. Topics could include: introductory statistical mechanics; plasma physics; general relativity; linear integrated circuits; cryogenics; radio astronomy; history of physics; astrophysics; astronomy. Class variable, Credit variable (offered upon sufficient request)

1017-599 Independent Study: Physics

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 (offered every year)**

GENERAL SCIENCE

1018-621 Building Scientific Apparatus Laboratory

Basic skills associated with the construction of scientific laboratory apparatus, some of which is not commercially available, will be 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

1027-201 Introduction to Biomedical Computing

An introduction to the applications of computers in health care. Information concerning career opportunities and cooperative education will also be provided.**Class 1, Credit 1 (W)**

1027-305 M Programming

An in-depth study of the M programming language and its data base capabilities. Programming projects will be required and will be 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. (0601-241, 242) **Class 4, Credit 4 (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 will be 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 two course sequence (see 1026-221 below) 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 will be reinforced by laboratory experiences in microscopy, urinalysis, clinical chemistry, hematology, serology, and bacteriology. Laboratory safety and quality assurance also will be 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 life style. Basic structure and function of selected human body systems will be discussed and related to factors such as diet, alcohol, drugs, smoking, stress, and the environment. Lecture, discussion, demonstrations, and student participation will all be used to explore health-related issues. **Class 3, Lab 2, Credit 4 (W)**

1026-289 Contemporary Science: Health Sciences

This course will examine areas within the health field, including evolutionary structural development and future projects, with emphasis on methods of diagnostic testing, selected disease conditions, the utilization of computers, and current topics in health care. Course content emphasis varies each quarter. **Class 4, Credit 4 (F, W, S)**

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 (offered every year) (F, W, S)**

1026-415 Pathophysiology

This course combines knowledge of human physiology with disease processes. The etiology, pathological mechanisms, characteristic symptoms, clinical manifestations, diagnostic and therapeutic procedures of common diseases will be covered. Topics include cellular and tissue response to pathogenic agents, neoplasia, developmental disorders, disorders of body systems, and disease of major organs. (1001-306) **Credit 4 (S)**

1026-559 Special Topics: Clinical Sciences

Advanced courses which are of current interest and/or logical continuations of the courses already being offered. These courses are structured as ordinary courses and have specified prerequisites, contact hours and examination procedures. Class variable, Credit variable (F, W, S)

1026-599 Independent Study: Clinical Sciences

Faculty-directed study of appropriate topics on a tutorial basis. This course will be used to enable an individual to pursue studies of existing knowledge available in the literature. **Class variable, Credit variable (F, W, S)**

1024-210 Medical Technology Seminar

This course is designed to introduce the student to the profession of medical technology through a series of lectures which provide an overview of the major departments within the modern clinical laboratory. Historical perspectives, development aspects, and regulating standards of the medical technology profession will be discussed. **Class 1, Credit 1 (F)**

1024-401 Hematology/Immunohematology

A study of the blood (erythrocytes, leukocytes, platelets, coagulation factors and blood group antigens). Descriptions of the cellular components of the blood in health and in disease. Cellular and immunological functions and their interrelationships. Hemostasis and coagulation mechanisms. Structures of antigens and antibodies and mechanisms of antigen-antibody reactions. Lab procedures demonstrate cell counting techniques, coagulation studies, antigen-antibody reactions and compatibility testing of various blood groups. (1001-306 or permission of instructor) **Class 3, Lab 3, Credit 4 (F)**

1024-405 Diagnostic Bacteriology and Mycology

Study of bacteria and fungi that cause human disease. Lecture and laboratory subjects include microorganisms growth, isolation, identification, antibiotic sensitivity, and related human immunological and serological responses. (1001-404)**Class 3, Lab 3, Credit 4 (W)**

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

This course emphasizes the role of clinical laboratory testing in the areas of blood banking, clinical chemistry, hematology, urinalysis, and microbiology. It relates laboratory values with disease states. **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 (S)**

1025-310 Radiation and the Human Body

This course 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. It presents a rationale for the safe handling and use of radioactive materials.**Class 2, Credit 2 (SR)**

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. (Fourth-year standing in NMT program)**Credit 4 (F)**

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 standing in NMT program)**Credit 1 (F)**

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 standing in 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 standing in 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 standing in the NMT program)**Credit 1 (F)**

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 standing in NMT program)**Credit 2 (W)**

1025-512 Nuclear Medicine Procedures Cardiovascular System

A combination lecture/practicum course. Lectures are given on specific imaging procedures involving structures in the cardiovascular system. Physiology and anatomy, medical indications, fundamental principles, technique and scan interpretation are covered. Students observe and perform these procedures in the clinical setting. (Fourth-year standing in NMT program)**Credit 2 (W)**

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 standing in NMT program)**Credit 2 (S)**

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 standing in NMT program)**Credit 1 (S)**

1025-515 Nuclear Medicine Procedures Hematological and In Vitro Studies

1025-515 Nuclear Medicine Procedures Hematological and In Vitro Studies

1025-515 Nuclear Medicine Procedures Hematological and In Vitro Studies

This course covers the 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 standing in NMT program)**Credit 1 (S)**

1025-516 Instrumentation and 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 standing in NMT program)**Credit 2 (W)**

1025-517 Radiochemistry and 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 standing in 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 standing in NMT program)**Credit 1 (W)**

1025-519 Radiation Health Safety

A course designed to familiarize the student with the daily routine for 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 (S)**

1025-520 Radioassay

A combination lecture/practicum course in RIA. Topics include theory and basic principles, instrumentation, types of assays performed, and quality control. Commonly encountered pitfalls, current RIA developments and the diagnostic meaning of several tests are covered. (Fourth-year standing in NMT program)**Credit 4 (S)**

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 standing in NMT program)**Credit 2 (S)**

1025-522 Clinical Nuclear Medicine I

A clinical practicum which 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 standing in NMT program)**Credit 7 (F)**

1025-523 Clinical Nuclear Medicine II

Continuation of Clinical Nuclear Medicine I. (Fourth-year standing in NMT program)**Credit 7 (W)**

1025-524 Clinical Nuclear Medicine III

Continuation of Clinical Nuclear Medicine II. (Fourth-year standing in NMT program)**Credit 7 (S)**

1032-210 Physician Assistant Seminar

This course introduces the student to the role of the physician assistant in relationship to patients, supervising physicians, colleagues, and other physician assistants. Emphasis is placed 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 standing in PA program or permission of instructor)**Class 1, Credit 1 (W)**

1032-401 Patient History and Physical Examination 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. Course 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 data base, 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 standing in PA program or permission of instructor)**Class 2, Credit 2 (F)**

1032-402 Patient History and Physical Examination 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. Course includes performing and writing complete, accurate medical histories and physical examinations with small group instruction. Weekly patient contact. (1032-401)**Class 1, Credit 1 (W)**

1032-403 Patient History and Physical Examination 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. Course 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 1 (S)**

1032-410 Clinical Skills

This course is designed to provide for the PA student requisite skills for professional courses and internships. Emphasis is placed on developing competence in basic skills in conjunction with patient care. (Third-year standing in 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. It will emphasize 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 standing in 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. Course will emphasize agents commonly prescribed in the diagnosis and treatment of disease. A body systems approach is utilized to study fluids/electrolytes/nutrition, gastroenterology, nephrology, urology, endocrinology, and dermatology. (1032-420) **Class 3, Credit 3 (W)**

1032-422 Clinical Pharmacology III

Continuation of 1032-421. Indications, effects, distribution, absorption, metabolism, excretion, interactions, pharmacokinetics, and administration/dosing. It will emphasize 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

Designed to introduce 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 standing in 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, infectious diseases, dental diseases, otorhinolaryngology, neurology, and ophthalmology. (Third-year standing in PA program or permission of instructor) **Class 15, Credit 5 (F)**

1032-441 Clinical Medicine II

Continuation of 1032-440. This section covers fluids/electrolytes/ nutrition, gastroenterology, nephrology, urology, endocrinology, and dermatology. (1032-440) **Class 15, Credit 5 (W)**

1032-442 Clinical Medicine III

Continuation of 1032-441. Further areas of study encompass hematology, obstetrics, gynecology, orthopedics, surgery, geriatrics, pediatrics, and psychiatry. (1032-441) **Class 15, Credit 5 (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), Family Practice, Emergency Medicine, OB/GYN, Pediatrics, General Surgery, and Psychiatry. Students will also be able to select one elective rotation and one final preceptorship. These latter rotations allow students to individualize their experiences according to their own areas of interest. (Fourth-year standing in PA program) **Credit 12 (SR)**

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)**

1030-412 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 will be discussed. Emphasis will be on the creation of high quality images on laboratory scanners. **Class 4, Credit 4 (S)**

1030-414 General Vascular Examination

A course designed to give basic knowledge of general vascular evaluation with an emphasis on the sonographic approach. Two-dimensional real-time imaging and Doppler techniques will be presented as well as a discussion of other imaging modalities and their use in vascular evaluation. Performance of examinations on laboratory equipment will be stressed. This is an internship course. (Fourth-year standing in 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 will be stressed. Examination protocols, review of specific anatomy, film reading, and use of other imaging techniques will be addressed. This is an internship course. (Fourth-year standing in Ultrasound Program or permission of faculty)**Class 3, Credit 3 (F)**

1030-553 Gynecologic Ultrasound

Information necessary to perform basic gynecologic sonographic examinations is presented. Examination strategies for various procedures will be 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 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 will be 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 will be stressed. Examination protocols, review of anatomy, film reading, and use of other scanning techniques will be addressed. This is an internship course. (Fourth-year standing in the 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 will be stressed. Examination protocols, review of anatomy, film reading, and use of other scanning techniques will be addressed. This is an internship course. (Fourth-year standing in the Ultrasound Program or permission of faculty)**Class 3, Credit 3 (F)**

1030-558 Small Parts Ultrasound

This course 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 will be

discussed, as well as the role of ultrasound in established clinical practices utilizing small parts imaging. This is an internship course. (Fourth-year standing in the Ultrasound Program or permission of faculty) **Credit 3 (S)**

1030-560 Seminar in Ultrasound I

Speaking, writing, and researching skills are explored. This course presents 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 standing in Ultrasound Program or permission of faculty) **Class 2, Credit 2 (W)**

1030-561 Seminar in Ultrasound II

Candidates will 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 will work together to develop the physical, administrative, and financial aspects of a department. This is an internship course. (Fourth-year standing in Ultrasound Program or permission of faculty) **Class 2, Credit 2 (S)**

1030-570 Clinical Ultrasound

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 will be stressed. Nursing procedures and medico-legal considerations will also be discussed as related to the practice of ultrasound examination. This is an internship course. (Fourth-year standing in Ultrasound Program or permission of director) **Credit 7 (F)**

1030-571 Clinical Ultrasound 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 will be stressed. The candidate will be expected to perform basic examinations with little, if any, assistance by the end of this course. This is an internship course. (Fourth-year standing in Ultrasound Program or permission of director; 1030-570) **Credit 7 (W)**

1030-572 Clinical Ultrasound III

Final development of ultrasound examination skills by means of clinical internship. The candidate will be expected to perform general ultrasound examinations with no assistance by the end of this course. This is an internship course. (Fourth-year standing in Ultrasound Program or permission of director; 1030-571) **Credit 7 (S)**

CLINICAL CHEMISTRY

1023-705 Mechanisms of Disease

Following a brief review of normal physiology, this course will cover such topics as: mechanisms of cellular injury, the healing process, atherosclerotic heart disease, hypertension, infectious disease, and many other important medical topics. **Class 4, Credit 4 (offered every other year) (W)**

1023-712 Statistics and Quality Control

The principles of statistics as applied to biomedical research as well as clinical laboratory analysis will be studied. Using a problem-oriented approach, probability, normal values, analysis of variance and quality control as well as the relationship of these procedures to patient care will be studied. **Class 3, Credit 3 (offered every other year) (S)**

1023-722 Clinical Laboratory Computer Applications

The basic concepts of data processing, as well as the design evaluation and utilization of computer systems in both hospital and clinical laboratories, will be studied. The legal aspects of biomedical data processing as well as instrument interfacing will also be studied. **Class 3, Credit 3 (offered every other year)**

1023-820 Advanced Clinical Chemistry I

Quality control, statistics, electrolytes, acid-base physiology, renal function, trace metals, lipids, carbohydrate metabolism, enzymes, and various standard methods are covered. (Permission of instructor) **Class 4, Credit 4 (offered every other year)**

1023-821 Advanced Clinical Chemistry II

A study of the concepts and applications of therapeutic drug monitoring, pharmacokinetics, toxicology, inherited disorders of metabolism, liver function tests, protein measurement, hepatitis, porphyrias, vitamins, pediatric clinical chemistry, geriatric clinical chemistry, and gene probes. (Permission of instructor) **Class 4, Credit 4 (offered every other year)**

1023-822 Advanced Clinical Chemistry III

A survey of endocrinology and of the immunoassay methods used in performing endocrine assays. The endocrine systems covered include the thyroid, the adrenals, calcium metabolism, growth hormone, the human reproductive system, and the fetal-placental unit. The survey of immunoassay includes the fundamental principles of both isotopic and nonisotopic immunoassay plus a brief discussion of data reduction methods. **Class 4, Credit 4 (offered every other year)**

1023-870 Clinical Chemistry Seminar

Credit 1 (W)

1023-872 Special Topics in Clinical Chemistry

In response to student and/or faculty interest, special courses which are of current interest and/or logical continuations of regular courses will be presented. These courses will be structured as ordinary courses with specified prerequisites, contact hours and examinations. **Class variable, Credit variable (offered upon sufficient request)**

1023-877 External Clinical Chemistry Research

Research carried out in a laboratory outside of the College of Science. Prior to the initiation of external research, a proposal from the student as well as a commitment of support and direction from the laboratory are evaluated for determination of credit to be awarded. **Credit variable**

1023-879 Clinical Chemistry Research

Research carried out in the College of Science laboratories under the direction of RIT faculty members. The amount of credit awarded for such projects is determined after evaluation of a research proposal. **Credit variable 1-16**

1023-899 Independent Study

Individual projects or studies carried out under the direction of a faculty member. Study objectives and design are developed through faculty-student interaction with evaluation and credit to be awarded determined after review of a study proposal. **Credit variable**

MATERIALS SCIENCE AND ENGINEERING

1028-701 Introduction to Materials Science

The course provides an understanding of the relationship between structure and properties for development of new materials. Topics include: atomic and crystal structure, crystalline defects, diffusion theories, strengthening mechanisms, ferrous alloys, cast irons. Structure of ceramic and polymeric materials and corrosion principles. (Graduate standing or permission of instructor) **Class 4, Credit 4 (F)**

1028-702 Introduction to Polymer Science

A study of the chemical nature of plastics detailing the relationships between polymerization conditions, structure and properties in both the solid and fluid states. (1028-701 or equivalent) **Class 4, Credit 4 (W)**

1028-703 Solid State Science

This course will survey topics in the physics of solids. Included in these will be crystal symmetry, structure, and binding; mechanical, thermal, and electrical properties of insulators, semiconductors, and conductors including band theory. (1028-704 or equivalent) **Class 4, Credit 4 (W)**

1028-704 Introductory Theoretical Methods

Treatment of waves and fields; selected topics of interest in electrodynamics and fluid mechanics; statistical mechanics; Maxwell-Boltzmann, Bose Einstein, and Fermi-Dirac distributions and their applications. (Graduate standing and permission of instructor) **Class 4, Credit 4 (F)**

1028-705 Introductory Experimental Techniques

The course introduces the student to laboratory equipment for hardness testing, impact testing, tensile testing, x-ray diffraction, and thermal treatment of metallic materials. Experiments illustrating the characterization of high molecular weight organic polymers will be conducted. (1028-701 and 702 or equivalents) **Class variable, Lab variable, Credit 4 (S)**

1028-706 Experimental Techniques: Thin Films

Production of thin films of metals and dielectrics by physical vapor deposition. Lectures cover vacuum systems, evaporation, sputtering, nucleation and growth of thin films, analysis and characterization of thin films, and application of thin films. Laboratories cover use of vacuum systems in evaporation and sputtering and some methods of characterizing the thin films thus produced. (Permission of instructor) **Class variable, Lab variable, Credit 4**

1028-707 Experimental Techniques: Electron Microscopy & Spectroscopy

The course includes a detailed study of scanning electron microscopy and modern applications in microelectronic engineering. (Permission of instructor) **Class variable, Lab variable, Credit 4**

1028-708 Experimental Techniques

This course is designed to provide an in-depth integrated approach to the analysis, investigation and development of materials, concentrating on specific types or classes. (1028-701 or equivalent) **Class variable, Lab variable, Credit 4**

1028-710 Materials Properties and Selection

A study of the principles of material behavior as applied to design. Application of materials according to these principles is stressed. Ferrous, nonferrous, and nonmetallic materials are considered. (1028-701 or equivalent) **Class 4, Credit 4**

1028-714 Glass Science

Topics covered will include the structure and properties of glass, applied areas such as glass melting and processing, and various technological applications of glass. (1028-701 or equivalent; 1028-704) **Class 4, Credit 4**

1028-717 Materials Degradation Corrosion

This course introduces the student to the basic electrochemical nature of corrosion and considers the various factors which influence the rate of corrosion in a variety of environments. Various means of controlling corrosion are considered. (1028-701 or equivalent) **Class 4, Credit 4**

1028-720 Organic Polymers

This course is designed to meet the needs of students in the area of organic chemistry related to synthesis, polymerization mechanism, structures, stereochemistry and reactions of organic polymers and their industrial usage. (1028-702 or equivalent) **Class 4, Credit 4**

1028-721 Physical Chemistry of Polymers

A study of the theoretical and experimental methods available for designing plastics products and selecting appropriate materials, with special emphasis on the interrelationships between materials, product design, tooling construction and manufacturing producibility. (1028-702 or equivalent) **Class 4, Credit 4**

1028-722 Polymer Processing

A study of the basic principles and methods involved in the technology of processing polymeric materials, including treatments of heat transfer, mass transfer, mixing and shaping or molding of these materials. (1028-702 or equivalent) **Class 4, Credit 4**

1028-730 Optical Properties of Materials

Fundamentals of geometrical and physical optics; interaction of radiation with matter; dielectrics and thin films; introduction to electro-optic and acousto-optic effects. (1028-704 or equivalent) **Class 4, Credit 4**

1028-733 Magnetic Properties of Materials

Band structures of pure and doped solids and solid compounds, transport phenomena, semiconduction, optical properties, galvanomagnetic and magneto-optic effects. (1028-701 and 704 or equivalents) **Class 4, Credit 4**

1028-734 Advanced Optics

Lasers: theory, types and construction; optics of metals; multilayer dielectrics; electro- and acousto-optic modulators and deflectors; optical detectors. (1028-730 or equivalent)**Class 4, Credit 4**

1028-736 Amorphous and Semicrystalline Materials

Electrical, thermal, and optical properties of amorphous materials; model of conduction. (1028-701, 703, 704 or equivalents) **Class 4, Credit 4**

1028-740 Nuclear Science and Engineering

Systemics of the atomic nuclei, radioactivity, nuclear reactions, fission, nuclear reactor principles, designs, materials and safety. (1028-701 and 704 or permission of instructor)**Class 4, Credit 4**

1028-760 Plasma Science

An introduction to plasma science; a study of the basic phenomena and application of plasma to etching, deposition, polymerization, plasma production of materials, analytical emission spectroscopy and atmospheric science. (1028-701 or equivalent)**Class 4, Credit 4**

1028-770 Physics and Chemistry of I. C. Processing

Study of the various processing steps used in integrated circuit fabrication technology with special emphasis on diffusion, thermal oxidation, ion implantation and plasma assisted deposition and etching processes. Process modelling using SUPREM. (1028-703 or permission of instructor) **Class 4, Credit 4**

1028-800 Special Topics

In addition to in-depth study of any of the courses listed under Elective Courses, special topics may be selected from such areas as elastomers, organometallics, radiation damage, processing of materials, superconductivity, etc. (Permission of instructor)**Class variable, Credit 4**

1028-877 External Research Project

Research using equipment and facilities at a site other than RIT. Prior to enrollment in the course, a proposal from the student that includes a letter of support from the host facility is evaluated for determination of credit to be awarded upon successful completion of the project. A total of 8 quarter credit hours, with a maximum of 4 quarter credit hours per quarter, can be applied toward the MS degree. (Permission of program director)**Credit variable**

1028-879 Research and Thesis Guidance

A project involving research on a topic in materials science and engineering. An oral examination and written thesis are required. A maximum of 16 quarter credit hours can be applied toward the MS degree. **Credit variable**

1028-890 Seminar

This course is required for completion of the program and will involve a one-hour presentation on some topic in materials science in engineering. **Class variable, Credit 1 (F, S)**

1028-899 Independent Study

This course number should be used by students wishing to study a topic on an independent study basis. (Permission of instructor)**Credit variable**

NATIONAL TECHNICAL INSTITUTE FOR THE DEAF

- Applied Accounting
- Applied Art and Computer Graphics
- Applied Computer Technology
- Architectural Technology
- Audiology
- Business Occupations/Business Technology/Office Technologies
- Civil Technology
- Educational Interpreting
- Electromechanical Technology
- English
 - Entry Courses
 - Integrative Courses
 - Emphasis Courses - Reading
 - Emphasis Courses - Vocabulary
 - Emphasis Courses - Grammar
 - Emphasis Courses - Writing
- General Education
 - Fine Arts and Humanities
 - History
 - Language and Literature
 - Religion
 - Interdisciplinary
 - Mathematics and Science
 - Social Science
 - Economics and Political Science
 - Psychology
 - Sociology and Anthropology
 - Theatre
- Industrial Drafting Technology
- Manufacturing Processes Technology
- Medical Laboratory Technology
- Ophthalmic Optical Finishing Technology
- Photo/Media Technologies
- Electronic Publishing and Printing Technology
- Sign Communication
- Speech-Language
- Technical Mathematics
- Pre-Baccalaureate Studies
 - College of Liberal Arts Courses
 - Criminal Justice
 - Language, Literature, Communication
 - Social Work
 - College of Science Courses
 - Biology
 - Chemistry
 - Mathematics
 - Physics

NATIONAL TECHNICAL INSTITUTE FOR THE DEAF

Dr. James J. DeCaro, Dean

The National Technical Institute for the Deaf (NTID), one of RIT's eight colleges, provides deaf students with technological training that leads to meaningful employment in business, industry, government, and education. Created in 1965 by Congress and funded primarily by the U.S. Department of Education, NTID represents the world's first effort to educate large numbers of deaf 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.

ROCHESTER INSTITUTE OF TECHNOLOGY

More than 1,100 deaf students from across the United States as well as from several U.S. territories and other countries study and reside at RIT.

NTID provides RIT's deaf students with technical and professional training in more than 30 programs. An NTID education prepares students for technical careers in areas such as applied accounting, applied art and computer graphics, applied computer technology, engineering technologies, ophthalmic optical finishing technology, and photo/media technologies

Traditionally, 95 percent of NTID graduates who enter the work force find employment in their fields of study.

Deaf students who take courses or matriculate into one of RIT's seven other colleges may request educational access services, which may include sign language interpreting in classrooms and laboratories, notetaking, tutoring, personal and career counseling, and academic advising. This package of services is provided to students based on student need and resource availability

For hearing students, NTID offers an associate degree in educational interpreting

APPLIED ACCOUNTING

0801-100 Career Exploration: Business Technology

This course is designed to help 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 General Accounting I

This course is an introduction to accounting for both accounting and non-accounting students. Topics covered are the basic accounting equation; the recording of transactions using debits and credits; general and subsidiary ledgers; and the accounting cycle, including recording transactions for service and merchandising enterprises, preparing trial balances, adjusting and closing processes, and preparing basic financial statements. **Class 6, Credit 3 (W, S)**

0801-202 General Accounting II

This course is a continuation of General Accounting I for both accounting and non-accounting students. Topics covered include the calculation of interest on notes and the discounting of notes, adjustment for uncollectable accounts, merchandise inventory systems and calculations, internal control, and the voucher system. Coursework includes recording transactions in special journals and a practice set that applies accounting concepts in a simulated business situation. Spreadsheet applications are used on microcomputers. (0801-201) **Class 6, Credit 3 (F, S)**

0801-231, 232 Fundamentals of Economics I, 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 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 3, Credit 3 (0801-231, W; 0801-232, S)**

0801-251 Applied Accounting I

This course for accounting students is a continuation of General Accounting I and II. Topics covered include a computerized review of the accounting cycle and financial reports, the components of a payroll system, the calculation and recording of employee earnings and employer payroll taxes, the recording and adjusting of deferrals and accruals, partnerships, and depreciation or amortization of assets. Coursework includes a computerized practice set designed to summarize General Accounting I and II and Applied Accounting I in a simulated business situation. (0801-202) **Class 6, Credit 4 (F, W)**

0801-252 Applied Accounting II

This course 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. The course culminates with practical application of course content through a practice set. Computer applications include spreadsheets. (0801-251)

Class 6, Credit 4 (W, S)

0801-253 Applied Accounting III

This course is 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 data bases.

(0801-252) **Class 6, Credit 4 (F, S)**

0801-254 Applied Accounting IV

This course consists of managerial accounting topics and concepts. Topics covered include financial analysis, accounting concepts and principles, statement of cash flow, and corporate accounting. Computer applications include spreadsheets. (0801-253)

Class 6, Credit 4 (F, W)

0801-260 Applied Accounting Techniques

This course 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 data bases. (0801-253)

Class 6, Credit 2 (F, W)

APPLIED ART AND COMPUTER GRAPHICS

0849-100 Career Exploration: Art

This course is designed to help students collect the information necessary to make appropriate decisions about a possible career in the art field. Students have opportunities to explore their interests and skills in art through structured hands-on experiences with art tools and equipment. Emphasis is on increasing students' awareness of their art skills, art career options, working conditions, salaries, and job responsibilities.

Studio 2, Credit 1 (F, W, S)

0849-111, 112, 113 Basic Design I, II, III

This course sequence is an introduction to the concepts and elements of design as they relate to a career in the art field. Emphasis is on exploration and analysis of all design principles such as point, line, shape, texture, space, and color as they apply to two-dimensional problems. (0801-100 for 0801-111; 0801-111 for 0801-112; 0801-112 for 0801-113)

Lab 3, Credit 2 (F, W, S)

0849-121, 122, 123 Basic Drawing I, II, III

This is a fundamental course sequence that introduces students to various freehand drawing concepts, methods, and techniques. Emphasis is placed on eye-hand coordination, rendering techniques, one- and two-point perspective, and various drawing media. A variety of forms are used, including still life objects, architectural forms, and the human figure. (0801-100 for 0801-121; 0801-121 for 0801-122; 0801-122 for 0801-123)

Lab 6, Credit 3 (F, W, S)

0849-141, 142, 143 Career Seminar I, II, III

This course sequence 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. This course sequence emphasizes systematic decision making related to art careers.

Class 2, Credit 1 (F, W, S)

0849-151, 152 Computer Graphic Systems I, II

This course sequence is an introduction to computer graphics systems. Emphasis is placed on learning how to use hardware and software for generating images and type. File management, vocabulary, safety, and legal aspects of computer use also are covered. In this course, students have hands-on experience using various types of hardware and software. (0801-100 for 0801-151; 0801-151 for 0801-152)

Lab 3, Credit 2 (F, W, S)

0849-161, 162, 163 Media and Processes I, II, III

The basic tools, materials, and equipment used in the professional applied art studio are introduced to students. Emphasis is placed on identification, vocabulary, maintenance, and correct

use of media, mechanical tools, copying equipment, and a variety of materials. (0801-100 for 0801-161; 0801-161 for 0801-162; 0801-162 for 0801-163)**Lab 3, Credit 2 (F, W, S)**

0849-231, 232, 233 Introduction to Typography I, II, III

This sequence is a study of the use of typography in applied art: the origins of typographic form, type classifications, production processes, measurement systems, and type specification methods. Students gain experience in design, copy marking, planning formats, copyfitting, and using the computer as a composition tool. (0801-113, 123, 152, 163 for 0801-231; 0801-231 for 0801-232; 0801-232 for 0801-233) **Lab 3, Credit 2 (F, W, S)**

0849-241, 242, 243 Art Survey I, II, III

This course sequence offers a survey of major historical developments in the visual arts as they relate to applied art. Students are introduced to research methods used in the field of art as the basis for design concept development. **Class 2, Credit 2 (F, W, S)**

0849-258 Applied Art Photography

This is an elective course in the 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 basically well-crafted photographic image. **Class 4, Credit 2 (F, S)**

0849-261, 262, 263 Traditional/Electronic Layout I, II, III

This course sequence applies design concepts, principles, and methods developed in first-year courses. Students learn how to use both electronic and traditional methods to develop design solutions and produce accurate comprehensive layouts. Students receive hands-on experience using computer hardware and software related to page layout. The course includes marker skills, creative problem solving and practices evident in a professional art studio. (0801-113, 123, 152, 163 for 0801-261; 0801-261 for 0801-262; 0801-262 for 0801-263) **Lab 6, Credit 3 (F, W, S)**

0849-267 Three-Dimensional Applications

This elective course 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. **Lab 3, Credit 2 (S)**

0849-268 Survey of Electronic Layout

This course is an overview of and introduction to the principles, concepts, and processes involved in producing visual layouts. It 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 layout as well as the basic methods and criteria utilized in making design/layout decisions. This is an elective course for students not enrolled in the applied art and computer graphics program. **Studio 4, Credit 2 (F, W, S)**

0849-269 Applied Computer Illustration Techniques

The purpose of this course is to provide students an opportunity to enhance their skills 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 and letterspacing, and the importing and exporting of files. **Studio 3, Credit 2 (F, W, S)**

0849-271, 272, 273 Production Methods I, II, III

Emphasis is placed on understanding printing methods used to produce black-and-white and color artwork. The creation and preparation of artwork, including color separation, are taught using both traditional hand skills and computers. Specific vocabulary related to reproducing artwork also is covered. (0801-113, 123, 152, 163 for 0801-271; 0801-271 for 0801-272; 0801-272 for 0801-273) **Lab 3, Credit 2 (F, W, S)**

0849-277 Air Brush/Retouching

This elective course 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. (0801-112, 0801-122, 0801-162) **Class 3, Credit 2 (F, S)**

0849-280 Computer Illustration Methods

This course provides students with advanced skills in the area of computer illustration. In the course, students learn how to use the advanced functions of black-and-white and color graphic software to create professional-quality renderings for print publication. (0801-113, 123, 152, 163)

Lab 3, Credit 2 (F, W, S)

0849-284 Mechanical Perspective

Students learn the use of mechanical drawing methods for visualizing three-dimensional form in perspective. Experiences in this elective course 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. (0801-121) **Class 3, Credit 2 (W)**

0849-285 Mechanical Drawing Methods

Students are introduced to mechanical processes for depicting three-dimensional forms on a flat surface. This elective course includes drawing methods, such as oblique and isometric, based on simple and complex forms. Emphasis is on translating the three-dimensional form into a technically accurate drawing. (0801-284) **Class 3, Credit 2 (S)**

0849-287 Drawing Applications

This is an advanced elective course refining freehand and technical drawing concepts, methods, and techniques developed in Basic Drawing I, II, and III. Emphasis is on development of advanced drawing skills, using various types of subject matter, media, and processes. (0801-123) **Class 3, Credit 2 (F)**

0849-294 Freehand Lettering

Students are introduced to the basic processes of freehand lettering. The emphasis of this elective course 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, linespacing, and rendering of both serif and sans serif letterforms are taught. (0801-161) **Class 3, Credit 2 (W)**

0849-295 Finished Lettering

This elective course is an 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 letterforms. (0801-294) **Class 3, Credit 2 (S)**

0849-311, 312 Graphic Applications I, II

This is an advanced course sequence stressing layout, mechanical, and computer skills within the context of a professional studio environment. The courses involve practical work experience, with an emphasis on studio procedures, work habits, professional skills, and dealing with clients as well as refinement of individual portfolios. (0801-233, 263, 273, 280 for 0801-311; 0801-311 for 0801-312) **Lab 10, Credit 5 (F, W, S)**

0849-321, 322, 323 Employment Seminar I, II, III

Students are oriented to the total working/living environment of the professional applied art field, with an emphasis on processes for securing and maintaining employment. Experiences include resume preparation, interviewing techniques, guest lectures, field trips, presentations, discussions, and personally directed job-seeking. (0801-233, 263, 273, 280 for 0801-321; 0801-321 for 0801-322; 0801-322 for 0801-323) **Class 3, Credit 3 (F, W, S)**

0849-330 Graphic Applications/Portfolio Review

This course is applied art students' final professional preparation course prior to graduation. It includes practical work experience, interaction with clients, and involvement with all phases of studio production, including layout, mechanicals, and computer graphics. As part of this course, students must submit a portfolio of artwork for final review by a jury composed of department faculty members and professional artists. (0801-312) **Lab 10, Credit 5 (F, W, S)**

0849-399 Independent Study

Credit Variable

APPLIED COMPUTER TECHNOLOGY

Note: Required laboratories may take place during evening hours or on Saturdays

0802-100 Logic and Problem Solving

This course provides a programming language-independent introduction to problem solving and logic development on computers. Topics include techniques for problem analysis and identification, basic logical operators, and the fundamental logic structures and program components used in computer programming. **Class 3, Credit 2 (F, W)**

0802-101 Introduction to Business Programming

This course introduces students to computer programming concepts. The course focuses on problem analysis, design, and writing of typical business applications with emphasis on logic skill development. The course serves as a foundation for future programming courses. (0802-100, 0817-140) **Class 4, Credit 4 (F, W, S)**

0802-105 Career Exploration--Data Processing

This course is designed to help students collect the information necessary to make appropriate decisions about possible careers in data processing. Students are given opportunities to explore their interest in data processing through a combination of hands-on experiences with computers, presentations by faculty members and outside professionals, field trips, class observations, and student/faculty interviews. The course offers a unique integration of technical instruction and career counseling that enhances students' decision-making and career-planning abilities. **Class 3, Credit 2 (F, W, S)**

0802-157 Beginning Computer Operations

This course provides an introduction to information processing and the types of computer equipment used in business. Topics include hardware platforms, peripheral equipment, software, and job processing. (Corequisite: 0802-158) **Class 3, Credit 2 (F, W)**

0802-158 Beginning Computer Operations Laboratory

Students are given hands-on experience with one or more computer systems. (Corequisite: 0802-157) **Lab 2, Credit 1 (F, W)**

0802-170 Utilities/JCL for Computers

This course presents the use of job control language (JCL) and utilities as applicable to a typical mainframe operations data center environment. The JCL examples discussed include jobs for standard system utilities and production work. (0802-157) **Class 3, Credit 2 (W, S)**

0802-172 Utilities/JCL Lab

This lab provides hands-on experience related to the Utilities/JCL for Computers course lecture. Students write and run a variety of JCL jobs for typical system utilities and production work in a mainframe data center environment. (Corequisite: 0802-170) (0802-157) **Lab 3, Credit 1 (W, S)**

0802-213 Applications Software

This course is an introduction to the use of computer application software in a variety of work settings. Students work on computers to solve a variety of problems. **Class 3, Credit 3 (F, W, S)**

0802-214 Spreadsheet Software

This is 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 use the built-in language found in spreadsheet software to automate the solution to a variety of spreadsheet problems. The most popular spreadsheet software currently used in business is discussed. (0802-101, 213, 222) **Class 3, Credit 3 (F, S)**

0802-215 Microcomputer Database Software

This course covers creating, inquiring, reporting, and other data base functions. Several leading data base software products for microcomputers are studied. Similarities and differences of these and other data base software products are analyzed. Data base utilization in the business environment and application to the students' expected work environment are presented. (0802-213) **Class 3, Credit 3 (W, S)**

0802-220 Computer Hardware I

This course introduces students to the fundamental concepts of computer hardware. Topics include basic computer hardware components, I/O, secondary storage devices, data communications/network equipment, and media. (0802-157) **Class 3, Credit 3 (F, S)**

0802-221 Computer Hardware II

This course provides students with methodologies and hands-on activities related to the setup, configuration, upgrading, and troubleshooting of computers. Topics include examination of microcomputer hardware components, disassembly/reassembly and connection of equipment, and problem diagnosis. (0802-220) **Class 3, Credit 3 (F, W)**

0802-222 Software and Operating Systems I

This course discusses the popular microcomputer operating system used in business. Topics include operating system concepts and system-level commands as well as commands relating to program, file, and application management. Directories and subdirectories are discussed as part of file classification and naming conventions. There also is discussion of typical microcomputer management tasks such as installing and configuring applications software packages, formatting both floppy and hard disks, partitioning hard disks for optimum efficiency, and performing system backups. Several operating systems are examined. (0802-157) **Class 4, Credit 3 (W, S)**

0802-224 Networking I

This course focuses on stand-alone local area networks (LANs) of microcomputers. Students study network topologies, cabling, protocols, and network operating systems. Activities include network setup and reconfiguration, software installation, and identification and correction of hardware and software incompatibility problems. (0802-220) **Class 3, Credit 3 (F, S)**

0802-225 Networking II

This course builds upon Networking I. Topics focus on connecting local area networks (LANs) of personal computers with wide area networks (WANs) with mini, mid-sized, and mainframe computers. (0802-221, 224) **Class 3, Credit 3 (F, W)**

0802-230, 231 Business Programming in COBOL I, II

This is a two-quarter sequence in COBOL programming. Students learn printing of reports, general processing of files, and updating of random access files. The two-course sequence is intended to give students beginning skills in COBOL programming. (0802-101 for 0802-230; 0802-230 for 0802-231) **Class 4, Credit 3 (W, S)**

0802-232 RPG Programming I

This course provides an introduction to report program generator (RPG) language. Course content includes developing program logic, flowcharting, writing programs in RPG, entering the programs and related files, debugging, and executing the programs on a small to mid-range computer system. Break logic, exception reporting, and the use of data bases for input are discussed. (0802-101) **Class 3, Credit 3 (F, W)**

0802-233 RPG Programming II

This is a continuation of RPG Programming I. Course topics include the use of external files, the processing power of RPG III versus RPG II, screen design, real-time inquiry, the update process using RPG III, and creation of data entry files. (0802-232) **Class 3, Credit 3 (W, S)**

0802-235, 236 Programming for Computer Science Students I, II

This two-quarter sequence in programming teaches the language currently used by RITs School of Computer Science. Emphasis is placed on the use of tables/arrays and sorting. These courses are intended for students who plan to pursue a baccalaureate degree in computer science. (Michigan Test score higher than 70 California Reading Test score higher than 9.0, 0802-101 for 0802-235; 0802-235 for 0802-236) **Class 4, Credit 3 (W, S)**

0802-240 Assembler Language Programming

In this course, students learn to use assembler language to program the computer on a low-level basis. The major emphasis of the course is on the actual machine language of the computer and how the CPU works. The language taught (BAL) is not intended for use as a business programming language. (0802-101, 0802-163) **Class 4, Credit 3 (F, W)**

0802-241 Advanced Assembler Programming

This course is a continuation of Assembler Language Programming. It focuses on using assembler language as a programming language. (0802-240) **Class 4, Credit 3 (W)**

0802-250 Multiprogramming/Spooling for Operators

This course provides students with an in-depth discussion of computer systems that operate in multiprogramming mode. Queue and general control of a spooling system are the main topics covered. (Corequisite: 0802-251) (0802-170)**Class 2, Credit 2 (F, S)**

0802-251 Multiprogramming/Spooling Laboratory

This laboratory provides hands-on experience related to Multiprogramming/Spooling for Operators. Students develop skills in working with queues and spooling programs. (Corequisite: 0802-250)

Lab 2, Credit 1 (F, S)

0802-260 System Generation for Operators

Students learn the various parameters as well as the design of a medium-scale operating system from an operator's viewpoint. (Corequisite: 0802-261) (0802-170)**Class 2, Credit 2 (F, W)**

0802-261 System Generation Laboratory

Students receive hands-on experience in working with a medium-scale operating system. Exercises support concepts presented in System Generation for Operators. (Corequisite: 0802-260) **Lab 3, Credit 1 (F, W)**

0802-262 Advanced Operating Systems

Designed as a continuation of System Generation for Operators, this course focuses on the software that makes up a total computer system. Topics covered are the major operating system software components, compilers, and utilities. (Corequisite: 0802-263) (0802-260)**Class 2, Credit 2 (F, S)**

0802-263 Advanced Operating Systems Laboratory

Students in this laboratory investigate the software related to operating systems. (Corequisite: 0802-262) **Lab 1, Credit 1 (F, S)**

0802-299 Co-op Work Experience

Credit 0 (Su)

All 300-number courses require that students are enrolled in Written Communication I or higher level course.

0802-300 Software and Operating Systems II

This course is a continuation of Software and Operating Systems I and concentrates on advanced operating system functions and system utilities. Topics include conversion of files between different formats, system interfaces and shells, advanced hard disk management, and system and data protection. (0802-222, 0847-218)**Class 4, Credit 3 (F)**

0802-305 Introduction to Desktop Publishing

This course provides a hands-on introduction to the use of desktop publishing software on several computer platforms. The mechanics of the use of software products to create and integrate text and graphics are presented. Technical topics, including file formats and file exchange, are stressed over design considerations. (0802-213, 220, 222; 0847-218; third-year status or department approval) **Class 3, Credit 3 (W)**

0802-325 Data Base Systems

This course introduces students to the use of data base systems on computers. Students design a data base for an information system of their choice. (Two-quarter sequence in programming [language is not important], English Composition Placement Test)**Class 4, Credit 4 (W, S)**

0802-330 File Management

In this course, students learn to store and use maintenance information in files. Major topics include the various forms of storage and organization of files, backup and restore, and areas such as security and confidentiality. (One 200-series programming course, English Composition Placement Test) **Class 4, Credit 3 (F)**

0802-335 Data Organization

This course is a continuation of Programming for Computer Science Students II. The sorting process and the concepts of trees and pointers are discussed and programmed. This course is for students interested in pursuing a baccalaureate degree in computer science. (0802-236, 0817-151) **Class 4, Credit 4 (F)**

ROCHESTER INSTITUTE OF TECHNOLOGY

0802-340 Maintenance Programming

In this course, students learn the maintenance process of the programming environment and how to recognize other individuals' styles and logic as well as standards needed to alter existing programs. Students are given language syntax to correct as well as programs to alter, correct, and revise following a set of standards. This course is for students interested in COBOL business programming. (0802-231) **Class 4, Credit 3 (F)**

0802-350 Large-Scale Systems

In this course, students are introduced to large-scale systems and their operation. The content of this course varies depending on the systems available. The topics are related to the support functions in large computer installations. (Corequisite: 0802-351) (One 200-series programming course, 0802-250) **Class 2, Credit 2 (W)**

0802-351 Large-Scale Systems Laboratory

This laboratory supports the concepts of Large-Scale Systems. Students are assigned to set up and operate a medium- to large-scale system and have the opportunity to work in a large-scale computer installation. Laboratory meetings will be based on availability of systems. (Corequisite: 0802-350) **Lab 2, Credit 1 (W)**

0802-360 Small Business Systems

In this course, students learn the use of micro- and minicomputers in the small business environment. Students are assigned to operate a small business computer for a normal business cycle. This course requires extensive laboratory work outside of class. (Corequisite: 0802-361) (One 200-series programming course) **Class 2, Credit 2 (F, S)**

0802-361 Small Business Systems Laboratory

This is not a structured laboratory. Student projects are done in a combined class and laboratory environment. Students are responsible for successful management of financial work, inventory control, and payroll systems. (Corequisite: 0802-360) **Lab 3, Credit 1 (F, S)**

0802-390 Data Processing Seminar

This seminar provides a relevant framework for students' previous data processing courses and, by emphasizing new directions in data processing, also prepares students for continued growth on the job. Students may study independently a topic agreed upon with the instructor. **Class 1-3, Credit Variable (F, W, S)**

0802-399 Independent Study

Credit Variable (F, W, S)

ARCHITECTURAL TECHNOLOGY

0808-100 Career Exploration: Architectural Technology

This course provides students with information regarding careers in architectural technology. 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)**

0808-110 Construction Terminology

This course provides an introduction to construction terminology, materials, and methods. Topics include obtaining and surveying project sites, designing projects, and preparing contract documents. **Class 3, Credit 4 (F)**

0808-111 Construction Drafting I

This course introduces students to the basic drafting techniques for construction projects. Topics include line quality, lettering, scale measurement, dimensioning, drafting media and equipment, graphic reproduction methods, sheet layout, floor plans, site plans, sections, and isometric views. Students begin to develop a portfolio of their best work. (Corequisite: 0808-110) **Lab 6, Credit 2 (F)**

0808-112 Construction Drafting II

In this course, students continue to learn and practice basic drafting techniques for construction projects. Topics include field measurement and measured drawings, preliminary drawings, basic

rendering, base maps, perspectives, and site plans. Students also begin learning basic computer-assisted drafting (CAD) skills. (Corequisite: 0808-201) (0808-111)**Lab 6, Credit 2 (W)**

0808-113 Construction Drafting III

Students continue to learn and practice basic drafting techniques. They also learn to make three-dimensional models. Topics include building models, topographic models, presentation drawings from sketches, free-hand drawings, measured drawings from field measurements, topographic contour maps from spot elevations, and design development drawings from preliminary drawings. Students also continue CAD-skill development. (Corequisite: 0808-202) (0808-112)**Lab 6, Credit 2 (S)**

0808-201 Construction Methods and Procedures I

This course continues the introduction to construction terminology, materials, and methods begun in the Construction Terminology course. Topics include contracting, managing construction projects, earthwork, foundations, superstructure, and enclosing the building. (0808-110)**Class 3, Credit 3 (W)**

0808-202 Construction Methods and Procedures II

This course continues the introduction to construction terminology, materials, and methods begun in the Construction Terminology and Construction Methods and Procedures I courses. Topics include transportation systems, climate control, electrical power systems, communications systems, interior finishes, landscaping, and operating and maintaining projects. (0808-201)**Class 3, Credit 3 (S)**

0808-211 Architectural Materials I

This course provides information about materials used in construction. Students learn the characteristics, origins, sources, standard shapes, sizes, and units of measure for materials and manufactured products. Students use the standard referencing and indexing system for materials and products. (0808-202) **Class 3, Credit 3 (F)**

0808-212 Architectural Materials II

In this course, students apply information from the previous course, Architectural Materials I. Topics include building codes, comparison of materials, selection of materials and products for specific applications, and detailing. (0808-211)**Class 3, Credit 3 (W)**

0808-220 Principles of Structural Systems

Students identify and describe the major structural systems and their components. These systems include steel frame, cast-in-place concrete, precast concrete, masonry, steel joists, trusses, light frame, and heavy timber. Students read structural framing plans, details, and schedules. (0808-212) **Class 4, Credit 4 (S)**

0808-221, 222, 223 Architectural Design Drafting I, II, III

In this sequence of three courses, students learn drafting production techniques, production scheduling, and self-monitoring of progress. Students will produce drawings for one or more building projects during the three courses. The process will include preliminary drawings; design development; architectural working drawings; and working drawings for the mechanical, electrical, and structural elements of the project. Drawings may include cover sheets; site plans; floor plans; interior and exterior elevations; building, wall, and detail sections; interior and exterior perspectives; axonometric views; schedules; and diagrams. Students apply both manual and CAD drafting skills. (0808-113 for 0808-221; 0808-221 for 0808-222; 0808-222 for 0808-223)**Lab 12, Credit 4 (0808-221, F; 0808-222, W; 0808-223, S)**

0808-224 Construction Computations

This course introduces students to the basic techniques for calculating linear area, volume, and application of electronic spreadsheet techniques. Students apply basic math, algebra, geometry, right triangle trigonometry, law of sines, and law of cosines. (0817-151)**Class 2, Credit 2 (W)**

**0808-299 Co-op Work Experience
Credit 0 (Su)**

0808-340 Planning Project

This course introduces students to the basic techniques for planning surveys. These include base map preparation, data collection from field surveys and public records, data base management,

data analysis, graphic presentation of data, project organization, and work discipline skills. Students work as a team to perform an original planning survey. Students work in the field and in the laboratory. (0808-223) **Lab 15, Credit 5 (F)**

0808-351, 352 Architectural Projects I, II

In this sequence of two courses, students complete one or more building design projects. Activities usually include field inspection and measurement, measured drawings, schematic design drawings, design development drawings, and working drawings. The courses simulate the environment of an architectural office. (0808-340 for 0808-351; 0808-351 for 0808-352) **Lab 15, Credit 5 (0808-351, W; 0808-352, S)**

0808-375 Architectural History

Students learn the major elements of architectural styles and building technologies throughout the history of Western architecture. This provides a background for discussion of current topics in the field of building design and construction. **Class 2, Credit 2 (S)**

0808-376 Building Estimating

Students learn and apply basic concepts and skills for calculating the cost of a building project. Topics include elements of project cost, quantity survey techniques, material costs, installation costs, unit cost information sources, cost analysis, adjustments for locality, historical cost indexes, contingencies, overhead, and profit. (0808-224 or 0808-128) **Class 2, Credit 2 (S)**

0808-377 Building Equipment

Students learn to identify and understand the basic equipment and operation of mechanical and electrical systems in a building. These systems include water supply, drainage, fire protection, heating, ventilating, air conditioning, power, lighting, and conveying systems. Students become acquainted with the graphic representation for these systems in working drawings. (0808-202) **Class 3, Credit 3 (F)**

0808-390 Architectural Technology Seminar

Students learn about the work environment they may experience after graduation from NTID with a degree in architectural technology, including the role of a technician in an architectural office, the differences between private practice and public agency work, and the concepts of professionalism and professional ethics. Opportunities for comprehensive reviews of student portfolios are offered in preparation for the job search and interview process. Preparations are initiated for the required cooperative educational work experience. **Class 1, Lab 3, Credit 2 (W)**

**0808-399 Independent Study
Credit Variable**

AUDIOLOGY

0861-103 Survival Strategies for the Basic Speechreader

This course is designed to help students improve their communication with people who do not know sign language. Students are introduced to speechreading and learn a variety of alternative communication strategies. Particular emphasis is placed on writing as a means of facilitating communication. (Speech score lower than 3.0, speechreading score [with or without sound] lower than 35 percent, Michigan Test score lower than 70) **Class 2, Lab 1, Credit 2 (F, W, S)**

0861-105 Practicing Communication Strategies

This course provides review, practice, and integration of newly acquired listening, speechreading, speech, and strategy skills. It is a follow-up course for students who have completed any basic speechreading or strategy courses. Students role play a variety of everyday and work-related situations with people who do not know sign language. Overall communication success is evaluated by both students and instructor using a videotape format. Students also learn how to use these communication skills to succeed in basic conversations and conflict situations with non-signers. (One of the following: 0860-177, 0861-101, 0861-103, 0861-155, or 0861-157; speechreading score [with or without sound] lower than 35 percent) **Class 2, Credit 2, (F, W, S)**

0861-115 Communication for the Job Interview

This course focuses on improving the communication aspect of the job interview through a series of practice interviews. It is designed for students who have difficulty communicating during an

interview and is appropriate for students who prefer to use writing to communicate during the interview. (0847-101, speech score lower than 3.0, completion of at least three quarters in program of study) **Class 2, Lab 1, Credit 2 (W, S)**

0861-118 Orientation to Hearing Aids and Listening

This course is for students who have not used a hearing aid in a long time. It provides information about hearing aids and an opportunity to use them in supportive and structured situations. It also exposes students to the benefits of amplification through listening practice. This course meets twice for class lecturing and listening practice and once for individual hearing aid evaluation/listening laboratory practice each week. (Recommendation by audiologist, new earmold, \$50 fee upon acceptance of new hearing aid) **Class 2, Lab 1, Credit 2 (F, W, S)**

0861-120 Auditory Training for Auditory Profile 1 and 2 Students

This auditory training course is designed to help students learn the meaning of sound. Since students in the first two auditory profiles often are part-time hearing aid users, the major goal is to help them become better listeners. Students meet three times each week to participate in both group and individual practice listening for syllables, stress, and duration. Practice with these materials helps students' speechreading skills. Environmental sound training, with special emphasis on warning sounds and music, also is included. (Use of hearing aid, auditory profile of 1 or 2) **Class 2, Lab 1, Credit 2 (F, W, S)**

0861-130 Sounds of English 1: A

The goal of this course is acquisition of listening skills. Listening materials include words, sentences, short stories, and songs. Development of vocabulary skills is integrated into all listening activities. Classes meet twice weekly and a weekly one-hour laboratory is held for additional listening activities and lectures on topics related to audition and amplification. (Auditory profile of 3, use of amplification all or most of the time, speechreading score [with or without sound] higher than 35 percent) **Class 2, Lab 1, Credit 2 (F, W, S)**

0861-135 Sounds of English 2: A

This course is a continuation of Sounds of English 1: A in which auditory training is continued for the acquisition of listening fluency and comprehension. (0861-130, auditory profile of 3, use of amplification all or most of the time, speechreading score [with or without sound] higher than 35 percent) **Class 2, Lab 2, Credit 2 (F, W, S)**

0861-140 Sounds of English 1: B

The focus of this course is to help students acquire listening fluency and auditory comprehension skills. Classes meet twice weekly for group listening activities, group discussions, and lectures on special topics related to audition and amplification. A one-hour listening laboratory is held weekly for individual listening activities. Auditory activities for this course include books and short stories on audiotapes, music listening, and speech perception in noise. Vocabulary skill development also is emphasized. (Auditory profile of 4 or 5, use of amplification all or most of the time) **Class 2, Lab 1, Credit 2 (F, W, S)**

0861-145 Sounds of English 2:B

This course is a continuation of Sounds of English 1:B. The focus of the course is to continue auditory training for the acquisition of listening fluency and auditory comprehension skills. Vocabulary skill development is emphasized, and listening activities include music and books on audiotape. Special emphasis is placed on auditory skills and strategies for successful communication in social and vocational situations. Classes meet twice weekly for group lectures, discussions, and listening activities, and a one-hour laboratory is held weekly for individual listening activities. (0861-140, auditory profile of 4 or 5, use of amplification all or most of the time) **Class 2, Lab 1, Credit 2 (F, W, S)**

0861-155 Speechreading and Listening

This course develops reception of words, everyday sentences, and on-the-job social sentences by using speechreading and listening. Some auditory-only exercises are done in class and for laboratory assignments. Knowledge of strategies and associational cues is reviewed. (0861-101 or 0861-103, speechreading score [with or without sound] lower than 35 percent, Michigan Test score lower than 70, auditory profile higher than 1, use of amplification in class and lab) **Class 2, Lab 2, Credit 2 (F, W, S)**

0861-157 Speechreading and Strategies

This course is designed to help students use their visual skills to understand speakers. Students practice interpreting verbal and nonverbal information, facial expressions, eye glances, gestures, and body movements as people talk. Practice activities include speechreading and listening to individual words and everyday sentences. Students may be required to speechread hearing people during a practice interview. (Speechreading score [with or without sound] lower than 35 percent, Michigan Test score higher than 69)**Class 2, Lab 1, Credit 2 (F, W, S)**

0861-160 Intermediate Speechreading

In this course, speechreading and listening are used to help students understand sentences and short paragraphs. Strategies to assist communication are reviewed and practiced in conversational interviews with hearing staff members. (Speechreading score [with or without sound] of 35-60 percent, Michigan Test score lower than 70)**Class 2, Lab 1, Credit 2 (F, W, S)**

0861-170 Advanced Speechreading: Non-Technical

The intent of this course is threefold: to improve students' ability to speechread in noisy environments and to speechread difficult speakers, to develop factual knowledge to optimize receptive communication skills, and to develop useful strategies for communicating with hearing people. Students are challenged by a variety of speechreading exercises with and without sound. They learn pronunciation techniques, practical strategies for communicating in social and job environments, and skills for speechreading sentences and paragraphs. Class participation is strongly emphasized. (Speechreading score [with or without sound] higher than 60 percent, use of amplification in class and lab)**Class 2, Lab 1, Credit 2 (F, W, S)**

0861-177 Technical Speechreading and Speech

This course is designed to help students improve their speech and speechreading of technical vocabulary associated with their areas of specialization. This is a small-group class, with one discussion hour, one individual practice hour, and one homework laboratory hour weekly. Group discussions are provided on work communication, strategies, associational cues, and interviews. Individual practice includes speechreading key vocabulary as well as sentences and short paragraphs from technical areas of specialization. Students also practice pronouncing technical vocabulary with a speech instructor during individual practice hours. (Speech score higher than 3.0, speechreading score [with or without sound] higher than 60 percent, pass vocabulary test on first day of class, completion of at least three quarters in program of study)**Class 2, Lab 1, Credit 2 (F, W, S)**

0861-178 Technical Speechreading and Strategies

This course helps students improve their speechreading of technical vocabulary in their areas of specialization. It focuses on the use of writing strategies for communicating at work. The class consists of a small group with one discussion hour, one individual practice hour, one homework hour, and up to two laboratory hours weekly. Group discussions are provided on work communication strategies, associational cues, and job interviews. Individual practice includes speechreading key vocabulary, sentences, and short paragraphs from technical areas of specialization. Students also practice writing strategies with the instructor during individual practice hours. (Speech score lower than 3.0, speechreading score [with or without sound] higher than 60 percent, pass vocabulary test on first day of class, completion of at least three quarters in program of study)**Class 2, Lab 1, Credit 2 (F, W, S)**

0861-180 New Telecommunication Technology for the Job: A

This course teaches students about regular telephones and different kinds of telecommunication devices for the deaf (TDDs). Students use TDDs to make long-distance and emergency calls and appointments. They learn what to do if they have a bad connection or are disconnected. Each student makes calls using amplifiers and pay telephones. They are taught special codes for listening and speaking on the telephone. (Auditory reception score below 40 percent)**Class 2, Lab 1, Credit 2 (F, W, S)**

0861-186 New Telecommunication Technology for the Job:B

This course is offered to help students improve their ability and confidence in using the telephone with strangers. Students learn a variety of techniques, including the best way to use their hearing aids with the telephone, how to make long-distance calls, get information, make appointments over the telephone, and what to do if they have problems or an emergency. Students practice using special strategies to improve their talking and listening over the telephone. They also practice with pay phones. Students are required to practice making telephone calls every week. The instructor

works with each student individually during four special appointments. (Speech score 3.4 or higher, auditory reception score 40 percent or higher, telephone in room or apartment, use of amplification all or most of the time) **Class 2, Lab 1, Credit 2 (F, W, S)**

0861-399 Independent Study

This course is designed for students with special needs that cannot be met by another communication course. Students are required to write a contract describing what the course will cover. The contract must be signed by the student, instructor, and chairperson. Students interested in taking an independent study must talk to their communication advisor. **Credit 1-4 (F, W, S)**

BUSINESS OCCUPATIONS/BUSINESS TECHNOLOGY/ OFFICE TECHNOLOGIES

0804-101 Orientation to Business

This course is a 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 3, 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. This course is designed specifically for students enrolled in courses in the business occupations department. **Class 3, Credit 3 (W, S)**

0804-111, 112, 113 Keyboarding, OASFormatting, OASDocument Production I

These courses are for students with limited typing experience and for those who type below 30 net words per minute. The courses focus on keyboard training, skill development, and basic formatting. Business correspondence, reports, and tables are produced on microcomputers using WordPerfect software. Students are expected to exit OASFormatting with a net speed of 25 words per minute for five minutes and to exit OASDocument Production I with a net speed of 30 words per minute for five minutes. (0804-111 for 0804-112; 0804-112 for 0804-113) **Class 5, Credit 2 (F, W, S)**

0804-114 Keyboarding for Non-majors

This course is 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. This course is open to all NTID students. **Class 4, Credit 2 (F, W, S)**

0804-115 Word Processing Foundations

In this elective course, students learn to use the microcomputer with a popular software package to complete a variety of wordprocessing projects. The course, offered to students in all NTID programs except business technologies (AOS) and office technologies, teaches students to put words into print efficiently. Prior keyboarding experience is helpful. **Class 2, Lab 2, Credit 2 (F, W, S)**

0804-124 Introduction to Data Processing

This course gives students a background in data processing. It presents the concepts and techniques in the processing of data and is directed to the needs and requirements of students. **Class 2, Credit 2 (F, W, S)**

0804-211, 212 Records Management/Business Calculations, Payroll/Spreadsheet Applications

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 data bases; 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 (0804-211, F, W; 0804-212, W, S)**

0804-221 OASDocument Production II

The emphasis of this course is on the improvement of basic skills and their application to a variety of realistic office projects. Students type correspondence, reports, manuscripts, business forms, and tabulations on a microcomputer using WordPerfect 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 5, Credit 3 (F, W, S)**

0804-230 Office Technology Seminar

This course 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 4, Credit 2 (S)**

0804-284 Fundamentals of Management

This course 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. The course also introduces students to motivation and leadership theory as it relates to the role of a manager. (0804-101) **Class 3, Credit 1 (F, W)**

0804-286 Fundamentals of Marketing

This course is an 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 3, Credit 3 (S)**

0804-290 Small Business Organization and Management

This is an elective course designed 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 will write a business plan describing a selected business. (0804-201, 0804-284, or 0804-286) **Class 4, Credit 3 (S)**

0804-291 Applied Business Techniques

This course gives students an opportunity to review skill-oriented coursework on a microcomputer prior to graduation and job entry. Skill review includes production and speed typing, business machines, payroll procedures, records management techniques, and word processing operations and applications using various word processing software packages. (0804-301) **Class 3, Credit 2 (F, W, S)**

0804-299 Co-op Work Experience
Credit 0 (Su)

0804-301 Word Processing I

This self-paced course provides an introduction to basic word processing concepts and a discussion of various types of word processing office systems and procedures. Students learn basic documentation capabilities of the Xerox 6085 Professional Computer system. (0804-221) **Class 4, Credit 4 (F, W, S)**

0804-302 Word Processing II

This self-paced course provides a continuation of the word processing concepts and applications presented in Word Processing I. Using the Xerox 6085 Professional Computer system, students learn applications, including creation of fill-in forms and tables, and are introduced to basic graphics. (0804-301) **Class 4, Credit 4 (F, W, S)**

0804-303 Word Processing III

This self-paced course provides a continuation of the word processing concepts and applications presented in Word Processing II. Using the Xerox 6085 Professional Computer system, students learn procedures for creating basic business and data-driven graphics that are prepared in the office environment. (0804-302) **Class 4, Credit 4 (F, W, S)**

0804-304 Word Processing IV

This self-paced course contains the concepts and applications for creating, maintaining, and printing files. Using the Xerox 6085 Professional Computer system, students use files to create repetitive letters, lists, and reports. **Class 4, Credit 4 (F, W, S)**

0804-310 Desktop Publishing Concepts and Applications

This course for students in the office technologies program provides an introduction to the field of desktop publishing, utilizing word processing and microcomputer equipment. Students create documents on word processing equipment that contains business graphics, clip art, and self-created graphics. Current software programs also are introduced 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

This course will increase 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

0809-100 Career Exploration: Civil Technology

This course provides students with information regarding a career in civil technology. 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)**

0809-211 Surveying and Mapping

This course combines the elements of surveying and mapping. Students have the opportunity to use survey equipment in the field to obtain and record angle, distance, and elevation measurements. Using the information gathered in the field, students perform calculations and produce drawings for a term project. Topics include error of closure, bearings, interior angles, distances, coordinates, slope, reducing field notes, and cut and fill volumes. Students draw with lead and ink on a variety of media and also use the CAD system to produce drawings. (0808-113, 0817-152) **Class 6, Lab 4, Credit 6 (S)**

0809-241 Mapping I

This course allows students to work on a variety of assignments that focus on land planning and site design. Course topics include calculating angles, bearings, distances, co-ordinates and slope; analyzing proposed and existing contours; preparing a topographic base map; and drawing cross sections and a final site plan. Students use both manual drafting and CAD to produce drawings. (0808-113, 0817-152) **Lab 3, Class 1, Credit 2 (S)**

0809-250 Statics

This course requires students to apply physical concepts of equilibrium in co-planar force systems to structural members. Topics include vectors, forces, moments, equilibrium, distributed forces, centroids, and centers of gravity. Students calculate reactions, moments, and internal forces in beams, trusses, and frames. (0817-152, 0818-203) **Class 3, Lab 3, Credit 4 (F)**

0809-260 Strength of Materials

Students apply physical concepts of matter to calculate how forces affect structural members. Topics include stress, strain, behavior of common engineering materials, moment of inertia, section modulus, and basic beam theory. Students calculate the maximum tensile, compressive and shear stresses, and deflection in simple members. They also calculate deflection of beams and select simple tension, compression, and bending members and their connections. (0809-250) **Class 3, Lab 3, Credit 4 (W)**

0809-283 Soil Mechanics

This course introduces students to the characteristics of soils related to construction projects. Topics include visual and laboratory classification of soils, compaction, sub-surface investigation, percolation, and soil nomenclature. Students perform laboratory experiments and tests and write laboratory reports. **Class 3, Lab 3, Credit 4 (W)**

0809-284 Engineering Materials

Students investigate the basic engineering properties of portland cement concrete, portland cement mortar, and asphaltic cement concrete. They learn and practice standard laboratory testing procedures and write laboratory reports. (0809-283) **Class 2, Lab 6, Credit 4 (S)**

0809-285 Civil Technology Seminar

This course provides an overview of the field of civil technology. Students learn how the field is related to the profession of civil engineering. The course also introduces research and laboratory report writing, resume writing, and interviewing skills. **Class 1, Lab 3, Credit 2 (F)**

0809-290 Programming for Civil Technicians

This course gives students an opportunity to develop programming skills in BASIC computer language and to create an electronic spreadsheet. Students write programs and design spreadsheets to solve a variety of problems in areas related to mathematics, engineering, and business. **Class 2, Lab 3, Credit 3 (S)**

0809-299 Co-op Work Experience

Credit 0 (Su)

0809-311 Surveying Projects

Students continue to learn the basic techniques of land measurement with an emphasis on field work and related computations. Topics include angular and linear misclosure, traverse computations, stadia, and horizontal and vertical curves. Students have hands-on experience with surveying equipment including levels, transits, and a total station. (Corequisite: 0809-242) (0809-231, 241) **Class 1, Lab 6, Credit 3 (F)**

0809-312 Mapping and Site Design

Students apply skills learned in Mapping I to complete a site planning project. Requirements for the project include topographic, traverse, and highway mapping; cut and fill calculations; drafting with pencil and ink on a variety of media; and graphic reproduction. (Corequisite: 0809-232) (0809-231, 241) **Class 1, Lab 3, Credit 2 (F)**

0809-321, 322, 323 Structural Design Drafting I, II, III

In this sequence of courses, students apply the principles of statics and strength of materials and drafting skills. Students learn the basic principles of structural analysis and design, estimating quantities, preparation of structural and shop drawings, and construction. The first course and half of the second course concentrate on steel structures. The rest of the second course and the third course concentrate on concrete structures. (0809-260 for 0809-321; 0809-321 for 0809-322; 0809-322 for 0809-323) **Class 2, Lab 6, Credit 4 (0809-321, F; 0809-322, W; 0809-323, S)**

0809-340 Fundamentals of Fluid Mechanics

This course introduces students to the basic principles of fluid statics and fluid flow. Topics include hydrostatic pressure, forces on submerged surfaces, buoyancy, laminar and turbulent flow of incompressible fluids, fluid measurements, and open channel flow. Students perform experiments in the laboratory. **Class 3, Lab 3, Credit 4 (F)**

0809-350 Highway Design and Construction

This course introduces students to the basic practices in the study, design, plan, preparation, and construction of transportation facilities. Topics include horizontal and vertical alignments, typical sections, hydrology, quantity estimating, intersection design, and traffic control devices. (0809-311) **Class 3, Lab 3, Credit 4 (W)**

0809-385 Principles of Environmental Technology

This course introduces students to the factors affecting the quality of the environment. Topics include testing, regulation, and management of water supplies, waste water, soil erosion, solid wastes, atmospheric pollutants, and noise; energy measurement and conservation; visual resource analysis; and environmental impact analysis. Field observations are an important part of this course. (0809-340) **Class 3, Lab 3, Credit 4 (S)**

0809-390 Construction Seminar

Students learn about the work environment they may experience after graduation from NTID with a degree in civil technology, including the role of a technician in an engineering office, the differences between private practice and public agency work, and the concepts of professionalism and professional ethics. Opportunities for comprehensive reviews of student portfolios are offered in

preparation for the job search and interview process. Preparations are initiated for the required cooperative educational work experience. **Class 1, Lab 3, Credit 2 (W)**

0809-399 Independent Study
Credit Variable

EDUCATIONAL INTERPRETING

0870-110 American Sign Language I

This course concentrates on the development of conversational fluency in ASL. Students learn to accurately recognize and produce ASL with appropriate nonmanual behaviors and grammatical features. (Pre-AAS) **Class 4, Credit 3 (F)**

0870-112 Aspects and Issues of Deafness I

This course surveys the audiological, psycho-social, and developmental aspects of varying degrees of deafness and hearing impairment. **Class 3, Credit 3 (F)**

0870-114 Intercultural Communication for Interpreters

This course provides students with an introduction to the concepts of culture, communication, and intercultural communication as they relate to interpreters. **Class 3, Credit 3 (F)**

0870-120 American Sign Language II

This course concentrates on continued development of conversational fluency in ASL. Students learn to accurately recognize and produce ASL with appropriate nonmanual behaviors and grammatical features. (0870-110) **Class 4, Credit 3 (W)**

0870-122 Aspects and Issues of Deafness II

This course focuses on the heritage of deaf people and the ways in which their social needs are satisfied through affiliation with one another. The course covers-through reading, lectures, videotapes, and guest presentations-perspectives on the deaf community, identity of deaf people, and the evidence of a deaf heritage. (0870-112, 114) **Class 4, Credit 3 (W)**

0870-123 Processing Skills Development

This course is an introduction to a variety of mental processing skills that are components of the complex process of interpretation. The major skill areas developed include listening, memory, abstracting, concentration, sight translation, and lag time. **Class 4, Credit 3 (W)**

0870-124 Introduction to Interpreting

This course focuses on the interpreting process model, evolution of the interpreting field, and considerations when interpreting. Topics include competencies of sign language interpreters, relevant terminology, evolution in the field of interpreting, process of interpreting, assessment of interpreting assignments, environmental and practical considerations in interpreting, and problem-solving techniques. (0870-114) **Class 3, Credit 3 (W)**

0870-127 Principles of Tutoring and Notetaking

This course is designed to give students an overview of the research and development of tutor/notetaking programs and to develop students' tutor/notetaking skills. Tutor/notetaking provision in various educational levels as well as aspects of tutor/notetaking management are studied. (0870-112) **Class 3, Credit 3 (F, W, S)**

0870-131 Fingerspelling and Numbers

This introductory course focuses on the expression and reception of the manual alphabet and numbers. **Class 4, Credit 3 (S)**

0870-133 ASL Interpreting I

This introductory course focuses on the process of taking a spoken message and rendering it into the target language of ASL. Students practice interpreting using consecutive interpretation and rehearsed simultaneous interpretation. Additional topics include a comparison of foreign language and sign language interpretation as well as team interpreting. (0870-120) **Class 4, Credit 3 (S)**

0870-134 Practical and Ethical Applications

This introductory course focuses on the areas of decision making, assignment assessment, environmental management, consumer and professional organizations that interpreters must work with, and policies and procedures within agencies and organizations. The course also includes an

in-depth discussion and application of the RIDCode of Ethics principles and guidelines as they apply to various situations within religious, legal, performing arts, telephone, mental health, medical, vocational rehabilitation, and business and industry settings. **Class 3, Credit 3 (S)**

0870-135 Voice Interpreting I

This is the introductory course in a three-course sequence that focuses on the process of taking a signed message and conveying it into spoken English. Topics include the voice interpreting process, vocal control, topic preparation, message analysis, voicing techniques, feedback strategies, and managing interpreting interactions. (0870-120) **Class 4, Credit 3 (S)**

0870-214 Professional Interpreter

This course is designed to provide students with effective job-seeking skills as well as the basic skills needed by entry-level professionals. Topics include computer skills, resume preparation, interviewing skills, professional credentials, and public speaking skills. (0870-134) **Class 3, Credit 3 (F)**

0870-215 Voice Interpreting II

This is the second course in a three-course sequence that focuses on the process and performance of voice interpreting. Topics include topic preparation, vocal control, visible-to-spoken oral interpreting, team interpreting, and critique of voice interpreting skills. (0870-135) **Class 4, Credit 3 (F, W, S)**

0870-216 Transliteration I

This course is the first in a two-course sequence that develops the ability to present a spoken message into a signed message while retaining English word order and rendering an equivalent message. Coursework includes analysis of English vocabulary and structure for conveying an accurate message, development of use-of-space techniques to enhance message clarity, sign vocabulary, and fingerspelling. This course also addresses the areas of critiquing, assignment preparation, and knowledge of target audience. (0870-120, 131) **Class 4, Credit 3 (F)**

0870-217 Oral Transliteration

This course concentrates on the theory and skill of expressive oral transliteration. Students develop the skill of receiving a message and reproducing it in a highly visual modality by applying the principles of clear speech production and support techniques. Students also receive instruction in voicing for deaf and hard-of-hearing people who rely on speech and lipreading. Emphasis is placed on speech production principles, facial expression, natural gestures, body language, and speed of transmission. (0870-112, 124) **Class 4, Credit 3 (F)**

0870-222 Mainstreaming: Educational Programs and Alternatives

Students learn about educational options for deaf and hard-of-hearing students. The current status of education of deaf people is examined in relation to historical trends as well as legal, social, and cultural considerations. Major issues, such as identification, labeling, placement, least restrictive environment, and due process are reviewed. Current federal, state, and local legislation affecting disabled people are analyzed. (0870-112) **Class 3, Credit 3 (W)**

0870-225 Voice Interpreting III

This is the third course in a three-course sequence that focuses on the process and performance of voice interpreting. Assignments include learning jargon used for such sensitive topics as human sexuality, human anatomy, substance abuse, and crime. Strategies and practice in working with different age groups of signers also are included. (0870-215) **Class 4, Credit 3 (W)**

0870-226 Transliteration II

This course is the second in a two-course sequence that develops the ability to present a spoken message into a signed message while retaining English word order and rendering an equivalent message. Coursework includes analysis of spoken language discourse in order to render an equivalent message. Output emphasizes development of message accuracy, sign vocabulary, speed of transmission, use-of-space techniques, and fingerspelling. (0870-216) **Class 4, Credit 3 (W)**

0870-232 Support Service Professional

This course addresses the knowledge and skills necessary for functioning in a variety of educational and non-educational settings in which the support service provider has more than one major responsibility. (0870-127, 222) **Class 3, Credit 3 (S)**

0870-311 Interpreting Practicum I

This course provides students with an opportunity to acquire knowledge about the interpreting profession through observation of and discussion with professional interpreters. Practicum students are assigned mentors who supervise the practicum experience. Students enrolled in Interpreting Practicum I also must register for Interpreting Seminar I. (Grade of C or higher in 0870-112, 124, 134, 135) **Class 10, Credit 5 (F, W, S)**

0870-313 Interpreting Seminar I

This course is designed as part of the practicum experience. Students come together to share observations and experiences gained from the practicum placement. Class discussion focuses on analyzing ethical or situational problems, behavioral alternatives, and outcomes. Students enrolled in Interpreting Seminar I also must register for Interpreting Practicum I. **Class 2, Credit 1 (F, W, S)**

0870-321 Interpreting Practicum II

This course provides students with an opportunity to integrate skills and knowledge through practicum situations. Experiences are gained by observation and actual interpreting in a variety of settings. Practicum students are assigned mentors who supervise the practicum experience. Students enrolled in Interpreting Practicum II also must register for Interpreting Seminar II. (Grade of C or higher in 0870-122, 214, 215, 216, 222) **Class 10, Credit 5 (F, W, S)**

0870-323 Interpreting Seminar II

This course is designed as part of the practicum experience. Students come together to share observations and experiences gained from the practicum placement. Class discussion focuses on analyzing ethical or situational problems, behavioral alternatives, and outcomes. Students enrolled in Interpreting Seminar II also must register for Interpreting Practicum II. **Class 2, Credit 1 (F, W, S)**

ELECTROMECHANICAL TECHNOLOGY

0811-100 Career Exploration: Electromechanical Technology

This course provides students with information regarding a career in electromechanical technology. 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)**

0811-101 Basic Drafting I

This course provides instruction in the principles and techniques of basic drafting and includes an introduction to computer-assisted drafting. The emphasis is on understanding how drawings are made and used in industry. (0817-141) **Lab 6, Credit 2 (F, W)**

0811-171 Digital Systems

This course is an introduction to logic components and how they are used in machines. Students will study gates, switches, counters, flip-flops, multiplexers, demultiplexers, truth tables, Boolean algebra, logic families, registers, and counters. (0811-368) **Class 3, Lab 4, Credit 4 (S)**

0811-209 Technical Graphics

This course is an introduction to electronic and mechanical drawings. Students learn how to draw using drafting standards; computer-assisted drafting experience is included. They also learn about electronic symbols, component outlines, block diagrams, schematic diagrams, cable drawings, military standards, and integrated circuits. (0811-101, 0811-368) **Lab 6, Credit 2 (S)**

0811-210 Computer Techniques

This course emphasizes how the computer can be used to solve problems. Students learn a programming language and develop programming skills. Students are required to solve engineering problems through hands-on computer experience. (0818-100) **Class 3, Lab 3, Credit 4 (W)**

0811-211 Mechanical Components

This course introduces mechanical devices used in electromechanical equipment. The basic topics covered include torque, work, power, gears, cams, and drive systems. Students develop basic breadboarding skills. (0817-150, 0818-202) **Class 3, Lab 4, Credit 4 (S)**

0811-213 DC Circuits

This course introduces students to the theory and use of direct current circuits. Students learn about direct current units and measurements, basic circuit laws, networks, Thevenin's Theorem, and superposition theorem. (0817-150, 0818-202)**Class 3, Lab 6, Credit 5 (S)**

0811-234 Optical Systems

This course introduces students 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, 0817-202)**Class 3, Lab 2, Credit 4 (F)**

0811-241 Tool Skills

This course introduces students to the use of basic hand tools used by electromechanical technicians. Students learn about safety, measuring, layout techniques, cutting, finishing metal, fasteners, drilling, counterboring, countersinking, tapping, soldering, and wiring. The course requires the completion of several projects. (0817-141)**Lab 6, Credit 2 (F, W)**

0811-299 Co-op Work Experience

(0811-171, 321, 368) **Credit 0 (F, W, S, Su)**

0811-304 AC Circuits

This course emphasizes the theory and use of alternating current circuits. Students learn about inductance, capacitance, alternating current circuits, series, and parallel resonant circuits. (0811-210, 213) **Class 3, Lab 6, Credit 5 (F)**

0811-317 Kinematics

This course emphasizes the motion of machine parts. Students learn about linkages and levers, and the relation of these parts to velocities, accelerations, and distances. (0811-211, 0817-152) **Class 3, Lab 4, Credit 4 (F)**

0811-321 Fluid Power

In this course, students learn how power is transmitted by using fluids (liquids and gases). Topics covered include the character of fluids, pumps, valves, cylinders, motors, and the piping used. Students also learn how digital logic is used to control fluid power valves and equipment. (0811-317) **Class 3, Lab 4, Credit 4 (W)**

0811-322 Electrical Power Systems

In this course, 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

This course introduces students 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

This is 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

This is the first course in a two-quarter sequence. The course 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

This course 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

This course emphasizes the analysis of complex circuits. Students learn about Kirchhoff's Laws, independent and dependent sources, power, equivalent sources and resistances, Thevenin's Theorem, Norton's Theorem, superposition theorem, mesh analysis, and nodal analysis. (0811-370) **Class 4, Credit 4 (W)**

0811-332 Statics

This course covers characteristics of forces and force systems. Emphasis is placed on vectors, levers, moments, free body diagrams, couples, friction, and structure analysis. Problem-solving techniques are stressed throughout the course. (0811-317) **Class 4, Credit 4 (W)**

0811-333 Strength of Materials

This course introduces students to the reactions of engineering materials to different types of loading. The course emphasizes the use of standard handbooks, stress and strain relationships, Poisson's Ratio, safe loading, and expected deflection of beam- and column-shaped machine parts. (0811-332) **Class 3, Lab 3, Credit 4 (S)**

0811-334 Electromechanical Systems

This course 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)**

0811-368 Electronics I

This course introduces students to basic diode and transistor circuits. Students learn about semiconductor theory, diode circuits, bipolar transistors, transistor biasing circuits, and AC signal amplifiers. Students develop basic measurement and breadboarding skills. (0811-304) **Class 3, Lab 6, Credit 4 (W)**

0811-369 Electronics II

This course introduces students to FET and linear amplifiers and their characteristics. Topics of study include FET transistor AC-equivalent circuits, small signal amplifiers, power amplifiers, and push-pull amplifiers. Students develop basic measurement and breadboarding skills. (0811-368) **Class 3, Lab 6, Credit 5 (S)**

0811-370 Electronics III

This course introduces students to the theory and application of communications circuits. Students learn about regulator characteristics and applications, control circuits, and a variety of linear integrated circuits. Students are required to use manufacturers' data sheets and to develop proper breadboarding skills. (0811-369) **Class 3, Lab 4, Credit 4 (F)**

0811-399 Independent Study

Credit Variable

ENGLISH

Entry Courses

0862-100 Ideas in English/A Registration #0862-100

This course includes work on basic English sentence structure for reading, writing, speaking, and speechreading; practice with vocabulary and comprehension skills needed to read about contemporary topics; and the use of writing to report events. English Learning Center assignments are required. The course is for students with basic English skills. **Class 5, Lab 2, Credit 4 (F)**

0862-103 English in American Life

This is a summary course that integrates four communication skills: reading, writing, grammar, and vocabulary. Materials in each area provide reinforcement, follow-up activity, or context for the three other areas. To this end, grammar and vocabulary are contained in the reading assignments; reading provides inspiration for the writing assignments; and writing assignments contain vocabulary and structures taught in the grammar portion. English Learning Center assignments are required. This course is for students with low to intermediate English skills. **Class 4, Lab 2, Credit 4 (F)**

0862-105 Social Issues

This English course is designed to help students develop better reading and writing skills. Social issues such as child abuse and drug misuse are discussed. Students have opportunities to improve communication skills by completing a variety of vocabulary, grammar, and writing exercises. Summary writing is stressed and is preceded by a variety of writing exercises. English Learning Center assignments are required. This course is for students with intermediate to high English skills. **Class 3, Lab 2, Credit 4 (F, W, S)**

0862-107 Language Structure in Written English

This course provides students with instruction and practice in using appropriate language structures for different writing purposes. The course has three parts: reading and studying the content and meaning of different modes of writing; analyzing and practicing the various grammatical and structural strategies used in different modes; and writing and editing papers in the various modes. Generally, descriptive, narrative, and several forms of expository writing are reviewed. This course is appropriate for students with high-level English skills. **Class 4, Credit 4 (F, W, S)**

Integrative Courses

0862-110 Ideas in English/B

In this course, students study English grammar for compound and beginning complex sentences. Reading materials and vocabulary practice include world knowledge needed for college learning. Students are expected to write paragraphs and longer compositions about reading materials and short films. English Learning Center assignments are required. (0862-100) **Class 5, Lab 2, Credit 4 (W)**

0862-111 Ideas in English/C

In this course, students work on English needed for college reading and writing activities. Students study complex sentences and advanced verb patterns, reading for understanding, summarizing information, and communicating ideas clearly in longer writing assignments. English Learning Center assignments are required. (0862-110) **Class 5, Lab 2, Credit 4 (S)**

0862-112 Writing for Different Purposes

In this course, students use English skills to organize ideas and solve problems in situations related to their technical coursework in college and to their employment environments after graduation. Students are expected to work individually and in small groups to read and prepare written descriptions, requests, recommendations, and short reports. (California Reading Test score of 6.5-8.5, 12 credits of NTID English, one year in an area of specialization) **Class 3, Credit 3 (W, S)**

0862-113 Verbs and Complements

This course deals with verb tense, agreement, and active and passive voice. It includes a detailed study of complementation, which involves the writing of several short passages. Students also work on vocabulary development. (0862-174, California Reading Test score of 8.0-10.0, Michigan Test score of 55-70) **Class 4, Lab 1, Credit 4 (W, S)**

0862-114 Reading English Dialogue

This course is designed to help students improve their skills in writing English and using English words. It provides instruction in two areas: the use of verbs in different kinds of sentences and the independent analysis of vocabulary words. There is heavy emphasis on reading with practice also in writing skills. English Learning Center assignments are required. (California Reading Test score of 7.0-9.0, Michigan Test score lower than 60) **Class 4, Lab 2, Credit 4 (F, W, S)**

0862-118 Self-Expression

In this course, students explore communication and self-expression through discussions; viewing films; reading materials; and practicing reading, writing, signing, and speechreading. The course uses vocabulary and structural forms that are common in social, academic, and professional situations. Vocabulary clues, reading skills, and descriptive phrases are important parts of this course. English Learning Center assignments are required. (California Reading Test score higher than 7.5) **Class 4, Lab 2, Credit 4 (W)**

0862-119 Mass Communication

This course utilizes selections from literature and current newspaper and magazine articles to give students an idea of the power of language and to teach them sentence structure and paragraph organization in popular literature. English Learning Center assignments are required. (California Reading Test score higher than 7.5)**Class 4, Lab 2, Credit 4 (W)**

0862-120 English and the Arts

This course uses vocabulary and structural forms common in social, academic, and professional situations as well as slides and reading materials that provide an opportunity to practice complex sentence forms. Students learn idioms and verb forms in connection with art history and photojournalism. English Learning Center assignments are required. (California Reading Test score higher than 7.5)**Class 4, Lab 2, Credit 4 (S)**

0862-121 Improving Vocabulary Through Reading

This course is a continuation of English in American Life. The focus is on integrating the four communication skills--reading, writing, vocabulary, and grammar. Vocabulary, grammar, and writing assignments are based exclusively on the readings and are intended to provide continual follow-up, review, and support for material learned. English Learning Center assignments are required. (0862-103)**Class 4, Lab 2, Credit 4 (W)**

0862-122 Quantitative Concepts

This course teaches students vocabulary and sentence structures that are used in mathematical word problems. Students practice reading, writing, and performing calculations for word problems dealing with subjects that include wages, taxes, working hours, and cost of products. English Learning Center assignments are required. (California Reading Test score of 7.0-8.5)**Class 4, Lab 2, Credit 4 (F)**

0862-123 Famous Scientists

This course teaches students vocabulary and sentence structures that are used in technical reading and writing. Students read a textbook covering the lives of famous scientists, then practice reading and writing biographical information about these people. English Learning Center assignments are required. (California Reading Test score of 7.0-8.5)**Class 4, Lab 2, Credit 4 (F, W, S)**

0862-124 The Earth and Universe

This course examines vocabulary and sentence structures used in technical reading and writing. Students read textbooks covering various topics in geology and astronomy. Electronic media is used to practice reading and writing compositions on geology and astronomy. English Learning Center assignments are required. (California Reading Test score of 7.0-8.5)**Class 4, Lab 2, Credit 4 (F, W, S)**

0862-125 Library Research for Writing

This course teaches library techniques for writing research papers and helps students develop vocabulary, sentence structure, and composition skills. Students read textbooks about libraries and writing, visit the library several times, and write one or more college research papers. Classroom lectures cover card, microfiche, and computer catalogs; indexes; organizing and outlining ideas; and word processing as applied to research papers, including how to prepare footnotes and bibliographies. (California Reading Test score of 8.0-10.0)**Class 4, Credit 4 (F, W, S)**

0862-131 Changing World

This course reviews parts of speech, selected phrases and clauses, and kinds of sentences. It applies this review to the practical task of understanding a variety of texts related to the theme of idealism and reality in American life. Texts have included *Of Mice and Men*, 'I Have a Dream,' personal accounts of communal living, and a science fiction short story. English Learning Center assignments are required. (0862-105)**Class 3, Lab 2, Credit 4 (F, W, S)**

0862-132 Medical Issues

This is an advanced technical English course designed to help students develop better reading and writing skills. Students discuss medical issues, including the cause, spread, and prevention of disease, and have opportunities to become familiar with the language of everyday medical science. English Learning Center assignments are required. (0862-105)**Class 3, Lab 2, Credit 4 (S)**

0862-133 Visual Arts

Students in this course read a variety of texts that develop the human dimensions of issues related to photography. The course stimulates students to improve their English through use of captioned and uncaptioned slides; famous photos, including shots of Iwo Jima and Kent State; song lyrics; and art. English Learning Center assignments are required. (0862-105)**Class 3, Lab 2, Credit 4 (W)**

0862-134 Beginning Scientific English

This course introduces students to a broad range of topics related to the technical aspects of society. Emphasis is placed on developing reading skills, acquiring new vocabulary in context, and skimming and scanning procedures. This course is most useful to engineering and science students. English Learning Center assignments are required. (California Reading Test score higher than 8.0, Michigan Test score higher than 60)**Class 3, Lab 2, Credit 4 (F, W)**

0862-135 Writing Scientific English

In this course, designed to improve reading and writing skills, students discuss measurements, dimensions, and properties of objects used in experiments. General technical reading and grammar skills also are used. Homework includes writing short compositions, letters, and laboratory reports. This course is recommended for engineering and science students. English Learning Center assignments are required. (California Reading Test score higher than 8.0, Michigan Test score higher than 60)**Class 3, Lab 2, Credit 4 (W, S)**

0862-136 American Experiences

This integrative course focuses on the theme of alienation in American society. The course requires students to read and discuss articles or a novel, do vocabulary work, complete comprehension exercises, and write compositions related to the articles or novel. English Learning Center assignments are required. (0862-105)**Class 3, Lab 2, Credit 4 (W, S)**

0862-138 Reading and Thinking in English

This course is designed to improve students' skills in reading and thinking. Short articles covering such topics as drugs and pollution are read, analyzed, and discussed. Vocabulary and grammar also are covered, and opportunities to improve writing are provided. Course activities include reading, writing, discussion, drill, and practice. (California Reading Test score of 6.0-8.0, Michigan Test score of 45-60, writing test score lower than 60; or recommendation of technical program)**Class 5, Lab 1, Credit 4 (F)**

0862-139 Reading, Thinking, and Writing

This course is designed to improve students' reading, writing, and thinking skills. Short articles covering such topics as AIDS and human rights are read, analyzed, and discussed. Three feature-length captioned movies are shown and serve as the basis for written reports. Course activities include reading, writing, discussion, drill, and practice. (California Reading Test score of 6.5-8.0, Michigan Test score of 50-60, or writing test score of 45-60; or completion of 0862-138)**Class 5, Lab 1, Credit 4 (W)**

0862-144 Clear Thinking and Writing

This critical thought course includes critical reading, using language for personal analysis, writing for persuasive purposes, and studying the vocabulary of inference and implication.(0862-107)**Class 4, Credit 4 (W, S)**

EMPHASIS COURSES--READING

0862-150 English in Context

This course focuses on reading a novel and discussing the structures of English involved in the description of location (setting) and sequence of events (plot) in a narrative. It also touches on the organization and sequencing of facts in a composition. (California Reading Test score of 7.0-9.0)**Class 2, Credit 2 (F, W, S)**

0862-152 Reading a Novel

This course, which emphasizes the reading process, offers instruction in the elements of a novel. It provides experience in discussing and writing about a novel in terms of its setting, characterization, and conflict. To encourage reading for details, drawing conclusions, and making inferences, the course also provides experience with an interactive computer novel. (California Reading Test score lower than 8.5)**Class 4, Credit 3 (F, W, S)**

0862-153 Reading for Language Learning

This course is designed to help students use reading as a means of improving general English skills. The course emphasizes the skills involved in controlling reading processes to improve understanding and in learning new information while reading. Students learn the skills involved in using dictionaries and encyclopedias to increase world knowledge while reading. Some of the reading assignments involve the use of interactive computer materials that require problem solving and use of information during the reading process. (California Reading Test score of 7.09.0, Michigan Test score higher than 50) **Class 3, Credit 3 (F, W, S)**

0862-154 Reading and Vocabulary Skills for the Social Sciences

This course helps students develop reading skills, vocabulary, and strategies for understanding and studying textbooks from a variety of college disciplines. Reading materials in this course are primarily longer nonfiction materials from various college subjects, such as political science, psychology, anthropology, and history. These materials introduce general background knowledge and vocabulary useful for a variety of college social science disciplines. (California Reading Test score of 8.0-9.5) **Class 3, Credit 3 (F, W, S)**

0862-155 Reading for Comprehension in the Liberal Arts

This course allows students to practice college reading skills while they learn vocabulary and develop reading strategies for learning abstract ideas and acquiring information. Materials in this course emphasize important background knowledge and vocabulary useful for a variety of liberal arts courses while sampling from traditional liberal arts disciplines such as anthropology, history, religion, and science. Vocabulary units include key concepts from these disciplines. The course includes practice reading and studying textbooks, outlining, taking lecture notes, and using reference books to provide background knowledge and help in solving reading comprehension problems. (California Reading Test score higher than 9.2 or grade of A or B in another reading emphasis course) **Class 3, Credit 3 (F, W, S)**

0862-156 Literature Seminar

This course involves reading novels or short stories based on a specific theme. The course helps students become interactive, reflective, and thoughtful readers. Interaction between students and instructors helps students gain a cultural and historical perspective. (California Reading Test score higher than 9.0) **Class 3, Credit 3 (F, W, S)**

0862-157 Introduction to Deaf Literature

The goals of this course are to provide exposure to literature, improve literary analysis skills, and broaden knowledge of Deaf culture. Students read fictional and biographical stories by and about deaf people, including 19th-century stories as well as introductions to current literature. Deaf Literature focuses on reading comprehension and studying the actions, thoughts, and interactions of deaf characters. Other elements such as setting, theme, plot, conflict, point of view, and style/voice are discussed. Students write weekly journals and a short research paper. (California Reading Test score higher than 8.5) **Class 4, Credit 4 (F, W, S)**

EMPHASIS COURSES--VOCABULARY

0862-160 Vocabulary Through ASL

This course is for students whose preferred method of communication is American Sign Language (ASL). The course is designed to develop ability and confidence in translating ASL vocabulary into English equivalents. It includes translation principles, ASL vocabulary items, and English idioms. (ASL knowledge, rating of 4 or 5 on the Sign Instruction Placement Interview) **Class 2, Lab 1, Credit 2 (F, W, S)**

0862-161 Business Vocabulary

In this course, students read nine stories about famous business people/inventors. Each week, more than 60 vocabulary words are chosen for students to use in practice exercises and games, and weekly tests are given on half of these words. Other exercises include weekly reading comprehension, determination of anaphoric references, derivational morphology, and some inductive syntax. All vocabulary, grammatical, morphological, and anaphoric exercises relate to the context of the readings. (California Reading Test score higher than 8.0) **Class 3, Lab 2, Credit 4 (S)**

0862-162 Vocabulary/Dictionary Skills

This course helps students develop self-reliant methods for improving their vocabulary. To achieve the course's primary goal of developing advanced dictionary skills, students use the *Longman* and *Merriam-Webster* dictionaries. (California Reading Test score of 7.5-9.9, Michigan Test score of 60-80) **Class 2, Credit 2 (F, W, S)**

0862-163 English Idioms

This course is designed to help students understand and use common English idioms. Students are encouraged to bring to class for discussion idioms that they encounter. Idioms are discussed and practiced in context. Activities include written assignments and student participation. (California Reading Test score higher than 8.5) **Class 2, Credit 2 (F, W, S)**

0862-164 Popular Film and English

This course is designed to expose students to popular films and readings related to films in order to develop vocabulary skills and general world knowledge. Students then use the vocabulary in essays that express opinions about a variety of film genres. By viewing captioned films, students are introduced to the concept of genre and learn about the connection between film and literature. (California Reading Test score higher than 9.0, Michigan Test score higher than 65, or completion of a writing emphasis course with grade of B or better or permission of instructor) **Class 4, Lab 4, Credit 4 (F, S)**

EMPHASIS COURSES--GRAMMAR

0862-171 Introduction to Complex Sentences

This course is designed to improve English skills for constructing sentences and using new vocabulary. It provides instruction in two areas: the structure of sentences with two verbs and a connector and the analysis of independent vocabulary words. The course concentrates on improving written communication and developing reading skills. English Learning Center assignments are required. (0862-100) **Class 4, Lab 2, Credit 4 (F, W, S)**

0862-172 Identifying Parts of Speech

In this course students learn definitions of parts of speech and their functions in a sentence. Students also learn how to identify the parts of speech of new vocabulary and how to use the words appropriately in a sentence. The course focuses on the different uses of words that can function as more than one part of speech. It also explains root words and how different derivational morphemes can change words into different parts of speech. (Michigan Test score lower than 70) **Class 2, Credit 2 (F, W, S)**

0862-173 Basic English Phrase Structure

This course emphasizes grammar and deals with phrase structure, including noun and verb phrases. Gerunds also are introduced. Students are required to read a short novel and work on vocabulary development. **Class 4, Lab 1, Credit 4 (F)**

0862-174 Adverbials and Basic Clause Structure

This course emphasizes grammar and deals with adverbials, including single-word and adverb phrases; basic clause structure, including adjective and adverb clauses; and noun clause complements. Students also are introduced to coordination. In addition, students are required to read a short novel and work on vocabulary development. (0862-173) **Class 5, Lab 1, Credit 4 (W)**

0862-175 English Phrase Structure

This course, the first in a sequence of two, deals with parts of speech and phrase structure, including noun, verb, adjective, and adverb phrases. In addition, students are required to read a short novel and work on vocabulary development. This course is not for students who have completed Basic English Phrase Structure or Adverbials and Basic Clause Structure. (California Reading Test score of 7.0-8.5, Michigan Test score of 55-65) **Class 4, Lab 1, Credit 4 (F, W, S)**

0862-176 English Clause Structure, Tense, and Passive Voice

This course, which emphasizes grammar, is the second in a sequence of two. It deals with English clause structure, including adjective, adverb, and noun clause complements. Coordination also is introduced, and verb tense is covered. In addition, students are required to read a short novel and work on vocabulary development. (0862-175) **Class 4, Lab 1, Credit 4 (F, W, S)**

0862-178 English Discourse Grammar

This course is designed to help students better express ideas in written English. Two hours a week, formal grammar is studied, including the semantic function of sentence constituents and classical grammar (fragments, run-ons, pronoun reference, subject/verb agreement, consistent tense, etc.). One hour each week is devoted to composition, which then is evaluated for discourse and grammar components. One hour each week is devoted to reading for comprehension through grammatical cues (passive voice, tense, etc.). (0862-107)**Class 4, Credit 4 (W, S)**

EMPHASIS COURSES--WRITING

0862-180 Basic Composition

The course provides instruction in composition writing at the basic level. It focuses on the areas of English sentence structures for composition coherence, development of a more flexible vocabulary, and practice with different styles of composition organization. Students write compositions based on nonverbal films and discuss the areas mentioned above. (Michigan Test score lower than 60) **Class 2, Credit 2 (F, W, S)**

0862-181 Organizing Paragraphs

This course offers instruction and practice in developing short, well-organized compositions. The course focuses on two areas: intensive practice in developing specific writing skills, such as topic sentences, detail (supporting) sentences, outlining, and transition words; and learning to use different composition styles such as description, classification, cause/effect, comparison/contrast, and personal opinion. (California Reading Test score higher than 7.5, Michigan Test score higher than 55, or 0862-180) **Class 2, Credit 2 (F, W, S)**

0862-183 Essay Writing

This course focuses on the development of essay writing skills. Essays provide the basis for many types of writing, including proposals, research papers, and memos. Skill in writing essays also is required for the liberal arts curriculum. This course reviews basic paragraph structure, structure of essays, how to express a view or opinion, and how to defend it logically with reason or examples. (California Reading Test score higher than 8.5, Michigan Test score higher than 60, or grade of B or better in 0862-181) **Class 3, Credit 3 (F, W, S)**

0862-187 Creative Writing

This course is designed for students who need or want to improve their creative thinking and writing skills. The focus of the course is on stories and poetry. Students learn the mechanics of short stories and poetry and participate in assignments designed to improve their ability to think and write using imagination, imagery, descriptions, and feelings. (Michigan Test score higher than 60) **Class 2, Credit 2 (F, W, S)**

0862-188 Practical Writing

This course is designed to help students become skilled in practical, everyday writing. Students practice writing directions, forms, letters, notes, memos, ads, and reports that may be encountered in both the workplace and their personal lives. The emphasis is on form, content, and special grammatical structures necessary for professional writing. (Michigan Test score of 5065) **Class 3, Credit 3 (F, W, S)**

0862-189 Professional Writing

This course examines various types of letters, memos, and reports that students may encounter in the workplace. The emphasis is on form, content, and special grammatical structures necessary for professional writing. (Michigan Test score higher than 65)**Class 3, Credit 3 (F, W, S)**

0862-399 Independent Study

This course is designed for students with special needs that cannot be met by another English course. Students are required to write a contract describing what the course will cover. The contract must be signed by the student, instructor, and chairperson. Students interested in this course should talk to their communication advisor. **Credit 1-4 (F, W, S)**

GENERAL EDUCATION

Required Courses

0847-100 or 0853-100 Freshman Seminar

This course is designed to provide entering students with opportunities to enhance intellectual, academic, personal, social, and ethical decision-making skills in order to maximize their college experience. Students have opportunities to explore and negotiate the college environment, expand critical thinking skills, learn and use academic skills, confront questions of identity and social roles, and deal with ethical issues with faculty members and senior-level students who serve as mentors. **Class 3, Credit 2 (F, W)**

0847-101 Job Search Process

This course is designed for students who are preparing for their first co-op experience or permanent job. Students learn about resume writing, employment letters, sources of employment information, job applications, interviews, and ways to find a job. Learning activities include lectures and written assignments. **Class 2, Credit 1 (F, W)**

0847-102 Contemporary Life Issues

This course focuses on life issues and social problems. Students have an opportunity to broaden their understanding of themselves and society and develop survival skills to assist them in the transition from college to the wider community. One topic from each of the four content areas is covered from an individual and social perspective. This course is designed for students completing certificates, diplomas, and AOS degrees. AOS degree students who have completed the three Human Experience courses (0847-166, 167, and 168) may choose to take Contemporary Social Issues (0847-202) instead of this course. **Class 2, Credit 2 (F, W, S)**

0847-202 Contemporary Social Issues

This course focuses on social issues. Students apply the knowledge and skills learned in College of Liberal Arts courses to understanding current social issues and their impact on individuals and society. One topic from each of the eight content areas (personal/social problems, ethics, racial and other minority issues, peace and war, economic issues, political and public policy issues, environmental issues, and deaf community issues) are covered in class from individual, social, and political perspectives. This course is designed for AAS degree students who have completed three Liberal Arts courses. AOS degree students who have completed the three Human Experience courses (0847-166, 167, and 168) may choose to take this course instead of Contemporary Life Issues (0847-102). **Class 2, Credit 2 (F, W, S)**

ELECTIVE COURSES : FINE ARTS AND HUMANITIES **HISTORY**

0847-148 Deaf Heritage

This course examines many topics related to deafness. Students survey 'the deaf experience' from ancient times to the present by tracing the social and cultural heritage of deaf people and by examining important events and developments. Deaf individuals who have made important and remarkable contributions and achievements also are studied. **Class 3, Credit 3 (F, W, S)**

0847-149 American Past

This course gives students an understanding of American history, beginning in 1607 and continuing through the 20th century. It introduces students to a history of the country's past (heritage) and helps prepare them for the personal responsibilities of good citizenship in contemporary society. **Class 3, Credit 3 (F, W, S)**

0847-201 European History

This course is an introduction to political, social, and cultural history from 1600 through the 20th century and serves as a bridge to Modern European History offered in the College of Liberal Arts. Emphasis is placed on the major historical developments that have influenced the development of modern Europe. **Class 3, Credit 3 (W)**

0847-204 Perspectives on World Events

This course examines the major news events as they occur through identification of underlying issues and their historical foundations. **Class 3, Credit 3 (F)**

LANGUAGE AND LITERATURE

0847-215 Introduction to Dramatic Literature

This course provides a basic introduction to dramatic literature as well as a bridge to the study of dramatic literature in the College of Liberal Arts. It introduces students to the play script as literature and to play script analysis, focusing on vocabulary and basic skills.**Class 3, Credit 3 (F)**

0847-216 Introduction to Prose Literature

This course serves as a survey course for students desiring a basic knowledge of prose fiction and nonfiction and as a bridge to the study of prose in the College of Liberal Arts. It introduces students to the genres of the short story, novel, autobiography, and essay.**Class 3, Credit 3 (W)**

0847-218 Written Communication I

This course is designed for students who need to improve their reading and writing skills before entering Written Communication II. Using a variety of readings and topics, students develop the language and thinking skills needed to write effectively. Specifically, students learn the conventional structures of paragraphs and essays; generate ideas through a variety of invention strategies; use basic development techniques and order choices in writing; use a variety of analytic strategies for both reading and writing; and write paragraphs and essays using narration, exposition, and summary forms. (Appropriate score on NTID Liberal Arts Placement Test)**Class 3, Credit 4 (F, W, S, Su)**

0847-219 Written Communication II

This course is designed for students planning to take English Composition and who need an introduction to the basic concepts of good writing. Using a variety of readings and topics, students develop the language and thinking skills needed to write effectively. Specifically, students learn the conventional structures of documented reports; generate ideas through a variety of invention strategies; review basic development techniques and order choices and learn more complex forms; use a variety of analytic strategies for both reading and writing; enhance critical thinking skills by recognizing assumptions, overgeneralizations, oversimplifications, etc.; and write essays using exposition, summary, critique, persuasion, and argumentation forms. (0847-218 or appropriate score on the NTID Liberal Arts Placement Test)**Class 3, Credit 4 (F, W, S, Su)**

RELIGION

0847-145 The Bible as Literature: A Cultural and Historical Perspective

This course provides a basic understanding of the contents of the Bible. It presents some of the major events and themes, and focuses on the cultural and historical circumstances in which the biblical literature grew. Students with a variety of religious interests may take this course. The course does not approach the literature from any particular belief or lack thereof.**Class 2, Credit 2 (F)**

0847-150 Our Judeo-Christian Heritage

This course gives students an understanding of the historical and literary roots of two major religions of the world, Judaism and Christianity. The foundations of Western culture also are explored. A study of these roots begins with a geographical and sociological view of the Ancient Near East 6,000 years ago and continues with a study of factors that encouraged the later development of Jewish/Christian religious thought and understanding. Students have an opportunity to become more familiar with their own heritage so that they can better form values, opinions, and answers to religious questions in their own lives.**Class 2, Credit 2 (F, W, S)**

INTERDISCIPLINARY

0847-166 The Human Experience: An Individual Life

This course introduces the major challenges faced by human beings throughout the life cycle. It explores the factors that affect healthy and unhealthy adjustments to the circumstances of an individual's life, including biological inheritance, thoughts, feelings, and environment. Students examine contemporary issues related to the challenges of adolescence, adulthood, and old age in order to understand how unconscious adjustment and conscious decision making help in attaining and maintaining psychological health. Selected contemporary issues are explored through self-reflection; group discussions; writing; examination of scientific, literary, and periodical materials; guest speakers; and campus and community activities. Alternative solutions to life's challenges are generated, shared, and evaluated by students. Through these experiences, students are introduced to the knowledge, communication skills, and critical-thinking skills important for making

responsible decisions throughout their adult lives. This course is required for AOS degree students. (Permission of department chairperson or instructor)**Class 4, Credit 4 (F, W, S)**

0847-167 The Human Experience: The Individual and Society

This course focuses on the individual's relationships with others, starting from a study of primary groups and moving through a study of secondary groups (peers, school, work, and citizenship groups) to a study of world awareness and responsibility. The course involves the perception and evaluation of values, morals, ethics, human rights, and responsibilities. The study of selected social issues is accomplished through self-reflection, group and panel discussions, reading of periodicals and teacher-created materials, and participation in campus and community activities. Students are introduced to the knowledge, communication skills, and critical thinking skills important for making responsible decisions throughout their lives. This course is required for AOS degree students. (0847-166)**Class 4, Credit 4 (F, W, S)**

0847-168 The Human Experience: The Individual and Technology

This course explores the social, political, economic, and ethical dimensions of the relationship between the individual and technology in modern society. It provides a specific focus for the application of the general understanding of human development, society, and the possibilities for personal self-determination that students acquire in The Human Experience: An Individual Life and The Human Experience: The Individual and Society. Drawing on this knowledge and using the skills in communication and critical thinking that they have developed, students analyze selected current issues that affect their lives, present and future, and develop a course of responsible actions based on their analysis. This activity will be grounded in a consideration of the nature of science and technology, the role of human values in determining the course of scientific inquiry and the social uses of technology, and some major areas of controversy in this field. This course is required for AOS degree students. (0847-167)**Class 4, Credit 4 (F, W, S)**

MATHEMATICS AND SCIENCE

0847-220 or 0853-220 Reading and Thinking in Science and Technology

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)**

SOCIAL SCIENCE: ECONOMICS AND POLITICAL SCIENCE

0847-106 Personal Finance

This course introduces students to basic money management. Topics for in-depth discussion are based on student interest and selected from the areas of income tax, banking, credit, budgeting, inflation, and shopping wisely to save money.**Class 2, Credit 2 (F, W, S)**

0847-203 Economic Basics

This course serves as a bridge to Introduction to Economics offered in the College of Liberal Arts. It is designed to introduce students to basic background knowledge in economic concepts and methods of analysis. Emphasis is placed on the application of basic methods of economic analysis, economic theories, and contemporary economic issues of the United States. (0817-142 or the equivalent is recommended)**Class 3, Credit 3 (S)**

PSYCHOLOGY

0847-105 or 0853-105 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)**

0847-108 Drug and Alcohol Usage

This course is designed to give a general overview of various drugs commonly used among college-age populations. Upon completion of this course, students should be able to identify and describe the effects on the body, both short- and long-term, from using each drug covered; classification; dependence; and tolerance. Students study the following drug-related topics: social impact, peer pressure, economy of drugs, and personal values related to drugs.**Class 2, Credit 2 (F, W, S)**

0847-109 Growing Up Deaf in America

This course is designed to assist students who are postlingually deafened, individuals who prefer using an oral method of communication and have had little or no contact with other hearing-impaired people, and prelingually deaf people who have grown up in hearing environments. The course covers topics about deafness, including social issues, how deafness affects individuals and their families, and ways that an individual adjusts to deafness.**Class 2, Credit 2 (F, W, S)**

0847-111 Basic Human Sexuality

This course provides information and helps students understand human sexuality. Topics addressed include feelings and attitudes toward sexuality, values, and sensitivity to the feelings of others. Activities include lectures, discussions, and projects.**Class 3, Credit 2 (F, W, S)**

0847-113 Psychology and Your Life

This course presents a life-stages model of human development that emphasizes psychological aspects of development, including emotional, self-concept, and interpersonal relationship development. Students use this model to identify important life issues for themselves and others and also to better understand their own behavior as well as that of children, teenagers, parents, and older people. **Class 3, Credit 3 (F, W, S)**

0847-114 Early Childhood and Parenting

The purpose of this course is to help prepare college-age deaf students for the responsibilities and pleasures that come with parenthood. Students are introduced to such important topics as conception, labor, delivery, care of the newborn, and other issues of importance during the first three years of life. 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.**Class 3, Credit 3 (F,W,S)**

0847-126 Leadership Development

This course helps students develop managerial/leadership skills. A required project and class activities assist them in improving leadership skills. Course topics include one- and two-way communication, group leadership and followership, styles of leadership, delegating responsibility, planning skills, helping behaviors, establishing goals, and problem-solving techniques.**Class 2, Credit 2 (F, W, S)**

0847-146 Psychology of Religion

This course is designed to help students understand how religion may relate to their lives and how they can develop a mature, reflective, and critical view of religion as a life influence. Topics for study include religion as a type of human behavior, methods of studying religious experiences, the psychology of conversion, mysticism, and human development in religious understanding and practice. **Class 2, Credit 2 (S)**

0847-161 Career Decision Making

This course, designed for students who are not sure about their educational and career goals, teaches them how to plan careers and lives. Work is on an individual or small-group basis. Activities include independent study, field trips, role playing, lectures, and discussions.**Class 2, Credit 2 (F, W, S)**

0847-163 Interpersonal Relationships on the Job

This course teaches students the importance of good work relationships to careers. Topics include employer-employee relationships, co-worker relationships, and how work relationships affect job satisfaction. Activities include role playing, discussions, and presentations.**Class 2, Credit 2 (F, W, S)**

SOCIOLOGY AND ANTHROPOLOGY

0847-112 Love, Marriage, and the Family

This course examines the potentials and problems of married life. Students are introduced to such relevant topics as love, sexuality, singlehood, marital roles, conflict resolution, and parenting. The course challenges students to recognize their rights and responsibilities in relationships and offers them opportunities to clarify their thinking with peers and faculty members. **Class 3, Credit 3 (F, W, S)**

0847-127 Community Service I

This course is designed to give students an opportunity to learn some basic helping skills and to use these skills in a supervised community service experience. Students explore different volunteer and professional helping roles and use this information to make personal and career choices. Activities include lectures, discussions, volunteer service, and individual conferences. **Class 2, Credit 2 (F, W, S)**

0847-147 Law and Society

This course is designed to assist students in understanding the basic rules and applications of practical law as it applies to personal rights and responsibilities. Topics covered are how laws affect a society, civil rights, legal rights, torts, marriage, family relations, and criminal law. Activities include lectures and field trips. **Class 2, Credit 2 (F, W, S)**

THEATER

0848-100 Technical Theater I

This course covers the methods and materials used in technical theater. Topics include scenery construction, properties, and the responsibilities of different theater personnel. Activities include lectures, demonstrations, discussions, and involvement in theater productions. **Class 2, Credit 2 (F, W, S)**

0848-101 Technical Theater II

This is a course for students who want to learn more about technical theater. Activities include independent projects, supervision of crews, and shopwork. (0848-100) **Class 2, Credit 2 (F, W, S)**

0848-102 Stage Lighting

This course introduces students to theater lighting and teaches them how to use each piece of lighting equipment. Activities include hanging lights for plays, running the light board, and using color in lighting. (NGGT-100) **Class 2, Credit 2 (F, W, S)**

0848-120 Acting I

This course explores communication by using pantomime, sign mime, body language, facial expression, character study, and role playing. Students learn to perform in front of an audience with confidence and skill. **Class 2, Credit 2 (F, W, S)**

0848-121 Acting II

This course helps students perfect acting skills. Activities include advanced character development and preparation of scenes with a partner. (NGGT-120, permission of instructor) **Class 2, Credit 2 (F, W, S)**

0848-130 Introduction to Theater

This course, designed to teach students about theater production, encourages them to take part in theatrical experiences while they learn about acting, writing, directing, and designing (lights, scenery, costumes, make-up). Activities include lectures, demonstrations, and discussions. **Class 2, Credit 2**

0848-131 Creative Translation into Sign Language

This course covers translation forms used by the department of performing arts. Students learn to translate stories, poems, and plays into American Sign Language. They also learn to present their translated works in sign. Activities include lectures, discussions, drills, and group workouts. **Class 2, Credit 2**

0848-132 Sign Mime

This course teaches students to translate plays, poems, and stories into sign mime. Topics include how to develop and use sign mime in theater and how to express original ideas in sign mime. Activities include lectures, demonstrations, and a laboratory. **Class 2, Credit 2**

0848-133 Theater Practicum

This course is for students who are accepted for a role (performance or crew) in a faculty-directed theater production. Acting students analyze a script, develop a character, rehearse, memorize, and perform. Crew students build a specific scene or costume element and serve as members of the running crew. This course may be taken more than once. **Class 3-8, Credit 1-3**

0848-140 Dance Performance I

This course teaches students the basic terminology and techniques of modern dance. Basic body structure and creative movement are studied by the class. Individuals and groups perform in the studio. Activities include lectures, demonstrations, exercises, and performances. **Class 2, Credit 2 (F, W, S)**

0848-141 Dance Performance II

This intermediate-level modern dance course teaches technique, group work, and performance standards. Activities include lectures, discussions, exercises, and performances. (NGGT-140, dance experience, or permission of instructor) **Class 2, Credit 2 (F, W, S)**

0848-142 Sign Dance

In this basic dance class that includes warm-up, barre, center, and cross-the-floor movement, sign language and modern dance become the basis from which students make compositions. Students do not need to know sign language to take the course. Activities include lectures, demonstrations, and performances. **Class 2, Credit 2**

0848-143 Special Topics in Dance

This course teaches different styles of dance. Possible topics include Afro-Caribbean dance, ballet, jazz, and tap. This course may be taken more than once. **Class 2, Credit 2 (F, W, S)**

0848-150 Music Introduction/Instruction Practicum

This course helps students develop musical skills in one or more of the following areas: piano, guitar, electric bass, percussion, brass, woodwinds, strings, organ, and voice. Students may begin with basic instruction and progress to more advanced levels. Lessons are offered on an individual or small-group basis. This course may be taken more than once. **Class 2, Credit 2 (F, W, S)**

0848-399 Independent Study

Class 3-9, Credit 1-3

INDUSTRIAL DRAFTING TECHNOLOGY

0810-100 Career Exploration: Industrial Drafting

This course provides students with information regarding a career in industrial drafting. 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)**

0810-103 Introduction to Computer-Aided Drafting (CAD)

This is an introductory course in which students acquire basic competency in computer-aided drafting (CAD). Students create basic computer drawings, add dimensions and lettering, and learn some of the most useful commands of the software. They also have an opportunity to work on special applications. **Class 1, Lab 3, Credit 2 (F, W, S)**

0810-131, 132 Manufacturing Processes I, II

Students are exposed to various traditional and non-traditional manufacturing operations. Students develop an appreciation for tolerancing of manufactured parts. (0817-152 for 0810-131; 0810-131 for 0810-132) **Lab 3, Credit 1 (0810I-131, F; 0810-132, W)**

0810-141 Basic Technical Drafting I

Students learn basic engineering drawing skills through instruction as well as manual and CAD drafting projects. Students are introduced to the use of tools and equipment, lettering, geometric constructions, measurement, sketching and shape description, multiview drawings, and basic dimensioning practices. (0817-142) **Class 1, Lab 6, Credit 3 (F)**

0810-142 Basic Technical Drafting II

Students continue to practice basic drafting concepts learned in the previous course. New topics include developments, intersections, sections, auxiliary views, and basic tolerancing. Students produce industrial-quality drawings. (0810-141)**Class 1, Lab 6, Credit 3 (W)**

0810-143 Basic Technical Drafting III

Students continue to develop skills necessary to produce industrial-quality drawings. Major topics of this course include production drawings, tolerance limits and fits, threads and fasteners, surfaces, finishes, material specification, and preparation of an engineering notebook. (0810-142)**Class 1, Lab 6, Credit 3 (S)**

0810-151 Materials and Processes I

Students examine the nature of materials, including structure, classification, and properties of materials as well as the processes used to transform raw materials into manufactured products. Students learn to identify, select, and specify engineering materials and processes for design. (0818-156) **Class 3, Credit 3 (F)**

0810-152 Materials and Processes II

Students continue to learn the structure, classification, properties, and processes of engineering materials while practicing identification, selection, and specification methods. (0810-151)**Class 3, Credit 3 (W)**

0810-204 Technical Drafting IV

Students design welded structures from realistic engineering requirements. They work in the laboratory to produce a team-based welding assembly and supporting detail drawings. (0810-203)**Lab 8, Credit 3 (F)**

0810-205 Technical Drafting V

Students solve a complex design problem from realistic engineering data, applying knowledge of power transmission components and mechanisms. This laboratory course creates a concept layout supported by engineering data. (0810-204)**Lab 9, Credit 3 (W)**

0810-206 Technical Drafting VI: Seminar Project

Students design a working layout of a complex power transmission problem based on an engineering concept layout. This laboratory course provides a fully documented layout suitable for drafters to draw all individual parts. (0810-205)**Lab 15, Credit 5 (S)**

0810-213 Statics

Students learn the basic principles of statics, including reactants and equilibrium of force systems, trusses containing two-force members, structures containing three-force members, centroids, moments of inertia, and dry friction. (0817-202, 0818-135)**Class 6, Credit 5 (F)**

0810-214 Strength of Materials

Students learn the basic concepts of strength of materials, including stress and strain analysis, both elastic and plastic, with emphasis on elastic analysis of axially loaded members, connectors, beams, and columns. The laboratory experience includes testing of materials utilizing appropriate machines. Field trips to see test demonstrations also occur. (Corequisite: 0810-221) (0810-213)**Class 3, Lab 3, Credit 5 (W)**

0810-215 Mechanisms

Students learn about basic mechanical components such as linkages and levers, and combinations of these devices as they are applied in machines. Analysis of force, deflection, velocity, and acceleration is stressed. The laboratory experience includes mathematical and graphical solutions of problems. (0817-202) **Class 3, Lab 4, Credit 4 (F)**

0810-221 Machine Design I

This is a study of the analytical design of bearings, clutches, couplings, brakes, springs, gearing systems, and power shafting. (Corequisite: 0810-214) (0810-213)**Class 3, Lab 3, Credit 4 (W)**

0810-222 Machine Design II

Students learn methods of constructing machine parts as well as specifications of materials and manufacturing processes. (0810-221) **Class 3, Lab 3, Credit 4 (S)**

0810-230 General Tolerancing

This introductory course provides instruction in the principles of dimensioning and tolerancing. The course is designed to provide students with basic skills for recognizing, understanding, calculating, and applying different tolerance systems to individual and mating parts. These tolerance systems conform to industrial standards and practices and to the American National standards Institute document *Dimensioning and Tolerance* (ANSI Y 14.5M-1982). **Class 2, Lab 1, Credit 2 (F)**

0810-231 Geometric Tolerancing I

This is the first of two sequential courses that introduce students to geometric dimensioning and tolerancing. The course is designed to give students an overview of geometric symbols and how the assigned symbols indicate the shape and features of a part or object in relation to size. Tolerancing is applied in theory only, and the rules are presented to students to facilitate the concepts of geometric characteristic symbols per the American National standards Institute (ANSI Y 14.5M-1982). **Class 2, Lab 1, Credit 2 (W)**

0810-232 Geometric Tolerancing II

This is the second of two sequential courses that introduce students to geometric dimensioning and tolerancing. Students continue their study of a pictorial language that fosters uniform understanding among design, production, and inspection groups. This course completes the study of the individual feature characteristic symbols and introduces related feature and positional characteristic symbols per the American National standards Institute (ANSI Y 14.5M-1982). **Class 2, Lab 1, Credit 2 (S)**

0810-241 Technical Mechanical Drafting I

This is the first of three sequential courses that simulate an industrial drafting team project. Topics, taught in a lecture and laboratory format, include drawing and layout procedures, drawing media, basic drafting skills, basic dimensioning, circular dimensioning, common dimensioning, dimensioning methods, limits and tolerances, fits and allowances, working drawings, and assembly drawings. Students develop additional skills in manual and CAD drafting. **Class 2, Lab 6, Credit 3 (F)**

0810-242 Technical Mechanical Drafting II

This is the second of three sequential courses that simulate an industrial drafting team project. Topics, to be taught in a lecture and laboratory format, include surface texture; detail, assembly, subassembly, and purchased-part drawings; engineering change notices; sections and conventions; and threaded fasteners. Students develop additional skills by producing drawings using manual and CAD formats. **Class 2, Lab 6, Credit 3 (W)**

0810-243 Technical Mechanical Drafting III

This is the third of three sequential courses that simulate an industrial drafting team project. Topics, taught in a lecture and laboratory format, include working drawings, engineering change notices, purchased-part drawings, threaded fasteners, miscellaneous fasteners, forming processes, dies, and stamping and manufacturing materials. Students develop advanced skills by producing drawings using manual and CAD formats. **Class 2, Lab 6, Credit 3 (S)**

0810-251 Technical Electrical Drafting I

This course is the first in a three-course sequence and is designed to provide students with the necessary skills to identify, draw, and differentiate between various electronics components. Topics include graphic symbols, reference designations, color code systems components, schematic diagrams, and control drawings. Students develop skills in manual and computer-assisted drafting. **Class 2, Lab 6, Credit 3 (F)**

0810-252 Technical Electrical Drafting II

This is the second in a three-course sequence and is designed to provide students with the necessary skills to identify, draw, and differentiate between various electronics diagrams. Topics include reference designation systems; block, logical, connection, interconnection, cable, and industrial electronics diagrams; and wiring harnesses. Students develop their skills in manual and computer-assisted drafting. **Class 2, Lab 6, Credit 3 (W)**

0810-253 Technical Electrical Drafting III

This course is the third in a three-course sequence and is designed to provide students with the necessary skills to identify, define, and produce drawings required for printed circuit board

assemblies. Topics include artwork, board detail, marking, assembly drawings, productive processes, and fabrication. **Class 2, Lab 6, Credit 3 (S)**

0810-299 Co-op Work Experience
Credit 0 (Su)

0810-399 Independent Study
Credit Variable

MANUFACTURING PROCESSES TECHNOLOGY

0812-150 Introduction to Computer Numerical Control

This course introduces the principles, concepts, and terminology of computer numerical-controlled machining (CNC). Students review CNC history, development, and applications. Students learn basic programming formats and techniques. (0813-135)**Class 1, Lab 2, Credit 2 (S)**

0812-151 Computer Numerical Control I

This course introduces students 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, 0817-152)**Class 4, Lab 3, 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 4, Lab 3, Credit 4 (S)**

0812-253 Computer Numerical Control III

This course introduces students to computer numerical control. Topics covered 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 4, Lab 3, Credit 4 (S)**

0813-100 Career Exploration: Manufacturing Processes

This course provides students with information regarding a career in manufacturing processes. 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

This course 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. (0817-142) **Lab 6, Credit 2 (F)**

0813-102 Basic Drafting II

This course is a continuation of Basic Drafting I and is designed 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, 0817-150) **Lab 6, Credit 2 (W)**

0813-131, 132, 133 Manufacturing Processes I, II, 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 courses. (0817-140 for 0813-131; 0813-131 for 0813-132; 0813-132 for 0813-133)

Class 1, Lab 8, Credit 4 (0813-131, F; 0813-132, W; 0813-133, S)

0813-134, 135, 136 Manufacturing Processes IV, V, VI

Students apply theory required to set up and operate lathes, milling machines, drill presses, grinders, and precision hand tools. Students also are introduced to non-traditional machining. Greater emphasis is placed on accuracy and quality. Safety is stressed throughout all courses. (0813-133 for 0813-134; 0813-134 for 0813-135; 0813-135 for 0813-136)**Class 1, Lab 8, Credit 4 (0813-134, F; 0813-135, W; 0813-133, S)**

ROCHESTER INSTITUTE OF TECHNOLOGY

0813-139, 140 Blueprint Reading I, II

Students develop the skills necessary to read and interpret prints of engineering drawings of details and assemblies. (NTMM-141 for 0813-139; 0813-139 for 0813-140)**Class 1, Lab 3, Credit 2 (0813-139, F; 0813-140, W)**

0813-151 Industrial Materials

This course introduces students 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

This course introduces students 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. The course emphasizes proper operation of equipment and related safety measures. (0813-153) **Lab 4, Credit 2 (S)**

0813-237 Advanced Machining Processes

In this course, students develop advanced-level machining skills. Students apply theories associated with precision form and compound-angle grinding, advanced mill and lathe techniques, non-traditional 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

This course introduces students 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

This course 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 Work Experience Credit 0 (Su)

0813-399 Independent Study Credit Variable

MEDICAL LABORATORY TECHNOLOGY

(This program has been recommended for discontinuance by the college's strategic plan. If program discontinuance is approved by Institute governing bodies, the technical courses of this program will be discontinued at the end of the 1994-95 academic year.)

0815-215 Introduction to College Chemistry I

This course is for students enrolled in programs requiring review or preparation for College of Science chemistry courses. The course includes principles of measurement, composition of

matter, energy changes, behavior of gases, atomic structure, and bonding. Laboratory work includes experiments related to topics covered. **Class 4, Lab 4, Credit 4 (F)**

0815-216 Introduction to College Chemistry II

This is a continuation of Introduction to College Chemistry I. Solutions and equilibrium principles are studied. Also included are stoichiometric solution calculations involving ionization and solubility, product constants, and acid-base pH calculations. Laboratory work includes qualitative analysis of common cations and anions. **Class 4, Lab 4, Credit 4 (W)**

0815-217 Introduction to College Chemistry III

This course provides an introduction to quantitative analysis utilizing both gravimetric and volumetric techniques. Topics include evaluation of analytical data, gravimetric analysis, acid-base titrations, redox titrations, and principles of colorimetry and spectrophotometry. **Class 4, Lab 4, Credit 4 (S)**

0816-101, 102 Anatomy/Physiology and Disease I, II

These courses provide students with the fundamentals of human anatomy with emphasis on physiology and related diseases. Students perform a variety of experiments and dissections in the laboratory portion of the courses. **Class 2, Lab 2, Credit 4 (0816-101, F; 0816-102, W)**

0816-105 Introduction to Medical Parasitology

This course introduces students to the host/parasite relationship, life cycle, and identification procedures for intestinal and atrial protozoa, nematodes, cestodes, and trematodes. Classes include discussion of diseases and use of preserved microscopic slides, 35mm captioned slides, and laboratory preparation. **Class 1, Lab 2, Credit 2 (S)**

0816-111 Basic Histology

Theory and practice in tissue preparation for paraffin techniques are presented. Laboratory techniques include preparation of solutions, stains, sectioning, slide mounting, and staining of various tissues. Students develop skills in the operation, use, and care of histologic instruments. **Class 12, Credit 6 (S)**

0816-115

This course emphasizes use of instrumentation for selecting and monitoring tracings of common heart maladies. **Class 4, Credit 2 (W)**

0816-121 Urinalysis

This course provides theory and practice in the estimation of urinary constituents, microscopic examination, and additional tests of clinical significance. **Class 4, Credit 2 (F)**

0816-122 Hematology

This course is a study of routine blood tests, including white count, red count, hematocrit, hemoglobin, sedimentation rate, differential count, and the calculations of the hemacytometer. Emphasis also is placed on recognition of normal and abnormal cellular elements of blood. **Class 8, Credit 4 (F)**

0816-123 Advanced Hematology

This course provides instruction and practice in automated methods of cell counting, quality control, red cell description, reticulocyte counts, and test procedures in coagulation. The course emphasizes the correlation between laboratory work and diseases, such as anemia and leukemia, as well as bleeding and coagulation disorders. (0816-122) **Class 9, Credit 5 (W)**

0816-131 Microbiology I

This course is an introduction to the study of microscopic organisms such as viruses, bacteria, yeast, protozoa, fungi, and algae. The course also includes clinical procedures for the study of common disease-causing organisms with concentration in bacteriology. Techniques in the laboratory include media preparation, sterilization, culturing, mounting, staining, agglutination, antimicrobial susceptibility testing, and biochemical reactions. **Class 9, Credit 5 (S)**

0816-132 Immunology/Serology

The nature of immunity, the basic principles of the immune system, immunoassay, immunopathology, and histocompatibility are among the topics considered in this course. A variety

of routine and special immunological procedures are learned during laboratory sessions.**Class 2, Lab 3, Credit 3 (W)**

0816-133 Blood Banking

The theory of blood banking and routine procedures is presented in this course. Emphasis is placed on quality control, ABO grouping, sub-grouping, Rh testing, antiglobulin testing, antibody screening, antibody detection and identification, transfusion reactions, compatibility testing, erythroblastosis fetalis, preparation and storage of blood components, and recordkeeping.**Class 2, Lab 3, Credit 3 (S)**

0816-140 Electron Microscopy

Electron optics and the mechanics of the electron microscope are studied prior to any work on the electron microscope. The principles of specimen preparation, fixation, embedding, microtomy, staining, and photographic processing are studied in depth. The course grade is based on the quality of final products. (0814-109, 0816-111)**Class 2, Lab 5, Credit 3 (F, W, S)**

0816-200 MLT Co-op Seminar

This course provides students with knowledge and skills to prepare them for a successful co-op experience, including guidelines on professional ethics, employee-employer responsibilities, communication skills, and interpersonal relationship development. Class activities include discussion groups, panel presentations, hospital visitations, lectures, and the preparation of co-op materials. (Completed first year in program)**Class 2, Credit 1 (W)**

0816-201, 202, 203 Clinical Chemistry I, II, III

This three-quarter sequence provides theory and practice in the quantitative and qualitative analyses of physiochemical parameters. The sequence includes fundamental concepts of clinical analysis, theory and practical application of clinical instrumentation, and the relationship of clinical analysis to methodology, disease, and the diagnostic process. The winter and spring quarters include a hospital affiliation in clinical instrumentation twice weekly. (0816-201 for 0816-202; 0816-202 for 0816-203) **Class 12, Credit 6 (0816-201, F); Class 9, Credit 5 (0816-202, W; 0816-203, S)**

0816-211 Histology II

This course is a continuation of Basic Histology with emphasis on histochemistry, special stains, and tissue preparation techniques. (0816-111)**Class 12, Credit 6 (W, S)**

0816-224 Laboratory Simulation

This course is a review and summary of all specialties included in the total medical laboratory technology program. Students rotate into departments in the clinical laboratory environment. Students meet one hour per week with medical laboratory technology faculty members on campus. The remaining 12 hours each week are spent on rotation in an affiliated hospital or clinical laboratory under supervised conditions.**Class 1, Lab 6, Credit 3 (S)**

0816-232 Microbiology II

This course is an in-depth study of medical bacteriology and the related diseases. Theory and practice are provided in specimen collection, culturing, staining, media preparation and selection, normal flora, identification procedures for disease-producing organisms, susceptibility testing, agglutination reactions, and reporting results. (0816-131)**Class 12, Credit 6 (F)**

0816-233 Microbiology III

This course is a continuation of Microbiology II, with an emphasis on special techniques for anaerobic organisms, mycobacteriology, mycology, and virology. The theory portion of the course includes the study of diseases and their symptoms. This course takes place on campus and in affiliated hospital laboratories. (0816-232)**Class 9, Credit 5 (W)**

**0816-299 Co-op Clinical Experience
Credit 0 (Su)**

**0816-399 Independent Study
Credit Variable**

OPHTHALMIC OPTICAL FINISHING TECHNOLOGY

0827-105 Introduction to Optical Finishing Technology I

This course emphasizes a continuation of sampling in 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

This course teaches the function and use of optical laboratory equipment necessary to the production of single-vision eyewear. 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

This course 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

This course 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. (0817-141) **Class 4, Credit 3 (F)**

0827-112 Optical Finishing Technology Math II

This course teaches students how to select and determine appropriate base curves, cross curves, and inside curves of given lens powers. Students learn mathematic 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. (0817-141; 0827-111) **Class 4, Credit 3 (W)**

0827-115 Prescription Analysis I

This course 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 (F)**

0827-116 Prescription Analysis II

Students continue to analyze and write ophthalmic prescriptions in various forms with an emphasis on ortholite plastic, cataract, and trifocal prescriptions. (0827-115) **Class 4, Credit 3 (W)**

0827-117 Lens Design

This course teaches students how to design lens systems based on specific optical factors such as frame selection, lens material, lens thickness, index of refraction, size of lens, lens power, blank manufacturer, and cosmetic appeal. Students learn trade names of lenses, percentages of lens transmission, multifocal segment placement, and occupational and recreational lens forms. (0827-111, 112) **Class 5, Credit 3 (S)**

0827-121 Optical Finishing Techniques I

This course 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 (W)**

0827-122 Optical Finishing Techniques II

This course teaches students how to block and edge lenses using a variety of automatic edging machines. Students learn how to edge given lenses with a Vee bevel, rimless bevel, and hide-a-bevel. Edging concepts and operational techniques are emphasized. (0827-121) **Class 6, Credit 5 (S)**

0827-123 Optical Finishing Techniques III

This course teaches students the use of the vertometer and various layout markers to prepare single and multifocal lenses for edging. Students learn to process uncut ophthalmic lenses according to ANSI standards. (0827-122) **Class 12, Credit 6 (S)**

0827-161 Optical Finishing Terminology I

This course 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

This course 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

This course 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

Concepts taught in Optical Finishing Techniques III are further developed, with an emphasis on layout techniques, including multifocal and specialized vocational lens systems. Procedures for lens insertion, frame alignment, and proper use of assembly-alignment tools are emphasized. (0827-123) **Class 9, Credit 5 (F)**

0827-225 Optical Finishing Laboratory Simulation I

This course 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

This course 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)**

0827-241 Management of Optical Stockroom Procedures

In this course, students learn to identify the function and job responsibilities of stockroom personnel, suppliers of laboratory products, consumers (customers) of laboratory products, and flow of operations. Emphasis is on basic ophthalmic frames, receipt of orders, picking stock, stock check-in, and related administrative procedures. **Class 6, Credit 4 (F)**

0827-243 Optical Finishing Inspection and Correction

Students evaluate finished prescription orders as final inspectors, comparing all optical and mechanical details with written specifications. Emphasis is placed on accuracy, quality of workmanship, and the inspector's ability to recommend and produce any changes that may be necessary. Study includes learning acceptable ANSI tolerance levels and prism beveling. **Class 5, Credit 3 (S)**

0827-251 Professional Optic Seminar

In this course, students learn how attitude, aptitude, and personal/social factors contribute to successful employment. They will evaluate and summarize information provided by local ophthalmic professionals. **Class 2, Credit 2 (W)**

0827-299 Co-op Work Experience

(0827-101) **Credit 0 (Su)**

0827-399 Independent Study

Credit Variable

PHOTO/MEDIA TECHNOLOGIES

0872-100 Career Exploration: Photo/Media Technologies

This course explores the photo/media field to help students make well-informed decisions regarding their college area of specialization. Students have opportunities to explore their interest in the field through hands-on experiences with photo/media equipment and tools. Opportunities are provided for students to increase their awareness of necessary photo/media skills, industries, programs, and expectations of the photo/media technologies department. Technical areas of study include color negative printing, computer graphics, special effects slides, storyboards from 35mm slides, and video equipment. **Lab 2, Credit 1 (W, S)**

0872-101 Freshman Seminar --Photo/Media I

Students will develop college life survival skills in this course. Students will explore and develop skills in team building, learning styles, and learning strategies. Cultural diversity topics will also be included. **Class 2, Credit 1 (F, W, S)**

0872-102 Freshman Seminar --Photo/Media II

In this course, students will explore career and academic opportunities in the imaging disciplines and begin to develop a personal career plan. Systematic decision making related to imaging careers will be introduced. (0872-101) **Class 2, Credit 1 (F, W, S)**

0872-103 Freshman Seminar --Photo/Media III

In this course, students will develop a personal academic plan that is based upon a career plan in the imaging disciplines. Systematic decision making related to imaging careers will be emphasized. (0872-102) **Class 2, Credit 1 (F, W, S)**

0872-121 Computers in Visual Communications

Students will be introduced to how a computer works and what it can do in the digital imaging environment. The basic function of a computer and a variety of software programs will be introduced. **Lab 4, Credit 2 (F, W, S)**

0872-122 Image Sources I

This is an introductory image capture course utilizing current processes and materials to produce copy images. (0872-141, 181, 121) **Lab 6, Credit 3 (F, W, S)**

0872-123 Image Manipulation I

Students will be introduced to the production and manipulation of digital images originating from scanners, video capture, or other digital graphic files. (0872-121) **Lab 6, Credit 3 (F, W, S)**

0872-141 Imaging Lab I

Students will produce continuous tone paper prints by making enlargements and controlling density and contrast. This course will include proper use of equipment, chemical mixing, processing and print finishing techniques, and image evaluation for quality. (Corequisite: 0872-181) **Lab 6, Credit 3 (F, W, S)**

0872-142 Imaging Lab II

Students will apply principles of color theory to produce and evaluate color prints. This course includes making enlargements, controlling print density and color balance, and applying print finishing skills. (0872-101) **Lab 6, Credit 3 (F, W, S)**

0872-143 Imaging Lab III

Students will apply principles of color theory and densitometry to produce and evaluate color negatives and prints. Students will produce and calibrate standard images and use them to evaluate a variety of processes. Mechanized film and paper processor operation, maintenance, and processor monitoring skills will be introduced and practiced. (0872-142) **Lab 6, Credit 3 (F, W, S)**

0872-181 Basic Image Design

Students will learn technical skills and develop a sense of aesthetics and design in still imaging. Emphasis will be placed on identifying, defining, and applying the concepts of density, contrast, and composition. (0872-100) (Corequisite: 0872-141) **Lab 4, Credit 2 (F, W, S)**

0872-182 Image Design

Students will create images by practicing technical and aesthetic knowledge learned in Basic Image Design. Skills controlling density, contrast, composition, and design in color imaging will be emphasized. Concepts of color theory and color temperature will be introduced. (0872-181)**Lab 2, Credit 2 (F, W, S)**

0872-183 Presentation Media I

Students will utilize the electronic desktop, file management techniques, graphical user interface, and graphic applications to produce basic presentation images. (0872-121)**Lab 6, Credit 3 (F, W, S)**

0872-224 Image Manipulation II

Students will build on skills learned in Image Manipulation I. Production planning will be introduced as a key to producing a variety of photographic quality electronic images. (0872-123)**Lab 6, Credit 3 (F, W, S)**

0872-225 Image Manipulation III

This is a production-oriented course. Students will use skills learned in Image Manipulation I and II to continue to produce photographic quality electronic images. (0872-224)**Lab 6, Credit 3 (F, W, S)**

0872-244 Imaging Lab IV

Students will continue to apply principles of color theory and densitometry to produce and evaluate color negatives and prints. Topics such as calibration and production of conversion images, color matching prints, and production level skills in mechanized processing will be taught. (0872-143)**Lab 6, Credit 3 (F, W, S)**

0872-245 Imaging Lab V

Students will learn advanced production techniques for display images, reproduction printing, and process monitoring. (0872-244)**Lab 6, Credit 3 (F, W, S)**

0872-246 Imaging Lab VI

Students will produce and evaluate mural prints as well as make black-and-white prints from color negatives and color prints from transparencies. (0872-245)**Lab 6, Credit 3 (F, W, S)**

0872-261 Videography

This course introduces students to videography, cameras, videocassette recording, editing, and lighting. Emphasis is on proper operation of video equipment for single-camera productions. Students gain hands-on experience in making a single-camera production. (0872-181, 284)**Lab 6, Credit 3 (F, W, S)**

0872-268 Survey of Image Processes

This course provides students with an overview of several imaging systems, ranging from conventional photography (silver halide) to electronic imaging systems. Different method of recording, manipulating, and displaying images are emphasized. This course format includes lectures and demonstrations with some hands-on experience, including group activities**Lab 4, Credit 2 (F, W, S)**

0872-284 Presentation Media II

Students will apply design principles and intermediate digital techniques to prepare presentation media. Various input sources and output devices will be introduced. (0872-182 or 268)**Lab 6, Credit 3 (F, W, S)**

0872-285 Image Sources II

Students will build upon image-capture skills learned in Image Sources I. Current processes, calibration, and production techniques of image capture will be emphasized to produce copy images. (0872-122)**Lab 6, Credit 3 (F, W, S)**

0872-286 Presentation Media III

Students will plan and produce professional presentations. A variety of presentation systems will be used to prepare portfolio work. (0872-284)**Lab 6, Credit 3 (F, W, S)**

0872-299 Co-op Work Experience
Credit 0 (F, W, S)

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0872-347 Display Imaging

Students will learn to produce large mural display media. Assembly and specialized finishing techniques will be introduced. (0872-246)**Lab 6, Credit 3 (F, W, S)**

0872-348 Composite Imaging

Students will produce prints that combine photographic images composed from a variety of originals. (0872-246)**Lab 6, Credit 3 (F, W, S)**

0872-349 Retouching/Restoration

Students will learn to retouch and/or restore digital images using digital and hybrid technologies. (0872-225, 246) Lab 6, Credit 3 (F, W, S)

0872-387 Presentation Media IV
Students will combine presentation graphic skills and image manipulation skills to produce professional presentations. Students will expand on the use of grids, templates, and storyboards to produce presentations. (0872-286)**Lab 6, Credit 3 (F, W, S)**

0872-388 Multimedia

Students will use desktop animation and digital editing programs to create titles, captions, transitions, and video overlays for video presentations. In addition, students will manipulate graphics, photographs, and video for inclusion in these video presentations. (0872-387)**Lab 6, Credit 3 (F, W, S)**

0872-389 Multimedia Interactive

Students will combine various desktop media produced in other courses to create an interactive multimedia presentation including slides, video, animation, and graphics. (0872-268 or 284 or 387)**Lab 6, Credit 3 (F, W, S)**

0872-399 Independent Study

Credit Variable

ELECTRONIC PUBLISHING AND PRINTING TECHNOLOGY

0822-100 Career Exploration: Printing

This course explores printing as a career choice and is designed to help students make well-informed career planning decisions before enrolling in the printing production technology program. **Class 0, Lab 2, Credit 1 (F, W, S)**

0822-101 Introduction to Printing Processes

This course presents an overview of the printing processes, from design to finished product, through a combination of lab and classroom activities. Fundamental principles of job safety, paper image generation, image assembly, bindery, and comparative image reproduction processes—including flexography, gravure, screen printing, and xerography, with an emphasis on offset lithography—are studied. This course provides a background for subsequent courses in the printing production technology department. **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-110 Page Creation Methods

This course supports the career development of pre-press technicians. Included is an introduction to traditional and electronic-image page generation, typography, basic personal computer operation, and special-effects typography. Elementary desktop publishing skills are emphasized. This is the first course in a sequence. **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-115 Fundamentals of Desktop Publishing

This course provides students with desktop publishing skills. File management, image capture, networking, page layout, editing, and document output are covered. Laboratory projects are output to both laser printers and high-resolution imagesetters. (0822-110)**Class 1, Lab 3, Credit 2 (F, W, S)**

0822-120 Fundamentals of Reproduction Photography

This course prepares students to be camera technicians. Students learn tray and machine processing, exposure on manual and programmable cameras, scaling and cropping copy, line negative and stat production, and basic halftone production. An introduction to electronic image capture and manipulation also is provided. **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-125 Film Contacting, Proofing, and Platemaking

This course prepares students to be technicians in film contacting, proofing, and offset platemaking. Areas of study include contact exposure calibration, comparison of contact exposure targets, densitometry, registration, spreads and chokes, use of a flat identification and exposure communication system, production procedures, and quality control. **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-130 Fundamentals of Offset Film Assembly

This course prepares students to be offset film assembly technicians/strippers. Students learn single- and multicolor film assembly/stripping procedures, including production of film assembly rule-out, stripping halftones and tints, color break masking, reverse and surprint type, window cutting, opaquing, and spotting and correcting flats. Areas of study include use of film assembly materials, job analysis and planning, imposition and layout, use of a flat identification and exposure communication system, and an introduction to electronic image assembly. This is the first course in a sequence. **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-140 Offset Duplicator Operation I

This course prepares students to be duplicator operators. Included is instruction on various duplicators that are widely used by in-plant and commercial printers. A systematic method of preparation, operation, and maintenance is emphasized. This is the first course in a sequence. **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-145 Offset Duplicator Operation II

Second in a sequence, this course prepares students to be duplicator operators. Included is instruction on various duplicators that are widely used by in-plant and commercial printers. Multicolor register, feed of various paper stocks, quality assurance procedures, and basic finishing operations are among the areas of study. (0822-140) **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-200 Production Procedures and Quality Control

This course supports the career development of all printing students. Through production of a complete offset printed job, students learn cost estimating, safety, production standards and procedures, job flow and scheduling, quality control standards and procedures, job accountability and recordkeeping, troubleshooting, and problem solving. (0822-100-level) **Class 1, Lab 2, Credit 2 (F, W, S)**

0822-210 Computerized Typesetting

This course prepares students to be input operators in typesetting and desktop publishing environments. Special keyboard functions, coding systems, file management, telecommunications, optical character recognition, and output devices are studied. This course covers the basics of direct input imagesetting skills, media conversion, and translation principles used to generate and format text for reproduction. Basic typesetter/imagesetter maintenance is included. (0822-110) **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-215 Advanced Desktop Publishing

This course includes the principles and techniques required for complex document development using layout principles and skills covered in Fundamentals of Desktop Publishing. Topics include document tagging, template generation, style sheets, data base publishing, and mechanical color separation by computer. (0822-115) **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-220 Output Devices and Quality Control

This course prepares students to be pre-press technicians. Students learn film processor requirements, controls, maintenance, imagesetter film and paper processing, calibration, and quality control software. Other topics include proofing; image evaluation; page description language (PDL) problem-solving techniques; and laser printer, imagesetter, and related output device operation and maintenance. (0822-115, 120) **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-225 Electronic Halftone and Illustration Production

This course supports the career development of pre-press technicians. Students learn software and hardware system requirements as well as capabilities for image processing in electronic imaging and publishing environments. Scanning, calibration, tone reproduction control, image manipulation, file management, and output are covered. (0822-115, 120) **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-230 Process Color Film Assembly

This course continues the preparation of students to be offset film assembly technicians. Students learn about related color theory, various methods of aligning negatives, registration requirements and procedures, color matching with process color tints, type considerations, flat identification and contact exposure communication, and making composite negatives. (0822-130)**Class 1, Lab 3, Credit 2 (F, W, S)**

0822-231 Advanced Process Color Film Assembly

This course continues the study of process color film assembly techniques and quality control. Areas of study include job analysis and planning, comparative construction stripping and film contacting procedures, quality control, and an overview of computer-aided masking and stripping systems. (0822-230) **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-235 Offset Press Operation

This course emphasizes the systematic methods of press preparation and operation, sheet control, set-up of ink and dampening systems, and an introduction to four-color process printing. (0822-145) **Class 2, Lab 6, Credit 4 (F, W, S)**

0822-236 Advanced Offset Press Systems and QC

This course continues the development of offset press operators. Areas of study include process color printing, densitometry, use and interpretation of image quality control test targets, and troubleshooting press problems. (0822-235) **Class 2, Lab 6, Credit 4 (F, W, S)**

0822-241, 242, 243, 244, 245 Production Printing I, II, III, IV, V

This sequence of courses provides work experiences in a simulated production environment in which students apply standard production and quality control procedures. Previously learned skills are emphasized and reinforced. (0822-200 for 0822-241; 0822-241 for 0822-242; 0822-242 for 0822-243; 0822-243 for 0822-244; 0822-244 for 0822-245) **Class 0, Lab 4, Credit 2 (F, W, S)**

0822-258 Computer Publishing Methods

This advanced course in electronic publishing methods and techniques emphasizes paint/draw programs, interactive and format-based page makeup, color image scanning, special effects typography, and elementary PostScript programming. (0822-215) **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-259 Advanced Computer Publishing Methods

This course continues the career development of students in electronic publishing and emphasizes the attainment of proficiency in use of long document production and color separation software, systems management, and film output. Electronic still video is included. (0822-258) **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-260 Color Separation Methods

This course develops color pre-press technicians and includes a study of color separation theory, traditional and electronic color separation techniques, and desktop color separation software and system requirements. (0822-225) **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-268 Survey of Image Reproduction

This course provides an overview of the production processes and techniques utilized for the reproduction of a comprehensive layout. Emphasis is on electronic and traditional production techniques used to generate, process, reproduce, finish, and bind documents according to specifications. The course is an elective for students not enrolled in the printing production technology program. **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-273 Desktop Color Separation Production

This course further prepares color pre-press technicians to enter the printing industry as desktop color scanner operators and color workstation operators. Areas of study include copy evaluation, scanner calibration, scanning problem copy, color proofing and correction, and tone reproduction requirements. (0822-260) **Class 1, Lab 3, Credit 2 (F, W, S)**

0822-275 Electronic Image Assembly

This course prepares students in the area of computer-based image assembly. Areas of study include job flow, file management, system hardware and software requirements and applications,

film output devices, shop standards, and specifications. (0822-220, 230)**Class 1, Lab 3, Credit 2 (F, W, S)**

0822-278 Imposition

This course supports the career development of all printing production technology students. Students learn the variables and capabilities of press and post-press equipment and procedures in planning page imposition on the press sheet for publications of varying lengths. Students plan, specify, and produce various impositions. (Department approval required)**Class 1, Lab 3, Credit 2 (F, W, S)**

0822-280 Production Presswork

This course continues the study of offset press operation in a simulated production setting. Areas of study include systematic approaches to solving press-related problems and development of production skills. (0822-236)**Class 2, Lab 6, Credit 4 (F, W, S)**

0822-298 Employment Seminar

Students are introduced to the work environment of the printing and publishing industry and corporate publishing workplace, with an emphasis on the processes for securing and maintaining employment. Experiences include resume preparation and critique, interviewing techniques, field trips, presentations, discussions, and development of job-seeking skills.**Class 2, Lab 0, Credit 2 (F)**

0822-299 Co-op Work Experience

Credit 0 (Su)

0822-399 Independent Study

Credit Variable (F, W, S)

SIGN COMMUNICATION

0863-101 Sign Communication I

This course is designed to assist students with no previous sign communication skills in developing both receptive and expressive skills in basic American Sign Language (ASL) and natural sign English for both academic and social environments. The course includes conversational vocabulary, fingerspelling, grammatical principles, and cultural aspects of the deaf community. Also, strategies for use of sign language and speech together are discussed and practiced. (Sign Instruction Placement Interview [SIPI] rating of 1 or Language Background Questionnaire [LBQ] rating of 1 or 2) **Class 2, Credit 2 (F, W, S)**

0863-103 Sign Communication II

This course is designed to assist students in continuing their development of both receptive and expressive skills in ASL and natural sign English for academic and social settings. The course strengthens students' skills and knowledge with additional conversational sign vocabulary, grammatical principles, and cultural aspects of the deaf community. The focus is on developing expressive and receptive skills in dialogues and short presentations. Practice in using sign language and speech together is included. (SIPI 2 or grade of C or better in 0863-101)**Class 2, Credit 2 (F, W, S)**

0863-105 Sign Communication III

This course is designed to assist students in continuing their development of receptive, expressive, and conversational skills in advanced ASL and natural sign English for both academic and social settings. The course continues to strengthen students' skills and knowledge with advanced vocabulary, grammatical principles, and cultural aspects of the deaf community. The focus is on the development of receptive skills in dialogues and presentations. Continued practice with use of sign language and speech together is included. (SIPI 3 or grade of C or better in 0863-103)**Class 2, Credit 2 (F, W, S)**

0863-111 American Sign Language for Sign English Users

This course is designed to assist students who use sign English in developing expressive and receptive ASL skills. Study of ASL historical, cultural, and linguistic information is included. (SIPI 3 or 4 or grade of C or better in 0863-105) **Class 2, Credit 2 (F, W, S)**

0863-131 Signing Basic English Idioms

This course is designed to assist students in developing their skills in using natural sign English and ASL to receive and express English idioms. Also, strategies for effective use of these sign skills to assist in reading and writing English idioms are discussed and practiced. (SIPI of 4 or 5 or LBQ 4 or 5, English status: Marginally Qualified [MQ] or Preparatory [PP]) **Class 2, Credit 2 (F, W, S)**

0863-133 Signing Idiomatic English

This course is designed to assist students in developing their skills in using natural sign English and ASL to receive and express English idioms. Also, strategies for effective use of these sign skills to assist in reading and writing English idioms are discussed and practiced. (SIPI of 4 or 5 or LBQ 4 or 5, English status: Proficient [PF] or Provisionally Qualified [PQ]) **Class 2, Credit 2 (F, W, S)**

0863-135 Public Presentations

Students learn to specify a topic; research, organize, and present ideas; write an outline; and present from an outline using sign language and simultaneous communication as appropriate. Students also learn to communicate with a variety of audiences through the use of media and interpreters. Students present speeches designed to inform, demonstrate, and persuade. (SIPI of 4 or 5 or LBQ 4 or 5, California Reading Test score higher than 7.5) **Class 2, Credit 2 (F, W, S)**

0863-141 Understanding American Sign Language as a Language

This course is designed to assist students in developing basic knowledge about the linguistic structure of ASL. Also, basic information about the historical and cultural aspects of ASL is introduced and discussed. (SIPI of 5, Michigan Test score higher than 60) **Class 2, Credit 2 (F, W, S)**

0863-145 Linguistics of Sign Communications

This course is designed to assist students in developing basic knowledge of the grammar and structure of the range of sign communications systems, from American Sign Language (ASL) to invented English sign systems. Also included is discussion of the developmental roots of these sign systems and their purposes and usual environments. (SIPI of 4 or 5, LBQ 4 or 5, or grade of C or better in 0863-111) **Class 2, Credit 2 (F, W, S)**

0863-151 Sign Language Interpreting: Consumer Awareness

This course is designed to assist students in becoming better educated consumers of interpreting services. Aspects of interpreting discussed include: history of the Registry of Interpreters for the Deaf (RID); RID Code of Ethics; roles, rights, and responsibilities of all people involved in interpreting situations; laws relating to interpreters and services; pay scales for interpreters; and types of interpreting (oral, manual, combined, simultaneous, and consecutive). Practicum experience is provided. (SIPI 3, 4, or 5 or LBQ 4 or 5) **Class 2, Credit 2 (F, W, S)**

0863-161 Introduction to Sign Language Teaching

Students are given an overview of how languages traditionally have been taught as well as current methods and theories and their applications to the teaching of sign language. Students practice basic teaching techniques, selecting appropriate materials, designing curriculum and evaluations, teaching cultural information, and including grammatical features in lessons. Students learn about resources to support their efforts to teach sign language. (SIPI 4 or 5, 0863-141 or 0863-145) **Class 2, Credit 2 (F, W, S)**

0863-163 Practicum in Teaching Sign Language

This course is designed to strengthen students' knowledge of sign language teaching skills. Students observe sign language classes taught by faculty members in the sign communication program and instructors from the Rochester community. Students participate in class planning, teaching, and evaluation activities as teaching assistants, sign language tutors to faculty and staff members, or as teachers in the RITSIGN program. (SIPI 4 or 5, completion of 0863-161) **Class 2, Credit 2 (F, W, S)**

0863-399 Independent Study

This course is designed for students with special needs not met by other sign communication courses. Students are required to write a contract describing what the course will cover. The contract must be signed by the student, instructor, and chairperson. Students interested in this course should consult their communication advisor. **Credit 1-4 (F, W, S)**

SPEECH-LANGUAGE

0860-101 Speech Therapy I

This course helps students improve their spoken English. Special tests allow the teacher to evaluate individual needs. Students meet with a speech/language instructor for two hours per week and practice in the laboratory for one hour each week. Instruction may include training in voice, pitch control, articulation (speech sounds), and grammar. Students practice words, phrases, sentences, and conversations. (Speech priority rating of C)**Class 2, Lab 1, Credit 2 (F, W, S)**

0860-102 Speech Therapy II

This course is designed to help students improve their spoken English. Special tests allow the teacher to evaluate individual needs. Students meet with a speech/language instructor for two hours per week and practice in the laboratory for one hour each week. Instruction may include training in voice, pitch control, articulation (speech sounds), and grammar. (Therapist's recommendation, 0860-101)**Class 2, Lab 1, Credit 2 (F, W, S)**

0860-103 Speech Therapy III

This course is designed to help students improve their spoken English. Special tests allow the teacher to evaluate individual needs. Students meet with a speech/language instructor for two hours and practice in the laboratory for one hour each week. Instruction may include training in voice, pitch control, articulation (speech sounds), and grammar. (Therapist's recommendation, 0860-102)**Class 2, Lab 1, Credit 2 (F, W, S)**

0860-115 Pronunciation A

Students practice pronunciation of vocabulary through the use of *Merriam-Webster Dictionary* and knowledge of pronunciation rules. (Speech score of 2.0-3.5)**Class 2, Lab 1, Credit 2 (F, W, S)**

0860-116 Pronunciation B

Students practice independent pronunciation of vocabulary through the use of *Merriam-Webster Dictionary* and knowledge of pronunciation rules. (Speech score higher than 3.5)**Class 2, Lab 1, Credit 2 (F, W, S)**

0860-120 Speech and Listening Lab I

This course is appropriate for students who wish to improve articulation, listening, and self-monitoring skills. Students meet with a speech/language instructor to establish goals. Students work individually at their own pace using a variety of prerecorded audiotapes. The instructor monitors students and provides feedback. (Speech scores higher than 3.5, auditory reception score higher than 16 percent)**Class 2, Lab 1, Credit 2 (F, W, S)**

0860-121 Speech and Listening Lab II

This course is a continuation of Speech and Listening Lab I. Students continue to work on speaking and listening skills. (Recommendation from instructor of 0860-120)**Class 2, Lab 1, Credit 2 (F, W, S)**

0860-124 Speech Improvement Using Songs and Poems

In this class, students use singing and poetry readings to improve their speech. Exercises in pitch control, loudness control, and breath support are used to improve voice, vocal quality, and listening skills. (Speech score higher than 3.0 and auditory reception score higher than 16 percent)**Class 2, Lab 1, Credit 2 (S)**

0860-130 Strategies for Organizing Word Knowledge/A

The purpose of this course is to introduce strategies for organizing word knowledge. The course helps students better understand the relationships among concepts, including similarities, differences, classification, association, and analogies. (California Reading Test score lower than 8.5)**Class 2, Credit 2 (F, W, S)**

0860-131 Strategies for Organizing Word Knowledge/B

The purpose of this course is to introduce strategies for organizing word knowledge. The course helps students better understand the relationships among concepts, including similarities, differences, classification, association, and analogies. (California Reading Test score higher than 8.5)**Class 2, Credit 2 (F, W, S)**

0860-132 Vocabulary Development

In this course, students use a workbook, textbook, and computer laboratory practice to develop vocabulary. Students develop strategies to determine vocabulary meaning through use of contextual clues and knowledge of prefixes and suffixes. (Michigan Test score lower than 70)

Class 2, Lab 1, Credit 2 (F, W, S)

0860-133 Understanding Vocabulary in Context

This course focuses on and develops students' ability to determine the meaning of unfamiliar words encountered in everyday reading. Students identify specific types of vocabulary difficulties in their reading. Using newspaper and magazine articles in class, students practice word attack skills based on context. Implications, connotations, and a knowledge of prefixes, suffixes, and roots are used to determine meaning in reading passages. (Michigan Test score higher than 70)

Class 2, Lab 1, Credit 2 (F, W, S)

0860-136 Spoken Language Learning I/A

This course focuses on the use of spoken English to express information effectively. Students who have some intelligible speech will practice basic patterns of English structures, including asking and answering questions, conveying basic information, and brief descriptions. This course uses a text and workbook for grammar development and the self-instruction laboratory for speech and speechreading practice. (Corequisite: 0862-100) (Speech score higher than 3.0, California Reading Test score lower than 7.0)

Class 2, Lab 1, Credit 2 (F)

0860-137 Spoken Language Learning II/A

This course focuses on using spoken English correctly in the organization and expression of personal experiences. Practice is provided in some common complex sentence forms. This course uses the self-instruction laboratory for speech and speechreading practice. (0860-136)

Class 2, Lab 1, Credit 2 (W)

0860-138 Spoken Language Learning I/B

This course focuses on the use of spoken English to express information effectively. Students who have some intelligible speech practice basic patterns of English structures, including asking and answering questions and conveying basic information and brief descriptions. (Speech score higher than 3.0, California Reading Test score of 7.1-8.5)

Class 2, Lab 1, Credit 2 (F)

0860-139 Spoken Language Learning II/B

This course focuses on using English correctly in the organization and expression of personal experiences. Practice is provided in some common complex sentence forms. (0860-138)

Class 2, Lab 1, Credit 2 (W)

0860-140 Spoken Language Learning I/C

This course focuses on the use of spoken English to express information effectively. Students who have some intelligible speech practice basic patterns of English structures, including asking and answering questions and conveying basic information and brief descriptions. (Speech score higher than 3.0, California Reading Test score higher than 8.5)

Class 2, Lab 1, Credit 2 (S)

0860-160 Interpersonal Communication

This course helps students become aware of the communication process and their role in it. Students examine their communication skills and evaluate how successfully they communicate expressively and receptively. Students develop strategies to help them take control and communicate effectively in social and employment situations. Some traditional interpersonal communication concepts are discussed, including first impressions, opinions, points of view, clarification of information, problem solving, anger, assertiveness, and consideration. Classes include lectures, discussions, laboratories, films and videos, and role playing. (Recommendation of instructor)

Class 2, Lab 1, Credit 2 (F, W, S)

0860-162 Building Relationships Through Communication/A

This course helps students develop effective interpersonal communication skills and confidence. Students come to understand related concepts and develop skills in the following areas: first impressions, perception, self-disclosure, provision and use of feedback, listening, sharing opinions, conflict resolution, and assertiveness. An experiential approach is used, including structured experiences, role playing, and journal writing. (Speech score lower than 3.0)

Class 2, Credit 2 (F, W, S)

0860-163 Building Relationships Through Communication/B

This course helps students develop effective interpersonal communication skills and confidence. Students come to understand related concepts and develop skills in the following areas: first impressions, perception, self-disclosure, provision and use of feedback, listening, sharing opinions, conflict resolution, and assertiveness. An experiential approach is used, including structured experiences, role playing, and journal writing. (Speech score higher than 3.0)**Class 2, Credit 2 (F, W, S)**

0860-170 Group Presentation

This course helps students improve their ability to search for, organize, and present information to groups. It includes topic selection, library research, organizing, outlining written reports, and making presentations to an audience. Activities include a library tour, discussions, evaluations of speeches, and information regarding interpreting. (Speech score higher than 3.5, California Reading Test score higher than 7.0)**Class 2, Lab 1, Credit 2 (F, W, S)**

0860-171 Public Speaking

This course is designed to refine and increase presentation ability by giving further experience in researching and organizing information for presentation to different audiences. Presentations focus on topics related to deafness and its effect on communication, psychosocial development, and habilitation. Students can serve as presenters representing NTID. The course is highly recommended for students enrolled in social work and those preparing for managerial positions. Students should have some experience in public speaking before taking this course. (Speech score higher than 4.0, California Reading Test score higher than 10.0)**Class 2, Lab 1, Credit 2 (W, S)**

0860-172 Group Discussion Techniques

This course develops an awareness of group process and interaction. It introduces the principles and techniques necessary for successful communication in group situations. Group dynamics and leading and participating in group discussions are taught. Topics for group discussions include social and job-related information. (Speech score higher than 4.0, speechreading score [with or without sound] higher than 65 percent, California Reading Test score higher than 9.0)**Class 2, Credit 2 (F, W, S)**

0860-175 Improving Your Conversations/A

This course provides information and practice designed to improve students' effectiveness and comfort in auditory-oral conversations in English. Students learn what takes place in a conversation and how it is affected by communication skills; analysis of the partner and situation; and interactive skills, such as turn-taking and clarifying. Students discuss and practice the dynamics of a conversation, including how to initiate topics, maintain and change topics, and successfully close conversations. Students participate in the on-going evaluation of their conversational strengths and weaknesses and focus on improving their effectiveness when conversing with nonsigning partners. (Speech score of 3.0-3.9, speechreading score [with or without sound] higher than 34 percent. Speech therapy should be completed prior to enrollment whenever possible)**Class 2, Lab 1, Credit 2 (F, W, S)**

0860-176 Improving Your Conversations/B

This course provides information and practice designed to improve students' effectiveness and comfort in auditory-oral conversations in English. Students learn what takes place in a conversation and how it is affected by communication skills; analysis of the partner and situation; and interactive skills, such as turn-taking and clarifying. Students discuss and practice the dynamics of a conversation, including how to initiate topics, maintain and change topics, and successfully close conversations. Students participate in the on-going evaluation of their conversational strengths and weaknesses. They will focus on expanding their conversational repertoire and skills when conversing with nonsigning partners. (Speech score higher than 3.9, speechreading score [with or without sound] higher than 60 percent. Speech therapy should be completed prior to enrollment whenever possible)**Class 2, Lab 1, Credit 2 (F, W, S)**

0860-177 Strategies to Aid Functional Communication

This course is suitable for students who want to develop and practice receptive and expressive strategies to aid in oral/aural communication with a non-signing person. Students develop strategies for communicating in specific dialogue situations, such as renting an apartment and ordering food in a restaurant. Class activities focus on speaking, speechreading, and using

strategies in specific functional situations. Laboratory work includes viewing videotapes and practicing speech. Students produce and critique videotapes of simulated situations. Journals are used to describe out-of-class conversational practice. (Speech score of 1.93.1, speechreading score [with or without sound] higher than 34 percent, Michigan Test score higher than 50. This course is not appropriate for students with severe voice disorders as noted by a speech/language instructor) **Class 2, Lab 1, Credit 2 (F, W, S)**

0860-178 Communication for the Job Interview: Speaking

This course focuses on improving the communication aspect of the job interview through a series of practice interviews. It is for students who have difficulty communicating during an interview. The focus of this course is on using speech effectively. Students with some speech skills and who prefer to use them during an interview are appropriate for this course. Communication for the Job Interview: Writing, offered through the audiology department, is available for students who prefer to use writing during an interview. (Completed one year in program, speech score higher than 3.0, NGGE-101) **Class 2, Lab 1, Credit 2 (W, S)**

0860-399 Independent Study

This course is designed for students with special needs that cannot be met by another communication course. Students are required to write a contract describing what the course will cover and their responsibilities. The contract must be signed by the student, instructor, and chairperson. Students interested in this course should talk to their communication advisor. **Credit 1-4 (F, W, S)**

0864-101 Video Resume Preparation

This course provides students with a state-of-the-art format in which to use their communication skills to express personal/professional information. Students develop and produce a 35 minute video resume that describes their job qualifications and communication skills. Students consider their communication strengths and preferences to determine how to communicate on the video, using either speech with captions or sign with a voice interpreter. The students' employment advisors confer with them to decide how the resume might be used in the job search process. Students will be able to borrow or copy the video for their own use. (Approval of employment advisor, enrollment in or completion of Job Search course) **Class 1, Credit 1 (F, W, S)**

0864-102 Communication for Job Search

This course provides information and experience to assist students in optimizing communication during the job search process. Students review and discuss communication test results and critique a mock interview to decide how they can most effectively communicate with employers and colleagues. Information is included about using an interpreter's services on a job interview, preparing an effective resume and cover letter, and understanding and answering questions during a job interview. Videotaped practice interviews are reviewed by the communication instructor and employment advisor to evaluate students' application of the principles presented. Follow-up instruction in communication is recommended based on this information. (Referral by technical chairperson) **Class 1, Credit 1 (F)**

TECHNICAL MATHEMATICS

0817-120 Introduction to College Mathematics

This course 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 3, Credit 3 (F)**

0817-140 Fundamentals of College Mathematics I

This course is an introduction to the application of mathematics as a problem-solving tool. Emphasis is placed on measurement, use of proportion, approach to verbally expressed problems, and computation with and without a calculator. Elementary topics from geometry and statistics are included. Also, development of problem-solving skills as well as verbal and non-verbal mathematical communication skills and a positive attitude toward learning mathematics are emphasized. (0817-120 or approval of the offering department) **Class 5, Credit 3 (F, W)**

0817-141 Fundamentals of College Mathematics II

This course deals with the application of the basic tools of algebra, geometry, and trigonometry as solutions to problems. The course deals with the concepts of an algebraic variable as well as

techniques for solving simple equations and inequalities. Simple applications of geometric principles are taught as well as elementary applications of right-angle trigonometry. Attention also is paid to graphic display of data. (0817-140 or approval of the offering department)**Class 5, Credit 3 (W, S)**

0817-142 Fundamentals of College Mathematics III

This course deals with the application of a variety of algebraic and geometric techniques to problem solving. Emphasis is placed on the concepts of function and relation and on graphing linear relations. Concepts of area and volume, powers and radicals, and geometry on the coordinate plane are included as well as an introduction to the use of vectors. (0817-141 or approval of the offering department)**Class 5, Credit 3 (F, S)**

0817-150 Integrated College Mathematics I

Topics from algebra, geometry, trigonometry, and other areas of mathematics are explored. Relations, functions, geometric loci, loci on the coordinate plane, algebraic functions, graphing, and right-angle trigonometry are studied. Calculators are used extensively as aids in problem solving. Emphasis is placed on the development of careful work habits as a foundation for technical study. (0817-142 or approval of the offering department)**Class 5, Credit 4 (F, W)**

0817-151 Integrated College Mathematics II

Additional topics from algebra, geometry, trigonometry, and other areas of mathematics, including statistical concepts, are explored. Inequalities, graphing, polynomial and rational functions, geometry of the circle, trigonometric identities, measurement error, fractional exponents, and exponential functions are studied. Calculators, including those capable of drawing graphs, are used extensively as aids in problem solving. (0817-150 or approval of the offering department)**Class 5, Credit 4 (W, S)**

0817-152 Integrated College Mathematics III

Additional topics from algebra, geometry, trigonometry, and other areas of mathematics, including concepts from formal logic, are explored. Inverse relations, logarithms, truth statements, constructions, congruence, introduction to formal mathematical proofs, areas of geometric figures, law of sines, law of cosines, vectors, and complex numbers are studied. Calculators are used extensively as aids in problem solving. (0817-151 or approval of the offering department)**Class 5, Credit 4 (F, S)**

0817-163 Mathematics for Data Processing

This course provides basic mathematical skills relevant to the field of data processing. The course emphasizes arithmetic operations in various number systems and logical formulation of problems. **Class 3, Credit 3 (F, W, S)**

0817-170 Medical Laboratory Mathematics

This course provides mathematical skills that support medical laboratory procedures. Topics include use and application of electronic calculators in determining routine laboratory results; conversions of measurement systems; calculations of molarity, normality, and percentage strengths of solutions; applications of routine statistical calculations; and fundamental mathematical calculations used in urinalysis, hematology, and clinical chemistry.**Class 3, Credit 3 (S)**

0817-210 Advanced Mathematics I

Advanced topics from pre-calculus mathematics are studied with an emphasis on functions and graphs. A graphing calculator is used to facilitate exploration of mathematical concepts and to help develop deeper understanding. Linear and quadratic functions are explored in depth, and the properties of circular functions are developed. An introduction to formal study of the real number system is included. **Class 4, Credit 3 (F, W)**

0817-211 Advanced Mathematics II

Linear structures and advanced topics from trigonometry and pre-calculus are explored. Vectors, matrices and complex numbers, transformations, trigonometric identities, inverse trigonometric functions, and polar graphing are studied. Use of a graphing calculator to explore mathematical concepts is integral to the course. **Class 4, Credit 3 (W, S)**

0817-212 Concepts of Calculus

Topics traditionally encountered in a first calculus course are explored. 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. **Class 4, Credit 3 (F, S)**

0817-399 Independent Study
Credit Variable

TECHNICAL PHYSICS

0818-168 Optical Finishing Physics

This course involves the study of light, reflection, and refraction. These principles are applied to the study of the behavior of spherical and plano mirrors, prisms, and lenses. The usefulness and application of dioptric power, the lensmaker'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 placed on geometrical (ray) optics. The course includes a comprehensive laboratory experience that supplements and closely follows classroom instruction. (0817-141) **Class 4, Lab 1, Credit 3 (W, S)**

0818-201 Physics I

Physics I is the first course in a series designed to provide a broad background in general physics. The course is 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, include motion, Newton's Laws of Motion, forces, analysis of vectors, work, power, and mechanical energy. **Class 4, Credit 4 (F, W, S)**

0818-202 Physics II

Physics II is the second course in a series designed to provide a broad background in general physics. The course is 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. **Class 4, Credit 4 (F, W, S)**

0818-203 Advanced Topics in Mechanics

This is 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. **Class 4, Credit 4 (F, W, S)**

0818-204 Advanced Topics in Electricity

This is an elective course for students in all NTID engineering programs. The course is designed to provide a broad theoretical background in the physics of AC and DC electrical circuits. Students are provided with hands-on laboratory experience in a supervised setting. **Class 4, Credit 4 (S)**

0818-399 Independent Study
Credit Variable

PRE-BACCALAUREATE STUDIES

COLLEGE OF LIBERAL ARTS COURSES

CRIMINAL JUSTICE

0501-201 The Criminal Justice System

The principles of the criminal justice system as well as administration and management within various agencies, including the relationship of the police to the courts and the courts to the probation, correction, and parole functions, are studied. Consideration also is given to specific problems within the branches of the criminal justice system. **Class 3, Credit 4 (offered annually)**

0501-203 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. **Class 3, Credit 4 (offered annually)**

0501-207 Correction

This course is designed to introduce students to the basic organizations of the correctional system, their functions, and performance. Prisons and jails as well as probation and parole agencies are discussed within 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. (0501-201) **Class 3, Credit 4 (offered annually)**

Language, Literature, Communication

0502-220 English Composition

This course develops the language skills needed to write effectively. It should be taken in the freshman year. **Class 3, Credit 4 (F, W, S, Su)**

SOCIAL WORK

0516-210 The Professional Social Work Role

This course explores social work as a profession, the various fields in which social workers practice, and the differing job philosophies of human services and social work approaches. Also covered are strategies for developing self-awareness and professional self-assessment. **Class 3, Credit 4 (F)**

0516-212 Self-Awareness in the Helping Role

This course helps to develop students' helping skills in essentially three broad areas: skills in noticing or observing; observing one's professional use of self in the helping relationship and evaluating the appropriateness of such behavior; and observing the client and evaluating the effect one's response has on her/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. **Class 3, Credit 4 (W)**

COLLEGE OF SCIENCE COURSES

BIOLOGY

1001-201 General Biology

The course describes the 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. (Corequisite: 1001-205) **Class 3, Credit 3 (F)**

1001-202 General Biology

This course is 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. (Corequisite: SBIB-206) **Class 3, Credit 3 (W)**

1001-203 General Biology

This course includes a study of cellular and organismal reproduction, the principles of genetics and developmental biology, introduction to evolution and ecology. (Corequisite: 1001-207) **Class 3, Credit 3 (S)**

1001-205, 206, 207 General Biology Laboratory

Laboratory work complements the lecture material of General Biology (1001-201, 202, 203). The experiments are designed to illustrate concepts, develop laboratory skills and techniques, and improve students' ability to make, record, and interpret observations. (Corequisites: 1001-201 for 1001-205; 1001-202 for 1001-206; 1001-203 for 1001-207) **Lab 3, Credit 1 (1001-205, F; 1001-206, W; 1001-207, S)**

CHEMISTRY

1008-261 Quantitative Analysis I

This course offers an introduction to quantitative analysis, including experimental error and statistics, solubility and gravimetric analysis, volumetric analysis, acid-base equilibria and pH, acid-base and complexometric titrations. (Corequisites: 1008-265, 1010-252) **Class 4, Credit 4 (W)**

1008-262 Quantitative Analysis II

This course is a continuation of 1008-261. Fundamentals of electrochemistry, electrodes and potentiometry, redox titrations, electrogravimetric and coulometric analysis, polarography, spectrophotometry, nuclear chemistry, and coordination compounds are discussed. (Corequisites: 1008-261, 266) **Class 4, Credit 4 (S)**

1008-265 Quantitative Analysis I Lab

Experimental techniques include using the analytic balance, calibration of glassware, gravimetric determinations, titrations of weak acids and bases, multi-endpoint titrations, iodometric and EDTA titrations, and Gran plots. Emphasis is on record keeping and report writing. (Corequisites: 1008-261, 1010-252) **Lab 6, Credit 2 (W)**

1008-266 Quantitative Analysis II Lab

Experimental techniques include potentiometric and photometric determinations and titrations, electrogravimetric analysis, determination of equilibrium constant (weak acids). Emphasis is on record keeping and report writing. (Corequisites: 1008-261, 1010-262) **Lab 6, Credit 2 (S)**

1010-251 General Chemistry I

This course includes a detailed study of fundamental tools of chemistry, including properties and measurement, atomic theory, stoichiometry (elements, compounds, reactions), reactions in aqueous solutions, thermochemistry (First Law), and gaseous equilibrium. (Corequisite: 1010-255) **Class 3, Credit 3 (F)**

1010-252 General Chemistry II

This course describes gas laws, periodic tables and periodic trends, quantum theory of electrons, chemical bonding (ionic, covalent, valence bond theory, and hybridization), chemical kinetics, and introduction to organic chemistry. (Corequisites: 1008-261, 265) (1010-251) **Class 3, Credit 3 (W)**

1010-255 General Chemistry I Lab

A variety of experimental techniques, including determination of Avogadro's number, qualitative analysis, Job's plot, acid rain, antacid buffers, heats of reaction, and syntheses of aspirin and polymers are conducted. (Corequisite: 1010-251) **Lab 3, Credit 1 (F)**

1011-208 College Chemistry I

This course is 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, and chemical bonding. **Class 4, Credit 4 (F, W)**

1011-209 College Chemistry II

This course is a continuation of 1011-208. Topics include chemical equilibrium, properties of acids and bases, aqueous equilibria, free energy, entropy and equilibrium, electrochemistry, nuclear chemistry, and the chemistry of metals. (1011-208) **Class 4, Credit 4 (S)**

MATHEMATICS

1016-204 College Algebra and 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; and systems of linear equation. (Two years of high school algebra) **Class 4, Credit 4 (F, W, S)**

1016-214 Introduction to Calculus I

This course is an introduction to the study of differential calculus. Topics covered include functions and graphs, limits, continuity, the derivative and its significance, the algebra of derivatives, chain rule, related rates, and maxima and minima. (1016-204 or equivalent) **Class 3, Credit 3 (F, W, S)**

1016-215 Introduction to Calculus II

This course is a continuation of 1016-214, focusing on an introduction to integral calculus. Topics include definite integral, area, work, and distance problems; volumes; fundamental theorem of calculus; approximation techniques; exponential and logarithmic functions; applications; and introduction to differential equations. (1016-214) **Class 3, Credit 3 (W, S)**

1016-251 Calculus I

This is the first course in a standard three-course sequence in calculus intended for students majoring in mathematics, science, or engineering with an emphasis on understanding the concepts and using them to solve a variety of physical problems. Topics covered include 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

Topics include anti-derivatives by various methods, the definite integral with applications to calculation of area, arc length, volumes of revolution, transcendental functions, and numerical integration. (1016-251)**Class 4, Credit 4 (F, W, S, Su)**

1016-253 Calculus III

Topics include improper integrals, formal limits of sequences, infinite series, Taylor series, polar coordinates, and conic sections. (1016-252)**Class 4, Credit 4 (F, W, S, Su)**

PHYSICS

1017-200 Physics Orientation

This course is an introduction to the nature and scope of physics for first-year students interested in physics as a profession. Topics include what is physics, professional opportunities in physics, the physics profession, literature of physics, and communicating in physics. Laboratory includes safety instruction, measurement and recording techniques, graphics 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)**

1017-311 University Physics I

This is an intensive course in general physics, using calculus, for majors in the sciences and engineering. Mechanics, kinematics, and dynamics of a particle and of a rigid body; work and energy; momentum and impulse; rotational motion; oscillatory motion, and gravitation are discussed. (Credit or co-registration 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

Topics include fluids and elastic properties, heat and thermodynamics, wave motion, sound, geometrical and physical optics. (Credit or co-registration 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)**

1017-313 University Physics III

Topics include electrostatics, Gauss' Law, electric field and potential, dielectrics, DC circuits, magnetic fields, Ampere's Law, Faraday's Law, inductance and capacitance, magnetism in matter, AC series circuits. (Credit or co-registration 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)**

1017-371 University Physics Lab I

This laboratory course includes experiments related to the principles and theories discussed in corresponding lectures. (Credit or co-registration in 1017-311)**Lab 3, Credit 1 (F, W, S)**

1017-372 University Physics Lab II

This laboratory course includes experiments related to the principles and theories discussed in corresponding lectures. (Credit or co-registration in 1017-312)**Lab 3, Credit 1 (F, W, S)**

1017-373 University Physics Lab III

This laboratory course includes experiments related to the principles and theories discussed in corresponding lectures. (Credit or co-registration in 1017-313)**Lab 3, Credit 1 (F, W, S)**

GENERAL ACADEMIC INFORMATION

- o Academic Policies And Procedures
- o Counseling and Academic Services
- o Campus Life
- o Admission
- o Expenses and Financial Aid

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 strives to be free from coercive, exploitive behavior by its members. 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 advisement

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 pages in the Academic Programs of Study section 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 the 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 non-disclosure will be honored by RIT for only one year, requests to withhold such information must be submitted to the Office of the Registrar annually.

*Rochester Institute of Technology, '1980 Master Plan' (March 1980)

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 Health and Human Services concerning the alleged failure of RIT to comply with the requirements for this Act and the implementation of HHS regulations

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), social security number, and dates of attendance to assure proper identification of the record requested. There is a \$4.00 charge for each copy. Transcripts are usually prepared and available within 48 hours after the request is received. During exam and grading weeks, it may take longer to prepare the complete transcript

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 colleges other than RIT that have been received in support of admission applications and/or transfer credit evaluation will not be re-issued by RIT. Students with credentials from non-United States institutions may need to make special arrangements for re-release of such documents

The grading system

RIT uses a single letter grading system. All grades are determined and issued by the faculty, in accordance with the RIT Educational 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 chapter VII, Educational 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, properly enrolled in a course, and have made financial commitment. The Office of the Registrar operates the systems in which courses are scheduled, students registered, and academic records maintained. Students are given several opportunities to register for courses each academic term: Early Registration (including touch-tone telephone registration, Fax, mail-in, and walk-in), Open Registration, and late registration or 'Drop/Add' (which extends for the first six weekdays of each term). Matriculated students who fail to register before the first day of classes may be assessed a \$50.00 late fee. Specific dates and procedures for registration are found in the quarterly 'Schedule of Courses.'

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 are also 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.

Auditing courses

Courses which 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 eighth 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 eighth week. For policies pertaining to withdrawal from the Institute and tuition refund, see page 323

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, have not been placed on probation due to a low cumulative grade point average, and who 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 coursework 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/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, and, 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 Educational Policies and Procedures, section VIII). 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 her/her specialized field (usually from the students 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 may be placed on probation if either his/her Program Quarterly GPA or Principal Field of Study GPA (based upon at least 20 credit hours earned) 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 may 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. After a student is allowed to return to his/her original program from suspension and then goes on probation.

Suspended students generally must wait at least a year before re-applying for admission into an RIT degree program. While suspended, a student may not enroll in any RIT coursework unless the suspension is waived by an academic dean, and then may be required to take courses only 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 in advance of missing class. Attendance at class meetings on Saturdays, or at times other than those regularly scheduled may be required. RIT reserves the right to alter any of its courses at any time

Student retention

Based on a summary of the 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 non-degree students in the College of Continuing Education and NTID, 85 percent of first-year, full-time day students register for their second year; and 82 percent of third-year students continue through graduation (fourth or fifth year depending upon the program.)

RIT is developing a comprehensive study of the progress of students, which will include factors to predict retention for all student populations such as those on cooperative education work blocks and the large number of part-time and non-degree students

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

COUNSELING AND ACADEMIC SERVICES

Complementary Education

Viewed as a valuable dimension of the students education at RIT, Complementary Education formally recognizes and encourages important experiences outside the classroom that complete and enhance the traditional academic activities of RIT. Its essential aim is to further the personal development of students. It supplements their curricula in four broad content areas: personal and social development, learning skills development, civic competence, and leisure and avocational skills.

Complementary Education is multifaceted. The **Complementary Education Grants Program** makes funds available to students, faculty, and staff who want to develop unique kinds of experiences. These projects are cooperatively planned and facilitated by students and faculty

Some specific programs that make up the Complementary Education concept include the **Community Services Program**, which provides students with opportunities to volunteer in campus-organized community projects as well as in non-profit agencies in Rochester; the **Personal Leadership Program**, which emphasizes an in-depth look at individual leadership strengths; the **Freshman Seminar Program**, which joins with specific academic departments to develop and facilitate required courses that assist new students in their adjustment to college life through their focus on awareness and appreciation of diversity, the development of communication skills, an increased knowledge of academic and student life services, an opportunity for increased knowledge of self, and academic and career options; the **Outdoor Experiential Education Program**, which offers an intriguing way to enhance communication skills, decision-making skills, problem-solving skills and group interaction skills using the Red Barn as a classroom. Housed in the Red Barn is a series of experiential activities that challenge a groups ability to solve problems, expand awareness, and enjoy the energy of productive interaction. The activities combine intellectual problem-solving with various levels of physical involvement and the thrill of adventure. OEE makes Red Barn experiences available to various RIT groups, to individuals interested in taking a Red Barn team-building course for PE credit, and PE Rock Climbing courses that take place off-campus.

Students have the chance to expand their learning environment to include the outdoors. OEE offers Leadership Training Courses, which emphasize in-depth training of technical skills and group leadership skills. Participants have an opportunity to examine their own skills, share with and learn from others, and develop the self-confidence to lead others. These programs also serve to increase the interaction of hearing and hearing-impaired students

Cooperative Education and Placement

The Office of Cooperative Education and Placement supports the Institutes commitment to preparing students for the 'making of a living and the living of a life.' 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 over 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 to enhance classroom learning.

In the Office of Cooperative Education and Placement, 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, job listings for co-op and full-time positions, an on-campus interview program, and a reference service for graduating students. Services of the office remain available to alumni for a lifetime

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 Hale-Andrews Student Life Center, offers a variety of services to RIT students. These services include:

- o Personal/Psychological Counseling
- o Career Counseling
- o Career Walk-In Center
- o Career Resource Center
- o DISCOVER (a computerized guidance system)
- o IMPACT: Alcohol/Drug Assessment, Referral and Educational Services
- o Developmental Programs and Groups
- o Testing
- o REACT: Rape Education and Counseling Team
- o Consultation

Counseling Center hours

Counseling Center hours are 8 A.M.-5 P.M., Monday, Tuesday, Thursday; 8 A.M.-8 P.M., Wednesday; and 8:30 A.M.-4:30 P.M., Friday. Services are confidential and free. For more information about services, please call 475-2261 (voice/TTY)

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.

Career 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 Walk-In Center

Walk-in assistance is available to students with informational needs related to occupations, colleges, graduate schools, and selection of RIT courses/majors. Appropriate referrals may be made to other Counseling Center services, campus departments or off-campus resources. Call 475-2261 for hours of operation.

Career Resource Center

Located in the reception area of the Counseling Center, the Career Resource Center contains occupational information on a variety of careers, vocational and educational reference books, and college catalogs on microfiche. 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:

- o the career planning and decision-making process
- o themselves, especially their interests, abilities, and work-related values
- o careers that may be appropriate based on interests, abilities, and/or values
- o the world of work, including descriptions of over 40 occupations
- o graduate and professional school opportunities

Developmental programs and groups

The Counseling Center staff offers groups each quarter that assist students in their 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, Counseling Center staff members will present special programs to student groups and organizations. Presentations include communication skills, team building, leadership development,

and goal setting. Individuals should contact the Counseling Center at least three weeks in advance of program date.

Testing

The Counseling Center administers a number of psychological tests and interest inventories as part of the counseling process for some individuals. In addition, the Counseling Center administers a number of national tests. Advance credit exams (CLEP) are also given

Rape Education and Counseling Team (REACT)

REACT, jointly administered by the Counseling Center and the Department of Campus Safety, provides assistance to members of the RIT community who are victims of sexual assault (e.g., rape, attempted rape, sexual abuse, physical or verbal harassment, etc.). It is a confidential service staffed by specially trained volunteer counselors drawn from RITs faculty and staff.

IMPACT

IMPACT is an alcohol and drug education and prevention program. Individual assessment and referral services are available for persons having concerns about their (or other's) use or abuse of alcohol or other drugs. Educational workshops are also available. Student groups and organizations should contact the IMPACT office at 475-7081 (voice) or 475-2261 (voice/TTY) three weeks in advance of scheduling the program

Consultation

Staff members of the Counseling Center will provide consultation services to interested student groups and organizations in a number of areas within their scope and expertise

Educational Technology Center

The Educational Technology Center (ETC) provides television and audio-visual support services to faculty, students, and staff. These services include a campus-wide cable television network, satellite teleconferencing, and delivering media to classrooms. ETC also provides a Media Resource Center, which houses the RIT media collections and an extensive art slide library. Many faculty members place materials on reserve in the MRC for students to study, such as videotapes, films, and audio tapes.

ETC staff members assist faculty and students in finding and preparing media for classroom presentations, club meetings, or personal use. Our color laser copier is a popular tool used by many photographers and artists at RIT. Others find the photo and graphic design services of ETC helpful in preparing for presentations and lectures. Audio-visual and television equipment such as slide projectors, videoplayers, overhead projectors, telephone conferencing equipment is available for instruction and other campus events

RIT instruction extends beyond the campus classrooms. Courses are delivered to distant sites by a variety of techniques, including offerings on local cable and broadcast television, videotapes, computer and audio-conferencing, and use of an interactive electronic writing system called Telewriter. Workshops and lectures that originate at RIT are delivered by satellite to audiences throughout the United States, Mexico, and Canada. ETC supports these efforts with course development, equipment and production of materials

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 routine. Individuals are invited to drop in and explore these resources. The offices are open from 8:00 A.M.-10:00 P.M., Monday through Thursday; 8:30 A.M.- 5:00 P.M. Friday and Saturday, and 11:00 A.M.-9:00 P.M. Sunday.

The 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, presentation skills, business communication, and TOEFL preparation. For more information about the English Language Center's program offerings, visit the English Language Center (2321 Eastman) or call 475-6684 (voice/TTY)

Full-time program

The intensive English Language Program consists of 20 hours of class instruction and 5 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 I-20.

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 ESOL 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 teach their native languages. The international student meets with a trained language instructor who assists in curriculum development and provides language teaching methodology. The international student then instructs in his or her native tongue. Language, culture and customs can all be part of this program. 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 Center or pick up an application at 2321 Eastman.

Translation Service

The English Language Center's Translation Service provides quick and efficient translation of documents, reports, letters, and manuals for RIT students, faculty, and staff as well as businesses in the Rochester area. For a fee, documents of all types, general to technical, can be translated

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 they must 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 six-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 20 years on the RIT campus, HEOP has been applauded for its high graduation rate. Inquiries in regard to the program should be directed to 716-475-2221 (voice/TTY).

Computer Services And Facilities

Information Systems and Computing (ISC) manages a large VMScluster (networked Digital VAX computers), a high-speed ULTRIX system, an IBM mainframe, a campus-wide network-including access from several residence halls--dial-in access, and several user computing facilities.

containing microcomputers and workstations. Complete descriptions of our systems and facilities are available from the VTX Information Access System on the VMScluster, outside the Academic Computing and User Services (ACUS) office, or by calling 475-6929 (voice) or 475-2810 (voice/TTY). All facilities are available at no cost, except for a nominal charge for laser printing

RIT Menu Services provides easy access to the most popular features on the RIT computer facilities and network, which include:

- SIS student information access (access to grades and courses)
- electronic mail, including Internet access (used extensively by students, faculty, and staff), and the ability to ask questions online directly to several RIT departments
- online library services, including a catalog of books, media, articles, and journals; CD-ROM and Dow Jones access; and interlibrary loan requests
- the VTX Information Access System
- the Campus Events System
- the Job Viewing System
- word processing
- the Notes Conferencing System

Many faculty have incorporated these features, particularly e-mail and Notes, into their courses, resulting in innovative and interesting courses not available elsewhere

The use of computer systems managed by ISC is guided by the RIT Code of Conduct for Computer Use. ISC has adapted the general code for use in its facilities and supplemented it with other policy statements; e.g., guidelines for using Wide Area Networks and game playing. Copies of these policies are available in electronic form in the VAX/VMS VTX Information Access System or in printed form from ACUS.

Computer accounts are issued to students, faculty, and staff so that they can perform activities to support internal RIT functions. Students can obtain accounts in the ACUS office by showing their RIT ID card. Forms may be available in your department or can be obtained by calling 475-6926 (voice) or 475-2810 (TTY).

Academic Computing and User Services (located in room A291, Ross Building) helps users of mainframe computers, minicomputers, and microcomputers. As such, ACUS is the department that students and faculty normally will be involved with the most. Contact ACUS electronically by using the ASK command on the VMScluster or by calling the numbers listed above

ACUS also operates 15 user computing centers and microcomputer labs containing microcomputers, terminals, workstations, printers, and plotters. These facilities are available mainly to students for general computing use and to faculty for reserved class work. Lab assistants are on hand to help people use the hardware and software available in the labs

Staff also provide consulting, training, and seminars. Contact ISC staff for advice on hardware, software, and network selection and installation in order to help ensure an effective campus-wide computing environment. Computer equipment repair is available by calling 475-2591 (voice) or 475-2810 (TTY). Our service center is factory-authorized for repair of Apple and Digital equipment

International Student Affairs

The Office of International Student Affairs is the resource center for all hearing and deaf international students on visas and for those members of the campus community seeking cross-cultural information. The office provides assistance with immigration regulations and travel documents, helps international students adjust to the academic and cultural expectations in the U.S. and provides cross-cultural programming for international students and the campus at large. The staff works closely with international student clubs and International House, a special-interest house in the residence halls for both international and American undergraduates. Off-campus

hospitality is coordinated with the Rochester International Friendship Council, which extends friendship to international students. The office is located on the mezzanine level of the Student Alumni Union. The phone numbers are 475-6943 (voice/TTY) and 475-6876 (voice). The coordinator for deaf international students can be contacted at 475-5540 (TTY)

International student emergency loan fund

This fund is administered by the International Student Affairs office and its purpose is to provide emergency assistance to international students on visas. The loans may not exceed \$100 and must be repaid within one month. Students must have a good record of payment with the Bursar's Office and no unpaid previous loans from the fund to be eligible for a loan. Further information regarding this loan can be obtained from the International Student Affairs Office

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 Skills 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 while The College Anticipation Program is for students who need additional preparation before matriculating into a college program. For more information about these programs, see the program descriptions below.

College Anticipation Program

The College Anticipation Program is designed for the college-bound high school graduate who desires further skill development before matriculating in a full college program

Applicants are interviewed, and diagnostic and achievement tests are administered. Once the educational diagnosis has been analyzed, and it has been determined that the College Anticipation Program is appropriate for the student, an individualized program is designed

The program runs for one RIT academic quarter and generally includes a content course, LDC instruction and academic counseling. The work is based on a system of established deadlines and immediate evaluation of progress.

Participation in the program cannot guarantee that a student will be admitted to the college or university of his or her choice, but professional resumes of student achievement in the program are sent to colleges upon request of the student

During the summer the center runs a special five-week College Anticipation Program for high school graduates entering college the next fall. Students in the summer program take a credit course from the RIT College of Liberal Arts and a block of LDC reading, writing, math, computer, and study skills courses. The LDC instructors incorporate the Liberal Arts course reading, writing and study assignments in the 'learning-how-to-learn' courses.

For more information, contact the Learning Development Center at 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, LDC instruction, and counseling, is arranged

The student meets regularly with an LDC faculty mentor to clarify directions and goals, to discuss relationships between the skills courses and to review progress

The entire program is designed to strengthen the student's self-confidence. Successful completion of this program could qualify students for readmission to the college or department of their choice or for entrance into another educational program

Although the College Restoration Program does not guarantee a participant readmission to his or her former college or admission as a transfer student at another school, the center provides recommendations and resumes of student achievement in the program to colleges upon request of the student.

For more information, contact the Learning Development Center at 475-6682 (voice/TTY)

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 offered include Textbook Strategies, Proofreading, Writing Skills, and Vocabulary/Spelling Workshop. The Writing Lab provides individualized instruction to improve students' abilities to complete college writing assignments. Individual or small group instruction in reading is available by appointment

Mathematics Department: 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, computer science, and statistics. In the lab there are review packets on a variety of topics in algebra, trigonometry, and calculus, as well as a list of math videos available in Wallace Library. The Math Success Workshop Series deals with how to study math and prepare for math examinations. Students with concerns about placement in math courses can make an appointment with a member of the LDC math faculty for advice.

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 475-6682 (voice/TTY)

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 475-6682

Alternative Learning Department

The Alternative Learning Department is founded on current neurophysiological research and is committed to helping individuals recognize and access their natural learning abilities, rather than disabilities. ALD recognizes that each student is unique and responds to this by offering three levels of support.

- Level 1 allows students to self-direct their program needs; a learning specialist is available on an informal basis.

- Levels 2 and 3 (require additional fee) provide students with daily or weekly, individual or group, structured monitoring sessions facilitated by a learning specialist

Students with identified learning disabilities may access all academic modifications available by law under ALD coordination. Students may select their level of participation on a quarterly basis, unless otherwise specified by their contingent acceptance by RITAdmissions. For more information, contact the ALD chair at 475-2215

New Student Orientation

Each year, RIT provides freshman and transfer students with summer and fall orientation programs designed to help them make the adjustment to life in a new environment. These programs are developed for both students and parents and address the academic, social, emotional and intellectual issues involved in beginning college or changing from one college to another

Four Summer Orientation programs are offered, one specifically for transfers in late June, two for hearing freshmen in mid-July, and one for deaf freshmen through August. Summer programs concentrate on registration for classes, academic information, support services provided by RIT, housing information, and the opportunity to meet other new students. The fall program continues the academic information process and concentrates on promoting student interaction and community development. While the summer programs are not required, students are strongly urged to attend both the summer and fall programs to derive the greatest benefit. For most deaf students, the summer orientation program is required

All students are encouraged to stay in the RIT residence halls during the summer programs. This live-in experience is designed to allow all students to sample on-campus living regardless of their long-range housing plans.

Parents' orientation is offered only during the summer programs. A small parent orientation fee is charged to support the program.

All new, full-time, day, matriculated students are charged a program fee to cover program development costs.

The Office of Orientation and Special Programs is located on the A-level of the Student Alumni Union and is open 8:30 A.M.-4:30 P.M., Monday through Friday. The phone number is 475-2508 (voice/TTY).

STOP Program

The Support Team Orientation Program (STOP) is designed for deaf students who have been accepted into an RIT bachelor's degree program. This one-week orientation 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 selections.

NTID Learning Centers

NTID has communication, general education, mathematics, and physics learning centers that provide specialized academic support for deaf students

Communication learning centers include the Self-Instruction Lab, where students can practice skills they have learned in listening, speaking, and sign/simultaneous communication; Telecommunications Lab, where students can practice their telephone skills; and the English Learning Center (ELC), which has reading and writing labs that allow students to practice their skills independently. The ELC includes the Computer-Assisted Language Learning Lab, which helps students improve reading and writing skills using interactive computer software

The General Education Learning Center (GELC) supports deaf students in their general education and liberal arts core courses. Skilled peer tutors, working closely with faculty members, provide students with feedback related to their reading and writing assignments. Reference books and computers also are available for assistance with assignments. The GELC sponsors evening enrichment programs in language arts, study skills, and social and political awareness

The Mathematics Learning Center provides tutoring assistance to students enrolled in mathematics classes.

The Physics Learning Center (PLC) offers a variety of physics courses in a classroom setting. A laboratory experience is part of each course. Tutors supplement classroom and laboratory experiences. Students enrolled in applied science, engineering, and other NTID technical programs as well as deaf students studying in one of RIT's other colleges use PLC services. PLC courses assist students who plan to enroll in courses offered through the colleges of Science and Engineering.

NTID Career Development Counseling Services

Each NTID-sponsored student has a personal/career counselor trained in counseling theory and techniques, career development, and communicating with deaf people. Counselors help students decide what program of study to choose and learn how to get along better with people, how to adjust to college life, and how to gain more self-confidence. The counselors work with students in many ways, including academic advising, individual counseling sessions, special groups, assessments, and consultation.

NTID Psychological Services

NTID Psychological Services provides confidential mental health counseling and assessment to all deaf and hard-of-hearing students requesting assistance. Psychological Services faculty members work closely with RIT's Student Health Service, Counseling Center, Office of Residence Life, career development counselors, Campus Safety, and other related campus units

Some concerns that students may need help in resolving include adjustment to hearing loss, 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 Campus Safety and NTID Interpreting Services

NTID Summer Vestibule Program

The Summer Vestibule Program (SVP), an orientation program for new deaf students, 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 learn about students' skills, abilities, and motivation. Through this process, students gain information that assists their selection of an appropriate program.

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 of study depends on passing SVP, having adequate skills to begin the program, and availability of space in the program

During SVP, students participate in various activities, including program sampling, career planning, math and communication evaluation/assessment, and general education seminars. Recreational and leisure activities, including intramural sports, dances, picnics, swimming, and captioned movies, also are a part of SVP.

While most deaf students do attend SVP, there are some who are not required to attend based on clear career goals, previous college experience, and/or past academic performance. An admissions committee reviews each student's credentials to determine if SVP is appropriate

Office of Special Services

Pursuing a college education is a major challenge. 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 is a federally funded program that has been hosted at RIT for 19 years. Presently, there are four components that make up the office. Each has a distinct purpose while remaining integrally linked with the others.

The Academic component has developed a full complement of services—including tutoring, math mentoring, advisement, and skills development—to assist students with academic concerns and to enable them to understand and refine their learning process and to use academic resources more effectively. The academic staff help students develop success strategies and experience positive responses to academic endeavors.

The Counseling component works to bring students into the program and provides the appropriate personal support that enables them to direct their energies into positive pursuits. Understanding that each student brings a unique set of circumstances to the learning environment, a counselor assists the student in understanding all that is available to him or her and how to access the assistance each may need. A counselor also is available to work with students on areas of general concern.

The Programming component provides complementary experiences that enhance the students' academic and personal perspectives by drawing on RIT and other community resources. When used effectively, 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 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 RIT and the learning community that it creates in order to foster success.

For further information, contact the office at 475-2832 (voice) or 2833 (voice). It is located in the RITreat in the Student Alumni Union. 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 United States citizen and meets one of the eligibility requirements may become a member of Special Services.

Office of 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 (OVES). We know the 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 at a full-time job. Because of these demands, veterans attending college 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, program secretary, peer counselors, and VA work-study students, who are available to handle inquiries and assist veterans with VA-related and college-related information. The OVES is located on the first floor of the Bausch & Lomb Center and is easily accessible for both day and evening students. The office is open from 8:00 A.M. to 8:00 P.M., Monday through Thursday, and until 4:30 P.M. on Friday. Students may visit the office or telephone 475-6642 (voice) 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 servicemembers is equal to the monthly amount for single veterans, not to exceed the cost of tuition

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 will be forwarded to the Veterans Administration to insure prompt payment. Payment for reservists is \$190.00 per month for full-time attendance 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.

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 Veterans Administration. 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 (VEAP), Chapter 32, should bring a certified copy of the DD214 to the Office of Veterans Affairs, where the benefit paperwork can be initiated. These benefits, payable by the Veterans Administration, are prorated relative to the contribution made by the service member.

Chapter 30, commonly referred to as the New G.I. Bill, is a significantly different benefit from the aforementioned. While servicemembers 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 the evaluation of their military training 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 military evaluations with the academic department and the Office of Veteran Enrollment Services prior to enrolling at RIT.

Veterans have shown significant interest in the RIT Amvets Post #1829. Amvets has created a veterans' learning center—fully computerized with both DOS and Macintosh connections to the RITVAXs. The center is located in the lower level of the Student Alumni Union and is open daily, 8:00 A.M.-11:00 P.M.

Veterans who are planning on attending college should consider the difference that a campus veteran services 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

Information comes in many forms other than printed pages bound between two covers. When a student wants to research a topic at RIT's Wallace Library, he or she will find not only a variety of print and non-print forms such as books, compact disks, microfilm, microfiche and magazines in which to locate information, but also a unique on-line computer catalog of the library's holdings as well as access to materials in other collections. Individual terminals allow for access of authors, title and subjects of over 300,000 records. Access is also available remotely from office, home, or lab.

In addition the library offers computerized searching of information from commercial data bases specializing in a broad spectrum of subject areas, as well as an electronic reference service available by calling 610WMLREF on the VAX mail network. Inter-library Loan assists in providing access to virtually all publicly available material.

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To help in the use of all these resources, reference librarians are on duty during the week and on weekends. Located throughout the four floors are more than 1,000 study stations including individual carrels and group study rooms.

The library contains a special collection of materials on hearing loss and deaf people to serve NTID and to support research. The special collections area houses the archives, rare books, faculty writings, and RIT theses.

For library hours, call 475-2046 (voice); for Reference Desk, call 610WMLREF (RITVAX) or 475-2564 (voice) and 475-2563 (TTY); for Circulation Desk, call 475-2563 (voice) and 475-2962 (TTY).

CAMPUS LIFE

What happens in the classroom is one part of a college education. But what happens outside the classroom can be just as important.

The Division of Student Affairs at RIT coordinates many services provided to students during their years at college.

The division includes Physical Education, Intercollegiate Athletics, Residence Life, Student Health Services, Student Activities, International Student Affairs, Student Alumni Union, Religious Activities and the Chaplaincy, Counseling Center, Higher Education Opportunity Program (HEOP), Orientation and Special Programs, Upward Bound, Special Services, Judicial Affairs, and Horton Child Care 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 for 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 Department of Residence Life therefore, in keeping with the educational mission of the Institute, has as its overall purpose the general well-being and growth of our students. To ensure this goal, the atmosphere, conditions, and services within our residence halls provide for much more than just a place to sleep. The antiquated term 'dorm' is no longer an accurate description. The RIT 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 are also covered, each designed to better prepare students to grow and mature as complete individuals.

Serving approximately 3,500 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, co-educational, wellness, non-smoking, alcohol-substance free, quiet study, over 21 years of age, upperclass, deaf, and mainstream (hearing and deaf 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, 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 is also available to the residence hall population. Entering students are assigned to double rooms, but limited-availability options for upperclass students include single rooms and double deluxes (two students to two rooms). On occasion, entering freshmen may initially be housed three to a room. This is a temporary arrangement, and as space becomes available, students are quickly reassigned to double-occupant rooms.

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, while second-year students are required to live either in residence halls or RIT apartment housing. Students generally reside a minimum of two years in residence halls. Campus apartments are available to upperclass students through an annual housing selection process. RIT's residency requirement 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/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 Student Expenses 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. Room window coverings and closet space are also provided. Each corridor has its own bathroom equipped with showers, and floors have a community lounge area with a television. 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 2,800 students residing in nearly 1,000 individual townhouse and apartment units. Apartment housing is available to all upperclass students in the four apartment complexes owned and operated by RIT.

While single students comprise the majority of apartment residents, a mixture of graduate and undergraduate students, single and married students and faculty/staff can be found in each apartment complex. Apartment contracts run 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. 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 four complexes--Colony Manor, Perkins Green, Riverknoll, and Racquet Club--is available from the Department of Residence Life, Grace Watson Hall, 63 Lomb Memorial Drive, Rochester, NY, 14623-5603; 475-2572 (voice/TTY) or 475-2113 (TTY)

The Housing Connection

A service of the Department of 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 RIT 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.

Located on the first floor of Kate Gleason Hall (room 1060), The Housing Connection provides free maps, information pamphlets, and telephones for users of this service. A trained staff member will assist you in your research for housing or roommates. For more information, stop in or call 475-2575 (voice) or 475-2719 (TTY).

Student Clubs and 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 and forms the Student Hearing Board, which provides for the self-discipline of the student body.

All full-time and part-time undergraduate and graduate students are members of the Student Government when they pay the Student Activities Fee. All other students may become members of the Student Government if they wish to participate in student-sponsored activities by paying the Student Activities Fee.

NTID Student Congress

The NTID Student Congress (NSC) is an organization of and for deaf 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 students with opportunities to interact with hearing students socially, academically, athletically, and culturally.

NSC is divided into six areas: academic, athletic, cultural/social, student organizations, public relations, and legal affairs.

Off-Campus Student Association

OCSA is the representative student government for all RIT students who do not reside in a residence hall. The Off-Campus Student Association, formed in 1978, is composed of students who live with their parents, or in the four RIT-operated apartment complexes, or in off-campus apartments. OCSA provides input from off-campus students to the RIT administration

The OCSA main office, located in the RITreat, Student Alumni Union, offers complementary services. They include a typing room with typewriters and Macintosh computers, a copier, and various office supplies. Also available is a microwave; refrigerator; free coffee, tea, and hot chocolate. A daily newspaper and a variety of magazines are on hand, also. Each of two satellite offices in Colony Manor and Racquet Club apartments offers Macintosh computers, a copier, and a TV lounge.

If you are interested in getting involved, stop in at the OCSA office or call 475-6680 (voice/TTY) for more information.

The College Activities Board

The College Activities Board, which is composed of students, is responsible for providing a balanced program of activities that reflect and enhance the special social, cultural, recreational, and educational needs of the campus community. If you are interested in getting involved, stop by the office in the Student Alumni Union, or call 475-2509 (voice/TTY)

The Black Awareness Coordinating Committee

The Black Awareness Coordinating Committee is organized to foster an awareness of the role of black men and women in the total society and to create a greater understanding among black students at RIT. Each year the committee sponsors various social and cultural programs designed to achieve these objectives.

Student professional associations

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. *Techmila*, the student yearbook, contains a student-edited pictorial and written description of student life at the Institute during the year. *Reporter* and *Techmila* have consistently won state and national awards

A weekly calendar listing campus activities, 'The CalendaRIT,' is distributed to on-campus students, deans, directors, and department heads

These publications draw their talented staffs—artists, photographers, writers, managers, and printers—from the entire student body.

Publications produced by deaf students include *Rolling Bricks*, a literary/art magazine; *Eagle's Eye*, a newspaper published several times each quarter; and *NTIDLife*, the college's yearbook.

Student Alumni Union

The Student Alumni Union, a primary focal point at the main entrance to the academic plaza, is designed specifically to service events sponsored by and for the entire campus community—students, faculty, and administrative groups, alumni and guests. A staff is available to assist and

advise the various individuals and groups in planning and coordinating their activities. In addition, a complete information service is located in the main foyer

The three-level facility, the center of co-curricular activities, features the 507-seat Ingle Auditorium; a complete game room for bowling, billiards, foosball, and electronic games; a unisex hair-styling and tanning salon; a candy and tobacco counter; two separate dining areas consisting of the main cafeteria and the RITskeller; meeting rooms, and lounges. Offices housed in the Union also include Special Services, Student Affairs, Alumni Affairs, Orientation, Complementary Education, the Black Awareness Coordinating Committee, the Office of Minority Student Affairs, Food Services, College Activities Board, Student Activities, Student Government, WITR radio station, RITV, *Techmila*, *Reporter*, Off-Campus Student Association, and other student organization offices

The RITreat

Through the efforts of the Student Life Advisory Board and several other student groups and individuals, the RITreat is a dedicated student area. The following resources can be found in the RITreat:

- o Clubs and organizations space
- o Computers/typewriters/word processors
- o Stamp machine
- o Department of Special Services
- o Office of Minority Student Affairs
- o Student conference room
- o Student Government office
- o Mailfolders for SG clubs and organizations
- o Off-Campus Student Association
- o Study tables/lounge area
- o TV lounge

Social Events

Major social events on the activities calendar include Fall Weekend, Winter Weekend, Parents Weekend, and Spring Weekend.

Other dances, parties, speakers, and events are sponsored by organizations such as the College Activities Board, the Residence Hall Association, NTID Student Congress, the Greek Council, the Black Awareness Coordinating Committee, the Off-Campus Student Association, and various special interest clubs. 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. Greek Council consists of members of three national sororities and 13 national fraternities that offer social activities and promote high scholastic and social standards among members

RIT Creative Arts Program

RIT Singers

An Institute-sponsored vocal ensemble, the RIT Singers is composed of about 40 members and 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 475-6087 (voice/TTY)

RIT Collegium Musicum

This ensemble of men's and women's voices performs a range of musical literature. Particular attention is given to building individual vocal skills. Opportunities for solo work and small ensemble singing are emphasized. For further information, call 475-6087 (voice/TTY)

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 475-6087 (voice/TTY).

RIT Philharmonia

The RIT Philharmonia is open to all RIT students, faculty, and staff. No auditions necessary. Rehearsals are 7-9 P.M., Mondays, in Ingle Auditorium. For more information, call 475-2014

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 Student Activities, 475-6650 (voice/TTY).

RIT Jazz Ensemble

Instrumentalists with a background in jazz and jazz rock will want to check out the Jazz Ensemble. The group performs monthly on-campus concerts in the RITskeller. For more information, call Student Activities, 475-6650 (voice/TTY)

Sing/Sign Choir

Members are a blend of hearing and deaf students, faculty, staff, and community members. Songs are sung by a chorus of 25-30 members and signed by another group of 10-15. For more information, call 475-6797 (voice/TTY)

NTID Combo

Each quarter more than 60 deaf students enroll in the world-model NTID music program. Four to six of these students are selected to perform with the internationally renowned NTIDCombo. For more information, call 475-6797 (voice/TTY)

RITTiger Band

A combination of RIT and NTID students, faculty, staff, alumni, and community members form the RITTiger Band and perform music for sports events, award ceremonies, dedications, and student activities. For more information, call 475-6797 (voice/TTY).

RITTiger Band Auxiliary Squads

Members are recruited from the RIT student body to perform flag, rifle, and drum routines with the RITTiger Band. For more information, call 475-6797 (voice/TTY)

RITtimestompers

This popular ensemble is geared to give its members the widest possible experience in Dixieland, jazz, and dance band styles. For more information, call 475-6797 (voice/TTY)

RITFlute Loops and Polished Brass

These ensembles offer additional performing opportunities at events such as receptions, dinner parties, and ceremonies. For more information, call 475-6797 (voice/TTY)

Sunshine Too

Sunshine Too is NTID's acclaimed professional touring theater company. Each year a new company with different material is available for performances in public schools, schools for deaf students, and colleges. The performers are three deaf and three hearing actors; all performances are done in sign language and voice. For more information, call 475-6251 (voice/TTY)

RITDance 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 concert. For more information, call 475-6250 (voice/TTY)

NTID Theater

Main Stage--Three plays are produced each year. They feature deaf and hearing actors and are performed in both sign language and voice

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 475-6250 (voice/TTY).

NTID Performing Arts Course Offerings

For information regarding acting, mime, technical theater, lighting, music instruction, or dance classes, call NTID's Department of Performing Arts, 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 RIT. Students who wish to participate should call 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 Complementary Education Office. Many of the country's leading artists and critics are included in the program, which deals with the issues of technology in art today. For more information, call 475-2646 (voice/TTY)

Department of Campus Ministries

Although it has no formal religious affiliation, Rochester Institute of Technology recognizes the importance of religion in educating the whole person. Within the Division of Student Affairs, the Department of Campus Ministries strives to respond to the needs of students, faculty, and staff by celebrating their faith traditions and addressing their ethical and personal concerns. Various religious traditions have assigned campus ministers to the Institute to serve as full- or part-time members of the Department of Campus Ministries

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 the campus ministers

For more information, call the secretary of the Interfaith Center at 475-2135 (voice/TTY)

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 will coincide with the dates and times for the academic departments. A nominal fee is charged in some courses requiring specialized instruction and/or facilities.

The following classes are offered as selections in the Physical Education Department. The Institute's physical education requirements are described on page 11 of this bulletin

Cardiovascular and strength activities

Aerobics, Aikido, Army Conditioning Drills, Jogging, Karate, Kung Fu, Introduction to Weight Training, Yoga and Tai Chi, Red Barn Ropes

Recreation and sports activities

Archery, Badminton, Ballet, Ballroom Dance, Billiards, Bowling, Canoeing, Cross Country Skiing, Dance Performance I & II, Diving, English Horseback, Fencing, Fishing, Frisbee, Golf, Hunting, Ice Skating, Jazz Dance, Juggling, Modern Dance, Nightclub Dancing, Outdoor Experiential Education, Racquetball, Scuba Diving, Self-Defense (women), Skiing (downhill), Swimming, Tennis, Western Horseback, Rock Climbing, Skeeet and Trap

Team activities

Basketball, Softball, Volleyball

Life support and safety programs

CPR and First Aid, Lifeguarding, Water Safety Instruction, Health/Mind-Body Connection, Total Fitness

Support services for deaf students in Physical Education and Athletics

NTID's Physical Education and Athletics Support Team provides support services for deaf 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.

Intramural Activities

An extensive program of intramural activities is offered at RIT. Under the direction of the Department of Physical Education, Intramurals, and Recreation, activities include co-rec, as well as men's and women's teams in basketball, volleyball, softball, ice hockey, flag football, soccer, innertube water polo, bowling, tennis and golf

Recreation

RIT offers some of the finest recreational facilities available in colleges today. Indoor facilities feature four gymnasiums, an ice rink, swimming pool, elevated indoor running track, physical fitness and weight training center, dance studio, recreational equipment room, wrestling room and game room (bowling, video games, billiards). Outdoor facilities include nine lighted tennis courts, an all-weather track, and numerous athletic fields. The equipment issue room provides quality equipment for recreation, physical education instruction, and intramural needs and interests. Services offered include: general information, towel and lock service, and equipment loan-outs. The Recreation Department also provides a series of health education and exercise programs 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 (10 NCAA appearances and runner-up honors in 1988), cross country (seven Eastern College Athletic Conference crowns), hockey (two national championships and three ECAC titles), and lacrosse (four Empire Athletic Association crowns in the last seven years).

Women's teams have also excelled. Volleyball boasts six straight EAA crowns and third place in the 1993 NAAs. Women's tennis is 108-32 since 1980, and women's hockey won its first ECAC title in 1989.

Each year more than 350 athletes take part in 18 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, indoor track, and wrestling. Spring competition includes baseball, men's and women's track, lacrosse, softball, and men's tennis.

A National Collegiate Athletic Association (NCAA) Division III member institution, RIT competes against schools in the Northeast with similar academic and intercollegiate athletic philosophies. Known as the Tigers, RIT teams are also members of the Eastern College Athletic Conference, Empire Athletic Association (EAA), and New York State Women's Collegiate Athletic Association (NYSWCAA).

Since 1970, RIT has been a member of the EAA, which also includes Alfred University, Clarkson University, Hartwick College, Hobart and William Smith Colleges, Ithaca College, Rensselaer Polytechnic Institute, and St. Lawrence University.

EAA men's and women's soccer and women's basketball champions receive automatic berths in the post-season NAAs, and the conference is consistently well-represented in national championships with numerous titles in eight sports

Club Sports

In addition to intercollegiate sports and intramural programs, RIT offers several club sports. The program is a division of RIT Student Government with the purpose of providing

extramural/intercollegiate competition. Some club sports, however, are solely for recreational or instructional purposes. Participation is open to students carrying a minimum of 12 credit hours

The following sports are offered: bowling, crew, fencing, lacrosse (women, men), rugby (women, men), alpine skiing, volleyball (men), and indoor soccer (men). All except fencing and indoor soccer compete on the intercollegiate level

Student Health Center

RIT's Student Health Center provides primary medical care on an outpatient basis. The staff includes physicians, nurse practitioners, registered nurses, an interpreter for the deaf, and a health educator. Allergy, psychiatric, and gynecological services are available by appointment. Health education programs are provided also

The Student Health Center is part of the Hale-Andrews Student Life Center, which is located on the walkway linking the academic and residence hall areas of the campus. Students are seen on a walk-in basis, Monday through Thursday, 8:30 A.M.-7 P.M., with limited services only from 4:30-7 P.M.; and Friday, 8:30 A.M.-4:30 P.M. Only emergencies are seen during the last half hour of each shift. Hours are subject to change and will be posted

The Institute 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 Student Health Center is not covered by this fee; there is a nominal charge for this service. Prescription medicines may be purchased from local pharmacies or, for some specific prescriptions, from Student Health Center. The health fee does not include prescription medications.

Questions about Student Health Center or health insurance should be directed to the office at 475-2255.

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 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

For *emergency* assistance and/or transport, the RIT ambulance can be dispatched through Campus Saefy at 475-3333 (voice) and 475-6654 (TTY)

Health records

Medical records are **confidential**. Information will not be released without the students written consent. Exceptions to this rule are made only when required by the public health laws of New York State.

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.-8:30 P.M.; Friday, 8:30 A.M.-4:30 P.M.; and on Saturday, 11 A.M.-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 475-6033.

Campus Connections accepts cash, checks, and charge cards (VISA, MasterCard) 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, notions, sundries, magazines, daily newspapers, and snack items. Film can be dropped off here for processing.

Campus Safety

The Campus Safety Department is open 24 hours a day and is located in Grace Watson Hall. The department provides the following services:

Escort Service

Campus Safety strongly encourages students to use the Escort Service. The Escort Service is available to anyone, seven days a week. Simply call the Campus Safety Department at 475-2853/6654 (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 also use the call boxes. 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. New York State motor vehicle and traffic laws are in effect on the RIT campus. Institute fines are imposed for operators in violation of parking and traffic regulations.

Medical/Handicap parking permits

Campus Safety honors handicap and medical parking permits from every state. Temporary medical parking permits may be issued to persons in need of them

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 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. The Personal Safety Program is presented to all new students living in the residence halls

Rape Education and Counseling Team (REACT)

RIT's Rape Education and Counseling Team (REACT) provides counseling and educational services to the RIT community. The counselors are full-time professional staff, some of whom are skilled in sign language. REACT also provides a confidential hotline for people who need to contact a counselor. The hotline number is 258-3399 (voice/TTY). Educational programming is available to everyone in the community by calling the educational program coordinator at 475-6989

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/her own personal safety, learning and practicing some basic precautions could enhance one's well being.

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. This institutional focus attempts

- To affirm and validate valued differences
- To reflect appreciation and respect for diversity through its hiring practices and subsequent support for those who are 'culturally diverse'
- To articulate behavioral expectations clearly to its constituents as these relate to divergent groups within the larger community
- To demonstrate total commitment of management, faculty, staff, and students to the cultivation of pluralism
- To provide a community climate that encourages positive interactions with and support for one another.

Standards for Student Conduct

The RIT community intends that campus life will provide opportunities for students to exercise individual responsibility and places high priority on self-regulation by its members. All members of the community are responsible for encouraging positive behavior by others, as well as preventing or correcting conduct by others that is detrimental to RIT's educational mission and values.

As an educational community, RIT strives for a campus environment that is free from coercive or exploitative behavior by its members. Moreover, it sets high standards that challenge students to develop values that enhance their lives professionally and that will enable them to contribute constructively to society.

RIT enjoys a diversity of backgrounds, lifestyles, and personal value systems among those who comprise the academic community. Students, however, are expected to observe and respect the policies and standards of the Institute and the right of individuals to hold values that differ from their own and those expressed by RIT.

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.

Human rights and dignity

Students are expected to follow RIT's Harassment Policy. 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

Alcohol and drug abuse

Students are expected to follow RIT's Drug and Alcohol Policy. RIT considers drug and alcohol abuse as issues of health and safety, and thereby recommends that students who abuse substances seek counseling and treatment. Similarly, if a student thinks another individual is abusing drugs or alcohol he/she should suggest that the suspected abuser seek treatment. Students who evidence problems with alcohol or drugs will be offered, and if necessary, be required to avail themselves of counseling or other appropriate treatment

Individuals will be held responsible through RIT judicial processes for their behavior despite impairment from drug or alcohol use. RIT prohibits violations of federal, state, and local laws, and will not shelter students from prosecution

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 multi-user 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

Conduct off campus

The conduct of students at events held off campus which are sponsored by RIT organizations should adhere to the same standards and policies as events held on campus. Any off-campus action which 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 Honesty. 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

RIT acknowledges that an individual students 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 Sexual Harassment 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

RIT judicial process

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, and complete descriptions of these processes are available from that office. Sanctions imposed upon those found guilty may range from admonition to probation to restitution to disciplinary suspension from the Institute. Students suspended from RIT may not enroll in any course work until such time as the suspension is waived by the Director for Judicial Affairs

ADMISSION

Admission to RIT is competitive, but our admissions process is a personal one. We are interested in learning about your interests, abilities, and goals in order to provide the best information and guidance we can as you select the college that is right for you

Students applying for freshman admission for the Fall Quarter (September) may apply through an **Early Decision Plan** or **Regular Decision Plan**. The Early Decision Plan is designed for those who consider RIT their first choice 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 March 1 will receive admission notification by March 15. Applications received after March 1 will be reviewed on a 'rolling' basis, with notification letters mailed four to six weeks after the application is complete.

All applications for transfer admission and all freshman applications for Winter, Spring, or Summer Quarter entry are reviewed as they are received, and notification letters are mailed four to six weeks after the application is complete. **Specific instructions for completing the application process are contained in our application packet. 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 post-educational 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 non-refundable 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

Applying to NTID

All applications for admission to RIT's National Technical Institute for the Deaf are reviewed, and admissions notification is sent out four to six 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.

Students applying to RIT through NTID must complete both the standard RIT 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 seven colleges, they still must complete both applications. In addition to meeting NTID requirements, students also must fulfill requirements for admission to the selected college

NTID students should submit their applications in the fall of the year before they wish to attend. 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 June 30. NTID requires a \$100 deposit from accepted candidates

Application requirements

In order to complete the application process, you need to submit the following:

1. a fully completed application for admission (includes Part 1, Part 2, and any supplemental forms)
2. a nonrefundable \$35 application fee

3. an official high-school transcript for all freshmen and for transfers with fewer than 30 semester hours or 45 quarter hours
4. official Scholastic Assessment Test (SAT) or American College Test (ACT) results for all freshman applicants. NTID applicants should submit results from the Stanford Achievement Test-Advanced Level-Form J.
5. official transcripts of all completed course work and a listing of any course in progress (and not on the transcript) or work to be completed before enrolling at RIT

New York State immunization requirement

New York State Public Law 2165 requires that all matriculated students enrolled for more than nine quarter credit hours in a term and born after January 1, 1957, must provide RIT Student Health Services 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, 1969, 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 Services office.

Early admission

Students occasionally complete the prescribed number and adequate distribution of high school units in three years, with the exception of fourth-year English and/or history. In such instances they may seek admission to RIT under the Early Admission Program

Transfer credit

Because approximately 35 percent of RIT students are transfers, we have a strong commitment to providing services for them. Students who have completed studies at another accredited college before coming to RIT will be awarded transfer credit for all prior course work that is judged to be applicable to their RIT program. Usually a grade of C or better is required for a course to transfer.

Deaf 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) or 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 at 716-475-5780 to arrange for a special mathematics diagnostic test

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.

We encourage all students—whether high-school age or adults exploring a second career—to seek our assistance while clarifying or reexamining personal and career goals

To obtain answers to questions about RIT programs and procedures, contact the Admissions Office. Counselors are available to help students with questions and concerns. An appointment for an admissions interview and campus tour may be scheduled by writing RITAdmissions, Bausch

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&Lomb Center, 60 Lomb Memorial Drive, Rochester, N.Y., 14623-5604, or calling 716-475-6631 (Monday-Friday, 8:30 A.M. -4:30 P.M.).

Deaf students who wish to enter NTID or another RIT college may write to NTIDDepartment of Recruitment and Admissions, Lyndon Baines Johnson Building, 52 Lomb Memorial Drive, Rochester, N.Y., 14623-56047, or call 716-475-6700 (voice or TTY).

Deaf students may take regularly scheduled tours offered at NTID(10A.M., Monday-Friday, and 2 P.M., Monday and Thursday) and arrange personal interviews. Both of these are optional and are not required for admission.

Office of Part-time Enrollment Services (OPES)

This office provides a central information and counseling service for students interested in enrolling in part-time undergraduate studies offered through the Institutés various schools and colleges. We encourage you to contact this office 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 study at RIT.

OPES staff members are available to assist you from 8:30A.M. to 6 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 our offices on the first floor of the Bausch & Lomb Center on campus.

EXPENSES

Procedures and Costs: 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 1994-95 school year are as follows:

Fall Quarter	August 23, 1994
Winter Quarter	November 22, 1994
Spring Quarter	February 23, 1995
Summer Quarter	May 25, 1995

Students who have not participated in the early registration process for the quarter must first attend Open Registration to register for their courses. Payment of the quarterly charges (tuition, fees, room, and board) is due 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. Non-matriculated 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	\$40
(one-time charge for new students)	

Quarterly photo facilities fee	\$93
(charged to all full-time photo students; \$47 per quarter charged to all part-time photo students)	

Late registration fee	\$50
(charged to any student who fails to register, and make the necessary financial commitment, by the designated quarterly open registration day and time)	

FEE SCHEDULE 1994-95 (MATRICULATED DAY COLLEGE STUDENTS EXCEPT NTID)

	Per Quarter	Per Year-Tuition 3 Quarters
Full-time Undergraduate (12-18 Credit Hrs.)	\$4,656	\$13,968

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Part-time Undergraduate (Less than 12 Credit Hrs.) 333/Cr. Hr 333/Cr. Hr.

Student Activities Fee (Mandatory Charge)

Full-time Undergraduate	39	117
Part-time Undergraduate	16	48

Student Health Fee (Mandatory Charge)

Full-time Undergraduate	48	144
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Residence Hall Room Charges

Double Occupancy	1,022	3,066
Single Occupancy	1,175	3,525

Board/M meal Plans

20 Meals per Week	893	2,679
Any 14 Meals (Includes \$60 debit each qtr.)	868	2,604
Any 10 Meals (Includes \$20 debit each qtr.)	788	2,364

(Commuter meal plans are also available)

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 \$500 annually; in the arts and crafts, costs may range from \$800\$1,000; and in photographic illustration, a realistic allowance is \$2,500 per year in addition to cameras

Student sickness insurance plan

A charge of \$220 is assessed Fall Quarter to all full-time students who have no other medical insurance and have not signed a waiver option

Twelve-month payment plan

For the 1994-95 academic year, RIT will offer a 12-month payment plan. This combines the elements of a prepayment and deferred payment plan. For further information, contact the Bursar's Office at 716-475-6059.

Vocational Rehabilitation

1. Deaf students receiving Vocational Rehabilitation (VR) 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
25Lomb Memorial Drive
Rochester, N.Y. 14623-5603

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.

Procedures and Costs: 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 1994-95 school year are as follows:

Fall Quarter	August 23, 1994
Winter Quarter	November 22, 1994
Spring Quarter	February 23, 1995
Summer Quarter	May 25, 1995

FEE SCHEDULE (Matriculated Evening Division students)

Tuition--Undergraduate

Upper level (Courses in 400, 500, 600 series)	\$220/Credit Hour
Lower level (Courses in 100, 200, 300 series)	\$201/Credit Hour

Other fees

Some courses require additional charges to cover laboratory, studio, or supply fees. (Consult the registrar's quarterly schedule for those courses with additional fees.)

Late registration fee

A late registration fee of \$50 is charged to any student who fails to register (and make the necessary financial commitment) by the designated quarterly open registration day and time

Tuition assessment policies

1. Matriculated students are assessed the tuition rate associated with their program, regardless of the courses taken.
2. Non-matriculated 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*. 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 reasons at the request of the Institute during a quarter

3. Transfer by employer, making class attendance impossible
4. Withdrawal for academic or personal reasons at the request of the student, approved by the student's adviser or department representative, the Institute coordinator of academic advising, and the bursar.

Partial refund schedule:Tuition

Partial refunds will be made according to the following withdrawal schedule and percentage of tuition reduction:

- o During official drop/add period (first six days of classes)-100 percent tuition reduction
- o From the end of the official drop/add period through the end of the second week of classes-70 percent tuition reduction
- o During the third week of classes-60 percent tuition reduction
- o During the fourth week of classes-50 percent tuition reduction
- o Fifth and subsequent weeks--no tuition reduction

NOTE: NON-ATTENDANCE 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 and fees are not refundable

All students in their first quarter of attendance who are receiving Title IV federal financial aid funds are eligible for tuition, fee, room, and board proration through the end of the sixth week of classes.

For further information 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 non-resident student on a meal plan must check out with Housing and/or Food Service. 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. During the first four weeks --75 percent of unused room charge
2. After the first four weeks--50 percent of unused room charge
3. After the last two weeks--no refund

*Room and board policies are established by 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 1993-94, approximately 65 percent of our full-time undergraduate students received financial aid awards from RIT. These students qualified for over \$65 million in financial assistance from federal, state and institutional sources. Many families also took advantage of RIT's 12-month, 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 an RIT Financial Aid Application and the Free Application for Federal Student Aid (FAFSA). The FAFSA is available through high school guidance offices or college financial aid offices. The RIT Financial Aid Application is mailed to all students who have applied for admission to RIT.

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 vitally important that the FAFSA is filed by March 15. Applications received after March 15 receive secondary consideration because funds are limited. Therefore, students should file the form as soon after January 1 as possible. For transfer students, RIT also requires a financial aid transcript from each college attended.

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 through annual Outstanding Freshman Scholarship and Outstanding Transfer Scholarship programs. Winners are chosen on the basis of their academic record, recommendations, extracurricular activities, and requirements for their intended major. Please contact the Admissions Office for more details on either program

- **Grants** are gifts of financial assistance that are awarded on the basis of demonstrated need. RIT awards institutional grants that vary from \$100-\$10,000 for the academic year. RIT also awards grants under the federally funded Supplemental Education Opportunity Grant (SEOG) program.
- **Entitlements** are a special type of grant. They are funded by state and federal governments. Eligibility for entitlements can be based on financial need or on special characteristics of a recipient. Entitlements based on need include the federal government's Pell Grant program and various state grant programs (for example, the New York State Tuition Assistance Program).

Examples of entitlements based on special student qualifications are the G.I. Bill and vocational rehabilitation benefits. Entitlements need not be repaid

- **Loans** are a lien on future earnings. The money you receive on loan is 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 Federal Stafford Loan or the Unsubsidized Federal Stafford 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 enhance 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. 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. Over 3,000 students were employed on campus in 1993.

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. While co-op salaries vary depending upon academic program, a typical co-op student will earn \$3,000 to \$8,000 per year during his or her junior and senior years at RIT. Students are encouraged to contact the Cooperative Education Office for additional salary data.

- **NTID Grant-in-Aid**
Federal Grant-in-Aid funds, awarded on the basis of financial need, are the primary 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.

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 during April or May; returning upperclass students may expect award notification during June or July

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 Student Financial Aid Office 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

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 12-month period with **no interest or finance charges**. Participating families make their first payment by June 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 will contract for a 20- or 14-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. Approved financial aid may also be deducted from student charges to reduce the amount financed through the Plan.

Additional information, as well as applications for the monthly payment plan, may be obtained from the Bursar's Office. Monthly payment programs are also available through a number of commercial banks and agencies, and inquiries regarding these programs should be directed to the Financial Aid Office.

RIT, through special arrangements with CoreStates Bank, also offers a Tuition Prepayment Plan for two, three, or four years of tuition costs. Families who borrow under the Prepayment Plan are guaranteed no tuition increases for the years covered by the loan. Borrowers may take up to 10 years to repay the loan. 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 or 475-5489 (voice) or 475-2960 (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 two tables on page 330 list the approved standards of satisfactory progress for the associate degree and baccalaureate degree, respectively

In addition to accruing degree credits and earning a minimum grade point average as specified in the tables on page 330, TAP recipients must

Complete 6 credits per quarter to receive TAP payments	2-4
Complete 9 credits per quarter to receive TAP payments	5-7
Complete 12 credits per quarter to receive TAP payments	8-12.

Completion of a course is defined as meeting course requirements and receiving a letter grade of A, B, C, D, or F.

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 physical/mental 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.

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 (9 academic quarters) for degree completion

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 Federal Title IV financial aid eligibility 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 6-18	Minimum Cumulative GPA = 2.0

Federal aid recipients 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

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 Student Loans, Federal Stafford Loans, Federal Supplemental Loans, and Federal PLUS Loans.

Student loan recipients should also note that all Federal Family Education Loan Programs have specific annual and

cumulative maximum amounts. The loan limits are listed in the Undergraduate Financial Aid Programs 1994-95 chart (see page 333) and in the U.S. Department of Education 'Student Guide.' Copies of the guide are available in RIT's 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 (see this page). 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

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 and RIT Financial Aid Application by priority deadline.**
Presidential 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	Three types of awards are offered: \$6,000, \$5,000, or \$3,000 per academic year. Awards are 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.
Quality Cup Scholarships SAE Scholarships National Merit Scholarships Portfolio Scholarships				
RIT Outstanding Transfer Scholarships considered for	Third-year transfer applicants who apply for admission by February 15 and meet selection criteria	Awards based on academic record, recommendations, for intended major	Amounts vary up to one-half tuition. Awards are renewable activities, and requirements	Must apply for admission to RIT by February 15 to with GPA of 3.0 (B) or higher be Outstanding Transfer Scholarship Program.
RIT-Urban League, Ibero/PYRD, and Minority Scholarship Programs	Awarded to African American, Hispanic, or Native American students meeting selection criteria	Applicants must demonstrate financial need, academic achievement, and leadership potential.	\$2,500 per academic year for full-time study. Renewable	File Federal FAFSA and RIT Financial Aid Application by Transfer priority deadline.
RIT Phi Theta Kappa Admissions Office Scholarships	Transfer students elected to Phi Theta Kappa for scholarship information.	Theta Kappa at previous college	Must document Phi Theta Kappa membership GPA of 3.0 (B) or higher.	\$1000 per academic year for full-time study. Renewable with Contact
RIT Endowed Scholarships and RIT	Full-time RIT students meeting selection criteria	Selection criteria established by the donor for each program		Amounts vary File Federal FAFSA Financial Aid Application by priority deadline.
	Most awarded to upperclassmen based on financial need and academic performance at RIT.			
RIT Nathaniel Rochester (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.	\$750 for junior year of study (3 academic quarters). \$900 for senior year of study (3 academic quarters)	Contact NRS Scholarship Society Committee through Dean's Office in each RIT college. File scholarship application in March.
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 and RIT Financial Aid Application by priority deadline.
RIT-NY State Higher Education Opportunity Program (HEOP)	Must be a NYS resident, attend a NYS college sponsoring the program, and meet opportunity program guidelines	Must meet economic and educational eligibility criteria of the program. Contact RIT HEOP Office at 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 and RIT Financial Aid Application.

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RIT/ROTC Room	Available to Army, Air Force, and Navy ROTC Scholarship Financial cadets. (See Federal Programs) residence hall	Must be an ROTC Scholarship cadet and reside in RIT campus	Normally \$2,000 per year	File Federal FAFSA and RIT Subsidy Holders of three-year ROTC
			scholarships become eligible in sophomore year.	Aid Application by priority deadline.
RIT/ROTC Tuition	Holders of four-year Air Force or Army scholarships	Students must have a Type II or Type III scholarship	Normally 20 percent of tuition	File Federal FAFSA and RIT Subsidy Financial Aid Application by priority deadline.
RIT Employment Program	All students enrolled at least-half time in a degree program position.	No financial need requirement Hiring criteria may vary by	Varies, depending on hours worked and wage rate	Contact RIT Student Employment Office.
RIT College of Continuing application Education (CCE) Scholarship	Enrolled in CCE course work as	a full-time or part-time student	Financial need and academic record considered	Varies from CCE Office (716) 475-2234. Request scholarship
RIT Part-time Studies Scholarship	Matriculated or non-matriculated students registered for 2-11 credits each term in an undergraduate program	Need considered, but no fixed income maximum	10-50% of tuition charged. (Part-time Scholarship plus other grants cannot exceed 50% of tuition.)	Submit RIT Part-time Student Financial Aid Pre-Application.
Aid for Part-time Studies (NY State Funded)	Matriculated undergraduates registered for 6-11 credits per term	Financial need (based on taxable income as defined in current guidelines) and availability of program funding.	\$2,000 maximum per academic year. Funding dependent upon state allocation	Submit Aid for Part-time Studies Application to RIT Financial Aid Office.

Standard of Satisfactory Progress for the Purpose of Determining Eligibility for New York State Student Aid

Baccalaureate 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	1.40	1.50	1.60	1.65	1.70	1.75	1.80	1.85	1.90

*Only students in the HEOP program at RIT are eligible for more than 12 quarters of undergraduate awards.

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	1.40	1.60	1.80

Additional Eligibility Requirements

Transfer students

Cumulative grade point average requirements are the same as for non-transfer students (i.e., students must obtain a 2.0 GPA at the end of six academic quarters). Transfer students also are expected to accumulate 30 degree credits for each three-quarter academic year. However, the maximum number of quarters allowed for full-time students to accumulate remaining degree credits may be reduced. For every 10 credits, or fraction thereof, granted as transfer credit by RIT, the maximum number of quarters to accumulate remaining degree credits is reduced by one. For example, a student transferring from another college and granted 30 transfer credits would have 15 rather than 18 quarters to accumulate remaining degree credits; the same student transferring to

an associate degree program would be allowed six rather than nine quarters to complete the degree. The calculations used in the reduction in maximum quarters allowed for degree completion apply to both federal aid programs (18 academic quarters maximum) and RIT-sponsored awards (14 academic quarters maximum).

Part-time students

Students registering for 6 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.

New students should begin the process of applying for aid during the month of January. In order to receive full consideration, it is recommended that the FAFSA and RIT Financial Aid Application be submitted by March 15 prior to the fall quarter of your entrance. Applications received after March 15 are considered as long as funds remain available. We suggest that new students file application forms as soon after January 1 as possible.

Financial Aid Refund Policy

Institutional refund policies are listed in this bulletin. If institutional charges are reduced in accordance with those policies, a percentage of federal assistance, other than college work-study, must be returned to the aid program using the following formula:

$$\begin{array}{rcccl} \text{Amount of Refund} & & \times & \begin{array}{l} \text{Total Quarterly} \\ \text{Federal Aid} \\ \text{Total Quarterly Aid} \end{array} & = & \begin{array}{l} \text{Amount Returned} \\ \text{to Federal} \\ \text{Programs} \end{array} \end{array}$$

By regulations, amounts returned to federal aid programs are refunded in the following sequence: Federal Family Education Loans, Federal Direct Loans, Federal Perkins Loans, Federal Pell Grant, Federal Supplemental Grant.

Loan attribution

Federal Family Loan Program regulations require that eligibility be determined on a quarterly basis regardless of when funds are actually disbursed or received. Accordingly, if the total loan disbursed for the year exceeds total eligibility at the time of withdrawal, suspension, or leave of absence, the excess must be returned to the lender even if a deficit is created in the student's Bursar account.

Late disbursement

With guarantee agency approval, the first disbursement of a federal loan received after student withdrawal may be applied to unpaid institutional charges if the disbursement is received within 60 days after the official date of withdrawal. Subsequent disbursements must be returned to the lender. First-year students who withdraw from RIT during the first 30 days of the loan period are not eligible to receive a late loan disbursement.

Multiple refund calculations

Federal financial aid recipients with no previous college attendance who withdraw on or before the 60 percent point in time of the first quarter are eligible for federal pro-rata refund calculations. These may differ from the RIT Refund Policy detailed elsewhere in this bulletin. Eligible students will be evaluated under both calculations. The formula that yields the highest refund of charges will be used. Samples of both calculations are available in the Financial Aid Office.

State scholarships

Regulations vary. Any adjustments are done in accordance with the specific requirements of the sponsoring state.

Privately funded grants and scholarships

Some students will be recipients of funds from private donors such as churches, trade unions, foundations, etc. Many of these organizations will have provided specific instructions to RIT concerning disbursement of their funds to students who withdraw. In the absence of specific instructions, 100 percent of the quarterly award will be credited to the student's account. Funds on deposit with the Institute, designated by the donor for future terms of enrollment within the academic year, will be returned to the donor.

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:

$$\begin{array}{rclcl} \text{Remaining Credit} & & \text{Scholarship} & & \\ \text{Balance} & \times & \text{Scholarship Plus} & = & \text{Amount Returned} \\ & & \text{Student Payments} & & \text{to Scholarship} \\ & & & & \text{Program} \end{array}$$

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 in accordance with the special criteria of each scholarship. All applicants for financial aid are considered for scholarships for which they meet the established criteria

Harriet Thayer Adams Scholarship
 Max Adler Scholarship
 Alcom Printing Scholarship
 George Alden Scholarship Fund
 Mary R. Alexander Scholarship
 Fanny Knapp Allen Scholarship
 Alling Clements Scholarship
 Altier & Sons Scholarship
 Avis Mason Andrews Graduate Scholarship
 Arthur Anderson 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
 Arkell Hall Foundation Scholarship
 Atex Newspaper Group Scholarship
 Lee Augustine Memorial Scholarship
 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
 Bennett Award
 Fanny R. Bigelow Scholarship
 Roscoe Bills Scholarship
 Helen & Frederick Blaessig Memorial Scholarship
 Harriet Blickwede Scholarship
 Boeing Corporation Scholarship
 Bonadio/Insero Corporation Scholarship

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Austin Bonis Scholarship
Boston Litho Club Scholarship
Farid Bozorgi Scholarship
Braverman Scholarship
Joseph Briggs Endowed Scholarship
Chester W. Brink Scholarship
Stephen Briody Scholarship
Harold Brodie Scholarship
Steffan Brown Scholarship
Nettie Bullis Scholarship
Business Alumni Scholarship
Orilla Butts Scholarship
Harold Cadmus Memorial Scholarship
Caldwell Manufacturing Scholarship
Richard Capilla 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
Construction Specifications Institute Scholarship
Continental Corporation Scholarship
Continental Insurance Co. Scholarship
Cortland Brovitz Corporation 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
Deloitte, Touche, Haskins, & Sells Scholarship
De Ridder Corporation Scholarship
Ronald Dodge Engineering Scholarship
Ronald Dodge NTID Scholarship
Elizabeth Dunlap Sargent Scholarship
Dupont Undergraduate Scholarship
Dupont Graduate Fellowship
Eastman Kodak Merit Scholarship
Eberly Family Scholarship
Eisenhart Memorial Scholarship
Ellingson Foundation Scholarship
Isabel & Benjamin Emerson Scholarship
Fred Emerson Foundation Scholarship
Fred Emerson Graduate Scholarship
Raymond Englert Scholarship

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Engineering Women of Rochester Scholarship
Eyer Foundation Scholarship
Max Factor Scholarship
Farash Scholarship
John Doane Fay 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
Gamma Epsilon Tau Scholarship
Garlinghouse Scholarship
Gegeheimer/McClure Scholarship
Frank Geist Scholarship
General Motors Scholarship
General Railway Signal Technical Foundation Scholarship
Sarah Margaret Gillam Scholarship
Jean Gillings Scholarship
E. B. Gleason Scholarship
Arthur King Goldsmith Scholarship
Good Samaritan Association Scholarship
Isaac Gordon Scholarship
Gould Pumps Inc. Award
Graflex Scholarship
Phillip L. Graham Scholarship
Graphic Arts Technical Foundation
Graphic Controls Scholarship
Frank Grum Memorial Scholarship
Hakes Assoc. Scholarship
Edward Hableib Scholarship
Ezra Hale Scholarship
William B. Hale Scholarship
Mildred F. Hall Scholarship
Sil Hall Scholarship
Carter Harmon Scholarship
E. E. Harris Semiconductor Tuition
Rem. Harris Semiconductor Scholarship
Franz Haverstick Scholarship
G. Sherwon Haxton Scholarship
Safford Hazlett Scholarship
Healthcare Purchasing Scholarship
Heidelberg/Harris 'Printers Hall of Fame'
Sol Heumann Scholarship
John & Catherine Hill Scholarship
Hiroo Sato Memorial Scholarship
Hoffend Scholarship Fund
Hogadone & Larwood Scholarship
Charles C. Horn Scholarship
Frank Horton Scholarships
F. R. Huberlie Memorial Scholarship
Arthur Ingle Scholarship
Imaging Science Kodak Lab Scholarship
Imaging Science-Xerox Scholarship

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Louis & Sylvia Jackson Scholarship
Jack Jenkins Endowment Scholarship Fund
Lucille R. Jennings Scholarship
Jephson Trust Scholarship
Helen Lucille Jones Memorial Scholarship
John Wiley Jones International Scholarship
Michael Jones Memorial Scholarship
Abraham & Teresa Katz Scholarship
Henry & Mary Kearse Memorial Fund
David Klieman Scholarship
Lowell Koenig Scholarship
E. M. Kohler Scholarship
Robert Krups Industrial Design Scholarship
Sara L. Kuhnert Scholarship
Lancer Graphics Scholarship
Francis Lang Scholarship
Lasky Corporation Scholarship
Lehigh Press Scholarship
Abe Lincoln Scholarship
Milton Loder Memorial
Lomb Citizen Soldier Scholarship
Lomb People Scholarship
Los Angeles Times Mirror 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 McIntee Scholarship
McIntosh Education Fund
Dean McWhirter Memorial Scholarship
Alice Melnyk Scholarship
Mengel, Metzger, & Barr Scholarship
Manufacturers Hanover Scholarship
Marine Midland Fellowship
Barbara Milliman Scholarship
Abraham & Sadie Milstein Scholarship
Mobil Corporation Scholarship
Earl Morecock Scholarship
Clifford Waite Morgan Scholarship
Moscom Corporation Scholarship
Charles W., Sue L., Freda L. Muffitt
Endowed Scholarship Fund
Morris Mulligan Memorial Fund
Michelle Nageotte Scholarship
National Metal Decorators Scholarship
National Cash Register Scholarship
Nathaniel Rochester Society Scholarships
C. B. Nebllette Memorial Scholarship
New England Graphic Communications
New York Times Minority Scholarship
Grace B. Norton Scholarship
NTID Architect/Tech Award
NTID Business Careers Scholarship
NTID Endowed Scholarship
NTID Performing Arts Scholarship
NTID Printing Production Scholarship

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NTID Science/Engineering Scholarship
NTID Visual Communication Scholarship
Carol L. Oelkers Memorial Fund
Florence Ohringer Art Scholarship
Milton & Ray Ohringer NTID Scholarship
Robert Panara Scholarship
Barbara Paul Memorial Scholarship
Peat Marwick-Mitchell 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
David Presco Scholarship
Praxis Biologics Scholarship
Queens Group Scholarship
Radisson Scholarship
Harold Raphael Memorial
Redcom 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
RITWomen's Club
RIT Women's Council NTID Scholarship
Frank Ritter Memorial Scholarship
Archibald & Mary Robinson Scholarship
Rochester Community Savings Bank Scholarship
Rochester Sales & Marketing Executives Scholarship
Rochester Telephone Scholarship
Robert Root Award
Rebecca Rosenberg Scholarship
Laura Bradford Russell Scholarship
David & Fannie Rutty Memorial Scholarship
Bernard Sandelman Scholarship
Esther G. Sanders Scholarship
Nelson & Celeste Sanford Memorial 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 Scholarship
Sarah Shelton Scholarship
Carl M. Shrader 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
Leo & Mary Smith Scholarship
Society for Mechanical Engineering Scholarship
Harry Speck Scholarship
Karl Sperber Scholarship

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Statler Foundation 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
George Tanzer Memorial Scholarship
Eloise Thornberry Scholarship
Time Inc. Scholarship
Touche-Ross Scholarship
Clarence Tuites Scholarship
Turri & Browne Scholarship
Clifford & Ruth Ulp Memorial Scholarship
James Ventimiglia Scholarship
Frank Vereka Scholarship
Joseph Waldinsperger CCE Scholarship
Walter Walkowiak Memorial 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
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 Wittman Scholarship
Joseph & Loretta F. Wolf Scholarship
Wurzer/NRS Scholarship
William D. Wright Scholarship
Xerox Scholarship
Mary Alice Croston Yawman Scholarship
Young Printing Executives Club Scholarship
Jeffrey W. Zielasko Scholarship

DISTINGUISHED PROFESSORSHIPS

COLLEGE OF APPLIED SCIENCE AND TECHNOLOGY

Russell C. McCarthy Professorship in Engineering Technology

Established: 1979

COLLEGE OF BUSINESS

J. Warren McClure Research Professorship in Marketing

Established: 1977

Donor: Mr. and Mrs. J. Warren McClure

Purpose: To perpetuate Mr. McClure's professional interest in the field of marketing

Held by: Dr. Eugene H. Fram

Benjamin Forman Professorship in International Business

Established: 1986

Donor: Maurice Forman

Purpose: Perpetuate Mr. Forman's interest in international business

Held by: Dr. Riad Ajami

COLLEGE OF CONTINUING EDUCATION

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: Dr. Peter Lutz

Frederick H. Minett Professorship in Continuing Education

Established: 1978

Purpose: Brings distinguished Rochester-area professionals to share professional knowledge and experience with RIT students and faculty

Held by: William Johnson

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. Richard B. Hetnarski, P.E.

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. Guifang Li

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

COLLEGE OF IMAGING ARTS AND SCIENCES

Artist-in-Residence Professorship

Established: 1984

Purpose: To work with apprentice woodworkers and participate in conferences and lectures at RIT.

Held by: Wendell Castle

Charlotte Fredericks Mowris Professorship in Contemporary Crafts

Established: 1973

Donor: Mrs. Charles F. Mowris

Purpose: To perpetuate interest in the School for American Crafts through the work of faculty and students as talented craftspeople

Held by: Albert Paley

Melbert B. Cary Jr. Professorship in Graphic Arts

Established: 1969

Donor: Mary Flagler Cary Charitable Trust

Purpose: To provide a permanent memorial for Mr. Cary as a former president of the American Institute of Graphic Arts and to perpetuate his interest in the field

Held by: Professor Frank J. Romano

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

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: Professor James E. Rice

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

Roger K. Fawcett Distinguished Professorship in Publications Color Management

Established: 1991

Donor: World Color Press, and Fawcett family & 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: Professor Miles F. Southworth

Frederick and Anna B. Wiedman Professorship in Medical Imaging

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. Arthur E. Burgess

COLLEGE OF LIBERAL ARTS

Caroline Werner Gannett Professorship in the Humanities

ROCHESTER INSTITUTE OF TECHNOLOGY

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. Diane Hope

Arthur J. Gosnell Professorship in Economics

Established: 1985

Donor: Family and friends of Arthur J. Gosnell

Purpose: To perpetuate the memory of Arthur J. Gosnell through recognition of the importance of good teaching in economics and by facilitating research into public policy questions

Held by: Dr. Thomas D. Hopkins

Ezra A. Hale Professorship in Applied Ethics

Established: 1989

Donors: William B. and Patricia F. Hale and Lawyers Co-operative Publishing Company

Purpose: To establish a permanent memorial to a long-time and valued friend of RIT, Ezra A. Hale, and to provide instruction in applied ethics in keeping with his beliefs in sportsman-like conduct, fair play, and honesty.

Held by: Dr. Wade L. Robison

William A. Kern Professorship in Communication

Established: 1971

Donor: Rochester Telephone Corporation

Purpose: To commemorate the 100th anniversary of that company and to provide a memorial for a former president of the company and a man who served as an RIT trustee from 1959 to 1964

Held by: Michael Prosser

DIVISION 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 interdisciplinary teams of faculty and industry experts to address issues that face small and medium-sized manufacturing companies seeking growth

Held by: Balwant Karlekar

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Professor

Daniel A. Joseph, BS, Niagara University; MBA, SUNY Buffalo; MA, SUNY at Albany; Ph.D.,
SUNY at Buffalo--Associate Professor

INTERNATIONAL PROGRAM

Riad A. Ajami, BS, Western Michigan University; MBA, Portland State University; Ph.D.,
Pennsylvania State University--Professor

Marca Bear, BS, MS, Ph.D., Ohio State University--Assistant Professor

Ramesh Gehani, BS, MS, Indian Institute of Technology; MBA, International Management
Institute; Ph.D., Tokyo Institute of Technology-- Assistant Professor

Ashok J. Robin, Ph.D., M.B.A., SUNY Buffalo--Assistant Professor

MANAGEMENT PROGRAM

Robert J. Barbato, BA, LeMoyne College; Ph.D., Michigan State University--Associate Professor

Janet C. Barnard, BS, Nazareth College; Ed.D., University of Rochester--Associate Professor

Gary J. Bonvillian, BS, MS, Rochester Institute of Technology; Ph.D., University of Buffalo--Assistant Professor

Andrew J. DuBrin, AB, Hunter College; MS, Purdue University; Ph.D., Michigan State University - Professor

Ramesh Gehani, BS, MS, Indian Institute of Technology; MBA, International Management Institute; Ph.D., Tokyo Institute of Technology--Assistant Professor

Walter E. McCanna, BS, Marquette University; Ph.D., University of Wisconsin--Professor

Donald O. Wilson, BS, Oklahoma State University; MS, MPA, University of Southern California; Ph.D., University of California at Irvine--Assistant Professor

MARKETING PROGRAM

Eugene H. Fram, BS, ML, University of Pittsburgh; Ed.D., SUNY Buffalo--Professor

Patricia Sorce, BA, Kent State University; MS, Ph.D., University of Massachusetts--Associate Professor

Philip R. Tyler, BS, Rochester Institute of Technology; MBA, DBA, Michigan State University--Associate Professor

Stanley M. Widrick, BS, Clarkson College; MBA, SUNY Buffalo; Ph.D., Syracuse University--Associate Professor

Julian E. Yudelson, BS, University of Pennsylvania; MBA, Emory University; Ph.D., Northwestern University--Associate Professor

QUALITY ASSURANCE PROGRAM

Kathleen Fraser, Ph.D. in progress, Syracuse University, M.B.A. SUNY Albany--Assistant Professor

Bernard J. Isselhardt, BA, MS, Southern Illinois University; Ph.D., University of Iowa--Assistant Professor

George A. Johnson, BS, University of Rochester; MBA, DBA, Indiana University--Professor

A. Erhan Mergen, BS, Middle East Technical University, Turkey; MS, Ph.D., Union College--Associate Professor

Thomas F. Pray, BS, MS, Clarkson College; Ph.D., Rensselaer Polytechnic Institute--Professor

William J. Stevenson, BIE, MBA, Ph.D., Syracuse University--Associate Professor

Thomas A. Williams, BS, Clarkson University; MS, Ph.D., Rensselaer Polytechnic Institute--Professor

SPECIAL APPOINTMENTS

Edward C. McIrvine, BS, University of Minnesota; Ph.D., Cornell University--Professor

M. Richard Rose, BS, Slippery Rock; MS, Westminster College; Ph.D., University of Pittsburgh--Professor

ADJUNCT FACULTY **ACCOUNTING**

ROCHESTER INSTITUTE OF TECHNOLOGY

Paul Lebowitz, MS, Rochester Institute of Technology

Thomas W. Petrillo, BA, University of Buffalo; LLB/JD, University of Buffalo Law School

FINANCE

Linda C. Gardner, BA, University of Rochester; MBA, Rochester Institute of Technology

John W. Piccione, BS, MBA, Rochester Institute of Technology

MANAGEMENT

Brian C. Arnold, BA, Heidelberg College; MS, Ph.D., Colorado State University

Paul Bernstein, Ph.D., University of Pennsylvania; Ed.M., Temple University

Milton L. Cofield, BS, Southern University; MS, Ph.D., University of Illinois; MBA, Wharton School, University of Pennsylvania

Robert F. Pearse, BS, Olivet College; AM, Ph.D., University of Chicago

MARKETING

Frances Penn Dearing, BS, Northwestern University; MBA, J.L. Kellogg Graduate School of Management, Northwestern University

Joyce F. Noon, BA, MBA, University of Miami

Jenny C. Servo, BM, Eastman School of Music; BS, University of Rochester; MA, University of Kansas; MA, Ph.D., University of Rochester

Dean C. Siewers, BS, Marietta College; MBA, Duke University, Ph.D.; University of North Carolina

INFORMATION SYSTEMS

Lisa Marie Applebee, BS, West Virginia University; MBA, University of Rochester

Joseph Measer, BS, MBA, Rochester Institute of Technology

Philip M. Sherman, BS, Cornell University; MS, Ph.D., Yale University

QUALITY ASSURANCE

Eric E. Fredericksen, BA, Hobart College; MBA, University of Rochester

Michael L. Haravitch, BS, MBA, Rochester Institute of Technology

Martin D. Kosten, BBA, MBA, University of Michigan

Charles E. Koster Jr., BS, MBA, Rochester Institute of Technology

Elliot W. Lamb, BS, Union College

Salvatore Lanzafame, BS, LeMoyne College

Michael J. May, BS, MBA, SUNYBuffalo

J. Wixson Smith, BS, SUNYGeneseo; MS, Rochester Institute of Technology

Robert E. Steinle, BA, Boston College

Thomas E. Traub, BS, Clarkson University

ROCHESTER INSTITUTE OF TECHNOLOGY

Alan J. Wall, BS, Michigan State University

Paul Zinger, BS, University of Dayton; MBA, Rochester Institute of Technology

COLLEGE OF CONTINUING EDUCATION

Lawrence W. Belle, BA, MA, CaseWestern Reserve; Ph.D., University of Rochester--Dean; Professor

Lynda Rummel, BS, Oregon State; MA, SUNY Geneseo; Ph.D., Buffalo--Associate Dean; Director, Academic Division; Professor

Christine Hammer, BS, MS, SUNY Brockport--Assistant to the Dean

Alice McCrave--Coordinator, Information Services

Bobette Warner, AAS, Rochester Institute of Technology-- Manager, Academic Services

Bette Anne Winston, BS, SUNY Buffalo; MS, Rochester Institute of Technology--Manager, Academic Advising

Joanne Mahan, BS, SUNY Brockport --Administrative Assistant to the Dean

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SCHOOL OF PROFESSIONAL STUDIES

John Morelli, BS, Syracuse University; MS; SUNY College of Environmental Science and Forestry--Chairperson, Environmental Management; Visiting Assistant Professor

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Clinton J. Wallington, Ph.D., University of Southern California--Professor; Director

PRECOLLEGIATE PROGRAMS

James Papero, BS, Ed.M., University of Rochester--Director

UNIVERSITY PROGRAM

Nannett Haynes, BA, University of Rochester, MS, Rochester Institute of Technology--Coordinator

TRAINING & PROFESSIONAL DEVELOPMENT

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Eileen Benedict, AAS, Garfield Business Institute--Assistant to Executive Director

Mary Lou Carlson--Program Director, The Athenaeum

Carolyn Turner, BS, Western Liberty--Staff Assistant, The Athenaeum

TECHNICAL & EDUCATION CENTER OF THE GRAPHIC ARTS

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Mark DuPre, BA, College of the Holy Cross; MFA, Columbia University--Senior Program Director

David Tontarski, BFA, Rochester Institute of Technology--Senior Program Director

Lisa Ford, BS, Rochester Institute of Technology--Program Director

John Compton, MS, Rochester Institute of Technology--Director, Lab for Quality and Productivity in the Graphic Arts; Professor

Chernee Frood, BS, Rochester Institute of Technology--Program Assistant

Valeria Hill--BS, Nazareth College--Program Assistant

David Sell, BA, Rochester Institute of Technology--Program Assistant

Nancy Synesael--Secretary to Director

Mary Carol Maloney--Program Assistant

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David Cohn, BS, Rochester Institute of Technology--Senior Technologist

Chester Daniels, AAS, BS, MS, Rochester Institute of Technology--Senior Technologist

Daniel Clark--Manager, Web & Sheetfed Operations

Jim Clarke, AAS, Rochester Institute of Technology--Sheetfed Technician

Ruben Soto--Web Offset Technician

Barbara Giordano, BS, Rochester Institute of Technology--Operations Manager

Dick Gillespie--Web Offset Technologist

Kristine Greenizen, BFA, SUNY Potsdam--Image Assembly Technologist

William Garno, BS, Rochester Institute of Technology--Program Director

James Monteleone, BS, Rochester Institute of Technology--Web Offset Technologist

PROFESSIONAL DEVELOPMENT PROGRAMS

Barbara Cutrona, AAS, Erie Community College; BS, MS, Rochester Institute of Technology--Director

Judd Prozeller, BS, MBA, Rochester Institute of Technology; M.Ed., Nazareth College--Quality Specialist

Kitren VanStrander, BA, SUNY Potsdam; MS, Rochester Institute of Technology--Quality Specialist

Richard Thomas, AAS, Rochester Institute of Technology--Senior Program Director

Marianne Yarzinsky, BS, Empire State; MS, Rochester Institute of Technology--Senior Program Director

Lynn Prytula, AAS, Monroe Community College--Program Director

Dusty Swanger, BA, SUNY Fredonia; MFA, SUNY Brockport--Program Director

Angie Spano--Program Assistant

Nancy McEntee, BS, Southern Illinois University--Program Assistant

Nancy Siebert, BS, Purdue University--Program Assistant

IBM Site

Mohammed Serdah, BS, SUNY Buffalo--Senior Program Director

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Freyda Schneider, BS, Syracuse University--Marketing Coordinator

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Roy Pierce, Grad Certificate, Cornell University; MS, SUNY Brockport; AAS, BS, Regents College--Director

Betsy Saxe, AAS, BS, Rochester Institute of Technology--Staff Accountant

Tammy Gathers--Financial Assistant

Linda Kanaley--Financial Assistant

Terry Salerno--Coordinator, Facilities and Arrangements

Nancy Wixom--Program Assistant

Maria Foshier--Facilities Assistant

COLLEGE OF ENGINEERING

Paul E. Petersen, BS,MS, Ph.D.-Dean; Professor

Richard Reeve, BS, MS, Ph.D.-Associate Dean, Professor

Edward G. Schilling, BA, MBA, MS, Ph.D.--Director, Center for Quality and Applied Statistics

Jasper E. Shealy, BS, MS, Ph.D.--Department Head, Industrial & Manufacturing Engineering; Professor

Charles W. Haines, AB, MS, Ph.D.-Department Head, Mechanical Engineering; Professor

Raman M. Unnikrishnan, BS, MSEE, Ph.D.--Department Head, Electrical Engineering; Professor

Roy S. Czernikowski, BEE, ME, Ph.D.--Department Head, Computer Engineering; Professor

Lynn F. Fuller, BS, MS, Ph.D.-Department Head, Microelectronic Engineering; Professor

Margaret M. Urckfitz, BS-Assistant Dean for Student Services

Susan A. Hickey--Assistant to the Dean

COMPUTER ENGINEERING DEPARTMENT

George A. Brown, BS, Vanderbilt; MS, University of Rochester--Professor

Tony Chang, BS, Jiao Tong University, Shanghai; Ph.D., Chinese Academy of Science, Peking-Professor

Kenneth W. Hsu, BS, National Taiwan Normal University; MS, Ph.D., Marquette University; PE-Associate Professor

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ELECTRICAL ENGINEERING DEPARTMENT

J. Morris Chang, BS, Tatung Institute of Technology; MS, Ph.D., North Carolina State University--Visiting Assistant Professor

Joseph DeLorenzo, BS, Alabama; MS, Polytechnic Institute of Brooklyn; Ph.D., Boston University--Associate Professor

Soheil A. Dianat, BS, Aria-Mehr University, Iran; MS, Ph.D., George Washington University Associate Professor

Roger E. Heintz, BS, Michigan Technological University; MS, Ph.D., Syracuse University--Professor

Mark A. Hopkins, BS, Southern Illinois University; MS, Ph.D., Virginia Polytechnic Institute and State University--Assistant Professor

Guifang Li, BS, Tianjin University; MS, Ph.D., University of Wisconsin--Assistant Professor; Gleason Professor of Photonics

Swaminathan Madhu, MA, University of Madras; MS, University of Tennessee; Ph.D., University of Washington--Professor

Athimoottil V. Mathew , BEE, Jadavpur University, India; M. Tech., Indian Institute of Technology; Ph.D. Queens University, Canada--Professor

Steven McLaughlin, BS, Northwestern University; MS, Princeton University; Ph.D., University of Michigan-- Assistant Professor

Norman A. Miller , BS, London University, England--Lecturer

P. R. Mukund, BS, MS, Ph.D., University of Tennessee--Assistant Professor

James E. Palmer , BS, University of Western Ontario; MS, University of Pennsylvania; Ph.D., Case Institute of Technology--Professor

David Perlman , BS, MS, Cornell University--Associate Professor

Mysore R. Raghuveer , BS, Mysore University, India; ME, Indian Institute of Science, Bangalore, India; Ph.D., University of Connecticut--Associate Professor

Sannasi Ramanan , BS, BE, M.Tech, Ph.D., Indian Institute of Technology, India--Assistant Professor

V. C. V. Pratapa Reddy , BE, M.Tech., Osmania University, India; Ph.D., Indian Institute of Technology, Madras--Associate Professor

Harvey Rhody, BS, University of Wisconsin; MS, University of Cincinnati; Ph.D., Syracuse University--Professor

Edward R. Salem , BS, Pennsylvania State; MS, Catholic University of America; Ph.D., Buffalo--Professor

Robert Spina , BS, Western Michigan University; MS, Rochester Institute of Technology--Assistant Professor

David A. Sumberg , BA, Utica College of Syracuse University; MS, Ph.D., Michigan State University--Associate Professor

Fung-I Tseng , BS, Taiwan University; MS Chiao-Tung University, Taiwan; Ph.D., Syracuse University--Professor

I. Renan Turkman , Diplome D'Ingenieur (MS); Docteur-Ingenieur, Institut Nationale des Sciences Appliques, Toulouse, France--Associate Professor

Jayanti Venkataraman , BS, MS, Bangalore University; Ph.D., Indian Institute of Science, Bangalore, India--Associate Professor

Industrial and Manufacturing Engineering Department

Madhu R. Nair , BS, Rochester Institute of Technology; MS, Lehigh University--Visiting Instructor

Nabil Nasr, BS, Helwan University, Egypt; MS, Rutgers University; M. Eng., Pennsylvania State University; Ph.D., Rutgers University--Assistant Professor

Sudhakar R. Paidy , BS, Osmania University, India; MS, Ph.D., Kansas State University--Professor

Paul H. Stiebitz , BS, ME, Rochester Institute of Technology--Assistant Professor

ROCHESTER INSTITUTE OF TECHNOLOGY

Brian K. Thorn, BS, Rochester Institute of Technology; MS, Ph.D., Georgia Institute of Technology-Assistant Professor

Paul H. Wojciechowski, BS, MS, Ph.D., University of Rochester-Associate Professor

MECHANICAL ENGINEERING DEPARTMENT

Nir Berzak, BS, MS., Technion Israel Institute of Technology; Ph.D., Columbia University-Associate Professor

Richard G. Budynas, BME, Union College; MS, University of Rochester; Ph.D., University of Massachusetts; P.E.--Professor

Robert A. Ellson, BME, City College of New York; MS, Ph.D., University of Rochester, P.E.--Professor

Jon Freckleton, BS, University of Rochester; MS, Nazareth College; P.E.--Assistant Professor

Hany A. Ghoneim, BS, MS, Cairo University, Egypt; Ph.D., Rutgers University-Associate Professor

Amitabha Ghosh, B.Tech, M.Tech., Indian Institute of Technology, India; Ph.D., Mississippi State University-- Associate Professor

Surendra K. Gupta, B.Tech., Indian Institute of Technology, India; MS, University of Notre Dame; Ph.D., University of Rochester-Associate Professor

Robert J. Hefner, BS, MS, Ph.D., Georgia Institute of Technology-Associate Professor

Richard B. Hetnarski, MS, Gdansk Technical University; MS, Warsaw University; Dr. Tech.Sci., Polish Academy of Sciences; P.E.--James E. Gleason Professor

Satish Kandlikar, BE, Marathwada University, India; M.Tech., Ph.D. Indian Institute of Technology-Professor

Bhalchandra V. Karlekar, BE, MS, University of Baroda, India; MS, Ph.D., University of Illinois; P.E.-- Professor

Mark Kempfski, BS, Purdue University; MS, Ph.D., SUNY Buffalo-Associate Professor

Shirish Mulay, BS, MS, Indian Institute of Technology; Ph.D., Illinois Institute of Technology-Visiting Assistant Professor

Chris Nilsen, BS, Rochester Institute of Technology; MS, Worcester Polytechnic Institute; Ph.D., Michigan State; P.E.--Professor

Alan H. Nye, BS, MS, Clarkson College; Ph.D., University of Rochester-Professor

Ali Ogut, B.Ch.E., Hacettepe University, Turkey; MS, Ph.D., University of Maryland--Associate Professor

Marietta R. Scanlon, BS, Tufts University; SM, Massachusetts Institute of Technology; Ph.D., Johns Hopkins University--Assistant Professor

Frank Sciremammano, Jr., BS, MS, Ph.D., University of Rochester-Associate Professor

Robert L. Snyder, BS, Rochester Institute of Technology; Ph.D., Iowa State; P.E.--Professor

David G. Tomer, BS, ME, Pennsylvania State University-- Senior Lecturer

ROCHESTER INSTITUTE OF TECHNOLOGY

Joseph S. Torok, BS, University of Akron; MS, Ph.D., Ohio State University--Associate Professor

Panchapakesan Venkataraman, B.Tech., Indian Institute of Technology; MS, Ph.D., Rice University--Assistant Professor

Wayne W. Walter, BE, State University of New York Maritime College; MS, Clarkson College; Ph.D., Rensselaer Polytechnic Institute; P.E.--Professor

MICROELECTRONIC ENGINEERING DEPARTMENT

Karl D. Hirschmann, BS, MS, Rochester Institute of Technology--Visiting Assistant Professor

Michael A. Jackson, BS, MS, Ph.D., SUNY Buffalo--Assistant Professor

Santosh K. Kurinec, BS, MS, Ph.D., University of Delhi, India--Associate Professor

Richard L. Lane, BS, Ph.D., Alfred University--Analog Devices Professor

Robert E. Pearson--BS, MS, Rochester Institute of Technology--Assistant Professor

James F. Scanlon, BS, University of Rhode Island; MS, Northeastern University; Ph.D., Johns Hopkins University--Visiting Assistant Professor

Bruce W. Smith, BS, MS, Rochester Institute of Technology--Visiting Assistant Professor

I. Renan Turkman, Diplome d'Ingenieur (MS); Docteur-Ingenieur, Institut Nationale des Sciences Appliques, Toulouse, France--Associate Professor

THE JOHN D. HROMI CENTER FOR QUALITY AND APPLIED STATISTICS

Donald D. Baker, BA, Trinity College; M.Ed., MBA, Ed.D., University of Rochester--Professor

Anne M. Barker, BA, Nazareth College; MS, Rochester Institute of Technology--Assistant Professor

Thomas B. Barker, BS, MS, Rochester Institute of Technology-- Associate Professor

John T. Burr, Ph.D., Purdue University--Assistant Professor

John D. Hromi, BS, CarnegieMellon University; BEE, Clemson University; M. Litt., University of Pittsburgh; D. Engr., University of Detroit--Professor Emeritus

Daniel R. Lawrence, BA, BS, University of Akron; MA, Ball State University; MS, Rochester Institute of Technology; Ph.D., University of Toronto--Assistant Professor

Patrick J S. McNenny, BS, U.S. Naval Academy; MS, Rochester Institute of Technology--Manager, Academic Programs

Joseph G. Voelkel, BS, Rensselaer Polytechnic Institute; MS, Northwestern University; Ph.D., University of Wisconsin-Madison-- Associate Professor

Mason E. Wescott, BS, Ph.D., Northwestern--Professor Emeritus, Statistics

Hubert D. Wood, BS, George Washington University; MS, University of Rochester--Assistant Professor

ADJUNCT FACULTY

COLLEGE OF ENGINEERING

Hermann J. Stadtfeld

BS, Technical College in Offenburg, Germany; MS, Ph.D., University of Technology of North-Rhine, Germany

ELECTRICAL ENGINEERING

James Moon

Ph.D., University of California-Berkeley

MICROELECTRONIC ENGINEERING

Katherine Hesler

BS, Clarkson University; MS, University of Vermont

MECHANICAL ENGINEERING

Risa Robinson

BS, MS, Rochester Institute of Technology

COLLEGE OF IMAGING ARTS AND SCIENCES

Margaret O. Lucas, BS Hampton University; MA, Virginia Commonwealth University; D.Ed., Pennsylvania State University--Dean

Carole A. Sack, BA, University of Michigan; Ph.D., Michigan State University--Associate Dean

O. Terry Bruce, Director of Operations

Susan Chan, BS, Rochester Institute of Technology--Academic Coordinator

Susan Clark--Academic Coordinator

Katherine Gorman--Administrative Assistant

Marie Hanes--Academic Coordinator

Dawn House, BS, MS, Rochester Institute of Technology--Academic Coordinator

CENTER FOR IMAGING SCIENCE

Edwin Przybylowicz, BS, University of Michigan; Ph.D., Massachusetts Institute of Technology--Director

Gaylene Mitchell, BS, Southwestern Oklahoma University; MBA, Rochester Institute of Technology-- Operations Manager

Jonathan S. Arney, BS, Wake Forest University; Ph.D., University of North Carolina--Associate Professor

Roy S. Berns, BS, MS, University of California; Ph.D., Rensselaer Polytechnic Institute--Hunter Professor; Director of the Munsell Color Science Laboratory

Arthur E. Burgess, BS in Medical Imaging; Royal Military College of Canada; Ph.D., University of British Columbia--Professor

Edward Dougherty, BS, Fairleigh Dickinson University; MS, Stevens Institute of Technology; Ph.D., Rutgers University--Professor

Roger L. Easton, Jr., BS, Haverford College; MS, University of Maryland; Ph.D., University of Arizona--Assistant Professor

Mark D. Fairchild, BS, MS, Rochester Institute of Technology; Ph.D., University of Rochester--Assistant Professor

Richard Hailstone, BS, Northern Illinois University; MS, Indiana University--Associate Professor

ROCHESTER INSTITUTE OF TECHNOLOGY

Joseph Hornak, BS, Utica College; MS, Purdue University; Ph.D., University of Notre Dame--Associate Professor

Dana Marsh, BS, California State University; ME, Rochester Institute of Technology; Ph.D., University of California/Riverside--Associate Professor

Pantazis Mouroulis, B.Sc., University of Athens; Ph.D., University of Reading--Assistant Professor

Zoran Ninkov, BS, University of Western Australia; M.Sc., Monash University; Ph.D., University of British Columbia--Assistant Professor

Jeff Pelz, BFA, MS, Rochester Institute of Technology--Instructor

Navalgund Rao, BS, MS, BHU India; Ph.D., University of Minnesota--Assistant Professor

Harvey Rhody, BSEE, Wisconsin; MSEE, Cincinnati; Ph.D., Syracuse University--Professor

John Schott, BS, Canisius College; MS, Ph.D., Syracuse University--Professor

Mehdi Vaez-Iravani, Ph.D., University College of London--Assistant Professor

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Robert Daly, Ph.D., University of Arizona

Merle Hirsh, Ph.D., Johns Hopkins University

Robert Rolleston, Ph.D., University of Rochester

Carl Salvaggio, BS, MS, Rochester Institute of Technology

SCHOOL OF ART AND DESIGN

Steve Loar, BS, Murray State University; MA, Northern Illinois University--Interim Director; Associate Professor

Judy Battaglia, BFA, MFA, Rochester Institute of Technology--Lecturer

Mary Ann Begland, BS, Ohio State University; MFA, Kent State University--Associate Professor

Kener E. Bond, Jr., B.Ed., SUNY-Buffalo; MFA, Rochester Institute of Technology--Professor

Philip W. Bornarth, BAE, MAE, Art Institute of Chicago--Professor

Nancy A. Chwiecko, BA, St. Lawrence University; MFA, Rochester Institute of Technology--Assistant Professor

Nancy A. Ciolek, BFA, Indiana State University; MFA, Indiana State University--Associate Professor

Douglas Cleminshaw, BSME, Case Institute of Technology--Associate Professor

Bob Cole, BA, MS, University of Maryland--Professor

David Dickinson, Chelsea School of Art, London, England; SKHS, Oslo, Norway; MFA, Rochester Institute of Technology--Professor

ROCHESTER INSTITUTE OF TECHNOLOGY

Robert L. Dorsey, BFA, Rochester Institute of Technology; MFA, Syracuse University--Visiting Assistant Professor

Ronald Feinen--Lecturer

Elizabeth A. Fomin, BS, Syracuse University--Lecturer

Peter Giopulos, BFA, Syracuse University; M.Ed., Ph.D. Pennsylvania State University--Professor

Robert Heischman, BFA, Miami University; UCFA, Ruskin School of Art--Professor; Interim Associate Director

Frederick Hellenberg, BFA, University of Buffalo--Lecturer

Joyce Hertzson, BFA, Rhode Island School of Design; MFA, Indiana University--Associate Professor; Interim Chair of Foundation

Glen Hintz, BA, Lafayette College; MS, The Medical College of Georgia--Chair, Fine Arts; Assistant Professor

Barbara Hodik, BS Ed., Benedictine College; MA, New York University; Ph.D., Pennsylvania State--Professor

Robert M. Kahute, BID, BFA, Syracuse University; MFA, Rochester Institute of Technology--Professor

Robert P. Keough, BFA, Rochester Institute of Technology; MFA, Rochester Institute of Technology--Interim Chair, Graphic Design; Professor

Robert Kerr, BFA, University of Illinois; MFA, Rochester Institute of Technology--Professor

Heinz Klinkon, BFA, MFA, Rochester Institute of Technology--Associate Professor

Charles F. Lewis, B. Arch., Pratt Institute--Associate Professor

Thomas Lightfoot, BA, BFA, University of Connecticut; MFA, Instituto Allende, San Miguel de Allende, Gto., Mexico; MA Ed. Art, Ed.D. Art, Columbia University, Teachers College--Assistant Professor

Frederick Lipp, BAE, School of the Art Institute of Chicago; MFA, Rochester Institute of Technology--Professor

Douglas Manchee, BA, MA, San Francisco State University--Lecturer

Craig J. McArt, BID, Syracuse University; MFA, Rochester Institute of Technology--Professor

Edward C. Miller, BFA, SUNY at Buffalo; MFA, Illinois State--Professor

Robert C. Morgan, BA, University of Redlands; Ed.M., Northeastern University; MFA, University of Massachusetts; Ph.D., New York University--Professor

Gabrielle Peters, BFA, SUNY at Geneseo; MA, University of Toronto, Canada--Lecturer

R. Roger Remington, BFA, Rochester Institute of Technology; MS, University of Wisconsin--Professor

Karen Sardisco, BS, SUNY College at Buffalo; MFA, Rochester Institute of Technology--Lecturer

Luvon Sheppard, BFA, MST, Rochester Institute of Technology--Professor

James H. Sias, BFA, MA, Michigan State University--Professor

Alan Singer, BFA, Cooper Union; MFA, Cornell University--Assistant Professor

Bruce Sodervick, BS, Rhode Island School of Design; MFA, Indiana University--Professor

Joanne Szabla, BFA, Madonna College; MA, Catholic University of America; Ph.D., Walden University-- Professor

James E. Thomas, BS, Philadelphia College of Art; MFA, Pennsylvania State University--Professor

Karen Martin Tomaselli, BFA, Cleveland Institute of Art; MFA, Syracuse University--Lecturer

Toby Thompson, BID, Syracuse University; MFA, Rochester Institute of Technology--Professor; Chairman of Industrial Design, Interior Design and Packaging Design

Kathryn Vajda, BFA, Cleveland Institute of Art; MFA, Indiana University--Lecturer

Robert H. VanValkinburgh, BID, Syracuse University; MFA, Rochester Institute of Technology--Lecturer

James Ver Hague, BS, Massachusetts Institute of Technology; MS, Rensselaer Polytechnic Institute; BA, MFA, SUNY at Buffalo--Professor

Robert Wabnitz, Diploma, Rochester Institute of Technology; Certificate, University of Rochester--Professor

Joseph A. Watson, BFA, University of Georgia; MFA, Yale University--Professor

Bruce Wenger, BS, Western Michigan University; MFA, Ohio University--Lecturer

Lawrence Williams, BFA, Kansas City Art Institute; MFA, University of Illinois--Professor

Norman Williams, BFA, MS, Syracuse University--Professor

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Donald G. Bujnowski, BS, SUNY at Buffalo; MA, University of Minnesota--Professor

Wendell Castle, BFA, MFA, University of Kansas--Professor; Artist-in-Residence, Chair in Contemporary Crafts

Richard A. Hirsch, BS, SUNY at New Paltz; MFA, Rochester Institute of Technology--Associate Professor

William A. Keyser, Jr., BS, Carnegie-Mellon Institute of Technology; MFA, Rochester Institute of Technology--Professor

Max L. Lenderman, BS, MS, Indiana State; MFA, University of Kansas--Professor

Albert Paley, BFA, MFA, Tyler School of Art, Temple University--Professor; Artist-in-Residence, The Charlotte Fredericks Mowris Professor in Contemporary Craft; Ph.D. (honorary), University of Rochester

ROCHESTER INSTITUTE OF TECHNOLOGY

Robert D. Schmitz, BS, East Carolina University; MS, Alfred University; MFA, Wisconsin--Professor

Douglas E. Sigler, BFA, MFA, Rochester Institute of Technology--Professor

Mark Stanitz, BFA, MA, Kent State University--Associate Professor

Richard Tannen, BS, Cornell University; Certificate of Mastery in Woodworking and Furniture Design, Boston University--Assistant Professor

Michael Taylor, BS, Middle Tennessee State University; MA, MFA, East Tennessee State University--Professor

Leonard A. Urso, BFA, MFA, SUNY at New Paltz--Associate Professor

Michael White, BFA, MFA, Rochester Institute of Technology--Assistant Professor; Chair of American Crafts

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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 302 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 achieved 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 offering the course. Audited courses may not be used to fulfill degree requirements, although the course and an audit grade 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 Placement, 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 submitting paperwork to add or remove 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 submit a drop/add form for a course, you may receive a failing grade for a course you have stopped attending, or not receive credit for a course you have begun attending

Dual degree program--A program combining the course curricula from a bachelor's degree program and a master's degree program. This produces a streamlined curriculum that allows selected students to earn both a bachelor's and master's degree at the same time.

Evening program--An academic program specifically designed for students who attend college part time. The RIT Budget Committee has approved specific evening programs as eligible for 'evening division' tuition rates.

Full-time student--A student registered for at least 12 quarter credit hours of course work per quarter (excluding audits and credits by exam or experience) or registered for a cooperative education work block during the quarter.

Good standing--A student eligible to enroll in courses (not suspended) as verified by the Office of the Registrar. Certain financial aid programs have specific 'standards of progress' by which students are determined to be in 'good standing' and therefore eligible for aid. See page 329

Half-time student--A student registered for 6 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--A 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 page 320 for specifics) or deny them access to RIT facilities. For more information, contact the RIT Student Health Service.

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 insures that RIT faculty have sufficient opportunity to evaluate your academic abilities

Summer orientation programs--Two- to three-day events scheduled during June and July for students (and their parents) who will enter RIT during the upcoming academic year. 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 302). 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 vice president for Student Affairs (Judicial Affairs).

Upper-division course--A course usually taken during the last two to three years of study (400- to 600-level courses).

Withdrawal from a course--Removal of a student from the official enrollment list of a class for a given quarter *after* the six-day drop/add deadline. You may withdraw from a course at any time through the eighth week of the quarter (time frames are adjusted for sessions of fewer than 10 weeks). After the end of the eighth 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 grade of 'W' and you are still responsible for paying all or part of the course tuition.

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Notes on the Catalog Conversion Process

This catalog is being viewed in the Adobe Acrobat Reader using Portable Document Format (PDF), but was originally prepared for use with a different multi-media viewer.

It was converted from computer files supplied by the school, or the printed catalog was scanned and converted using an OCR (Optical Character Recognition) process. In either case, the catalog's original page formatting was stripped and all photographs and graphics were removed to conserve disk space. The catalog was then reformatted to fit the viewer parameters.

Because of this, the page numbers in the original Table Of Contents and Index were no longer valid and these sections were deleted to avoid confusion. A new, hyperlinked table of contents was then created.

Future editions of this catalog will be converted with a process that better retains page formatting and the original table of contents and index will be hyperlinked.