1978

1978-1979 Graduate Bulletin

Rochester Institute of Technology

RIT Official Bulletin • Rochester Institute of Technology • 78/79

GRADUATE STUDY

Rochester Institute of Technology Calendar 1978*79

	Graduate & Undergraduate Registration	No Classes	Non-Matriculated Student Registration	Classes Begin Day Colleges	Exam Week	Last Day of Quarter
Fall Quarter, 1978	Sept. 8, 9	Nov. 22- Dec. 3	Sept. 11	Sept. 11	Nov. 17, 18, 20, 21	Nov. 21
Winter Quarter, 1979	Dec. 4	Dec. 23- Jan. 7 Feb. 6 March 4-11	Dec. 5	Dec. 5	Feb. 27, 28 March 1, 2	March 3
Spring Quarter, 1979	March 12	May 27 June 3	March 13	March 13	May 22-25	May 26

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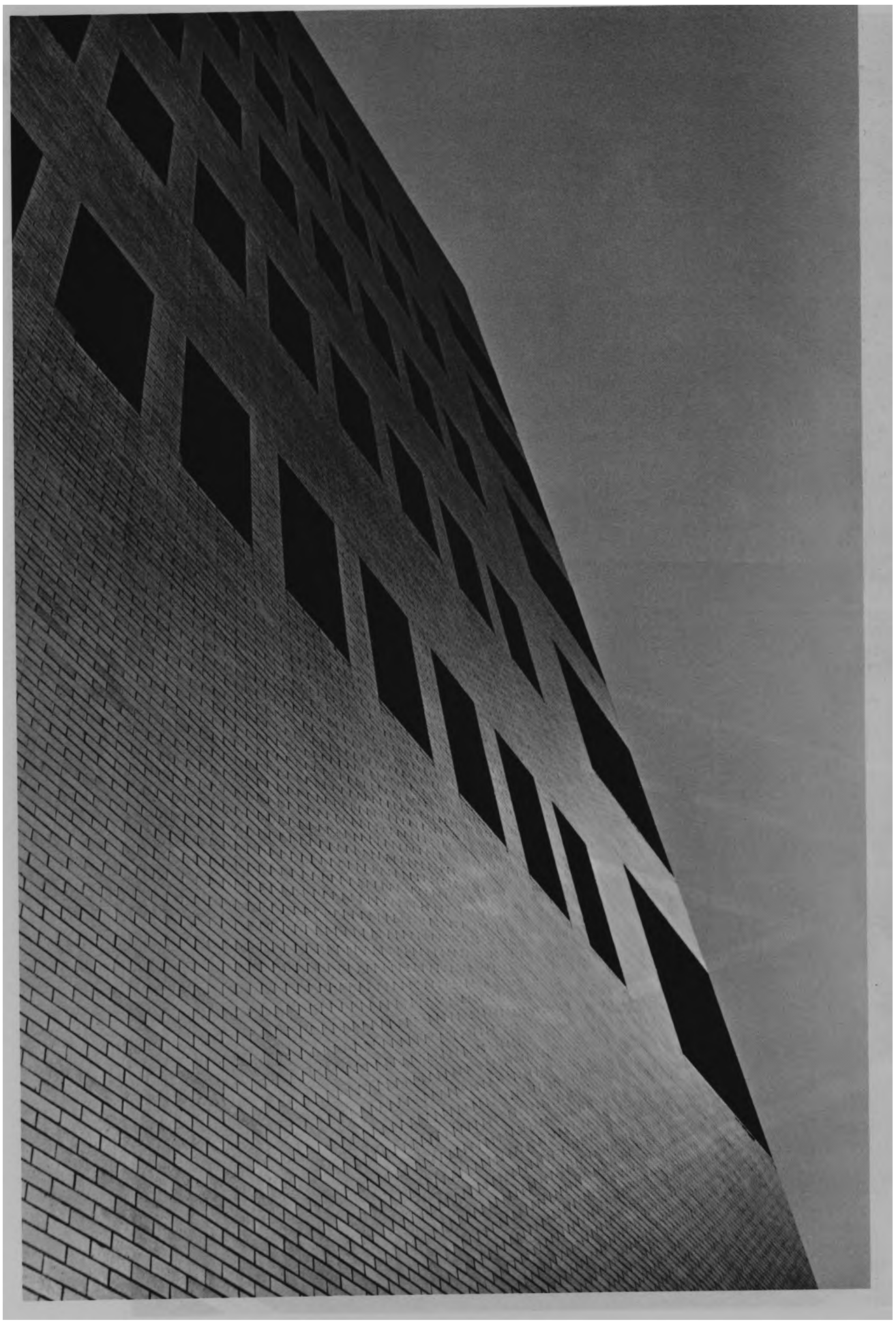

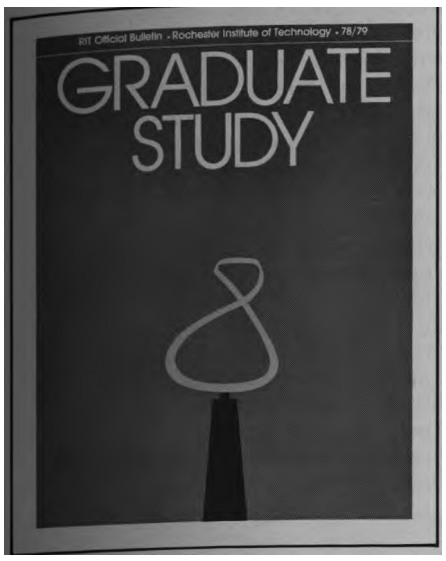

The cover
The cover depicts Jose de Rivera's stainless steel sculpture which is located on the quadrangle between the Wallace Memorial Library, the College of General Studies and the College of Engineering. His abstract form is based on the Mobius strip discovered by 19th century German mathematician August Ferdinand Mobius. The strip consists of a band that has been given a half twist before joining the ends together. The result is a look of one continuous edge and one plane.

About this bulletin—
This Graduate 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 the Graduate Bulletin was published. Course and curriculum changes, modifications of tuition, fee, dormitory, meal and other charges, plus unforeseen changes in other aspects of RIT life sometimes occur after the Graduate 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 contractural obligation with its students for the contents of this Graduate Bulletin.

Graduate Study 1978-79
Produced by RIT
Communications and the Graduate Council

Write or phone:

ochester Institute of Technology
Admission Office
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Rochester NY 14623
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RIT Official Bulletin

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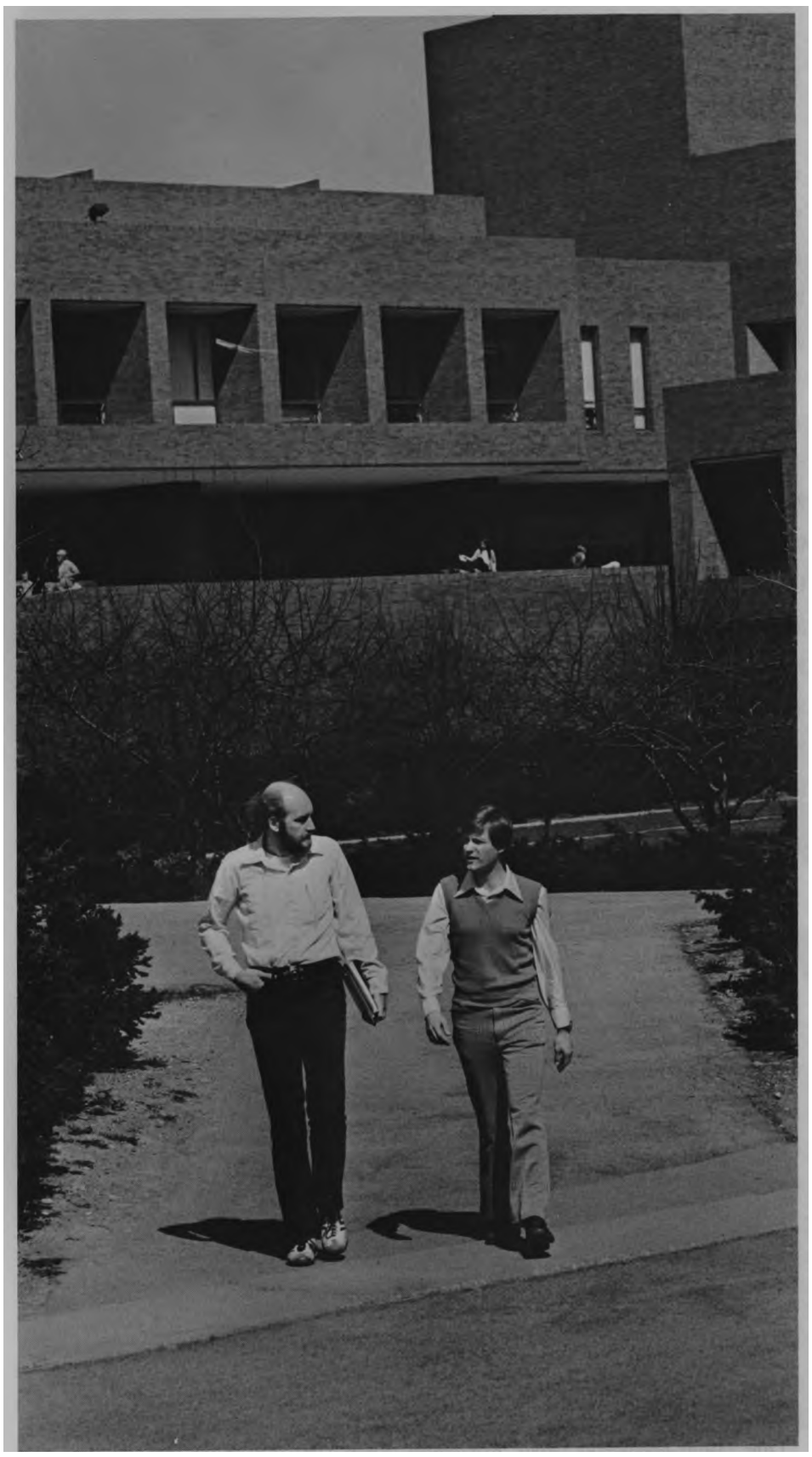
Graduate Education at RIT



About 17 years ago, Rochester Institute of Technology expanded its educational responsibilities to include graduate curricula. Encouragement from a variety of professional sources plus student demand caused the Institute to produce programs in the arts and crafts leading to the master of fine arts degree. Shortly thereafter, RIT appointed a graduate council and petitioned for a charter to change to give the Institute authority to grant the master of science degree. The function of the Council on Graduate Studies was “to define the essential character of a graduate study at the Institute, to establish policies and procedures for the administration of graduate study, and to provide for a continuous coordination in review of graduate programs.”

By 1963 student interest and industrial and business requirements caused the College of Science to develop a master's program in chemistry. This program was designed to provide opportunities for significant research, additional acquisition of knowledge in appropriate areas of chemistry, and study in allied areas such as physics and mathematics.

Within a year, the Institute received requests from the armed forces and many industrial employers for a graduate program in photographic science. The new curriculum, in contrast to offerings at European universities, was concerned principally with the application of photography to problems of science and engineering.

By 1965 national and local surveys suggested another area of responsibility that RIT might undertake. Considerable need was indicated for sophisticated statisticians, particularly individuals who could undertake the complex task of collecting, analyzing, and interpreting data necessary for industrial planning. Accordingly, the College of Continuing Education created a Department of Statistics and began to offer work leading to a master of science degree in applied and mathematical statistics.

Soon thereafter the College of Engineering entered the field of graduate education through new programs in electrical and mechanical engineering. These curricula were designed to meet the needs of the academically capable engineers in industry who wished to continue studies in a graduate degree program. The graduate curricula in engineering provided

students with meaningful opportunities to associate with those who were engaged in the daily application of scientific engineering, and management knowledge in business and industry.

By 1968 important unmet demands for graduate training in business administration had been apparent in the Rochester area and beyond. In view of this considerable need, the College of Business developed a master of business administration program which encompassed all of the management and business areas common to middle and upper-middle management. The new curriculum was also designed to provide a balance between the behavioral and quantitative aspects of business management.

As a logical extension of RIT's long experience in technical education, a new area of graduate study for community and technical college faculty was also inaugurated. The Center for Community College Faculty Development was created to provide students with advanced knowledge in their technical speciality, and orientation to the objectives, programs, and philosophy of the two-year college, and those insight and skills required for teaching at the lower division level. An interdisciplinary approach to graduate study was emphasized, since the educational objectives of two-year college faculty varied from those of traditional graduate students. Programs were made available in the fields of business technology and engineering technology.

Later in 1968, in addition to the two-year MFA program, the College of Fine and Applied Arts developed a program in art education leading to the master of science in teaching degree. The program was specifically designed for secondary school teachers of fine and applied arts who wished to improve their understanding and skills, and earn certification.

One of RIT's newer graduate programs has emanated from its School of Printing. The need for additional people with technological training in the grapic arts, as well as teachers who could apply new instructional methods and concepts that would encourage students to enter the printing profession, became apparent from the numerous requests RIT received for a graduate program in printing. As a result, the School of Printing introduced a graduate program with two majors, operational in January, 1969, leading to the MS degree.

Recent additions to the list of graduate degree programs now available include the MFA in photography, meeting the demand for higher level professional offerings by the School of Photographic Arts and Sciences, and a program leading to an MS degree in accountancy. Another new program was the graduate internship leading to a master of engineering degree. Also, through the Center for Community/Junior College Relations, there is a new external degree, in cooperation with other graduate learning centers, leading to an MS in engineering technology. The center's most recent addition to its graduate programs is an MS in career information, designed for school, business, and industrial personnel.

The Department of Instructional Technology has developed an MS degree program in instructional technologies for those engaged in teaching or directing multi-media communications. This combines and builds upon the several communication/graphics/visual disciplines long associated with RIT. In addition, Institute College now offers three new programs through its School of Computer Science and Technology. These are the MS in computer science, the MS in computer system management and the MS in information science.

The Institute has a continuous concern for the emerging needs of the business, industrial and scholarly communities, and will consider additional graduate programs as these requirements become evident.

Accreditation

The Institute is chartered by the legislature of the State of New York and accredited by the Middle States Association of Colleges and Secondary Schools. In addition to institutional accreditation, curricula in some of the colleges are accredited by appropriate professional accreditation bodies. Specific mention of these are included in the college descriptions, where applicable.

Graduate Programs of Study

	Graduate Degrees Offered	Programs Available in	For More information See Page
College of Business	Master of Business Administration	Accounting Applied Decision Science Finance General Business Management Marketing	16
	Master of Science	Accountancy	
College of Continuing Education	Master of Science	Applied and Mathematical Statistics	28
College of Engineering	Master of Science	Electrical Engineering Mechanical Engineering	34
	Master of Engineering	Engineering (EE, ME, IE)	
College of Fine and Applied Arts	Master of Fine Arts	Ceramics and Ceramic Sculpture Communication Design Design Applications Glass Metalcrafts and Jewelry Painting Printmaking Weaving and Textile Design Woodworking and Furniture Design	48
	Master of Science for Teachers	All above areas plus Art Education	
College of Graphic Arts and Photography	Master of Science	Printing Technology Printing Education	56
	Master of Science for Teachers	Printing Education	
	Master of Science	Photographic Science and Instrumentation	
	Master of Fine Arts	Photography	
College of Science	Master of Science	Chemistry Clinical Chemistry	69
Institute College	Master of Science	Business Technology Career Information Computer Science Computer System Management Engineering Technology Instructional Technology Information Science	75
	Certificate	Information Science	

Dr. Paul A. Miller

RIT mixes education, real world of work says Dr. Miller

What do we mean when we say that RIT offers its students career education?

RIT President Dr. Paul A. Miller has spent nine years here carefully examining what we do mean by career education.

"Certainly we do better than most places at mixing education with the real world of work," he reported earlier this year. "We helped pioneer cooperative education. Activity on the campus is interwoven into employment practice off the campus. All our colleges link up with industrial systems in extraordinary ways, and such services as placement add to the partnership."

In short, he reported, "Our commitment to career education influences most of what we do."

Dr. Miller, a recognized expert in the field of continuing and adult education, has strong opinions about RIT and its place in technical, professional, and continuing education.

Miller, is the sixth president RIT has had in its 149 year history.

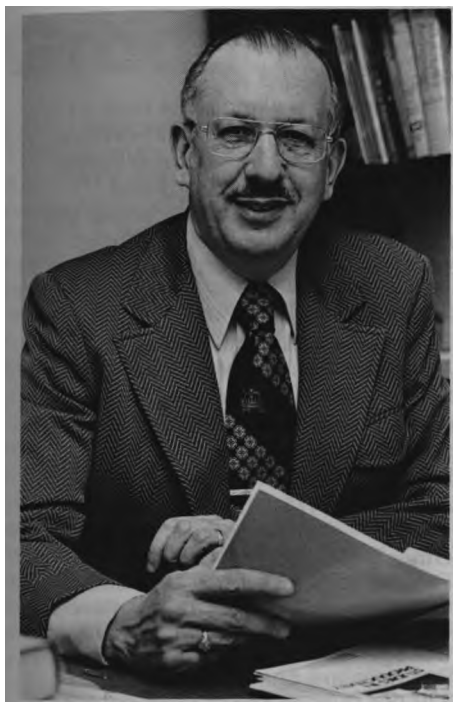
He was appointed in 1969, after serving at various times as assistant secretary of Education of the Department of Health, Education and Welfare; president of West Virginia University; and provost of Michigan State University.

Admission requirements

Decisions of graduate selection rest within the college offering the program to which the student is applying. Correspondence between the student and the Institute will be conducted through the Admission Office, according to the following procedures:

1. Inquiries about, and applications for graduate study are directed to the Director of Admission, Rochester Institute of Technology, One Lomb Memorial Drive, Rochester, New York 14623.
2. The Admission Office will acknowledge the inquiry or application, instructing the student as to the information required by the school or department to which he or she is applying before the admission can be made.
3. Once a student has made formal application, the Admission Office will prepare an applicant folder for him or her. All correspondence and admission data will be collected by the Admission Office, and placed in the applicant's folder.
4. When all relevant admission data has been received, the applicant's folder will be sent to the appropriate school or department for action.
5. When the school or department has made a decision on the application, this decision and the applicant's folder will be returned to the Admission Office.
6. The Admission Office will notify the student of the admission decision.

Rochester Institute of Technology admits men and women of any race, color and national or ethnic origin.



Dr. Paul Bernstein

Graduate programs specialized, and diverse.

"RIT is a highly specialized institution and our graduate program is a reflection of that," says Dr. Paul Bernstein.

"The hallmark of our overall graduate program is the diversity of the individual programs," he says.

Bernstein is dean of Graduate Studies. He received his bachelor's and master's degrees in education from Temple University, and his Ph.D. in history from the University of Pennsylvania, and has been at RIT since 1966.

"Each of our graduate programs is built as a freestanding unit," he says. "They're programs designed to fill a specific need in their respective fields."

"As a need developed in a specialized field and RIT felt it could satisfy that need, we started a program," he says.

"A good example of that is the computer management program. We perceived a real need for people to learn management skills as well as computer skills, and we didn't feel the need was being satisfied elsewhere. RIT has started a graduate program in career information for the same reasons."

Costs

On the date of publication, the tuition for graduate students pursuing a master's degree is:

Full time (12-18 credit hours)— $1,158/quarter

Part-time (11 credit hours or less)— $98/credit hour

Master of Science (CCE)— $77/credit hour

Internship*—$36/credit hour

In addition, any graduate student carrying over 18 credit hours of study will be charged the full-time tuition rate plus $98/credit hour for each hour of study exceeding 18.

The graduate fee charge for those receiving a master's degree is $20, which also includes rental of the master's hood.

Tuition and fee payments are due on the following dates: Fall Quarter, August 18, 1978; Winter Quarter, November 13, 1978; Spring Quarter, February 19, 1979; Summer Quarter, May 14, 1979. These due dates are rigid. If payment is not received by the date stated, the student must appear at the registration day for the quarter desired. (See calendar on inside front cover.) The Institute reserves the right to change its price without prior notice.

'Applied only to the internship portion of the master of engineering degree in the College of Engineering and the industrial research option of the MS degree in the Department of Chemistry.

Deferred payment plan

For those students who are not able to pay the amount due by the designated due date, RIT has made arrangements for deferred payment through a local bank. With this plan you may defer no more than 50% of your quarterly balance. For further information regarding this plan call the RIT Bursar's Office at (716) 475-6186.

Refund policy

Advance deposits are not refundable.

The acceptable reasons for withdrawal with refund during the quarter are:

Full refund

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 may elect to complete the course by making special arrangements with both his instructor and department, or to withdraw and receive a full tuition refund. If he withdraws, he will have to repeat the course 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 had failed prerequisites, the student will be given a full refund upon withdrawal. It remains the student's responsibility to contact his or her department to assure that the withdrawal form and refund are properly processed.

Partial refund

A partial refund will be made during a quarter if withdrawal 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 advisor or department representative, the Institute Coordinator for Academic Advising and the Bursar.

Tuition will be refunded according to the following schedule:

Withdrawal

During the first week of classes 90%

During the second week of classes 75%

During the third week of classes 60%

During the fourth week of classes 50%

Fifth and subsequent weeks No Refund

Withdrawal

A student is not "officially withdrawn" until he or she receives the student's copy of the withdrawal form. The date on which a withdrawal form is properly completed shall be the date of "official withdrawal" used to determine the refundable amount.

During the first week of classes 90% of ***unused*** room charge

During the second week of classes, 75% of ***unused*** room charge

During the third week of classes, 60% of ***unused*** room charge

During the fourth week of classes, 50% of ***unused*** room charge

Board charges will be refunded according to the following schedule:

During the first four weeks, 75% of ***unused*** board charge

After the first four weeks, 50% of the ***unused*** board charge

A specific rate schedule is available in the Housing Office.

Fees
Fees are not refundable.

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 pro-rated from the date of official withdrawal from the Institute.

Financial Aid
Fellowships and Graduate Assistantships are often available. Please write to the appropriate department chairperson or dean, as shown in the Correspondence Directory or contact the Financial Aid Office (475-2187).

Other
Fees for all proficiency examinations in the MS degree programs offered by the Center for Community/Junior College Relations and the College of Business are charged at the rate of $20 per quarter credit hour covered by the examination. Arrangements for such proficiency examinations are made through the director of the Center for Community/Junior College Relations.

Students enrolled in the external degree engineering technology program offered by the Center for Community/Junior College Relations are charged a $10 fee for each quarter of each academic year (not including summers), when not taking courses for credit at RIT under the normal tuition procedures. The charge is applicable after the student has been accepted into the external degree program. This fee is to partially defray the cost of committee time, correspondence, and faculty time needed for preparing and maintaining individual curriculum contracts.

Graduation Requirements

Credit hour requirements
The minimum credit requirements for a master's degree is 45* quarter credit hours (30* semester credit hours). A maximum of nine quarter credit hours with a grade of B or better (six semester credit hours) may be awarded as transfer credit from other institutions except for the external degree offered through the Center for Community/Junior College Relations. A request for transfer credit must be made at the time of application for graduate student status. A graduate student who wishes to take work at another institution and transfer it to his or her degree work at the Institute must obtain prior permission. A program cumulative grade point average of 3.0 ("B" average) is required for graduation.

Thesis requirements
Included as a part of the total credit hour requirement is a research and thesis requirement as specified by each department.

The amount of credit the student is to receive for Research and Thesis Guidance in any given quarter must be determined by the time of registration for that quarter, recorded on his or her registration card and verified on the course list.

For the purpose of verifying credit, an end-of-quarter grade of "R" should be submitted for each registration of Research and Thesis Guidance by the student's faculty advisor. Before the degree can be awarded the acceptance of the thesis must be recorded on the student's permanent record. It should be noted that some departments have requirements in place of a thesis.

Candidacy for an advanced degree
A graduate student must be a candidate for an advanced degree for at least one academic quarter prior to receipt of the degree.

The basic position of the Graduate Council is that a student is a candidate for the master's degree when he or she has been formally admitted to the Institute as a graduate student.

A student not formally admitted as a graduate student of the Institute (regardless of the number of graduate credits earned) is a non-matriculated student and not a candidate for an advanced degree. Such a student cannot be a candidate until being formally admitted to the Institute as a graduate student. There is no guarantee that any credits in graduate courses earned as a non-matriculated student will apply toward an advanced degree. Some colleges may offer graduate or undergraduate credit for 600 level courses.

All RIT degree candidates are required to file an application with the Registrar's Office for graduation.

Summary experience
The Graduate Council regards some form of integrative experience necessary for candidates of advanced degrees. The nature and format judgement and decision for the individual colleges or schools or departments within the colleges. Such requirements as the comprehensive examination, the oral examination on the thesis, and a summary conference are examples of forms which would be appropriate provided they are designed to help the student integrate the separate parts of his or her total experience.

Full- to part-time status
If a 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 Period, he or she may contact the Bursar for a refund based on the differential between the full-time tuition payments and the total per credit charge for the part-time load. Courses dropped after the Official Drop Period will not result in a tuition refund.

Financial standing
Tuition and fees paid to the Institute cover approximately 60-70 percent of the actual expense of a student's education. The rest of the cost is borne by the Institute through income on its endowment and from the gifts of alumni and other friends.

Students, former students, and graduates are in good financial standing when their account is paid in full in the Bursar's Office. Any student whose account is not paid in full will not receive grade reports, transcripts, or other forms of recognition or recommendation from the Institute.

The Institute reserves the right to change its prices without prior notice.

"For the College of Fine and Applied Arts, 48 quarter credit hours is the minimum for the MST degree, and 85 quarter credit hours is the minimum for the MFA degree. Other colleges such as the College of Business also require more than the minimum of 45 quarter credit hours.

Student Services

The Wallace Memorial Library
The Wallace Memorial Library is a true multi-media learning center with expanded services and innovative procedures to increase its usefulness.

Particularly adapted to an institution of technology and the arts and sciences, the Wallace Memorial Library contains, in addition to material in the usual form of books, magazines, newspapers, and pamphlets, material in the form of microfilm, microfiche, films and slides. To assist students in the use of all these resources, reference librarians are on duty during the week and on weekends. Located throughout the three floors of the library are over 900 student study stations, including individual study carrels and group study rooms.

During the year student work in art and photography is exhibited in the second floor display gallery. Outstanding student art work is permanently displayed throughout the building. Two music listening rooms are located on the third floor, and there are several lounge areas within the building.

The library contains a special collection of materials on the deaf to serve the National Technical Institute for the Deaf and to support research by anyone wishing to pursue studies in the problems of deafness. Supplementing the main library is the Graduate Chemistry Library.

The Media Resource Center located just inside the library entrance on the main level contains a variety of audiovisual equipment and non-print media for individual use. In addition, the Center contains one of the finest slide collections in the country with more than 70,000 slides. Preview facilities and study carrels are also provided.

The Audiovisual Services Department houses a collection of nearly 400 films and provides materials, equipment, and assistance for classroom instruction. Approximately 3,500 films are shown in classrooms each year.

Counseling Center
The counseling and testing services of the Counseling Center are available to graduate students. Any student may see a counselor promptly for assistance in dealing with a personal problem or in clarifying career plans. When appropriate, tests may be used to obtain more evidence about interests, abilities, aptitudes, and personality characteristics. In its offices in the residence halls the Counseling Center maintains a library of educational and occupational information.

In addition to providing counseling services for RIT students, the Counseling Center offers career counseling for individuals. Brochures describing the types of service and fees may be obtained by telephoning or writing the Counseling Center.

Learning Development Center
The Learning Development Center provides individual and group instruction in efficient reading, study procedures, mathematics and writing skills. These services are available at no additional charge to all graduate students of the Institute and may be scheduled at the Center located on the second floor, north end, of the administration building.

Automobile registration
Those students having automobiles on campus must register these vehicles with the Protective Services Department at the time they first register for classes, or upon bringing the automobile onto campus for the first time.

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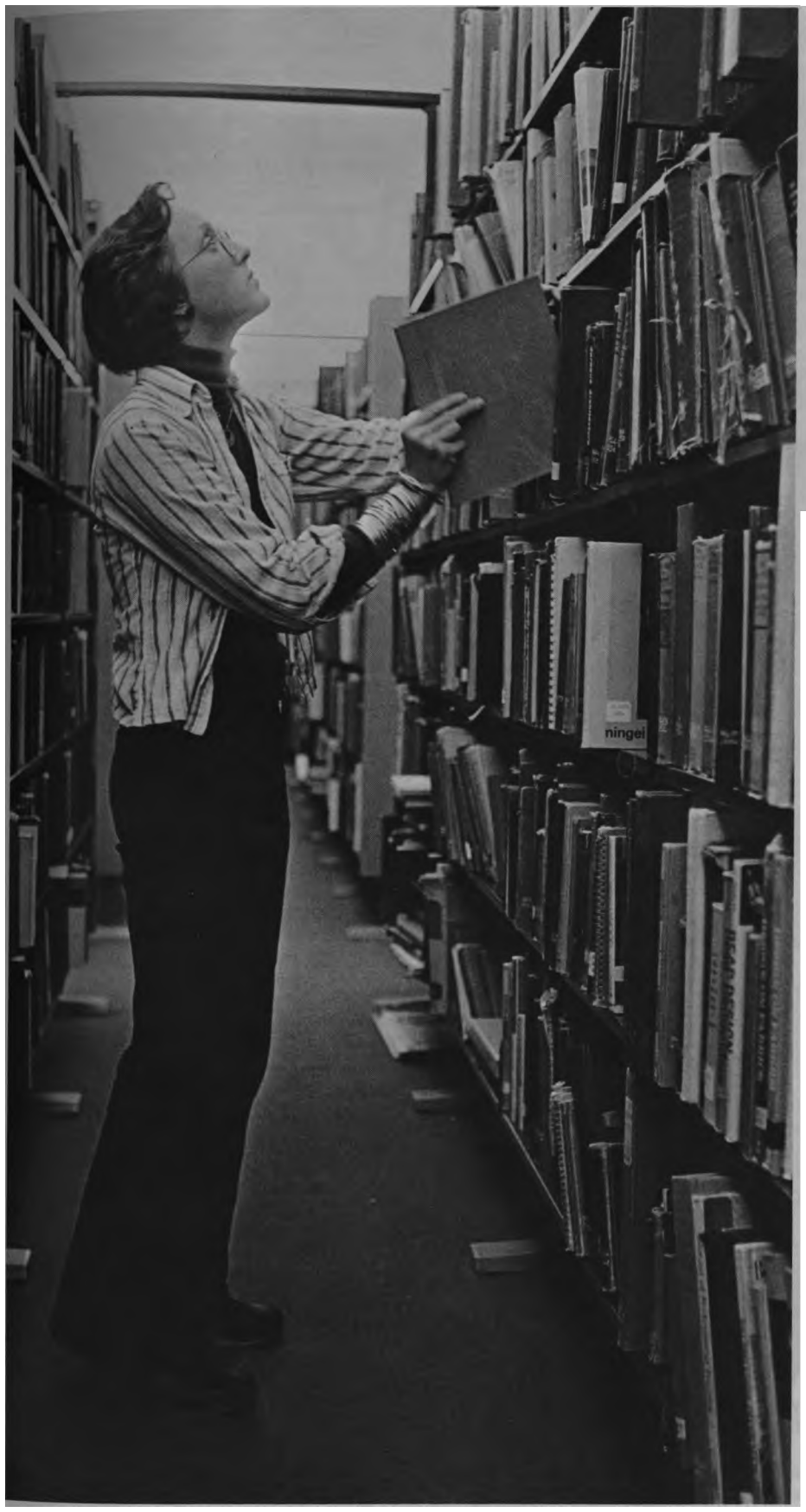


Wallace Library
“is more than books”
says director

“We’re a pretty advanced library, technologically speaking,” Wallace Memorial Library Director Gary MacMillan says.

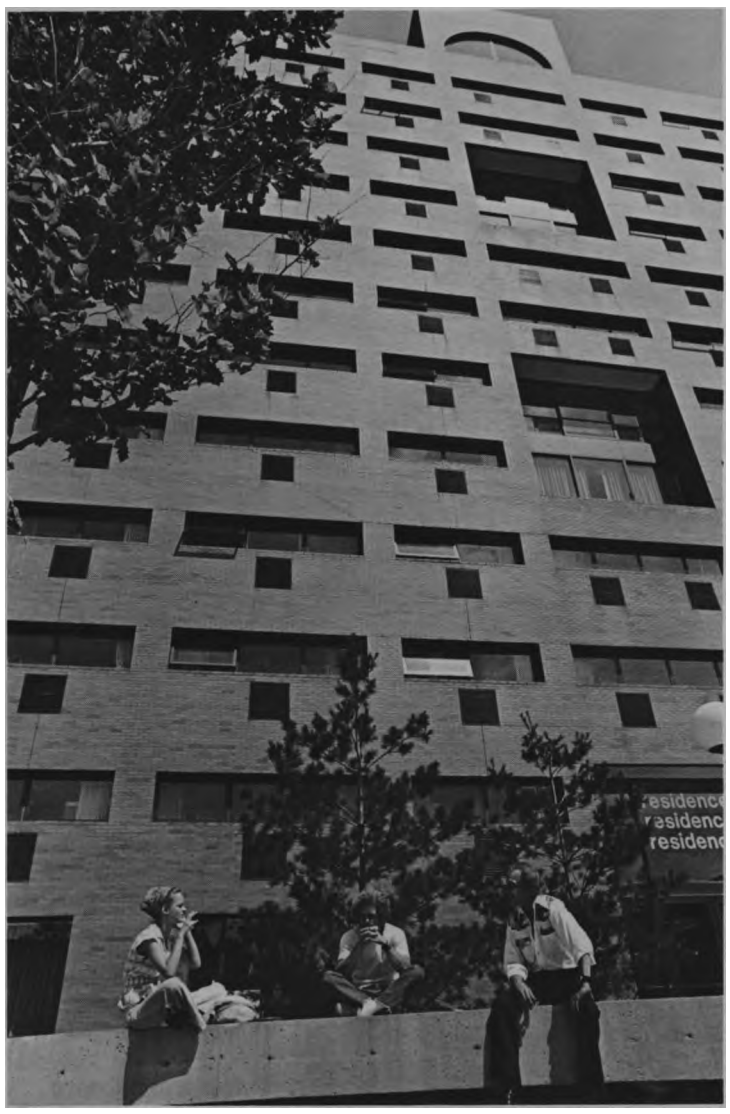
“Books are losing some of their importance and other media are taking over...there’s growing awareness here that there are other ways to get information than from the printed word,” he says.

And so, Wallace Library has phased out the traditional clumsy card catalog in favor of a microfiche system. "The entire card catalog,” MacMillan says, “can be held in a notebook.”

Other technological advances are evident throughout the three-story air-conditioned Wallace Library. The Media Resource Center on the first floor offers a wide range of instructional audiovisual materials such as videotapes and motion pictures for student use in the building.

MacMillan came to RIT in December, 1970, fresh from a job at the University of Liberia in West Africa, where he was working in a joint United States government—Cornell University program. He’s a graduate of Kalamazoo College (psychology/sociology) and University of Michigan (library science).

A library doesn’t mean just books anymore,” he says. “It’s a collection of information kept in the way that’s easiest to retrieve."



Housing
The Institute has campus residence facilities available for both single and married students.

Most residence hall units have double rooms only. However, some units do include a limited number of single rooms.

All corridors and rooms are carpeted. A bed, desk, chair, dresser, closet, and window covering are provided for each student in a room. Each corridor in the unit has its own bathroom, equipped with showers. Each house has its own lounge furnished for study and relaxation. Coin-operated laundry facilities are available in the basement.

Married students should apply for campus apartment housing through the Campus Apartment Housing Office, 113 Kimball Drive, Rochester, NY 14623.

Identification Cards
You'll need an RIT identification card to use any campus facility.

You apply for your identification card at the time of your first registration.

For further information, call the ID office at 475-2125.

Enrollment of Veterans
Courses and Programs at the Institute are approved for the education of veterans under the Veterans Readjustment Benefits Act, the Rehabilitation Acts, and War Orphans Act.

To receive benefits, an eligible veteran or dependent must submit an application for the VA "Certificate of Eligibility". This application must be sent to the VA Regional Office in Buffalo, New York, well in advance of the beginning of the starting quarter. These applications are available at your local VA Office or on campus from the Veterans Affairs Office.

Visit the Veterans Affairs Office and complete the necessary forms to ensure your benefits will arrive on time for the beginning of school.

Students who have been receiving benefit payments at other institutions or while participating in a different program and wish to transfer into one of RIT's many programs will be required to complete and submit a "Request for Change of Program or School" form.

To ensure a smooth transition and successful academic program completion at RIT, start your benefits paper work early. For benefits assistance or information, call the Veterans Affairs Office at 475-6641.

Emergencies
In case of an emergency (fire, injury) the Institute 24-hour emergency number 475-3333, should be called. For routine security services 475-2853, which is staffed 24 hours a day, should be contacted.

Central Placement Services
This office provides career counseling and aids students in making appropriate contacts with part-time, Co-op and full-time employers. The centralized activities of Central Placement Services make it easier for potential employees and employers to meet and to become aware of the full spectrum of opportunities and personnel available at any given time. The staff and facilities of Central Placement Services are located on the second floor of the George Eastman Memorial Building and are available to students Monday through Friday, 8:30 a.m. to 4:30 p.m.

Medical Service
The Institute Student Health Service maintains out-patient services at the Health Center on the second floor of the Eastman Building. A nurse and physician are on duty Monday through Friday during the daytime hours posted at the Health Center. The usual out-patient services are rendered to students without charge while they are attending the Institute. Other medical expenses are the responsibility of the student. The student should bring his or her Blue Cross-Blue Shield or other prepaid medical plan identification card to the Center.

Institutional and Civil Authority
Students must recognize that they are members of the local, state and federal communities, and that they are obliged to live in accord with the law without special privilege because of their status as students or temporary residents.

Course

descriptions

The Institute reserves the right to alter any of its courses at any time.

In addition to its title, each course is identified by two numbers.

The alpha-numeric course number directly to the left of the course title is the official Institute course number. This number will appear on grade reports, transcripts, and other official correspondence. This is what the alpha-numeric number means:

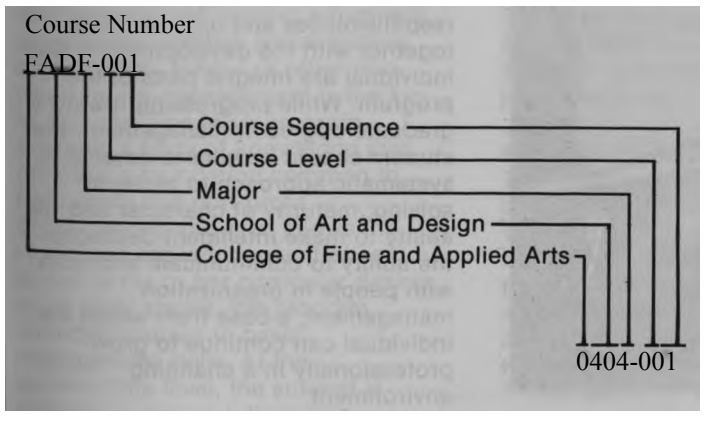
First letter: College offering the course

Second and Third letters: School or department of that college

Fourth letter: Major field of interest

First number: Course level: 0 = Non-credit, 1 = Diploma; 2 or 3 = Lower level degree courses; 4, 5 or 6 = Upper level undergraduate degree courses; 6, 7, or 8 = Courses for graduate credit. (6 may be undergraduate or graduate.)

Second and Third numbers: Course differentiation and sequencing



Registration Number

Directly below the alpha-numeric number in the course description is the registration number. You must use this number with a section number (i.e. 01,02,) when you register for a course, because the alpha-numeric number cannot be read by the computer system.

College of Business

Edward A. Johnson, Dean

John H. Burns, Director, Graduate Programs (475-2256)

RIT's graduate programs in management include the master of business administration and the master of science with an emphasis in accountancy. Each program is designed for full- and part-time students.

Through a flexible, decision-oriented curriculum, graduate students focus on key aspects of modern management common to profit and non-profit organizations, with the opportunity to concentrate in selected areas. Tomorrow's manager must be able to handle highly complex problems set in an ever changing environment. Recognizing this need, RIT gears its graduate management and accounting programs to education in sophisticated analytical techniques. In addition, an effective manager must have an appreciation for the behavioral facets of his or her position. The faculty arranges courses and experiences that offer the requisite knowledge necessary for a leadership role in business and government.

The College of Business is housed in the George Eastman Memorial Building on RIT's Henrietta campus. Facilities include a Learning Support Center, time-sharing computer terminals on-line with RIT's Sigma 9 computer, and an up-to-date business collection of texts, periodicals and reference services in the Wallace Memorial Library.

The overall goal of RIT's graduate management programs is to provide education for men and women preparing themselves for continuing executive positions in management. Preparation for managerial responsibilities and opportunities, together with the development of the individual are integral parts of the program. While progressing toward a graduate degree in management, the student should be able to develop: a systematic approach to problem solving; maturity of character and the ability to make intelligent decisions; the ability to communicate and work with people in organization management; a base from which the individual can continue to grow professionally in a changing environment.

Master of Business

Administration

The master of business administration program is professional in nature. Management is the common element found in all successful organizations. The professional manager must be able to work with and through others. He or she must have organizational skills, be able to identify and solve problems, and carry out decisions by motivating others to accomplish goals.

While the MBA degree was originally conceived for education in the profit-oriented business discipline, this is no longer the only area where broad based managerial talent can be employed to advantage. Whether you are running a business, government agency, social service organization, school or other non-profit group, management is the key to success. The MBA program presents a body of knowledge that provides a foundation common to both profit and non-profit organizations and then allows the student to explore concentrations suited to his or her particular desires. In its early stages, the program includes courses in basic management skills. At the intermediate level, the student is exposed to forces influencing decisions. Advanced courses allow application of previously acquired skills to specialized areas as well as the integration of the various management functions.

To accomplish program objectives, the curriculum will provide:
1. education in the basic tools needed for management decision making;
2. a background in the functional areas of marketing, finance, accounting, and management;
3. an understanding of the environment in which business operates;
4. an opportunity to develop a specialty with the broad foundation of required courses by offering concentrations in accounting, finance, marketing, management, and decision sciences;
5. an opportunity to practice management problem solving through the use of cases, computers, simulation, gaming, and other dynamic management techniques;
6. an opportunity to integrate fundamental and advanced knowledge through course work and job experiences.

Full-time program

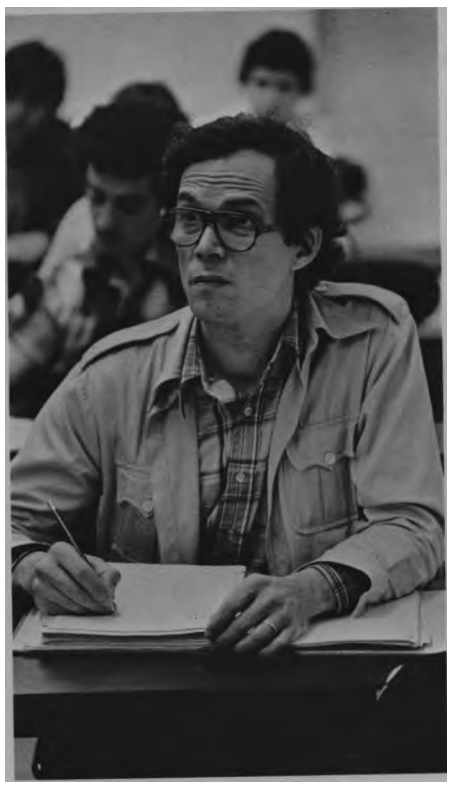
The full-time MBA program allows two possible routes to the degree. Those students desiring to minimize their time in school will find that three or four quarters of intensive study will allow them to complete degree requirements. After a thorough grounding in tools and foundations, the student pursues a course in each of the functional areas. Simultaneously with functional courses, a major area may be explored by concentrating in a sequence of option area courses. Alternatively, a general business option may be completed by selecting appropriate free electives. Details on available programs will be found in following material. Actual credit hour requirements will vary depending on the student's background.

Full-time students desiring work experience while in the master's program may include a management internship in their curriculum. Students may arrange internships with business and non-profit organizations, both locally and nationally. Each academic quarter of internship will add one quarter of time to the program's duration. RIT offers no guarantee to provide internships but does work with students to obtain positions. Students should contact the director of Experiential Learning Programs for the College of Business in the Career Education Division for more information. In order to gain academic credit for a management internship, a research paper is required and the internship must be approved by the director of the Graduate Business Programs prior to its start.

Full-time students will find that while certain courses are scheduled during the day, they will take most courses during the evening hours with each evening course meeting once a week.

Part-time program

In addition to full-time study, all graduate programs are available on a part-time basis, with courses offered in the evening and on Saturday. Course requirements, faculty, and admission procedures correspond to the full-time program. The part-time MBA allows individuals from the Greater Rochester area to prepare themselves for advancement in management without interrupting their careers. A normal course load for the part-time student is two courses per quarter, permitting program completion in approximately two years if no courses are waived. Credit hour requirements and curriculum will be found in following material.



Graduate programs in Accountancy

The increasing demands on the professional accountant have produced a need for a broad, extensive educational preparation. In recognition of this need, the College of Business offers graduate programs leading to the master of business administration with accounting option, and the master of science with an emphasis in accountancy.

These two programs are registered with the New York State Education Department. This means that graduates meet the educational requirements for the Uniform Certified Public Accounting examination and may sit for the exam immediately upon completion of the master's degree.

Proper selection of electives within an accounting program will also prepare a student for a number of possible accounting careers other than in public accounting. Not only has the curriculum been designed to help prepare students for the Certificate in Management Accounting examination as administered by the Institute of Management Accounting of the National Association of Accountants, but also the student has the opportunity to gain an in-depth knowledge in taxation, international accounting, and accounting for non-profit organizations, by electing courses in a seminar series. Students desiring to pursue an accounting major must nofity the Graduate Office to insure their programs are designed to meet licensing requirements.

MBA with accounting option

The MBA with accounting option enables the student to obtain a broad education encompassing those behavioral and quantitative aspects of management common to middle and upper management, in addition to meeting the previously mentioned educational requirements for either the Certified Public Accounting Certificate or the Certificate in Management Accounting.

Specifically, the MBA with accounting option is designed for students with or without an extensive background in accounting or business at the undergraduate level. The program normally requires a sequence of accounting courses to be integrated as approved electives in the MBA program.

MS with an emphasis in accountancy

The master of science with an emphasis in accountancy is an intensive 48 quarter credit hour program and is specifically designed for students with 28 to 32 undergraduate quarter credit hours of accounting in their bachelor's degree program who desire to continue their accounting studies at an advanced level. Those students lacking the prerequisite undergraduate hours in accounting may still pursue the MS degree by making up those courses, on an accelerated basis, in which they are deficient. This program also prepares students for the Uniform Certified Public Accounting examination and | meets New York State requirements, The admission standards and procedures are the same as those for the MBA program.

Programs prepare students to "go out and manage"

Dr. John Burns

"We want students to go through one of our management programs and then be able to go out and manage—to apply what they've learned directly on their jobs," says Dr. John H. Burns, director of Graduate Business Programs at RIT.

"We're a very managerially oriented program as opposed to a highly theoretical or research oriented one. I think we're tuned in to what people in business need to know to achieve success in their careers," he says.

He must be right.

RIT graduated its first class of graduate business students in 1970 and the classes have grown consistently since then. During the past academic year, more than 600 students were enrolled. And, Burns says, full-time enrollment in the Program is steadily increasing.

"We think there's a trend for People who've done undergraduate work in other areas—like social work or graphic arts or liberal arts or engineering—to come over and enroll for a graduate program in business because they see a need not only to be able to do what they do well, but to be able to manage others in the same field.

"One important thing about a graduate business program at RIT is that you don't necessarily have to have any undergraduate work in business to be admitted—or successful—in the program."

The faculty in the College of Business, Burns said, brings to the classroom a blend of high quality academic preparation and strong business relationships. Many of the professors are active consultants and maintain memberships on numerous boards of directors.

Professors teach both undergraduate and graduate programs in both day and evening.

"We think it's important for everyone on the faculty to be exposed to all the students as they come here, and not be shelved with any particular group. It's good for both the faculty and the students."

Burns is a graduate of the University of Cincinnati, (BS, industrial management), the University of Rochester (MS, finance), and Michigan State University, (Ph.D., finance). He has been at RIT since 1964, and has been director of Graduate Programs since 1973.

Admission

Any student who wishes to study in the graduate business programs must first be admitted to one of the graduate programs. Admission will be granted to graduates of accredited baccalaureate degree programs, who in the opinion of the Graduate Admission Committee of the College of Business have demonstrated, through their achievements in their undergraduate program and through the results of the Graduate Management Admission Test, their potential to successfully complete graduate business studies.

Applicants whose past performance does not satisfy all conditions of admission but who appear to merit a trial period will be admitted and reviewed after the completion of 12 credit hours of graduate level work.

All applicants who are admitted prior to the conclusion of their baccalaureate program are required to submit their final transcript by the end of the first quarter of graduate work.

Procedures

To be considered for admission it is necessary to file an application, submit transcripts of all previous undergraduate and graduate work, two letters of recommendation, and results of the Graduate Management Admission Test. The admission test must be taken. Information may be obtained from the College of Business or by writing the Graduate Management Admission Test, Educational Testing Service, Box 966, Princeton, New Jersey 08540. The test is usually given four times a year in convenient locations.

Non-matriculated students

Individuals already holding master's or doctor's degrees in business may enroll in graduate business courses as non-matriculated students. Evidence of previous degree must be presented to the College of Business before registering as a non-matriculated student.

Financial aid
Graduate research assistantships are available to deserving full-time graduate students. Assistants work with faculty on research projects, thus enhancing their education, and receive in turn tuition remission. The amount of the grant is dependent upon the nature of the appointment. Interested individuals should write to the director, Graduate Business Programs, requesting an assistantship and indicating the quarter or quarters in which they desire aid.

Assistantships and most other forms of financial aid are available only to full-time students.

Other forms of financial aid such as fellowships, loans, and grants should be investigated through the director of Financial Aid at RIT's Student Financial Aid Office.

Placement Service
RIT maintains a fully staffed Central Placement Service. Students seeking employment after graduation should register with the Placement Service approximately one year prior to graduation. This lead time will enable the student to take full advantage of resume preparation aid and offers the opportunity to interview a wide variety of local and national firms as they visit the campus. The Placement Service is located in the administration building.

Credit hour requirements
Credit hour requirements vary depending on the particular program and a student's prior academic achievements. A maximum of 72 quarter credit hours are required in the master of business administration program. The master of science with an emphasis in accountancy program requires a maximum of 48 quarter credit hours. Each course carries four quarter credit hours. In certain cases, total credit hour requirements may be reduced by the use of waiver credit and/or transfer credit. Some accounting majors may require more than the normal maximum hours depending on background.

An admitted student with appropriate undergraduate business courses, taken prior to entry in the MBA program, carrying grades of "B" or better, may waive up to 24 quarter credit hours and thus reduce the total required hours accordingly. Certain courses may also be waived in the MS program; however, they must be replaced by approved electives to maintain the 48 quarter credit total.

Ordinarily, courses eligible for waiver will be those commonly referred to as foundation or tool courses. Elective courses cannot be waived.

Transfer credit
A maximum of nine quarter credit hours (six semester credit hours) may be awarded as transfer credit from other graduate programs provided the courses in question carry a grade of "B" or better. This applies to both the MBA and MS programs. A graduate student who wishes to take work at another institution and transfer it to his or her degree work at the Institute must obtain prior permission. Any questions concerning waiver or transfer credit should be referred to the director, Graduate Business Programs.

Grade requirements
The average of all course grades earned at RIT while in a graduate business program must be at least a "B" in order to satisfy requirements for master's degree certification. Transfer credits, waiver credits, or credits from undergraduate courses taken while in the graduate program are not counted in the grade point computation. Graduate course credit cannot be given for undergraduate courses taken while in the graduate program. If at any time a student's average falls below "B", he or she will be placed on probation and must raise the average back to a "B" level within the next 12 credit hours or face dismissal from the program. In addition, failure in any course at any time in the program or the demonstration of other unacceptable academic performance may result in a faculty recommendation that the director review a student's case and take appropriate action.

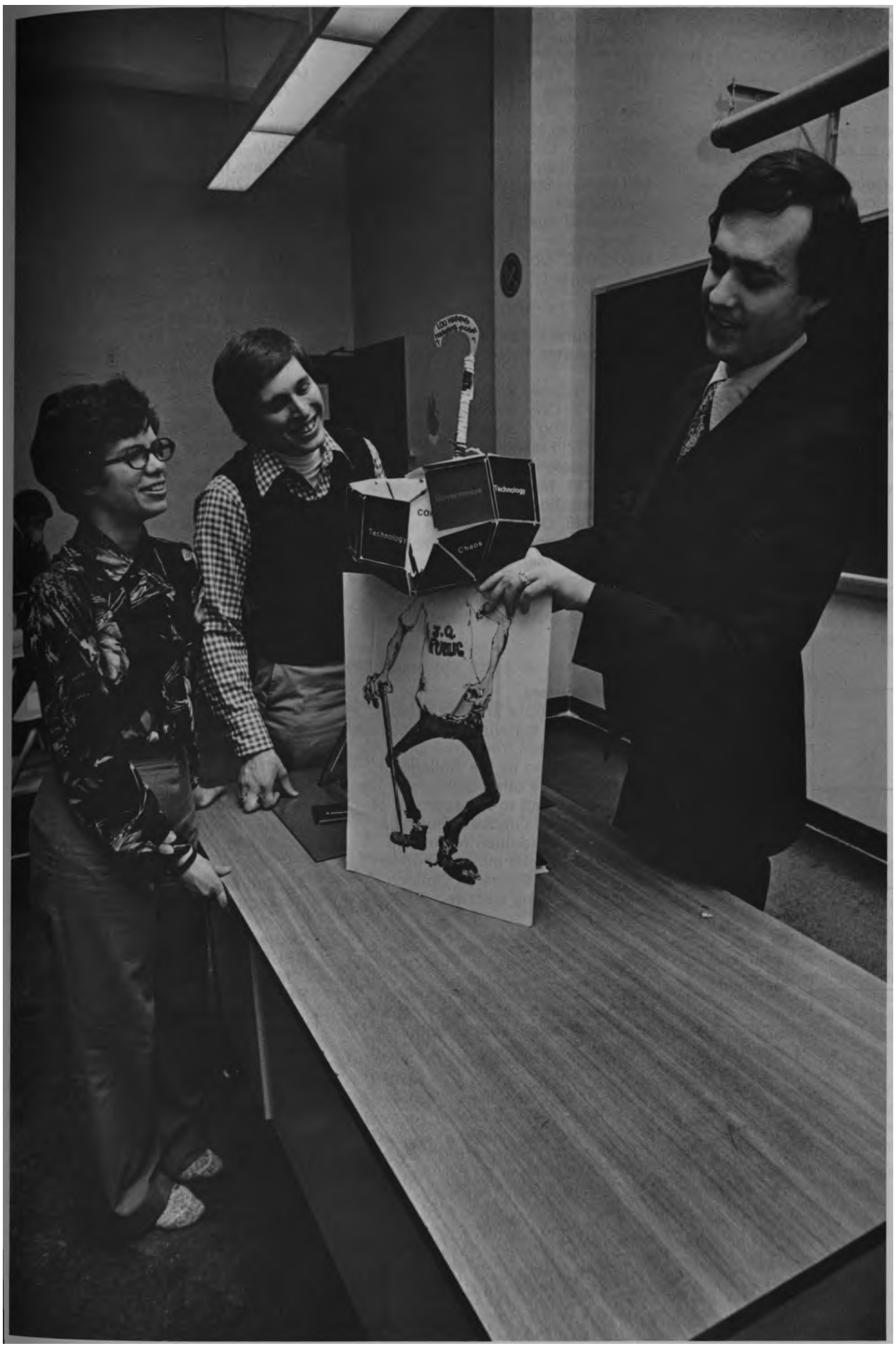
Incomplete grades may be given when a student has justifiable reasons for not completing course requirements during the quarter he or she is registered for the course. Incomplete grades must be removed by the second quarter following that in which the "Incomplete" grade was given. If the Incomplete is not removed within two quarters, the student will receive a failing grade for the course, possibly necessitating retaking the course.

Course offerings
Information concerning courses to be offered in a given quarter will be available through the Graduate Business Office. The institute reserves the right to make any necessary changes in course schedules or instructors, including the right to cancel courses, without prior notice. Day courses meet twice a week, and evening or Saturday courses meet once a week. The Institute makes no guarantee that every catalog course will be offered in any given year.

Curriculum
The master of business administration curriculum is designed so that a student will progress through the program in a logical sequence while allowing for maximum flexibility. Three curriculum phases are evident in the accompanying model. Initially, students must demonstrate their ability in foundation courses, either j by taking graduate coursework or by waiving up to 24 quarter credit hours of foundation courses, based on having taken appropriate undergraduate courses.

In the second phase students are exposed to the various functional areas of business through a series of required core courses. Coincident with or following the core courses, students may pursue electives concentrating in accounting, applied decision sciences, finance, management, marketing or general business. These options are illustrated in the following example programs. Except for the registered accounting programs, these options are not indicated by title on the transcript or degree itself.

A general program requirement is that foundation courses must be completed before a student attempts core courses or option electives. However, as a student approaches completion of the foundation courses, he or she may combine the last foundation courses with appropriate core courses in order to maintain a full schedule in the specified quarter. Students must also adhere to the prerequisite sequencing. Any proposed exceptions to the above must be approved by the director of Graduate Business Programs.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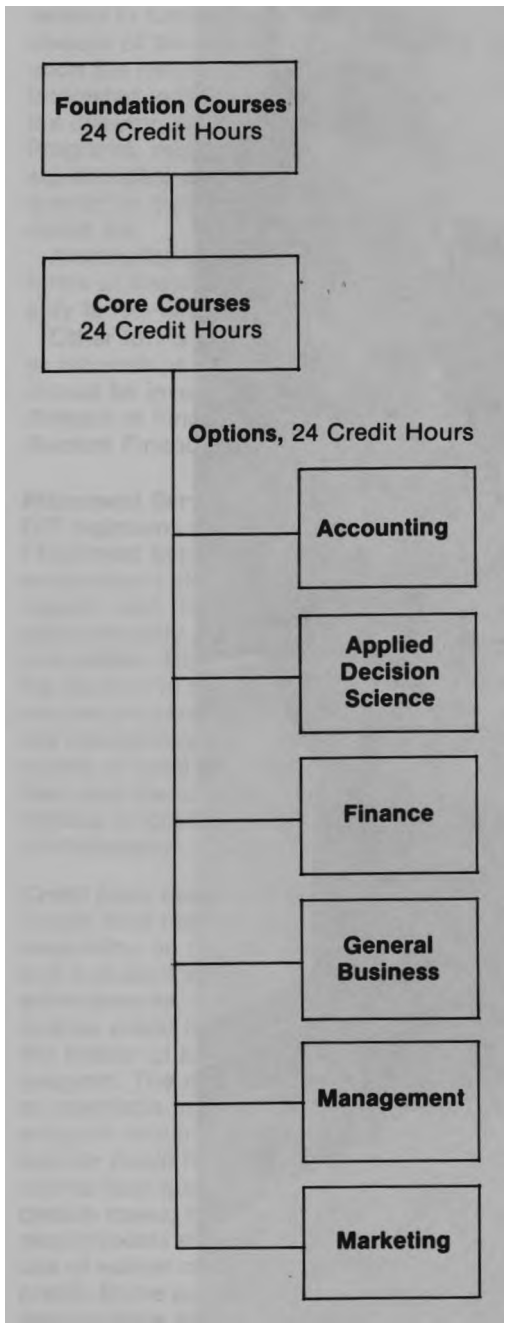
Master of Business Administration curriculum



Foundation Courses: Phase I

Course Number and Title	Credit Hours
BBUA-701 Financial Accounting	4
BBUB-744 Behavioral Science in Management	4
BBUF-745 Economic Environment of American Business	4
BBUQ-781 Statistical Analysis I	4
BBUQ-782 Statistical Analysis II	4
BBUQ-792 Concepts in Computer Utilization	4
	24

Core Courses: Phase II
(Prerequisites listed in parentheses)

Course Number and Title	Credit Hours
BBUA-702 Cost and Managerial Accounting (Phase I)	4
BBUF-722 Financial Management (Phase I)	4
BBUB-741 Management and Organization (Phase I)	4
BBUB-743 Operations Management (Phase I)	4
BBUM-761 Marketing Concepts (Phase I)	4
BBUB-759 Integrated Business Analysis (All other Phase II courses)	4
	24

Option Courses
Approved options are illustrated in the following material. Free electives may be selected from graduate level courses offered by the College of Business or by other colleges of the Institute subject to the approval of the director of Graduate Business Programs. In addition to elective courses, students may earn up to eight hours of Research Option credit in fulfilling elective requirements.

	24
Total hours	72

Note that the required foundation courses must be completed before a student attempts core or option courses.

Accounting Option—CPA Preparation
(Prerequisites listed in parentheses
(Accounting programs may exceed 72 hours)

Course Number and Title Hour;	Credit
*BBUA-704 Accounting Theory I (Phase I)	4
'BBUA-705 Accounting Theory II (BBUA-704)	4
BBUA-707 Advanced Accounting and Theory (BBUA-705)	4
BBUA-708 Auditing (BBUA-705)	4
**BBUA-709 Basic Taxation Accounting (Phase I)	4
BBUB-751 Legal Environment of Business (Phase I)	4
BBUF-724 Problems in Financial Management (BBUF-722)	4
	~28

Note: If BBUF-745, Economic Environment of American Business is waived, it must be replaced by a graduate level economics elective if the student wishes to qualify for the New York State Uniform Certified Public Accounting Examination. Students deficient in undergraduate economics may be required to complete two graduate economics courses making the maximum possible total program 80 quarter hours for C.P.A. preparation.

**Can be waived with 28 to 32 undergraduate quarter credit hours in accounting. If waived, other approved electives must be taken.*
***Can be waived on the basis of an equivalent* j *undergraduate tax course. The approved elective to be substituted must be a graduate level tax course.*

Applied Decision Science Option*
(Prerequisites listed in parentheses)

Course Number and Title	Credit Hours
BBUB-770 Business Research Methods (Phase I)	4
BBUQ-778 Probability Theory (Differential and Integral Calculus**)	4
Four courses from Group A or other quantitative electives approved by Graduate Programs director	16
	24

Group A

BBUB-747 Systems Administration (PHASE I)
BBUB-790 Information Systems (BBUB-743)
BBUQ-784 Decision Theory (BBUQ-778)
BBUQ-786 Operations Research—**Mathematical** Programming **(BBUB-743)**
BBUQ-787 Operations Research-**Probabilistic** Models (BBUQ-778)
BBUQ-789 Simulation (Phase I)

•This option is currently being revised; certain decision science courses may not be offered in the current year.

*••No credit will be given for calculus in the MBA program. The calculus requirement may be satisfied by courses taken at the baccalaureate level prior to or concurrently with the graduate program. This option is currently being revised; certain decision science courses **may** not be offered in the current year.*

Finance Option
(Prerequisites listed in parentheses)

Course Number and Title	Credit Hours
BBUF-723 Theory of Finance and Research (BBUF-722)	4
BBUF-724 Problems in Financial Management (BBUF-722)	4
BBUF-725 Securities and Investment Analysis (BBUF-722)	4
One course from Group A	4
One course from Group B	4
One graduate elective from the College of Business or approved by Graduate Programs director	4
	24

Group A
BBUF-767 Advanced Microeconomic Theory (Phase I)
BBUF-768 Advanced Macroeconomic Theory (Phase I)
Group B

BBUA-704 Accounting Theory I (Phase I)
BBUF-729 Seminar in Finance (various; permission of director)

General Business Option

(Prerequisites listed in parentheses)

Course Number and Title	Credit Hours
One course from Group A	4
Five graduate electives from the College of Business or approved by Graduate Programs director	20
	~~24

Group A
BBUB-770 Business Research Methods (Phase I)
BBUA-707 Advanced Accounting and Theory (BBUA-704)
BBUF-723 Theory of Finance and Research (BBUF-722)

Management Option
(Prerequisites listed in parentheses)

Course Number and Title	Credit Hours
BBUB-748 Labor/Management Problems (Phase I)	4
BBUB-770 Business Research Methods (Phase I)	4
Completion of courses in Group A or Group B	16
	24

Group A: Organization and Human Resources
BBUB-746 Seminar in Management Development (BBUB-741)
BBUB-750 Personnel Systems (Phase I)
BBUB-758 Seminar in Management (various; permission of director)
One graduate elective from the College of Business or approved by Graduate Programs director

Group B: Environmental Policy and Analysis
BBUB-742 Business and Society (Phase I)
BBUB-751 Legal Environment of Business (Phase I)
Two graduate electives from the College of Business or approved by Graduate Programs director

Marketing Option
(Prerequisites listed in parentheses)

Course Number and Title	Credit Hours
BBUQ-762 Advanced Marketing Management (BBUM-761)	4
BBUF-767 Advanced Microeconomic Theory (Phase I)	4
BBUB-770 Business Research Methods (Phase I)	4
Two courses from Group A	8
One graduate elective from the College of Business or approved by Graduate Programs director	4
	24

Group A
BBUM-763 Seminar in Consumer Behavior (BBUM-761)
BBUM-764 Marketing Logistics (BBUM-761)
BBUM-766 International Marketing (BBUM-761)
BBUM-769 Seminar in Marketing (various; permission of director)
BBUQ-783 Bayesian Decision Analysis (Phase I)

Master of Science in Accountancy curriculum

Foundation Courses: Phase I*
(Prerequisites listed in parentheses)

Course Number and Title	Credit Hours
BBUB-744 Behavioral Science in Management	4
BBUF-745 Economic Environment of American Business	4
BBUQ-781 Statistical Analysis I	4
BBUQ-782 Statistical Analysis II	4
	~~116

Advanced Courses: Phase II
(Foundation courses must be completed before taking advanced courses)

Course Number and Title	Credit Hours
BBUB-741 Management and Organization	4
BBUF-724 Problems in Financial Management	4
BBUA-707 Advanced Accounting and Theory	4
BBUA-708 Auditing	4
BBUA-710 Advanced Taxation Accounting	4
BBUA-712 Seminar in Accounting (various; permission of director)	4
Approved Electives	8
	32
	48

***Note:** If eight quarter credit hours of business law and/or eight quarter credit hours of finance were not completed at the undergraduate level, BBUB-751, Legal Environment of Business and/or BBUF-722, Financial Management, must be part of the approved electives.

Foundation courses are waivable with appropriate undergraduate background. However, any courses waived must be replaced with approved courses to maintain the 48 quarter credit hours minimum. If BBUF-745, Economic Environment of American Business, is waived, it must be replaced with a graduate level economics elective.

Business Administration courses

Accounting Group

BBUA-701 **Financial Accounting**
Registration #0101-701
An introduction to financial accounting. Topics covered will include: financial statements; transaction analysis; accounting for revenues, costs, and expenses; accounting for assets, liabilities and owner's equity; measurement; and the use of financial statements.

Credit 4

BBUA-702 **Cost and Managerial Accounting**
Registration #0101-702
Emphasizes the uses of cost data and reports for managerial decision making. Includes problems and procedures relating to job order, process, and standard cost systems with special attention to problems of overhead distribution. The planning process, the control process, and analytical processes are considered in detail. (Foundation courses)

Credit 4

BBUA-704 **Accounting Theory I**
Registration #0202-704
Theory and practice of accounting for assets based upon the latest pronouncements of the APB and FASB. Study of alternative valuation systems and their impact on income and financial position is the central focus of each asset category as it is studied in detail. (Foundation courses)

Credit 4

BBUA-705 **Accounting Theory II**
Registration #0101-705
Continuation of Accounting Theory I with emphasis on liabilities, equity, long-term debt and special reporting problems. Included here is the Statement of Changes in Financial Position, pensions, leases, and accounting for changes in the price level. (BBUA-704)

Credit 4

BBUA-707 **Advanced Accounting and Theory**
Registration #0101-707
Analysis and evaluation of current accounting thought relating to the nature, measurement and reporting of business income and financial position; concepts of income; attention to special areas relating to consolidated statement, partnerships, consignments and installment sales. (BBUA-705 or admission to MS program)

Credit 4

BBUA-708 **Auditing**
Registration #0101-708
The theory and practice of advanced public accounting are examined; critical study of auditing procedures and standards in the light of current practice; measurement and reliance of internal control covered by case studies; modern day auditing techniques by statistical sampling and electronic data processing applications. (BBUA-705 or admission to MS program)

Credit 4

BBUA-709 **Basic Taxation Accounting**
Registration #0101-709
A study of the basic field of federal income taxation is undertaken emphasizing its importance in business decisions and policies: application of income taxation to individuals, partnerships, and corporations is examined; income tax and accounting concepts affecting revenues and deductions are compared, including concepts of gross income, basis, recognition of gain and loss, capital asset transactions, exemptions and deductions. (Foundation courses or admission to MS program)

Credit 4

BBUA-710 **Advanced Taxation Accounting**
Registration #0101-710
A study of federal income taxes with special emphasis on corporate tax problems affecting business decisions and policies, including corporate reorganizations, personal holding companies, dividends, liquidations, capital gains transactions, federal gifts and estate taxes; tax planning and management. (BBUA-709 or admission to MS in accountancy)

Credit 4

BBUA-712 **Seminar in Accounting**
Registration #0101-712
Course content will differ by instructor and quarter. Topics covered: taxation, international accounting and accounting for non-profit organizations (Permission of director of Graduate Programs)

Credit 4

Business group

BBUB-741 **Management and Organization**
Registration #0102-741
Analysis and description of management principles and processes from the classical and behavioral viewpoints. Study of organizations and organizational change from the structural, systematic, and humanistic perspectives. Text and reading of original sources supplemented by case analysis and/or research paper. (Foundation courses)

Credit 4

BBUB-742 **Business and Society**
Registration #0102-742
A study of the impact on the manager of the needs, demands and restrictions posed by employees, government, the consumer and other environmental forces. The course examines possible managerial responses within the framework of several definitions of "social responsibility." (Foundation courses)

Credit 4

BBUB-743 **Operations Management**
Registration #0102-743
An analytical approach to the theory and application of operations management. Combines quantitative models and qualitative considerations relating to forecasting, inventory management, quality control, and queuing analysis. Statistical reasoning and computer utilization are basic tools in problem solution. (Foundation courses)

Credit 4

BBUB-744 **Behavioral Science in Management**
Registration #0102-744
The implications of studies from the fields of psychology are discussed; problems in perception, motivation, social interaction, group dynamics, attitudes and values are stressed. Lecture, discussion, case studies and emphasis on critical analysis and interpretation of original research readings.

Credit 4

BBUB-746 **Seminar in Management Development**
Registration #0102-746
Concepts of individual development; overview of present individual and group procedures; implications of current technological development for training, replacement, and advancement. (BBUB-741)

Credit 4

BBUB-747 **Systems Administration**
Registration #0102-747
General systems theory applied to the management of business systems. Topics covered include philosophy of systems, design, analysis and control of systems, cybernetics, project management, reliability, and human factors. (Foundation courses)

Credit 4

BBUB-748 **Labor/Management Problems**
Registration #0102-748
Problems in labor/management relations as they influence managerial decision making. Topics may include collective bargaining, conflicts and agreements between labor and management, and contemporary issues. From the perspective of labor/management structure, concepts are developed concerning market forces, unionism and labor law as they influence wage levels and wage structure. (Foundation courses)

Credit 4

BBUB-750 **Personnel Systems**
Registration #0102-750
This course introduces the concept of personnel systems and allows a detailed examination of the systems' different elements. The student will become acquainted with current theory and research in behavioral sciences. The course also allows the student to integrate theory with practical application through exercises and class projects dealing with problems in personnel selection, placement, training and evaluation. (Foundation courses)

Credit 4

BBUB-751 Legal Environment of Business
Registration #0102-751
An introduction to legal principles and their relationship to business practices including the background and sources of law, law enforcement agencies and procedures. Topical cases and examples are used as a guide to the observation of legal requirements and the legal forces which influence business and accounting decisions. (Foundation courses)

Credit 4

BBUB-758 Seminar in Management
Registration #0102-758
This course will take on different content depending on the instructor and quarter when offered. Topics which may be covered include management thought, systems theory and application, and behavioral aspects of management. Specific content for a particular □uarter will be announced prior to the course offering. (Permission of director of Graduate Programs)

Credit 4

BBUB-759 Integrated Business Analysis
Registration #0102-759
A course intended to give experience in combining theory and practice gained in other course work. This integrative exposure is achieved by solving complex and interrelated business policy problems that cut across the several functional areas of marketing, production, finance and personnel. This course is aimed at the formulating and implementation of business policy as viewed by top management. The case method is used extensively. (All other core courses)

Credit 4

BBUB-770 Business Research Methods
Registration #0102-770
Research as a basis for policy building, planning, control and operation of the business enterprise. Concepts, tools, sources, methods, and applications are covered. Procurement and evaluation of data for business use from government and private sources. (Foundation courses)

Credit 4

BBUB-771, 772 Research Option
Registration #0102-771, -772
A thesis course requiring the student to confront a real business problem. Requirements include steps from design to completed management report. (Core courses and one of the following: BBUB-770, BBUA-718, BBUF-723, BBUQ-784)

Credit 8

BBUB-790 Information Systems
Registration #0102-790
The concepts and techniques for the design and implementation of a computer-based management information system are studied. Topics include systems theory, the generation and collection of data, the transformation and dissemination of information, and the economics of information. (BBUB-743)

Credit 4

Finance group

BBUF-722 Financial Management
Registration #0104-722
A broad coverage of business finance with emphasis on the analytical techniques of resource allocation and asset management. Covers securities and securities markets, capital structure, analysis of financial statements, financing business operations, cost of capital and capital budgeting. (Foundation courses)

Credit 4

BBUF-723 Theory of Finance and Research
Registration #0104-723
This course involves a study of the current literature and most recent developments relating to the theories of investment and valuation, cost of capital, risk and dividend policy. Also considered are specific areas of application and the policy implications of the theories studied. (BBUF-722)

Credit 4

BBUF-724 Problems in Financial Management
Registration #0104-724
This course is designed to give the student greater depth in the basic concepts of financial management and greater facility in using the analytical techniques. Extensive use will be made of case material. Problem types to be considered include liquid asset management, capital budgeting, security valuation, methods of financing and dividend policy. (BBUF-722)

Credit 4

BBUF-725 Securities and Investment Analysis
Registration #0104-725
Study of securities and various investment media and their markets. Analysis of investment values based on financial and other data. Considers factors such as return, growth, and risk. (BBUF-722)

Credit 4

BBUF-729 Seminar in Finance
Registration #0104-729
This course will take on different content depending on the instructor and quarter when offered. Topics which may be covered are: financial models, financial analysis techniques, financial institutions and capital markets. Specific content for a particular quarter will be announced prior to course offering. (Permission of director)

Credit 4

BBUF-745 Economic Environment
Registration #0104-745 of American Business
Nature of the business firm; theory of demand, costs and prices; competition and monopoly; production function and the marginal productivity theory of distribution; saving and investment; the determination of the level of income; Federal Reserve operations; fiscal and monetary policies.

Credit 4

BBUF-757 Seminar in Economics
Registration #0104-757
Content will differ depending on the quarter and instructor. Topics which may be covered include international finance, monetary theory, labor economics and market structure. (Permission of director)

Credit 4

BBUF-765 Business Economics and
Registration #0104-765 Applied Econometrics
The course stresses model building, with emphasis on the economic foundations of the models. Econometric techniques are employed in the development and testing of aggregate, industry, and company models, with attention given to the feedback relationship from the aggregate (macro) model to the industry and company models. Forecasting and analysis of the industry and company models are employed. Simulation of the models under alternative policy assumptions is performed. Bank data, model-tools, and computer programs are supplied. (Foundation courses)

Credit 4

BBUF-767 Advanced Microeconomic Theory
Registration #0104-767
An advanced study of the fundamental economic principles underlying the nature of a business firm. Topics include: theories of demand and revenue; theory of costs and production analysis in both the short-run and the long-run; equilibrium of demand and supply and efficiency of competition; market structures and their characteristics; pricing and output under perfect competition, pure monopoly, imperfect competition, and oligopoly; resource allocation and product distribution. Business applications are given along with the exposition of the theory. (Foundation courses)

Credit 4

BBUF-768 Advanced Macroeconomic Theory
Registration #0104-768
An advanced study of the fluctuations and growth of economic activity in a modern complex society. Topics include: measuring macroeconomic activity; modeling economic activity; microeconomic foundations of macroeconomic theory (the labor, the commodity, the money, and the bond markets); a parallel discussion of the complete Classical and Keynesian macroeconomic models; recent criticism of the two models; the general equilibrium; the phenomena of inflation and unemployment and the way business can forecast them; the impact of fiscal and monetary policies in promoting and maintaining economic stability and growth; reality and macroeconomic disequilibrium; and wage-price policies. (Foundation courses)

Credit 4

Marketing group

BBUM-761 **Marketing Concepts**
Registration #0105-761
Critical examination of the marketing system as a whole; functional relationships performed by various institutions such as manufacturers, brokers, wholesalers, and retailers. Analysis of costs, strategies and techniques related to the marketing system. Both behavioral and quantitative aspects of marketing are considered. (Foundation courses)

Credit 4

BBUM-762 **Advanced Marketing Management**
Registration #0105-762
An in-depth study of selected problems which face marketing managers concerned with promotion, place, price, and product. Material centers on staff marketing functions. Research topics unique to the field of marketing are covered. (BBUM-761)

Credit 4

BBUM-763 **Seminar in Consumer Behavior**
Registration #0105-763
A study of the market in terms of the psychological and socio-economic determinants of the buyer's behavior, including current trends in purchasing power and population movements. (BBUM-761)

Credit 4

BBUM-764 **Marketing Logistics**
Registration #0105-764
The study of an integrated system for the distribution of products from producer to consumer. The emphasis is on the physical flow of goods both between and within marketing institutions. Specific topics covered are unit geographic location, internal product flow, inter-unit transportation, and warehousing. (BBUM-761)

Credit 4

BBUM-766 **International Marketing**
Registration #0105-766
A study of the differences in market arrangements as well as in the legal, cultural, and economic factors found in foreign countries. Topics included are planning and organizing for international marketing operations: forecasting and analysis; inter-relationships with other functions; and product, pricing, promotion, and channel strategy. (BBUM-761)

Credit 4

BBUM-769 **Seminar in Marketing**
Registration #0105-769
This course will take on different content depending on the instructor and quarter when offered. Topics which may be covered are: marketing models, marketing channels, articulation with top marketing executives, and marketing positioning. Specific content for a particular quarter will be announced prior to course offering. (Permission of director of Graduate programs)

Credit 4

Quantitative group

BBUQ-778 **Probability Theory**
Registration #0106-778
A calculus-based introduction to probability theory. The course includes set theory, theorems, axioms, and concepts of probability, discontinuous and continuous distributions, moment generating functions and probability generating functions. (Differential and Integral Calculus and Foundation courses)

Credit 4

BBUQ-781 **Statistical Analysis I**
Registration #0106-781
A study of probability and classical statistics including set theory, discrete and continuous probability distributions, sampling distributions, point estimation, and hypothesis testing. Applications are made to the managerial decision making situation.

Credit 4

BBUQ-782 **Statistical Analysis |i**
Registration #0106-782
A continuation of topics from classical statistics including interval estimation, nonparametric tests, analysis of variance, regression and correlation analysis, time series, and index numbers. (BBUQ. 781)

Credit 4

BBUQ-783 **Bayesian Decision Analysis**
Registration #0106-783
An introduction to decision theory for managerial decision situations with a strong emphasis on Bayesian decision analysis. Topics include modeling, principles of choice, the expected opportunity loss, the expected value of information, revision of discrete and continuous prior distributions, the expected value of sample information, optimal sampling, utility functions, and decision diagramming. (BBUQ-782) Not open to decision science majors)

Credit 4

BBUQ-784 **Decision Theory**
Registration #0106-784
The decision theory approach to decisions under uncertainty is examined. The modeling of business decision situations, the utilization of utility theory, and the application of various principles of choice are considered. The Bayesian approach to decision theory is primarily emphasized. (BBUQ-778)

Credit 4

BBUQ-786 **Operations Research—**
Registration #0106-786 **Mathematical Programming**
An introduction to the application of operations research techniques to business decision making. Specific topics covered are linear programming, algebraic and geometric concepts, simplex method, sensitivity testing and duality, optimization, dynamic programming and integer programming. (BBUB-743)

Credit 4

BBUQ-787 **Operations Research—**
Registration #0106-787 **Probabilistic Models**
An introduction to the use of probability in operations research models. Probabilistic techniques are applied to the problems of forecasting, capital budgeting, PERT, inventory, queueing and Markov processes. (BBUB-778)

Credit 4

BBUQ-789 **Simulation**
Registration #0106-789
An introduction to the various uses of simulation as a management tool for decision making. Models of varying levels of sophistication employing simulation programming languages are constructed. (Foundation courses)

Credit 4

BBUQ-792 **Concepts in Computer Utilization**
Registration #0106-792
An introduction to the use of computers in problem solving. Students are exposed to BASIC programming language. Computer systems and their use in business are examined.

Credit 4

BBUQ-795 **Seminar in Decision Sciences**
Registration #0106-795
This course will take on different content depending on the instructor and quarter when offered. Topics which may be covered are: multi-variate analysis, simulation, operations research, linear programming and Bayesian techniques. Specific content for a particular quarter will be announced prior to course offering. (Permission of director of Graduate programs)

Credit 4

Graduate Faculty, College of Business

Edward A. Johnson, Ph.D., Michigan State—Dean; Professor, Management

John H. Burns, Ph.D., Michigan State—Director, Graduate Business programs; Associate Professor, Finance

Dale F. Gibson, MBA, Pennsylvania—Assistant Dean, Administration; Associate Professor, Marketing

Brian C. Arnold, Ph.D., Colorado State—Lecturer, Behavioral Sciences

j. Clarke Baker, MBA, Chicago—Lecturer, Management Science

Thomas R. Burns, J.D., Notre Dame—Lecturer, Law

Richard J. Butler, MS, Clarkson College—Assistant Professor, Management

Robert C. Camp, Ph.D., Pennsylvania State—Lecturer, Marketing

Richard L. Cattanach, DBA, Arizona State; C.P.A., Alaska, Arizona—Lecturer, Accounting

You-Keng Chiang, Ph.D., Chicago—Professor, Economics

Arthur E. Coles, MBA, Rochester Institute of Technology—Lecturer, Management

Thomas E. Comte, MBA, Columbia—Assistant Professor, Management

Martin J. Cunniffee, MS, University of Rochester—Lecturer, Information Systems

Terry L. Dennis, Ph.D., Purdue-Associate Professor, Operations Systems

Andrew J. DuBrin, Ph.D., Michigan State—Professor, Behavioral Sciences

William E. Dunkman, Ph.D., Columbia—Professor, Economics

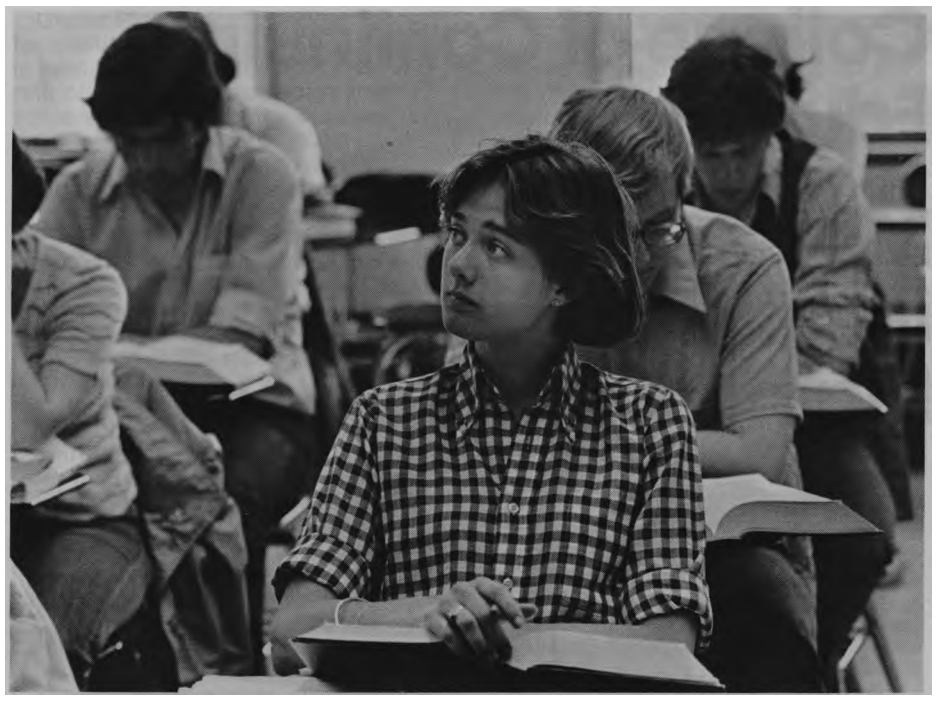
Stanley M. Dye, BA, Haverford, C.P.A., New York—Distinguished Lecturer, Accounting; Former Partner, Coopers Lybrand

Larry O. Edwards, MBA, Harvard—Lecturer, Management

Eugene H. Fram, Ed.D., SUNY at Buffalo—Director, Center for Management Study; Professor, Marketing

James C. Galloway, MBA, Pennsylvania—Assistant Professor, Finance

Thomas H. Greco, Jr., MBA, University of Rochester—Assistant Professor, Quantitative Methods



C. Michael Hamilton, Ph.D., Kansas—Lecturer, Finance

John K. Hartley, Jr., MS, Georgia Institute of Technology—Associate Professor, Management

John Hickman, J. D., Yale-Associate Professor, Finance

Frank E. Holley, BS, Illinois-Distinguished Lecturer, Finance/Economics; Former Chairman of the Board, Marine Midland

Ronald G. Hudson, MS, Stanford—Lecturer, Mangement Sciences

Vernon G. Lippitt, Ph.D., Harvard—Lecturer, Economics

Henry E. Mattice, MBA, Indiana—Lecturer, Statistics

James McGuire, MBA, Rochester Institute of Technology—Lecturer, Labor Relations

E. James Meddaugh, Ph.D., Pennsylvania State; C.P.A., New York, Washington, D.C.—Accounting Coordinator; Associate Professor, Accounting

William L. Mihal, Ph.D., University of Rochester—Associate Professor, Behavioral Sciences

Herbert J. Mossien, BS, Alfred—Professor, Marketing; Former Vice President and General Manager, Scientific Apparatus Division, Bausch & Lomb, Inc.

Donald J. Onimus, MBA, Syracuse; C.P.A., New York—Lecturer, Accounting

Francis J. Pallischeck, MBA, Siena College—Professor, Mangement; Former Group Vice President, Xerox Corporation

Keith G. Provan, MBA, Boston University—Assistant Professor, Behavioral Sciences

Neil Rich, MBA, Rochester Institute of Technology—Lecturer, Computers

Jose A. Rullan, MS, Rochester Institute of Technology—Instructor, Accounting

Dean C. Siewers, MBA, Duke—Assistant Professor, Marketing

G. Hollister Spencer, DBA, Arizona State—Professor, Management

Robert D. Spooner, Ph.D., Pennsylvania—Lecturer, Finance

Robert E. Stevens, J.D., SUNY at Buffalo—Lecturer, Labor Relations

William J. Stevenson, Ph.D., Syracuse—Associate Professor, Operations Systems

Howard A. Taylor, MBA, University of Rochester—Lecturer, Accounting

Daniel D. Tessoni, MS, Clarkson—Instructor, Accounting

Philip R. Tyler, DBA, Michigan State—Associate Professor, Marketing

Paul H. Van Ness, MBA, Michigan-Associate Professor, Quantitative Methods

Michael J. Vernarelli, Ph.D., SUNY at Binghamton—Instructor, Economics

Stanley M. Widrick, MBA, SUNY at Buffalo—Assistant Professor, Marketing

Thomas A. Williams, Ph.D., Rensselaer Polytechnic Institute—Professor, Operations Systems

Julian E. Yudelson, Ph.D., Northwestern—Associate Professor, Retailing/Marketing

John S. Zdanowicz, Ph.D., Michigan State—Associate Professor, Finance

College of Continuing Education

Master of Science degree in Applied and Mathematical Statistics

Harold J. Alford, Dean
Austin J. Bonis, Chairman, Department of Statistics: 475-2002

The program in applied and mathematical statistics is conducted on a part-time evening basis and is intended primarily for full-time employees of business and industry. Students from other programs at RIT may also participate as may those without a degree objective who desire specialized training in particular statistical fields. Also, those in industry desiring to update their skills or extend their education in statistics further will find this program well suited to their needs.

The basic requirement for the master of science in applied and mathematical statistics is the satisfactory completion of 45 quarter credits (15 quarter courses) of approved work. Normally this takes two years, attending two nights a week.

There are two levels of courses: the 700 level series furnishes most of the standard methods currently used in industry; the 800 series covers theory and applications in special areas like the design of experiments. From time to time, special courses in topics of particular interest are offered when requested by the students: reliability, Bayesian methods, information theory, are examples.

A minimum of 21 credits must be earned through courses in the 800 series. Otherwise, all courses in applied and mathematical statistics are elective. In consultation with a departmental advisor, a total program structured to achieve individual professional objectives will be determined.

Admission

Admission to the degree program will be granted to qualified holders of a baccalaureate degree from an accredited college or university who have acceptable mathematics credits through integral calculus. Applicants who fail to meet the latter requirement may, at the discretion of the department chairperson, be accepted and required to complete two or three undergraduate mathematics courses before being able to proceed in the regular graduate program.

Credit for courses of graduate stature in statistics, mathematics, computer programming, operations research, and other fields related to statistics may be accepted toward fulfillment of degree requirements at the discretion of the department chairperson with due regard to the candidate's objectives. (However, in order to insure credit toward the degree, prior approval should be obtained from the department chairperson.)

Those who do not have college degrees may be admitted to courses of their special interest by consent of the department chairperson.

Grades
The candidate must attain an overall average grade of at least 3.0 (B) for graduation.

Location
Courses are offered at the Henrietta campus and at selected off-campus locations. Students may wish to check with the department advisor for the most convenient meeting place.

Plans of study
A student may, with permission of the department chairperson, elect one of three curricular plans. All candidates under all three plans, upon completion of course work, must pass a final oral examination designed to assure professional competence as a statistician at the master's level.

Under Plan A, the candidate completes 36 quarter credits, and must submit a satisfactory research project and thesis which count as nine quarter credits.

Under Plan B, the candidate completes 45 quarter credits of satisfactory work.

Under Plan C, Independent Study for qualified students, the candidate is held responsible for his or her own rate of progress in subject matter achievement rather than pursuing a scheduled course completion program. The candidate will be assigned to a faculty advisor who will set subject matter goals, as approved by the department chairperson, for the candidate to work toward. The candidate will be free to attend as an auditor, and at his or her discretion, without the necessity of formal registration in the class, any part or all of any course in the program that may be helpful to him or her. Registration as a candidate is required each quarter.

As determined by the candidate and advisor, the candidate will periodically stand for both written and oral department examinations to measure progress in achievement of assigned subject matter goals. The number of credits earned by the candidate each quarter will be reported for the record. He or she may elect at the end of each quarter to transfer to Plan A or Plan B, with attained quarter credits to be assigned at the point of transfer as determined by the department chairperson.

Normally, a minimum of six quarters of work under Plan C should be required to qualify for the MS degree, but no minimum is mandatory. The cumulative record will show 45 quarter credits before awarding the degree.

Transfer of a candidate from Plan A or Plan B to Plan C is also possible at the discretion of, and with credit determined by the department chairperson, but this procedure is exceptional rather than common.

Dr. Austin J. Bonis

Program tries to

"serve local industry"

"Security is an illusion; the only real security people have is their trade," says Dr. Austin J. Bonis, chairman of the graduate statistics program at RIT.

And Bonis, since he joined RIT in 1970, has devoted all of his energy to helping employees of local firms stay secure in their positions by keeping their statistical skills polished.

"Basically, I believe we try to help people get ahead in the job that they're in," he says. "We hope that what they learn today will be applied in their work tomorrow."

Bonis, a recognized expert in the field of statistical reliability, is a former chief statistician for the Department of Defense and served as military aide to Presidents Roosevelt and Truman. He still does consulting for the Army, as well as private industry.

But his approach to teaching statistics is, he says, "definitely not the classical approach."

"The typical program is classic in that it leads to further study in the field; ours is a terminal program. . . it's interdisciplinary and it really attempts to serve local industry.

"The leading researchers at Kodak and Xerox have considerable input into that structure of the program. . . they guide us toward teaching what industry needs."

The faculty, he says, are tops in their field: "Each of our faculty members is rated quarterly by his or her students. Those who don't measure up are not rehired."

Bonis, who was director of research for a division of General Motors Corp., said he left industry and came to RIT because "basically, I've been teaching all my life, no matter what job I happened to be in. And I was attracted by the challenge of teaching in this program."

Course descriptions
Statistics

CTAM-711 Fundamentals of Statistics I
Registration #0240-711
For those taking statistics for the first time. Covers the statistical methods used most in industry, business and research. Essential for all scientists, engineers, and administrators.
Topics: organizing observed data for analysis and insight; learning to understand probability as the science of the uncertain; concepts of practical use of the Central Limit Theorem. (Consent of the department).

Credit 3

CTAM-712 Fundamentals of Statistics II
Registration #0240-712
Continuation of CTAM-711.
Topics: concepts and strategies of statistical inference for making decisions about a population on the basis of sample evidence; tests for independence and for adequacy of a proposed probability model; learning how to separate total variability of a system into identifiable components through analysis of variance; regression and correlation models for studying the relationship of a response variable to one or more predictor variables. (All standard statistical tests) (CTAM-711 or equivalent.)

CTAM-721 Quality Control: Control Charts
Registration #0240-721
A practical course designed to give depth to practicing quality control personnel.
Topics: statistical measures; theory, construction, and application of control charts for variables and for attributes; computerization procedures for control charts; tolerances, specifications, and process capability studies; basic concepts of total quality control, and management of the quality control function. (Consent of the department.)

Credit 3

CTAM-731 Quality Control: Acceptance Sampling
Registration #0240-731
Investigation of modern acceptance sampling techniques with emphasis on industrial application.
Topics: single, double, multiple, and sequential techniques for attributes sampling; variables sampling; techniques for sampling continuous production. The course highlights Dodge-Romig plans, Military Standard plans, and recent contributions from the literature. (Consent of the department.)

Credit 3

CTAM-741 Techniques for Investigational Analysis
Registration #0240-741
Studies of special statistical techniques applicable to industrial, educational, accounting, medical, and business-type problems. Helpful to those doing research in these fields.
Topics: use of special probability papers, profit analysis, sensitivity testing, order statistics and extreme value applications, analysis of means, goodness of fit tests, and special plotting techniques. (CTAM-712 or equivalent.)

Credit 3

CTAM-751 Introduction to Decision Processes
Registration #0240-751
A first course in statistical decision theory featuring concrete situations and realistic problems.
Topics: basic statistical ideas; how to make the best decision prior to sampling, after sampling, sequentially; optimum managerial strategies, practical applications. (Consent of the department.)

Credit 3

CTAM-761 Reliability
Registration #0240-761
A methods course in reliability practices: What a reliability engineer must know about reliability prediction, estimation, analyl sis, demonstration, and other reliability activities. Covers most methods presently being used in industry.
Topics: applications of normal, binomial, exponential, and Weibuli graphs to reliability problems; hazard plotting; reliability confidence limits and risks; strength and stress models; reliability safety margins; truncated and censored life tests; sequential test plans-Bayesian test programs. (CTAM-712 or equivalent.)

Credit 3

CTAM-801 Design of Experiments |
Registration #0240-801
How you design and analyze experiments in any subject matter area; What you do and why.
Topics: basic statistical concepts, scientific experimentation, completely randomized design, randomized complete block design, nested and split plot designs. Practical applications to civil engineering, pharmacy, aircraft, agronomy, photoscience, genetics, psychology, and advertising. (CTAM-712 or equivalent.)

Credit 3

CTAM-802 Design of Experiments II
Registration #0240-802
Continuation of CTAM-801
Topics: factorial experiments: fractional, three level, mixed; response surface exploration. Practical applications to: medical areas, alloys, highway engineering, plastics, metallurgy, animal nutrition, sociology, industrial and electrical engineering. (CTAM-801.)

Credit 3

CTAM-811 Probability Theory and Applications I
Registration #0240-811
How to handle processes that have some chance element in their structure.
Topics: review of basic concepts of mathematical theory; Markov sequences; Poisson processes, and discrete parameter random processes; applications. (CTAM-822 or equivalent.)

Credit 3

CTAM-812 Probability Theory and Applications II
Registration #0240-812
Continuation of CTAM-811, with more on stochastic processes.
Topics: algebraic methods useful for solving Markov chains, non-finite and continuous Markov chains, limiting distributions, and an introduction to queuing theory. (CTAM-811 or equivalent.)

Credit 3

CTAM-821 Theory of Statistics I
Registration #0240-821
Provides a sound theoretical basis for continuing study and reading in statistics.
Topics: constructs and applications of mathematical probability; discrete and continuous distribution functions for a single variable and for the multivariate case; expected value and moment generating functions; special continuous distributions. (Consent of the department.)

Credit 3

CTAM-822 Theory of Statistics II
Registration #0240-822
Continuation of CTAM-821.
Supporting theory for, and derivation of, sampling distribution models; applications and related material. (CTAM-821 or equivalent.)

Credit 3

CTAM-823 Theory of Statistics III
Registration #0240-823
Continuation of CTAM-821, 822.
Point estimation theory and applications, the multivariate normal probability model, its properties and applications; interval estimation theory and applications. (CTAM-822 or equivalent.)

Credit 3

CTAM-830 Multivariate Analysis
Registration #0240-830
Deals with the summarization, representation, and interpretation of data sampled from populations where more than one characteristic is measured on each sample element. Usually the several measurements made on each individual experimental item are correlated as univariate analysis should not be applied to each **measurement** separately. This course covers the use of the basic multivariate techniques. Computer problem solving will be **emphasized.** Topics will include multivariate, t-test, ANOVA, regression analysis, repeated measures, quality control and profile analysis- (CTAM-801, 802.)

Credit 3

CTAM-841 Regression Analysis I
Registration #0240-841
A methods course dealing with the general relationship problem.
Topics: the matrix approach to simple and multiple linear regression; analysis of residuals; dummy variables; orthogonal models; computational techniques. (CTAM-802 or equivalent.)

Credit 3

CTAM-842 Regression Analysis II
Registration #0240-842
A continuation of CTAM-841.
Topics: selection of best linear models; regression applied to analysis of variance problems; nonlinear estimation and model building. (CTAM-841 or equivalent.)

Credit 3

CTAM-851 Nonparametric Statistics
Registration #0240-851
Distribution-free testing and estimation techniques with emphasis on applications.
Topics: sign tests; Kolmogorov-Smirnov statistics; run tests; Wilcoxin-Mann-Whitney test; Chi-Square tests; rank correlation; rank order tests; quick tests. (CTAM-712 or equivalent.)

Credit 3

CTAM-853 Managerial Decision Making
Registration #0240-853
Continuation of CTAM-751, statistical decision analysis for management.
Topics: utilities; how to make the best decision (but not necessarily the right one); normal and best Bayesian theory; many action problems; optimal sample size; decision diagrams. Applications to marketing; oil drilling, portfolio selection; quality control; production; and research programs. (CTAM-751 or equivalent.)

Credit 3

CTAM-861, 862 Reliability Certification
Registration #0240-861, 862 Seminars I & II
The American Society for Quality Control (ASQC) offers Certification as a Reliability Engineer by written examination. These two-quarter courses prepare students for this examination, purpose is to increase reliability expertise. Offered are lectures, nandouts, workshops, and practice examinations.
Topics: reliability management, prediction, estimation, analysis, apportionment, test and demonstration, math models growth; maintainability, parts selection, design review, human deparfm ^t") other selected reliability activities. (Consent of the

Credit 3/Qtr.

CTAM-871 Sampling Theory and Application
Registration #0240-871
An introduction to sample surveys in many fields of applications with emphasis on practical aspects.
Topics: review of basic concepts, sampling problem elements; sampling; random, stratified, ratio, cluster, systematic, two-stage cluster; wild life populations, questionnaires, sample sizes. (CTAM-712 or equivalent.)'

Credit 3

CTAM-881 Bayesian Statistics I
Registration #0240-881
Probability as a degree of belief; how we learn; the applications of Bayesian principles to: estimation of failure rates, revising odds, testing precise hypotheses, finding credible regions, entropy and information; description of errors in measurements; analysis of experimental results. (CTAM-712 or equivalent.)

Credit 3

CTAM-882 Bayesian Statistics II
Registration #0240-882
Continuation of CTAM-881; non-normal and contaminated distributions; decision making; discrimination; test of significance and goodness of fit from the Bayesian point of view; sequential decisions; handling several variables: comparisons, measuring efficiency, straightline analysis. A potpourri of applications: rare events, reliability, radar, and other. (CTAM-881.)

Credit 3

CTAM-895 Statistics Seminar
Registration #0240-895
This course or sequence of courses, provides for one or more quarters of independent study and research activity by students other than those in the Plan C option. This course may be used by other departments at RIT (or other colleges) to provide special training in statistics for students who desire an independent study program in partial fulfillment of graduate degree requirements. (Consent of all departments involved.)

Credit 3

CTAM-896, 897, 898 Thesis
Registration #0240-896, -897, -898
For students working toward the MS degree in mathematical statistics under Plan A. (Consent of the department.)

Credit 3/Qtr.

CTAM-899 Individual Achievement Program
Registration #0240-899
For students accepted under the Plan C Option (Independent Study). The program to be followed will permit either:

(a) satisfactory achievement in the same subject matter the student would select under Plan A or Plan B; or

(b) satisfactory achievement through independent studies in the student's particular field of professional interest in statistics, such as mathematics, engineering, quality control, or business.

Prerequisite: Consent of the department.

Credit 3-45 quarter hours to be earned and recorded in quarter hour segments as the candidate progresses in the plan of independent study set up with him or her.

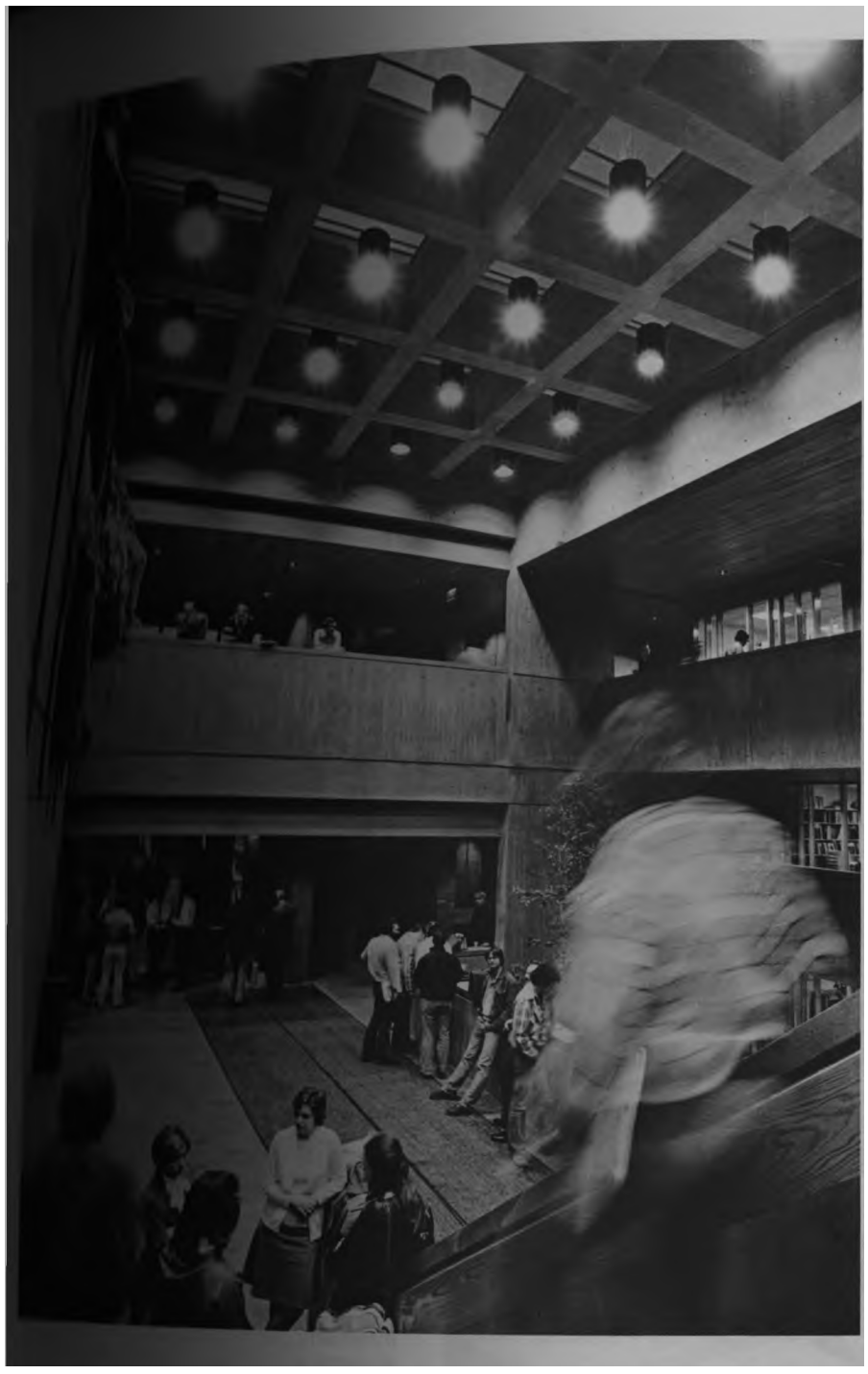
CTAM-886 Sample Size Determination
Registration #0240-886
The question most often asked of an industrial statistician is "What size sample should I take?" This course answers that question for a wide variety of practical investigational projects. Techniques for the full use of the optimal sample evidence are also offered.

Prerequisite: 0240-712 or equivalent.

Credit 3

CTAM-891, 892, 893 Special Topics in Applied Statistics
Registration #0240-891, -892, -893
This course provides for the presentation of subject matter of important specialized value in the field of applied and mathematical statistics not offered as a regular part of the statistics program. (Consent of the department.)

Credit 3/Qtr.



Austin J. Bonis, BS, College of the City of New York, Ph.D, George Washington University—Professor, Chairman, Statistics

Mason E. Wescott, Ph.D, Northwestern—Professor Emeritus, Statistics

Thomas B. Barker, BS, MS, Rochester Institute of Technology

Larry P. Chapman, BS, North Carolina State; MS, Rochester Institute of Technology

Douglas Ekings, BS, Virginia Military Institute; MS, University of Rochester

Richard A. Garth, BS, University of Rhode Island; MS, Rochester Institute of Technology

Robert Kringle, BS, MS, University of Wisconsin

John K. Lynch, BS, MS, University of Wyoming

Martin J. Madigan, BS, MS, Rochester Institute of Technology

Mitchell Mergenthaler, BS, State University College of New York at Cortland; MS, Pennsylvania State University.

Patricia Mrozek, BA, SUNY at Albany; MS, University of Delaware

John L. Pabrinkis, BS, MS, University of Rochester

Joseph D. Patton, Jr., BS, Pennsylvania State University; MBA, University of Rochester

Wilma Priester, BS, Prairie View A&M; MS, Rochester Institute of Technology

Albert D. Rickmers, BS, Bloomsburg State College; M.Ed., St Bonaventure University; MS, Rochester Institute of Technology—Professor

Jacob C. Rubin, BS, College of the City of New York; MS, Rochester Institute of Technology

Richard R. Scott, AAS, BS, MS, Rochester Institute of Technology

A. Said El Shami, BS, MS, The American University in Cairo

Allan F. Toth, BS, Widener College; MS, Rochester Institute of Technology

Joseph Tsiakals, BS, MS, Bradley University

Hubert D. Wood, BS, George Washington University; MS, University of Rochester

Raymond F. Woods, BS, Canisius College; MA, Bowling Green State University

Nicholas A. Zaino, Jr., AAS, Mohawk Valley Technical Institute; BS, Rochester Institute of Technology; MSEE, Pennsylvania; MA, University of Rochester

College of Engineering

Richard A. Kenyon, Dean
Swaminathan Madhu, Director of Graduate Programs

Master of Engineering degree

Master of Science degree in Electrical or Mechanical Engineering

The College of Engineering offers graduate programs leading to the master of engineering degree, or the master of science degree in electrical or mechanical engineering. The purpose of the graduate programs in engineering is to equip the graduate student with the insight, understanding and competence commensurate with demands of current and future positions in engineering.

Degree programs are available on either a part-time or a full-time basis.

Part-time study

The College of Engineering encourages practicing engineers in the Greater Rochester industrial community to pursue a program toward the master of science degree or the master of engineering degree without interrupting their work at their place of employment. Consequently, many of the courses in the graduate programs in engineering are normally scheduled in the late afternoons or early evenings.

Students employed full-time in industry are limited to a maximum of two courses or eight credits each quarter. A student who wishes to register for more than eight credits while employed in full-time industry must obtain the permission of his or her advisor and the approval of the department head.

It is possible for a student to obtain the MS degree in two academic years (or six academic quarters) by taking courses in late afternoons or early evening only.

A student in the master of engineering degree program may earn academic credits for industrial experience which will be treated as internship experience while the student is enrolled in the program.

Full-time study

Even though graduate programs in engineering serve the need of a large number of practicing engineers who wise to pursue a part-time program, the different programs may also enroll full-time graduate students. A full-time student may take up to 16 credits per quarter.

In-plant graduate courses
A full-time student in the master of engineering degree program alternates academic quarters with his or her internship. A full-time student can normally complete the degree requirements in one calendar year. A limited amount of financial aid is available to the full-time student. Details of such aid can be obtained from the individual department heads.

In order to enable the practicing engineer to take graduate courses with the minimum amount of inconvenience, a number of courses for RIT credit are offered in selected industrial locations using a combination of video tapes, and in-person discussion sessions.

Admission

Any student who wishes to study at the graduate level must first be admitted to the graduate program.

An applicant is admitted as a graduate student if he or she has received a bachelor's degree from an approved undergraduate school, and if an examination of the required documents indicates the qualifications to undertake a graduate program.

Applicants whose past performance does not satisfy all conditions of admission but who appear to merit a trial period will be admitted and reviewed after the completion of 16 credit hours of graduate level work.

All applicants who are admitted prior to the conclusion of their baccalaureate program are required to submit their final transcript by the end of the first quarter of graduate work.

To be considered for admission it is necessary to file an Application for Admission to Graduate Study accompanied by the appropriate transcripts of previous under-graduate and graduate study, two letters of recommendation, and evaluation of Graduate Record Examination, if one has been taken.

Non-Matriculated status
An applicant is permitted to take graduate courses as a non-matriculated student if he or she has a bachelor's degree from an approved undergraduate school and the necessary background for the specific courses in which he or she wishes to enroll. The courses taken for credit on a non-matriculated status can usually be applied toward the master of science or master of engineering degree when the student is admitted to the graduate program at a later date. However, the maximum number of credits which can be transferred to the degree program from courses taken as a non-matriculated student is normally 16 credits.

To be admitted as a non-matriculated student, the applicant must file an application/registration form each quarter. There is usually no need to submit supporting documents of the type required with the application for admission to a graduate program.

Graduate Record Examination
The College of Engineering does not require graduate applicants to take the Graduate Record Examination.

RIT's Solar Energy House

Plan of study
The programs are flexible and afford students an opportunity to plan a course of study suited to their own interests and directed toward their own objectives. Each graduate student should submit a Plan of Study to the department office within the first year after admission as a graduate student. To assure a coherent program and one which reflects the student's maturing capacities and aims, the plan may be revised on request.

Transfer credits
A maximum of nine quarter credits (or six semester credits) can be transferred from graduate courses taken outside the Institute. To be considered for transfer credit, the course must have been taken within a five-year period prior to the date of the student's initial entry into a graduate program in engineering at RIT as a non-matriculated or regular student. Courses taken at another institution after the student's initial entry into a graduate engineering program at RIT are also eligible for transfer credit. However, to insure transferability, prior approval should be obtained. The student should contact the individual department office about the procedure for obtaining transfer credits.

Faculty advisor
A member of the graduate faculty is appointed as a faculty advisor for each graduate student. The faculty advisor supervises the progress of the student towards the master's degree. Non-matriculated students should direct their questions to either the department head or the chairperson of the department's Graduate Committee.

Course descriptions
For a complete outline of courses, refer to the course description section on the following pages.

Grade requirements
The average of the grades for all courses taken at the Institute and credited toward the master's degree must be at least a "B" (3.0). Transfer credits from other institutions and internship credits are not included in the computation of the cumulative grade point average. If at any time a student's average falls below a "B", or if he or she fails in any required examination, the student's advisor may recommend to the dean that the student's performance be reviewed and appropriate action taken.

Thesis
The thesis requirements vary among the different departments. The requirements of an individual department are stated in the sections describing each department's programs.

The thesis must comply with the following regulations:
The thesis must be completed and accepted at least 30 days before the last day of scheduled classes of the quarter in which the student expects to receive a degree. The original and two copies of the thesis must be submitted to the departmental office before the above deadline. These copies are for transmittal to the Institute library, the departmental office, and the student's thesis advisor. For detailed instructions about the organization of the thesis, the student should consult the brochure "Thesis Format," available at the departmental office.

Maximum limit on time
The required credits for the master's degree must be completed within seven years after the student's initial registration in graduate courses at the Institute as a regular or non-matriculated student.

Courses of instruction
Information about the courses that will be offered in a particular quarter will be available from the departmental office prior to registration. The Institute reserves j the right to withdraw any course for which enrollment is insufficient, **or** to make any changes in the schedule of courses if necessary.

Master of Engineering degree program

This is a post-baccalaureate internship program leading to the professional degree of master of engineering. The objective of the program is to provide the engineering BS graduate the means for earning a terminal master's degree, substituting a well organized and carefully chosen cooperative, industrial internship for the conventional thesis or equivalent requirement for an MS degree.

Special features of the program

An industrial internship of duration equivalent to two academic quarters in a specially developed full-time engineering position is an integral part of the program. A minimum of eight and a maximum of 16 credits may be earned by the student's internship experience. The internship position is selected to reflect each student's primary professional interest and is integrated with his or her curriculum.

The program, although rooted in engineering, will be significantly interdisciplinary. By design, a student's program may range over several colleges of the Institute in assembling courses which will best help the student meet professional objectives. A maximum of 16 credits can be taken by the student in courses outside the traditional area of engineering and the sciences, subject to advisor approval.

Admission requirements

The requirements and general standards for admission and the selection procedure will be essentially similar to those for the MS degree programs. However, the number of full-time students admitted into the program will be limited by the number of internship positions available.

Degree requirements

A minimum of 48 credits, including the academic credits awarded for the internship experience, are required for the master of engineering degree.

Faculty advisor

Each student will be assigned a faculty advisor as soon as he or she is formally admitted to the program. In cases where the student's background warrants it, a committee of two advisors will be assigned. The faculty advisor will assist the student in preparing a meaningful plan of study. The advisor will also monitor and evaluate the student's internship experience (in cooperation with the student's industrial supervisor) and recommend to the Graduate Committee of the College of Engineering the number of academic credits to be awarded for the internship experience.

For information

General questions of graduate engineering programs call 475-2167 (Dr. Madhu)

Specific questions on the individual department programs:

Electrical Engineering 475-2167 (Dr. Madhu)
Industrial Engineering 475-2147 (Dr. Reeve)
Mechanical Engineering 475-2153 (Dr. Budynas)

Questions on course schedules and registration:

Electrical Engineering 475-2164
Industrial Engineering 475-2598
Mechanical Engineering 475-2163

electrical engineering pepartment

james **E Palmer,** Department Head

paster of Science degree program

Thesis

The master of science degree in **electrical** engineering is awarded upo**n** successful completion of an approved graduate program **consisting** of a minimum of 45 q**uarter** credits. Under certain **circumstances,** a student may be expected to complete more than the **minimum** number of credits.

The inclusion of a thesis as a **formal** part of the master of science **degree** program in electrical **engineering** is optional. Students **who** decide to write a thesis can earn **a minimum** of six credits and a **maximum** of 12 credits toward their **degree** from the thesis.

Non-thesis options

Students who do not wish to write a **thesis** may choose one of the **following** non-thesis options:

Option 1

A student with significant industrial experience of at least six years after earning the baccalaureate degree **may** be permitted to make an oral technical presentation on an engineering project the student has worked on. The technical presentation carries no academic credits and the student will earn all the required credits for the degree in course work. Proposals for such a technical presentation must be submitted to the chairperson of the Graduate Committee on or before January 31 of the academic year in which the presentation is to be made.

Option 2

A student may choose to write a "graduate paper" in lieu of a thesis. The graduate paper is an extensive term paper on a topic of professional interest. The objective of the 9faduate paper is to enable the student to undertake an independent and in-depth literature search, and write a report summarizing the 'ndings. A faculty member interested |n the topic of the paper will serve as ne student's supervisor and direct the scope and depth of the paper as wel| as the format of the final written version. The paper will ormally be used to earn a minimum four and a maximum of eight cademic credits. The student must rst consult a faculty member about a suitable topic for the paper and obtain consent. The course numbers EEEE-800-801 Graduate Paper are used in registering for the paper. The student choosing this option will earn the remainder of the required credits for the degree by means of course work.

Core courses

The two courses EEEE-700, 701 Linear Systems I, II will be required of all students entering the graduate programs in electrical engineering in fall, 1977 or later. The requirement will be waived only in cases where the student can clearly establish that he or she already has an adequate background in linear system theory.

With the exception of the above two courses, students choose courses in consultation with their advisors and according to their professional objectives. Students should, however, make sure that they have the proper prerequisite background (as stated in this bulletin) for any course they plan to take.

It should be emphasized that, besides the two courses in linear systems mentioned above, the courses EEEE-702 Introduction to Random Variables and Signals and EEEE-713 Modern Control Theory are prerequisites for a number of courses in the department. The student should arrange to take these courses as early in the program as possible.

Elective courses

A maximum of 12 quarter credit hours can be chosen from graduate or advanced undergraduate courses offered by any department of the Institute with prior approval of the faculty advisor. The remaining credit hours must be earned from graduate courses in electrical engineering.

Course calendar

Most of the graduate courses in electrical engineering are scheduled on the basis of a two-year cycle as shown in the course calendar below. The calendar does not, however, apply to courses offered off campus at several industrial locations. Courses which are found in the course descriptions but not included in the following calendar, are offered when there is sufficient student interest, or on an independent study basis.

Fall 1978 and every even-numbered year

EEEE-700 Linear Systems I
EEEE-711 IC Operational Amplifiers
EEEE-712 Control Systems Fundamentals
EEEE-719 Sampled Data Control Systems
EEE-722 Automatic Control Systems Design
EEEE-743 Minicomputer Fundamentals

Winter 1979 and every odd-numbered year

EEEE-701 Linear Systems II
EEEE-702 Introduction to Random Variables and Signals
EEEE-713 Modern Control Theory
EEEE-734 Communications Techniques
EEEE-738 Physics of Semiconductor Devices
EEEE-744 Microprocessors

Spring 1979 and every odd-numbered year

EEEE-714 Nonlinear Control
EEEE-716 Digital Signal Processing
EEEE-735 Digital Data Transmission
EEEE-739 Integrated Circuit Design

Fall 1979 and every odd-numbered year

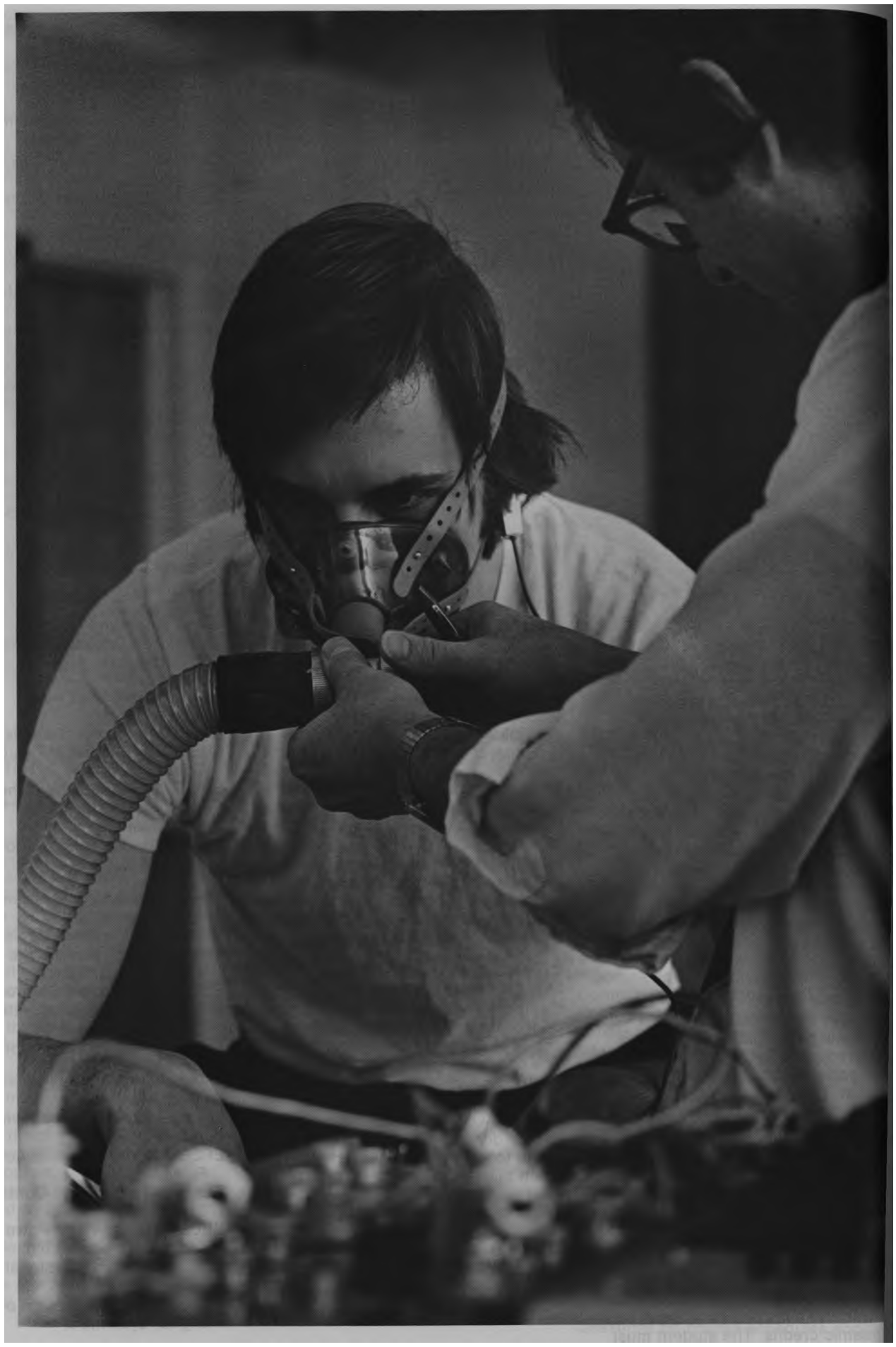
EEEE-700 Linear Systems I
EEEE-718 Statistical Design of Control Systems
EEEE-736 Information Theory
EEEE-743 Minicomputer Fundamentals
EEEE-750 Logic Design of Digital Systems I

Winter 1980 and every even-numbered year

EEEE-701 Linear Systems II
EEEE-702 Introduction to Random Variables and Signals
EEEE-713 Modern Control Theory
EEEE-740 Digital Integrated Circuits
EEEE-744 Microprocessors
EEEE-751 Logic Design of Digital Systems II

Spring 1980 and every even-numbered year

EEEE-708 Passive and Active Filter Design
EEEE-720 Optimum Control Systems
EEEE-721 Thyristor Power Control and Conversion
EEEE-737 Random Signals and Noise
EEEE-752 Logic Design of Digital Systems II



industrial Engineering Department

Richard Reeve, Department Head

Graduate courses are offered by the industrial Engineering Department primarily for candidates of the master of engineering degree whose professional interests fall within Industrial engineering and/or engineering management. Close cooperation with the School of Business Administration insures the master of engineering (engineering management, industrial engineering) candidate a wide selection of courses and a unique opportunity to build a program tailored to his or her professional interests and goals. **There** is no master of science degree in industrial engineering at the present time.

Mechanical Engineering Department

Robert M. Desmond, Department Head

Master of Science degree program

The master of science degree in mechanical engineering is awarded upon successful completion of an approved graduate program consisting of a minimum of 45 quarter credits. A minimum of 33 credits are to be earned in course work, while the thesis—when required—carries a minimum of four credits and a maximum of 12 credits.

Thesis option
There are five options offered by the department with regard to completing the requirements of the master of science degree. Each student is free to select either a research thesis, design thesis. literature thesis, project option, or additional work with a comprehensive examination. Detailed information can be obtained from the department head.

Each student completing a thesis will be required to pass, as a minimum, an oral examination on the **thesis** subject. Students in a non-**thesis** program will be required to **Pass** a comprehensive examination in their major field. This examination will be taken near the end of the formal program of study, but in any **case,** no earlier than the completion of **at** least 30 graduate credits.

Core courses
All graduate students in the Mechanical Engineering Department are expected to have a mathematics background equivalent to Analysis for Engineers, EMEM-692. Students not meeting this prerequisite will be expected to take EMEM-692 as soon as possible after enrolling.

All graduate students are required to complete the following:

Course Number and Title	Credits
EMEM-800 Applied Engineering Analysis I	4
EMEM-801 Applied Engineering Analysis II	4
EMEM-810 Introduction to Continuum Mechanics	4

In those cases where students have had the equivalent in graduate level courses of any of the core courses, the departmental Graduate Committee may permit substitution.

Students changing their major discipline to mechanical engineering from another field, or having graduated from a non-accredited undergraduate program, should anticipate additional core requirements.

Elective courses
The majority of a student's program will be developed from the mechanical engineering graduate courses. However, when the needs of a particular program require additional courses, the student may elect to take up to 12 credits from other departments in the Institute. Graduate students are allowed to take those upper level undergraduate electives in mechanical engineering specified in the course descriptions as EMEM-6XX. However, a maximum of two such courses are allowed for graduate credit. All graduate student programs must be submitted to and approved by the departmental Graduate Committee.

Course descriptions
For a complete outline of graduate courses offered, please consult the following course description section.

Assistantships and fellowships
Some assistantships and fellowships are available for full-time students. Appointment as a teaching assistant carries a 12-hour per week commitment to a teaching function, and permits a student to take graduate work at the rate of 12 credits per quarter. Appointment as a research assistant also permits taking 12 credits per quarter while the remaining time is devoted to the research effort which serves as a thesis subject. Fellowships generally permit taking courses at the rate of 16 credits per quarter. All appointments provide full tuition and may provide stipends up to $2,500 per academic year. Applicants for financial aid should write directly to the department head for details.

Course calendar
The courses Introduction to Continuum Mechanics, EMEM-810; Applied Engineering Analysis I, EMEM-800; and Applied Engineering Analysis II, EMEM-801 are offered in the fall, winter, and spring quarters, respectively, each year. Other courses in mechanical engineering are generally given in alternate years. For further information on current course offerings, the student should contact the office of the Mechanical Engineering Department (475-2163).

Engineering courses

EENG-790 **Engineering Internship**
Registration #0302-790
This course is used by the students in the master of engineering degree program for earning intership credits. The actual number of credits is to be determined by the student's faculty advisor and subject to approval by the Graduate Committee of the College of Engineering.

Credit variable

Electrical Engineering

EEEE-700, 701 **Linear Systems I, II**
Registration #0301-700, -701
These two courses are required of all graduate students in electrical engineering (except those who were admitted before September 1977). Topics in the first course (700) include differential equations, linear algebra, linearity and superposition, convolution, Fourier series and Fourier Transforms. Topics in the second course (701) include LaPlace Transforms, complex variables, the Inverse LaPlace transformation, transfer functions of networks, state variables, Z transform and difference equations. Many of the above topics might be familiar to the graduate student because they are covered in undergraduate electrical engineering courses in some form or other. However, these topics will be covered in these two courses in greater depth and the student will be expected to develop a higher level of understanding.

Credit: 4/quarter

EEEE-702 **Introduction to Random Variables and Signals**
Registration #0301-702
Random events, random variables, histograms; probability density functions; functions of a random variable, moments; multi-variate topics; statistical decision theory; parameter estimation. This course is a prerequisite for the sequence 735, 736, 737.

Credit 4

EEEE-704 **Electromagnetic Fields**
Registration #0301-704
Vector analysis; electrostatic fields in vacuum and in dielectrics; energy and forces; analytical methods of solution of electrostatic problems; approximate methods; magnetic field of steady currents; magnetic materials; electromagnetic induction; Maxwell's equations. (EEEE-471, 472)

Credit 4

EEEE-705 **Electromagnetic Waves**
Registration #0301-705
Maxwell's equations; propagation of plane waves in unbounded regions; reflection and refraction of waves: total reflection, polarizing angle, multiple dielectric boundaries; guided electromagnetic waves; characteristics of common waveguides; circular waveguides; resonant cavities; radiation and antennas.

Credit 4

EEEE-706 **Special Topics in Electromagnetics**
Registration #0301-706
Selection of one or more of the following topics depending upon the interest of the students: interaction of fields and matter; wave propagation in anisotropic media; theory of antenna arrays; microwave networks; field computation by method of moments; generation of microwaves. (EEEE-704, 705)

Credit 4

EEEE-708 **Passive and Active Filter Design**
Registration #0301-708
Network analysis (review); classical frequency domain filters and passive filter design; filter transformations: low pass to high pass and bandpass; active filter design using single Op amps and RC networks; filter design using multiple Op amps for two-pole two-zero sections; realization of n-pole filters using two-pole sections; sensitivity analysis; tuning of filters; effect of non-ideal Op amp characteristics on filter performance; design examples and demonstrations. (EEEE-700, 701)

Credit 4

EEEE-709 **Active Network Synthesis**
Registration #0301-709
Fundamentals of network synthesis: energy functions, P. R. functions; properties of network functions; synthesis of RC one-port and two-port networks; approximation, normalization and frequency scaling; active network analysis; active network elements: tunnel diodes, gyrators, impedance converter, impedance inverter; realizability, stability and sensitivity of active networks; synthesis of one-port and two-port active networks using negative resistances; synthesis of one-port and two-port active networks using controlled sources. (EEEE-700, 701)

Credit 4

EEEE-711 **Integrated Circuit Operational Amplifiers**
Registration #0301-711
Analysis of operational amplifier circuits using the ideal Op amp; development of circuit models to predict non-ideal Op amp characteristics; study of feedback systems, stability (using Bode plots), and compensation; direct-coupled amplifiers and operational amplifier design; interpretation of manufacturers' specifications and basic applications with emphasis on practical aspects. (EEEE-442, 700, 701)

Credit 4

EEEE-712 **Control System Fundamentals**
Registration #0301-712
This course is intended for graduate students who have not had a formal course in control systems in their undergraduate program. It is not open to those who have already had an introductory control systems course.
It is a study of linear control systems, their physical behavior, dynamical analysis and stability using mathematical models. This involves the use of root locus, Bode, and Nyquist techniques for the analysis of single and multiple-loop systems. (Elementary knowledge of LaPlace transforms)

Credit 4

EEEE-713 **Modern Control Theory**
Registration #0301-713
The development of the analytical techniques of modern theory as applied to linear control systems. Topics include vector spaces, j state space, state variables, matrices and matrix functions, controllability, observability and stability theory. (EEEE-700 and either 613 or 712)

Credit 4

EEEE-714 **Nonlinear Control Systems**
Registration #0301-714
An introduction to the physical nature and mathematical theory of nonlinear control systems' behavior using phase plane techniques, Liapounov theory, (including Aizerman's methods, variable gradient methods and the Lure Forms), perturbation methods, describing function techniques and Popov's criterion; analysis of switching and relays. These are applied to both piecewise-linear and analytical nonlinear systems. (EEEE-713)

Credit 4

EEEE-716 **Digital Signal Processing**
Registration #0301-716
A course in sampled data methods aimed at the development ana study of discrete signal processing techniques. Elementary sampling theory and the one-sided 2 transform are the principal tools used. Emphasis is placed on the design of digital filters and the **use** of fast Fourier transform methods. (EEEE-700, 701)

Credit 4

EEEE-718 **Statistical Design of Control Systems**
Registration #0301-718
Brief review of probability; statistical description of random Proc esses; mean square error analysis; design of optimum linear control system for minimizing the mean square error with stationary random imputs with or without additive noise; design with constraints (EEEE-613 or EEEE-712)

Credit 4

EEEE-719 **Sampled Data Control System**
Registration #0301-719
Brief review of the theory of sampling and quantizing; modified Z transform properties and application; design and compensate techniques for sampled data control systems; stability criteria synthesis of digital controllers; multirate sampled data control systems; computer control theory. (EEEE-713 and 701)

Credit 4

EEEE-720 Optimum Control Systems
Registration #0301-720
Introduction to calculus of variations; conditions of optimality; optimizing transient performance by statistical and variational procedures, dynamic programming and by Pontryagin's maximum principle; design of optimal linear systems with quadratic criteria. (EEEE-713)

Credit 4

EEEE-721 Thyristor Power Control and Conversion
Registration #0301-721
Thyristor family of semiconductors is becoming increasingly important in the area of power control and conversion. The objective of this course is to provide an adequate, application-oriented knowledge to those interested in the areas of control, power and power electronics. Topics to be discussed: preliminaries: basic principles of static switching, thyristor theory, triggering, commutations; rectifiers: principles of controlled rectification, analysis of single- and three-phase controlled rectifiers; inverters: series and parallel SCR inverters, design of inverters, sinewave filters, forced commutated inverter, McMurray inverter; DC systems: principles of DC—DC conversion, choppers, DC motor control, single-phase DC motor drives, three-phase DC motor drives, dual converter; cycloconverter: frequency conversion using SCR's phase-controlled cycloconverters, cycloconverter controls.

Modeling and simulation of thyristor circuits: thyristor models, approximations, digital simulation of choppers, inverters and cycloconverters, areas for further research.

Demonstration experiments will be set up. Also, individual projects by interested students will be enouraged.

Credit 4

EEEE-722 Control System Design
Registration #0301-722
Evaluation of feedback control system performance; design using root locus and frequency response plots; compensating networks; realization of transfer functions—cascade and feedback compensation; applications; analysis and design of AC feedback control systems; introduction to nonlinear system representation and design. (EEEE-613 or EEEE-712)

Credit 4

EEEE-734 Communication Techniques
Registration #0301-734
Study of different modulation schemes; linear modulation; angle modulation; Heuristic discussion of noise inlinearmodultionand 61 FM systems; noise figure; brief discussion of pulse modulation. (EEEE-700)

Credit 4

EEEE-735 Digital Data Transmission
Registration #0301-735
Pulse code modulation and pulse amplitude modulation; carrier systems, FSKand PSK systems; DCPSK system; signal space representation of data signals and discussion of signal space. (EEEE-702, 734)

Credit 4

EEEE-736 Information Theory
Registration #0301-736
An introduction to the fundamental concepts of information theory: entropy, equivocation, transinformation and redundancy; coding for binary channels; measurement of signal parameters in the presence of noise; bandwidth vs. accuracy. (EEEE-702)

Credit 4

EEEE-737 Random Signals and Noise
Registration #0301-737
Random processes; correlation functions; spectrum of periodic functions and periodic random processes; orthogonal series for a random process; spectral densities; the Gaussian random process; noise through a linear system; physical sources of noise; noise figure; statistical decision theory. (EEEE-700, 702)

Credit 4

EEEE-738 Physics of Semiconductor Devices
Registration #0301-738
A basic course dealing with the physics of semiconductors. Topics include: crystal structure and bonding; electron and hole motion; 62 energy band structure; lattice vibrations; impurities; defects; occupation statistics; carrier transport; optical phenomena; and pn, npn, pnp junctions.

Credit 4

EEEE-739 Integrated Circuit Design
Registration #0301-739
A discussion of the practical as well as the physical aspects of integrated circuit design. Device layout and processing methods along with their effects on actual device characteristics will be considered in some detail. Passive components and active components such as the JFET, MOSFET and bi-polar devices will be discussed in conjunction with their implementation in linear as well as logic integrated circuits. (EEEE-738)

Credit 4

EEEE-740 Digital Integrated Circuits
Registration #0301-740
Evolution of digital IC's, pertinent properties, overview of logic families. Techniques to: measure characteristics, model via computer, employ standard MSI/LSI, minimize package count, use programmed logic, interface. Small system case studies; microcomputer, TV terminal, etc. (EEEE-650 or EEEE-750, 751. 751 may be taken concurrently).

Credit 4

EEEE-742 Computer Methods in Electrical Engineering
Registration #0301-742
A study of numerical methods for the solution of problems in electrical engineering with special emphasis on approximation techniques. The method of moments and computer solutions of problems in antennas and microwave networksare studied. (SMAM-611)

Credit 4

EEEE-743 Minicomputer Fundamentals
Registration #0301-743
A course designed to provide engineers with a practical knowledge of minicomputers. Stress will be placed on basic architecture, software fundamentals, interfacing characteristics, and interrupt structures and control of I/O devices.

Credit 4

EEEE-744 Microprocessors
Registration #0301-744
This course aims to provide an understanding of basic microprocessor architecture, develop an understanding of microcomputer programming techniques and software aids, and illustrate methods of interfacing microcomputers to digital systems. Typical microprocessor applications which illustrate conventional logic replacement, hardware and software design trade-offs and design flexibility will be discussed. Most discussions will be based upon the Intel 8080 and the Motorola M6800. Lab exercises are an integral part of the course. (EEEE-743)

Credit 4

EEEE-750, 751, 752 Logic Design of Digital Systems I, II, III
Registration #0301-750, -751, -752
These three courses are devoted to the study of various aspects of logic design and digital systems, both theoretical and practical. The first course (750) covers combinational logic. Topics include Boolean algebra, classical approaches to the design of combinational logic networks, NAND and NOR networks, multiplexers, encoders and decoders, ROM's and their applications and arithmetic units. The second course (751) covers sequential circuits. Topics include asynchronous, fundamental mode and pulse mode sequential circuits, synchronous sequential circuits, counters, shift registers, shift registers with feedback and programmable counters. The third course (752) covers miscellaneous topics which deal with the extension of the concepts covered in the first two to more complex digital systems. Topics include some or all of the following: finite state models, arithmetic logic units, programmable logic arrays, logic design with microprocessors, fault detection. (The titles of these courses were formerly Switching Circuits I, II, III).

Credit 4 per course

EEEE-772, 773, 774 Special Topics in Electrical Engineering
Registration #0301-772, -773, -774
Topics and subject areas that are not among the courses listed above are frequently offered under the title of Special Topics. Such courses are offered in the normal course format (regularly scheduled class sessions taught by an instructor). The number of credits may vary from course to course, but usually it is 4 credits per course.

Credit variable (maximum 4 per course number).

EEEE-780 Independent Study
Registration #0301-780
This course number should be used by students wishing to study a topic on an independent study basis. The student must obtain the permission of the faculty member prior to registration.

Credit variable

EEEE-800, 801 **Graduate Paper**
Registration #0301-800, -801
This course number is used to fulfill the graduate paper requirement under the non-thesis option for the master of science degree in electrical engineering. The graduate paper is an extensive term paper on a topic of professional interest. The student must obtain the consent of a faculty member to supervise the paper before registering for these course numbers.

Credit 4 for EEEE-800; variable (maximum 4) for EEEE-801

EEEE-890 **Research and Thesis Guidance**
Registration #0301-890
An independent engineering project or research problem to demonstrate professional maturity, preferably involving the reduction of theory to practice. An oral examination and a written thesis are required.

Credit variable (maximum of 12 credits total)

Industrial Engineering

EiEI-601 **Value Analysis**
Registration #0303-601
This course examines the nature and measurement of value. The concept and construction of a value index representing average value is related. Numerical estimation methods such as ranking, pair comparison, magnitude estimation, and criteria analysis are explained and used to measure the value of diverse items. The methods used are applicable to the study of a wide variety of problems and have special utility in engineering design studies.

Credit 4

El EI-620 **Engineering Economy**
Registration #0303-620
Time value of money, methods of comparing alternatives, depreciation and depletion, income tax consideration, replacement, retirement and obsolescence, and capital budgeting.

Credit 4

EIEI-680 **Engineering Planning and Control**
Registration #0303-680
A course designed to introduce the student to the basic concepts of long range planning control, and project management. Topics will include budgeting, planning cycles, planning models, and related topics. Related topics will depend on the interest and direction of the class and may include such areas as aggregate planning models (linear decision rule, management coefficient model, search decision rule).

Credit 4

EIEI-685 **Patent Law**
Registration #0303-685
The course will be primarily directed towards the patent laws of the United States, however, comparisons to the patent laws of other countries will be addressed as appropriate. The course will cover the broad categories of obtaining a patent, the exploitation of a patent, the corporation and patents as well as other patent-related items. Major topics to be specifically addressed include what is patentable under U.S. law, the concept of prior art, techniques used in the preparation of patent applications, the prosecution of a patent application at the U.S. Patent Office, the licensing of patents, the enforcement of patent rights through litigation, the benefits of patents, specific problems involving intellectual property within a corporate environment, trademarks, copyrights, and trade secrets. Emphasis will be placed on practical situations involving the handling of inventions within the corporation and on behalf of an individual inventor.

Credit 4

EIEI-701 **Principles of Operations Research I**
Registration #0303-701
Applied linear programming; computational techniques for solving constrained optimization problems; linear programming; the simplex method and variations; duality and sensitivity testing.

Credit 4

EIEI-702 **Mathematical Programming**
Registration #0303-702
Application of non-linear programming techniques; classical optimization techniques; quadratic, stochastic, integer programming and dynamic programming; applications to industry. (EIEI-701)

Credit 4

EIEI-705 **Survey of Operations Research**
Registration #0303-705
A survey course designed to introduce the student to such topics as waiting line analysis, inventory, scheduling, replacement, and simulation. This course is intended to present an integrated view of the field of operations research to students who will take more specialized courses as well as those in other disciplines desiring only a limited exposure to the field.

Credit 4

EIEI-710 **Systems Simulation**
Registration #0303-710
Methods of modeling and simulating human-machine systems with emphasis on model validation, design of simulation experiments variance reduction techniques, random number generation, distribution generation. Major emphasis is placed on GPDS simulation language.

Credit 4

EIEI-715, 716 **Statistical Analysis for**
Registration #0303-715, -716 **Engineers I and II**
A basic two-quarter course in probability and statistics designed to give the student a foundation for further study in areas such as design of experiments, stochastic systems, and simulation.

Credit 4/Qtr.

EIEI-718 **Inventory Design**
Registration #0303-718
Overview of inventory problems; single period models under risk and uncertainty; dynamic models under certainty; dynamic models under risk and uncertainty; forecasting; inventory system analysis.

Credit 4

EIEI-720 **Production Control**
Registration #0303-720
A systems approach to the design of production control operations, investigation of forecasting operations planning; inventory control, and scheduling! Case studies and the design of actual production systems are encouraged.

Credit 4

EIEI-725 **Technological Forecasting**
Registration #0303-725
Technological forecasting is concerned with the Delphi method, SOON charts, trend extrapolation, relevancy trees, cross input analysis, internally consistent scenarios, and decision matrices. The course will provide a thorough introduction to the basic concepts and techniques of technological forecasting.

Credit 4

EIEI-730 **Biotechnology and Human Factors I**
Registration #0303-703
Basic functional anatomy and physiology; human body systems; anthropometry; applications on the design for people and human-machine systems; work physiology; industrial biomechanics.

Credit 4

EIEI-731 **Biotechnology and Human Factors II**
Registration #0303-731
Effect of mechanical and physical environment on: physiology behavior, performance of people; design considerations to protect people against environmental effects (thermal environment, noise, vibration, acceleration, light, altitude).

Credit 4

EIEI-732 **Biotechnology and Human Factors III**
Registration #0303-732
Theoretical fundamentals of human body mechanics; development and applications of biomechanics and biomechanical models kinematics of the link system of the body and extremity joints.

Credit 4

EIEI-733 **Biotechnology and Human Factors IV**
Registration #0303-733
Measurements of human performance; functions that people form in human-machine systems; techniques to quantify people's behavior at work.

Credit 4

»lC: 734 Systems Safety Engineering
I'gistration #0303-734
»rcident study of the human component in occupational systems; roduct systems safety analysis; approaches in accident prevention.

Credit 4

ke1,771, 772, 773, 774 Special Topics in Industrial
neaistration #0303-771, -772, -773, -774 Engineering
This is a variable credit, variable topics course which can be in the form of regular courses or independent study under faculty supervision.

Credit variable (maximum 4 per course number)

Mechanical Engineering

euEM-601 Alternative Energy Sources
Registration #0304-601
Emphasis on the technical aspects of solar and wind energy. Wind characteristics and site analysis, aerodynamics of horizontal and vertical axis rotors, and the economics of wind power. Fundamentals of solar radiation, solar hot water heating and solar space heating, and the economics of solar utilization. Included, but to a lesser extent, are tidal power, wave power, geothermal energy, ocean thermal gradient, and energy from waste. Individual term projects are required. (Permission of instructor)

Class 4, Credit 4

EMEM-800 Applied Engineering Analysis I
Registration #0304-800
Use of matrices including matrix algebra, matrix inversion, diagonalization of matrices, eigenvalues and eigenvectors; application of matrices to the solution of sets of linear ordinary differential equations; the solution of partial differential equations by separation of variables using orthogonal functions, including Bessel functions; introduction to LaPlace transforms.

Credit 4

EMEM-801 Applied Engineering Analysis II
Registration #0304-801
Theory of complex variables including analytic functions, mapping, power series, and residues; application of complex variables, LaPlace and Fourier transform inversion for solving partial differential equations.

Credit 4

EMEM-802 Applied Engineering Analysis III
Registration #0304-802
Introduction to optimization techniques: calculus of variations, Hamilton's principle, Rayleigh-Ritz method; Volterra and Fredholm integral equations with applications. (EMEM-801)

Credit 4

EMEM-806 Numerical Analysis
Registration #0304-806
Numerical methods for solving algebraic and transcendental equations, finite difference methods, error and convergence analysis, numerical methods of solutions of initial value and boundry value problems in engineering. Extensive use of computer is anticipated. (Graduate standing)

Credit 4

EMEM-810 Introduction to Continuum Mechanics
Registration #0304-810
^artesian tensors and indicial notation. Analysis of the stress and erormation in a continuous media. Introduction to the linear theory elasticity and the mechanics of fluids. (SMAM-308 or EMEM-692)

Credit 4

EMEM-811 Theory of Elasticity
Registration #0304-811
Formulation of elasticity problems. Plane strain, plane stress solutions Potentials, torsion, thick cylinders, disks, and spheres, advanced Problems of bending of beams, curved beams. The semi-infinite medium and related problems. Stability problems. (EMEM-810)

Credit 4

EMEM-812 Theory of Plates and Shells
Registration #0304-812
Theory of thin plates for small deflections. Rectangular and circular plates with various boundary conditions, elliptic and triangular plates. Membrane theory of shells, cylindrical shells, pressure vessels, shells of revolution. (EMEM-811)

Credit 4

EMEM-813 Energy Methods in Mechanics
Registration #0304-813
Energy principles: virtual work, Betti theorem, Castigliano's theorems, Rayleigh-Ritz method. Statics of structure: beams, frames, rings, and columns. Matrix methods. Dynamics of structures: free and forced vibrations for structures with one degree of freedom, many degrees of freedom. Continuous structures. (EMEM-811)

Credit 4

EMEM-815 Experimental Stress Analysis
Registration #0304-815
Experimental methods of analysis of structural machine members, including strain gages and instrumentation, photoelastic methods, brittle coating, Moire fringe method, holographic techniques; and the hydrodynamic, electrical, and membrane analogs. Laboratory tests of models. (EMEM-694 or equivalent)

Credit 4

EMEM-816 Finite Elements I
Registration #0304-816
Development of theory from variational principles. Two-dimensional applications to elastic continua, considering plane stress, plane strain, and axisymmetric loading examples. Problem-solving sessions using RIT computer. Applications in structural mechanics, considering beam elements, plate elements, and shell elements. Utilization of these elements in solving specific structural problems. Introduction to three-dimensional stress analysis. Features of large general-purpose computer programs.

Credit 4

EMEM-818 Finite Elements II
Registration #0304-818
Variational principles for linear and nonlinear elements. Three-dimensional element derivations using natural coordinate systems. Solid elements, tetrahedron and hexahedron: various thin shell elements. Computer workshops with use of various programs demonstrating the above theory.

Credit 4

EMEM-820 Analytical Mechanics
Registration #0304-820
Brief review of vectorial mechanics with emphasis on the dynamics of rigid bodies and applications to systems of degrees. Introduction to continuum using the limiting case of a system with an infinite degree fo freedom. (Graduate standing or departmental approval)

Credit 4

EMEM-821 Vibration Theory and
Registration #0304-821 Applications I
Vibration of discrete multi-mass systems using matrix methods. Normal mode theory, and matrix eigenvalue extraction procedures. Matrix forced response. Practical examples using two and three degrees of freedom. Computer situtations.

Credit 4

EMEM-822 Vibration Theory and
Registration #0304-822 Applications II
Analysis of vibrations of linear continuous systems, involving beams, frames, plates, and shells. Solution by classical methods or by approximate methods, as expedient. Introduction to finite-element analysis of vibration. System analysis techniques such as mobility and receptance methods. Applications of methods discussed to practical problems.

Credit 4

EMEM-825 Lubrication
Registration #0304-825
Incompressible lubrication in one-dimensional and finite journal bearings, hydrodynamic gas bearings, hydrostatic bearings, squeeze film and dynamic loading, rolling elements, thrust bearings, sliding bearings. Design considerations. (EMEM-415)

Credit 4

EMEM-826 Materials, Principles and Selection
Registration #0304-826
A study of the principles of material behavior as applied to design Application of these materials according to these principles is stressed. Ferrous and non-ferrous materials are covered. Among the possible topics are strength, hardness, corrosion, fatigue, economy, welding, and machining. (EMEM-344)

Credit 4

EMEM-828, 829 Special Topics in
Registration #0304-828, -829 Applied Mechanics
An opportunity for the advanced student to undertake an independent investigation in the area of applied mechanics. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, theoretical study, or an investigation involving laboratory experiment.

Credit variable (maximum of 4 credits/quarter)

EMEM-830 Heat Transfer I
Registration #0304-830
The formulation of conduction heat transfer problems. Solutions to steady state and unsteady state problems by separation of variables, LaPlace transforms and numerical methods. Empirical methods for forced convection and their use in the design of industrial systems. (EMEM-514)

Credit 4

EMEM-833 Heat Transfer II
Registration #0304-833
Principles of natural and forced convection, thermal boundary layers and their solutions. Convection heat transfer systems such as flows inside tubes, outside tubes, and over external surfaces. Empirical relations; applications to heat exchangers; nature of thermal radiation, radiation properties of surfaces and gases, radiant energy interchange in an enclosure filled with participating media. Problems involving simultaneous conduction, convection, and radiation. (EMEM-514)

Credit 4

EMEM-835 Thermodynamics
Registration #0304-835
An advanced study of thermodynamic equilibrium and stability. The thermodynamics of chemical reactions, combustion and flame phenomenon, phase change, stressed solids and other topics de' pending on the interest of the students. An introduction to irreversible thermodynamics.

Credit 4

EMEM-836 Statistical Thermodynamics
Registration #0304-836
The relationship between macroscopic thermodynamic properties and microscopic behavior of matter. Calculation of macroscopic thermodynamic properties using Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein statistics. Determination of transport properties from kinetic theory of gases.

Credit 4

EMEM-840 Fluid Dynamics
Registration #0304-840
Selected topics from hydrodynamics, compressible flow, viscous flow, hydrodynamic instability and turbulence, depending on interests of the students. (EMEM-415)

Credit 4

EMEM-841 Gas Dynamics
Registration #0304-841
Governing equations of compressible isentropic flow through nozzles and diffusers. Perturbation techniques and sound waves. Subsonic and supersonic flow, mach cones. Theory of characteristics, rarefaction and compression waves. Normal shock waves in a converging/diverging nozzle and infront of a moving piston. Hugonoit relations across a shock. The shock tube. One-dimensional flow with friction, Fanno line flow.

Credit 4

EMEM-848, 849 Special Topics in Thermo
Registration #0304-848, -849 Fluid Systems
An opportunity for the advanced student to undertake an independent investigation in the area of thermo fluid systems. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, a theoretical study, or an investigation involving laboratory experiment.

Credit variable (maximum of 4 credits/quarter)

EMEM-851 Automatic Control Systems I
Registration #0304-851
A first course in control systems analysis at the graduate level. Topics include mathematical modeling and response of lumped-parameter systems, stability analysis and multi-variable techniques. Bode and root-locus analysis of feedback systems. Compensation is introduced. Physical systems and analog computer used for lecture demonstrations throughout the course. Level of mathematical rigor is sufficiently above “classical” undergraduate controls course to allow those with previous undergraduate background to take this course.

Credit 4

EMEM-852 Automatic Control Systems II
Registration #0304-852
A continuation of EMEM-851. Topics include Nyquist plots and stability theorem, Nichols charts, compensation, state-space formulation of multi-variable systems and non-linear systems. Students will undertake individual projects requiring both analytical and experimental work. Individual use of analog and digital computers is encouraged. (EMEM-851)

Credit 4

EMEM-854 Optimal Control Systems Design
Registration #0304-854
An advanced study of feedback systems in terms of optimal and adaptive control. Variational calculus, the maximum principle, Hamilton-Jacobi theory, criteria for optimal design, constrained and unconstrained optimization, examples of optimal systems control. Introduction to the adaptive problem, gradient methods and examples of adaptive or self-optimizing control systems. (EMEM-851, 852, 800)

Credit 4

EMEM-857 Advanced Topics in Systems Analysis
Registration #0304-857
A project-oriented course examining a spectrum of feedback systems and problems. Systems to be studied include mechanical, electromechanical, optical, biomedical, and systems associated with transportation: hybrid propulsion systems, car-driver interaction, vehicular traffic flow and high-speed vehicle guidance systems. (Subject to instructor's approval)

Credit 4

EMEM-858, 859 Special Topics in
Registration #0304-858, -859 Systems Analysis
An opportunity for the advanced student to undertake an independent investigation in the area of systems analysis. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, a theoretical study, or an investigation involving laboratory experiment.

Credit variable (maximum of 4 credits/quarter)

EMEM-861 Engineering Hydrology
Registration #0304-861
A study of the dynamics of the physical processes involving the waters of the earth. Included in the course will be: the meaning of hydrology, the hydrological cycle, transport processes, physical composition of the atmosphere, physical composition of oceansand lakes, planetary fluid mechanics, circulation of the atmosphere, and precipitation.

Credit 4

EMEM-862 Solid Wastes Engineering
Registration #0304-862
A study of the collection, processing, disposal and reuse of solid wastes of municipal, industrial, and agricultural origin. A discussion of the basic design parameters of landfilling, burning, and processing solid wastes. A presentation of considerations of importance to the development of workable regional and municipal management systems.

Credit 4

EMEM-890 Research and Thesis Guidance
Registration #0304-890
In conference with a thesis advisor, a topic is decided on, and either a theoretical or laboratory type research program is carried out Periodic progress reports and final written thesis with oral examination.

Credit variable (maximum 12 credits total)

Graduate Faculty College of Engineering

Richard A. Kenyon, Ph.D., P.E., Syracuse—Dean, Professor, Mechanical Engineering

Swaminathan Madhu, Ph.D., University of Washington—Director of Graduate Programs; Professor, Electrical Engineering

Douglas M. Marshall, MSEM, West Virginia University—Associate Dean, Associate Professor, Mechanical Engineering

Electrical Engineering Department

James E. Palmer, Ph.D., Case Institute of Technology—Professor, Digital Systems; Department Head

Frank J. Bogacki, M.S. Pennsylvania—Assistant Professor, Solid State Devices

George Brown, MSEE, University of Rochester—Associate Professor, Systems and Control

Roy S. Czernikowski, Ph.D., Rensselaer Polytechnic Institute-Associate Professor, Computer Engineering

Mohamed K. El-Sherbiny, Ph.D., Iowa—Visiting Associate Professor, Power Systems

Roger Heintz, Ph.D., Syracuse-Associate Professor, Solid State Devices

Robert E. Lee, Ph.D., University of Rochester—Associate Professor, Systems and Control

Swaminathan Madhu, Ph.D., University of Washington—Professor, Communication Theory, Logic Design

George W. Reed, MEE, P.E., University of Delaware—Professor, Electromagnetic Theory

Harvey E. Rhody, Ph.D., Syracuse-Associate Professor, Communication Theory

Edward R. Salem, Ph.D., Buffalo-Associate Professor, Digital Processing, Microcomputers

Tapan K. Sarkar, Ph.D., Syracuse-Visiting Assistant Professor, E.M. Fields, Antenna Theory.

George L. Thompson, MSEE, University of Rochester—Associate Professor, Switching Theory, Digital Electronics

Fung-I Tseng, Ph.D., Syracuse—Assistant Professor, Electromagnetic Theory

Raman M. Unnikirshnan, Ph.D., Missouri—Assistant Professor, Power Electronics

Watson F. Walker, Ph.D., Syracuse—Professor, Communication Theory

Industrial Engineering Department

Richard Reeve, Ph.D., Buffalo-Associate Professor, Applied Operations Research; Department Head

Don L. Anderson, Ph.D., University of Illinois—Assistant Professor, Simulation and Production Control

Gary D. Christie, MS Virginia Polytechnic Institute and State University—Instructor, Simulation, Information Systems, Operations Research

Jasper E. Shealy, Ph.D., SUNY at Buffalo—Associate Professor, Human Factors

Ralph H. Stearns, P.E., MBA, New York University—Lecturer, Work Measurement, Engineering Management

Mechanical Engineering Department

Robert M. Desmond, Ph.D., P.E. University of Minnesota—Professor, Heat Transfer; Department Head

William Bober, Ph.D., P.E., Purdue Associate Professor, Fluid Mechanics, Heat Transfer, Applied Mathematics

Richard G. Budynas, Ph.D., P.E., Massachusetts—Associate Professor, Applied Mechanics

Robert A. Ellson, Ph.D., P.E., University of Rochester—Associate Professor, Energy Conversion, Mechanics

Charles W. Haines, Ph.D., Rensselaer Polytechnic Institute—Associate Professor, Applied Mathematics

William F. Halbleib, Ph.D., P.E., Cornell—Professor, Stress Analysis, Vibrations,

Richard B. Hetnarski, Dr. Tech. Sci., P.E., Polish Academy of Sciences—Professor, Thermoelasticity

Bhalchandra V. Karlekar, Ph.D., P.E., University of Illinois—Professor, Heat Transfer, Applied Mathematics, Energy

Richard A. Kenyon, Ph.D., P.E., Syracuse—Professor, Thermo-dynamics and Fluid Mechanics

Chris Nilsen, Ph.D., P.E., Michigan State—Associate Professor, Metallurgy and Materials Science

Alan H. Nye, Ph.D., University of Rochester—Visiting Assistant Professor, Fluid Mechanics

Neville F. Rieger, Ph.D., University of Nottingham—Gleason Professor of Mechanical Engineering Mechanics

Martin P. Sherman, Ph.D., P.E., Princeton—Associate Professor, Fluid Mechanics, Thermodynamics

Robert L. Snyder, Ph.D., P.E., Iowa State-Professor, Materials Science, Chemistry

Wayne W. Walter, Ph.D., P.E., Rensselaer Polytechnic Institute-Associate Professor, Applied Mechanics

Paul Wojciechowski, Ph.D., University of Rochester—Associate Professor, Systems Analysis, Environmental Studies, Energy

College of Fine and Applied Aits

Robert H. Johnston, Dean
Peter Giopulos, Associate Dean
(475-2634)

Master of Fine Arts
Master of Science for Teachers

The College of Fine and Applied Arts, in its School for American Craftsmen, and in the design applications, communication design and fine arts programs of the School of Art and Design, prepares artists, craftsmen and designers to operate their own studios and shops, as self-employed professionals, and to **work** in business and industry as artists and designers. It also prepares graduates to teach at colleges and **at** secondary levels.

The College of Fine and Applied Arts provides a center for advanced study in the graphic, plastic and the fine arts in which the student has the opportunity to work in a professional environment which stimulates and encourages work of the highest quality. Students of superior ability who possess a baccalaureate degree in art or crafts may increase their competence in the field of their major interest under the guidance **of** accomplished professional artists and craftsmen. For those students who have a background in graphic design, painting, sculpture, printmaking, or one of the craft areas, there is opportunity to develop new areas of competence. The master's programs are also designed to enable students to broaden their experience in the practice of art in areas other than their majors and **to** increase their understanding of the arts in the humanistic sense. Students are expected to participate in the planned non-credit program **of** assemblies, discussions and exhibits as well as their formal class requirements.

Graduate degrees

The College of Fine and Applied **Arts** offers two graduate degrees: the master of science for teachers (which may be taken as a concentration in art education leading to permanent certification t teach in the public schools of the State of New York or as concentration in the practice of the creative arts and crafts), and the master of fine arts.

Objectives

The MFA and the MST **programs are** constituted to reflect the goals of Rochester Institute of Technology

They are designed to **graduate** artists, designers and craftsmen who can meet the needs of the environmental condition **through** high standards of personal discipline and professional performance.

Requirements for admission to the MST degree program

The applicant should have received the baccalaureate degree in a field of the arts from a regionally accredited college or university in the United States or Canada with a major concentration in art, art eduction, or industrial arts education. Applicants with different background should refer to the section on non-matriculated students. The undergraduate studies should include a minimum of 54 quarter credit hours (36 semester hours) in drawing, painting, design, or the crafts. If the applicant for admission holds the BA or BFA degree and seeks the MST degree in art education, the undergraduate Program must have included the studio course distribution required by the New York State Education department. For those holding the BS degree in art education and Provisional certification, the graduate concentration should be in the studio area and the Program must include minimum of 10 quarter credit hours general studies or humanities.

A student is accepted into the program with the understanding of full time status unless granted part-tirne status at admission.

Requirements for admission to the MFA degree programs

The applicant should hold the baccalaureate degree in a field of the arts or education from a regionally accredited college in the United States or Canada and demonstrate, in the quality of the undergraduate record and creative production, a genuine, professional potential (See also non-matriculated students.) The undergraduate degree should include 75 quarter credit hours (50 semester hours) in studio courses.

Acceptance for graduate study

Students are admitted to graduate study by action of the Graduate Committee. Enrollment in graduate courses does not constitute admission to the graduate program, and credit is not given for courses taken prior to acceptance unless the grade received in the course is a “B” or higher; in such a case the student, if admitted to graduate study, may petition for a grant of credit, but not in excess of nine quarter credit hours.

A student may be admitted who needs additional undergraduate study requirements. This study will be structured for breadth or increased performance in areas designated and will be determined at the time of acceptance.

Such prerequisites must be satisfied as defined in the letter of acceptance which students will receive prior to admission as a graduate student.

Upon full acceptance into any of the graduate programs the student is considered qualified to pursue the degree. This status would be changed by evidence of poor performance in the program.

Teacher training and certification

The teacher of arts and crafts in college or high school, the teacher or administrator of art programs in schools and community centers, the instructor in occupational skills, and the private teacher of art will find in the depth and breadth of the master’s program a way of extending and improving the skills and content background necessary for effective teaching. The student who possesses a baccalaureate degree with provisional certification for the teaching of art or industrial arts in the State of New York can achieve permanent certification within the structuring of the master of science for teachers program or the master of fine arts.

Admission as non-matriculated students
Students who have a baccalaureate degree and who wish to take particular courses may be admitted as non-matriculated students to courses for which they are qualified. They may receive graduate credit, but it may not be submitted toward degree requirements. Students deficient in admission requirements, or competence, may take upper level undergraduate courses, as advised by the Graduate Committee, to qualify for admission.

Those coming from foreign countries where the baccalaureate is not given for programs in the practice of art may be admitted to graduate study if the diploma or certificate received approximates the standards of the BFA, BA, or BS degrees, and their academic record and portfolio indicate an ability to meet graduate standards. A foreign student will receive individual evaluation and be considered for admission at the highest level commensurate with his or her preparation.

Admission procedure
To apply for admission to graduate study a student must submit evidence of his or her baccalaureate degree, a portfolio or other evidence of creative work, a statement of purpose, and references.

The portfolio is to consist of 20 to 24 slides or photographs (no larger than 8 x 10). No original work is to be sent unless it is specifically requested by the Graduate Committee. Return postage must be included. All correspondence concerning applications, catalogs and portfolios should be addressed to Director of Admission, Rochester Institute of Technology. Program inquiries should be addressed to Graduate Programs, College of Fine and Applied Arts.

Transfer of credit
Graduate work pursued to the extent of nine quarter credits (six semester hours) may be applied at the discretion of the Graduate Committee to specific course requirements, depending on the nature of the student's program and major, if completed within the five years preceding.

policy regarding student work
-The College of Fine and Applied Arts
ese rves the right to retain student
Lork for educational use or
x hibiti°n for a period of time not to
e ceed one and one-half quarters
beyond the year the object has been
made.

oevier Gallery
Ouring the year, the Bevier Gallery
resents a continuing series of
important exhibitions planned to
resent new directions in the fields
0f the arts, design, and the crafts, as
well as to do honor to the works of
the past. The gallery, architecturally
impressive, and a part of the college,
serves to enrich the cultural life of
the community, the Institute at large,
and to inform and inspire the
college's graduate body.
The Faculty Show, Graduate
Thesis Show, and Student Honors
Show are annual events on the
gallery calendar.

The MFA and MST degrees
The MFA degree is designed as a
professional degree for the
practicing artist, craftsman, or
designer, and for those wishing to
teach at the college or university
level. This is earned normally in two
years of full-time study and the
completion of a minimum of 85
credit hours including the
presentation of an acceptable thesis.
Those who have entered the MST
program and who may wish to
change to the MFA program must
petition the graduate faculty for
permission to change the degree
objective. The petition must be
presented to the academic council.
In view of the pronounced difference
in entrance requirements, students
requesting a transfer from MST to
the MFA program may be required
to take additional undergraduate
or graduate courses. Such students
must also have demonstrated their
Professional potential by establishing
a "B" average (3.0) in at least one
quarter (or one summer session) of
•he MST course of study.

Peter Giopulos

The MST degree may be earned normally in one academic year or three summer sessions through the satisfactory completion of a minimum of 48 credit hours in course work. It is arranged for the student holding the BFA degree (or a BA degree with an art major) who wishes to earn teacher certification, or who holds provisional certification (with a BS or BA degree in art or industrial arts education) and seeks permanent certification. The MST degree may also be taken as a concentration in the studio areas with supporting courses on the basis of need and interest from graduate offerings in other schools and departments of the Institute. This major in art education integrates public school teaching, social sciences and studio classes. In contrast, the studio MST candidate selects one of the nine art areas: communication design, design applications, painting, printmaking, ceramics, metals, textiles, wood or glass. Three summer sessions can accommodate teachers seeking permanent certification through study in an art area.

Graduate art students "usually know where they're going"

"Today's art student is not just interested in courses, but in a program of study that's well planned," says Peter Giopulos, coordinator of graduate programs in the College of Fine and Applied Arts.

"Most of our graduate students have been through an experimental stage, both in their lives and in their creative work. They've learned how to bring that experimentation into focus, whether personally or artistically. And they usually know where they're going."

RIT offers a variety of graduate programs through the School for American Craftsmen and the School of Art & Design, but all of them, Giopulos, says, have "depth within the major and allow for a minor sequence and electives, which are available from almost any program at the Institute."

In the graduate program, study is geared to the person "who has gained a marketable skill as an undergraduate or in other previous experience," Giopulos says. "These are people with very definite ideas about where they're going artistically."

Giopulos is a graduate of Syracuse University (BFA), and Pennsylvania State University (M.Ed.). He has been on the faculty of the College of Fine and Applied Arts for eight years, and has been named associate dean of that college and coordinator of graduate programs.

The Programs

The **Master of Fine Arts** program includes five categories of study:

	Quarter Credit Hours
1. Major Concentration Designed to give depth of experience in the area of the student's major interest and chosen from one of the following: ceramics and ceramic sculpture, metalcrafts and jewelry, woodworking and furniture design, weaving and textile design, glass, design applications (emphasizing environmental design), communication design, fine art (painting), fine art (printmaking).	30
2. Minor Concentration* From the above, to consist of studio and related electives, or internship, other than major.	15
3. Electives	18
4. Humanities, art history	10
5. Thesis	12
Total	85

"In certain cases the minor concentration or courses may be taken elsewhere in the Institute (photography, printing, business, etc.) when related to the objectives of the student. Such courses must be approved in advance, normally after arrival on campus, by the advisor and the deans of the colleges involved.

Another minor concentration can be taken in the Center for Community College Faculty Development program. The three required courses concern (1) the student, (2) the institution and (3) methods, along with eleven weeks of teaching in an area community college.

	MFA	MST STUDIO	MST ART EDUCATION
Major	30 credits	24 credits	22 credits
Minor	15	14	6
Humanities	10	10	20 Social Sciences
Electives	18		
Thesis	12		
	85 credits	*48 credits	**48 credits

'1 year or 3 summers ***September start*

The **Master of Science** for teachers program requirements include two categories of studies:

1. Master of Science for teachers in ***art education*** (for those holding the BFA or BA (art major) degree and permanent certification for teaching in the public schools.

	Quarter Credit Hours
The degree offers a concentration consisting of background courses in Education: Developmental Psychology, History of American Educational Thought and Practice, Educational Psychology, Educational Sociology	20
Art Education Concentration: 22 Methods and Materials in Art Education, Seminar in Art Education, Practice Teaching	
Studio elective	6
Total	48

Master of science for teachers in ***studio art*** (for those holding the BS degree in art education or industrial arts education, who desire permanent certificates, or for the BA or BFA student wishing advanced study).

The degree offers a major concentration of studies designed to meet the needs of individual students, and may include appropriate or relevant courses from other schools and departments of the Institute.

The following general pattern of studies covers requirements for the degree.

	Quarter Credit Hours
Major Concentration:	
Studio art, or crafts	24
Art history and humanities	10
Minor Concentration and electives from above	14
Total	~48

The Metropolitan Center

The College of Fine and Applied Arts graduate painting and art education programs are housed in downtown Rochester's historic area within its cultural, educational, and business center, at 50 West Main Street. This provides students who enroll in these programs with stimulating surroundings, city resources, and ample work **space.**

Fine and Applied Arts

Courses for the education concentration of the MST program are offered through the College of General Studies, and course descriptions are given under that heading with a GS call number.

Art Education

FADA-701, 702 **Methods and Materials**
Registration #0401-701, -702 **in Art Education**
Intensive study of curriculum in terms of teaching materials for both studio and appreciation aspects of elementary, early secondary and high school art education. Includes studio and elementary school teaching experience.

Class 2, Lab. 9, Credit 5

FADA-820 **Seminar in Art Education**
Registration #0401-820
Evaluation and study of the practice teaching experience. Discussion of the professional role of the art teacher in terms of professional associations, supervision, teacher training, and research. A final project on some intensively studied aspect of art education is required.

Lab. 25, Credit 3

FADA-860 **Practice Teaching in Art**
Registration #0401-860
A seven-week full-time practice teaching experience in secondary school, including professional duties of the art teacher in humanities courses, publication advising, audiovisual work, and supervision. Supplements the studio-theoretical education. Meets the state education requirements.

Credit 9

Communication Design

FADC-780 (MFA) **Communication Design Studio**
Registration #0402-780

FADC-750 (MST)
Registration #0402-750
Advanced creative problem solving experiences in communication design imagery. Professional problems in graphic design and related visual techniques for communication media such as print, television, film. Media Center facility available for extension of studio problems.

Lab. 9-27, Credit 3-9

Environmental Design

FADE-780 (MFA) **Design Applications**
Registration #0403-780

FADE-750 (MST)
Registration #0403-750
The reasoned application of theoretical three-dimensional design, to responsible, practical solutions that are valid in our complex and dynamic world environment, by considering the importance of the decision making role of the individual designer in a mass industrialized society.

Lab. 9-27, Credit 3-9

Painting

FADP-780 (MFA) **Painting**
Registration #0405-780

FADP-750 (MST)
Registration #0405-750
The pursuit of the pertinent, the ecstatic, the beautiful, by a small group of those dedicated to the art.

Lab. 9-27, Credit 3-9

Printmaking

FADR-780 (MFA) **Printmaking**
Registration #0406-780

FADR-750 (MST)
Registration #0406-750
Advanced techniques in etching, lithography and woodcutting as well as in many experimental areas including color processes' photo-etching, photo-lithography, vacuum forming, combination printing and calligraphy. Students are expected to develop along independent lines, and direction is offered in contemporary thought and concept. The emphasis is toward developing a complete respect for the printmaking craft and profession.

Lab. 9-27, Credit 3-9

Thesis

FAD(C, E, P, or R)-890 **Research and Thesis**
Registration # 040(2, 3, 5 or 6)-890 **Guidance**
The development of a thesis project instigated by the student and approved by a faculty committee and the Academic Council Representative. Primarily creative production, the thesis must also include a written report.

Credit 12

School for American Craftmen
Design, Techniques and Research Problems

A program structured on the basis of individual needs, interests, and background preparation as they may be determined through faculty counseling. This sequence of courses will lead to the production of a thesis project, suggested by the student and approved by the faculty. This applies to all craft areas.

FSCC-780 (MFA) **Ceramics**
Registration #0409-780

FSCC-750 (MST)
Registration #0409-750

FSCG-780 (MFA) **Glass**
Registration #0411-780

FSCG-750 (MST)
Registration #0411-750

FSCM-780 (MFA) **Metalcrafts and Jewelry**
Registration #0412-780

FSCM-750 (MST)
Registration #0412-750

FSCT-780 (MFA) **Weaving and Textile Design**
Registration #0413-780

FSCT-750 (MST)
Registration #0413-750

FSCW-780 (MFA) **Woodworking and Furniture**
Registration #0414-780 **Design**

FSCW-750 (MST)
Registration #0414-750

Lab. 9-27, Credit 3-9

FSC(C, G, M, T or W)-890 **Research and Thesis**
Registration #040(9, 11, 12, 13 or 14)-890 **Guidance**
Research and development of an acceptable thesis with a focus on technique design, production, or a combination of these approved by the faculty. The thesis subject will be chosen by the candidates with the approval of the faculty advisor. The thesis will include a written summation or report of the research and presentation.

Lab. 27, Credit 12

Graduate Faculty College of Fine and Applied Arts

Robert H. Johnston, Ph.D., Pennsylvania State—Dean, Director, School for American Craftsmen; Professor

Peter Giopulos, M.Ed., Pennsylvania State—Associate Dean, Director, School of Art and Design—Associate Professor

Kener Bond, MFA, Rochester Institute of Technology—Assistant Dean, Associate Professor

Norman Bate, MFA, University of Illinois—Professor, Printmaking, School of Art and Design

Philip w. Bornarth, M A **E.** School of the Art Institute—Professor, Painting, School of Art and Design*

Donald G. Bujnowski, MA, University of Minnesota—Professor, Weaving and Textile Design, School for American Craftmen

Mans Christensen, Diploma, National College of Arts and Crafts, Copenhagen—Professor, Metalcrafts and Jewelry, School for American Craftsmen

Hobart Cowles, MA, Ohio State—Professor, Ceramics, School for American Craftsmen

David Dickinson, MFA, Rochester Institute of Technology—Lecturer, Printmaking, School of Art and Design

Gary S. Griffin, MFA, Tyler School of Art, Temple University—Assistant Professor, Metalcrafts and Jewelry, School for American Craftsmen

Robert Heischman, U.C.F.A., Ruskin School of Drawing and Fine Art, Oxford University—Assistant Professor, Painting, School of Art and Design

James M. Hennessey, MFA, California Institute of the Arts—Assistant Professor, Environmental Design, School of Art and Design

William Keyser, MFA, Rochester Institute of Technology—Professor, Woodworking and Furniture Design, School for American Craftsmen

Max Lenderman, MFA, University of Kansas, MS, Indiana State University—Associate Professor, Weaving and Textile Design, School for American Craftsmen

Craig McArt, MFA, Rochester Institute of Technology—Associate Professor*, Environmental Design, School of Art and Design

Frederick R. Meyer, MFA, Cranbrook Academy of Art—Professor, Painting School of Art and Design*

Jon Meyer, BS, University of Vermont, Orrefors, Sweden—Assistant Professor, Glass, School for American Craftsmen

R. Roger Remington, MS, University of Wisconsin—Chairman, Communication Design, Professor, School of Art and Design

Robert Schmitz, MFA, University of Wisconsin, MS, Alfred University—Assistant Professor, Ceramics, School for American Craftmen

Douglas Sigler, MFA, Rochester Institute of Technology—Associate Professor, Woodworking and Furniture Design, School for American Craftsmen

Toby Thompson, MFA, Rochester Institute of Technology—Professor, Environmental Design, School of Art and Design

Lawrence Williams, MFA, Illinois State—Professor, Printmaking, School of Art and Design

Norman Williams, MS, Syracuse University—Associate Professor, Art Education, School of Art and Design

James C. Ver Hague, Jr., MFA, State University of New York at Buffalo, MS Rensselaer Polytechnic Institute—Lecturer, Graphic Design, School of Art and Design

Joseph Watson, MFA, Yale University—Lecturer, Communication Design, School of Art and Design

'Representative to the Academic Council

College of Graphic Arts and Photography

Lothar K. Engelmann, Dean

Master of Science degree in Printing

Printing Technology or Printing Education
The curriculum leading to a master of science degree in the School of Printing is a professional program designed to provide graduate education in printing for students whose undergraduate majors were in the arts, sciences, education, or other non-printing areas, as well as for graduates with a major in printing.

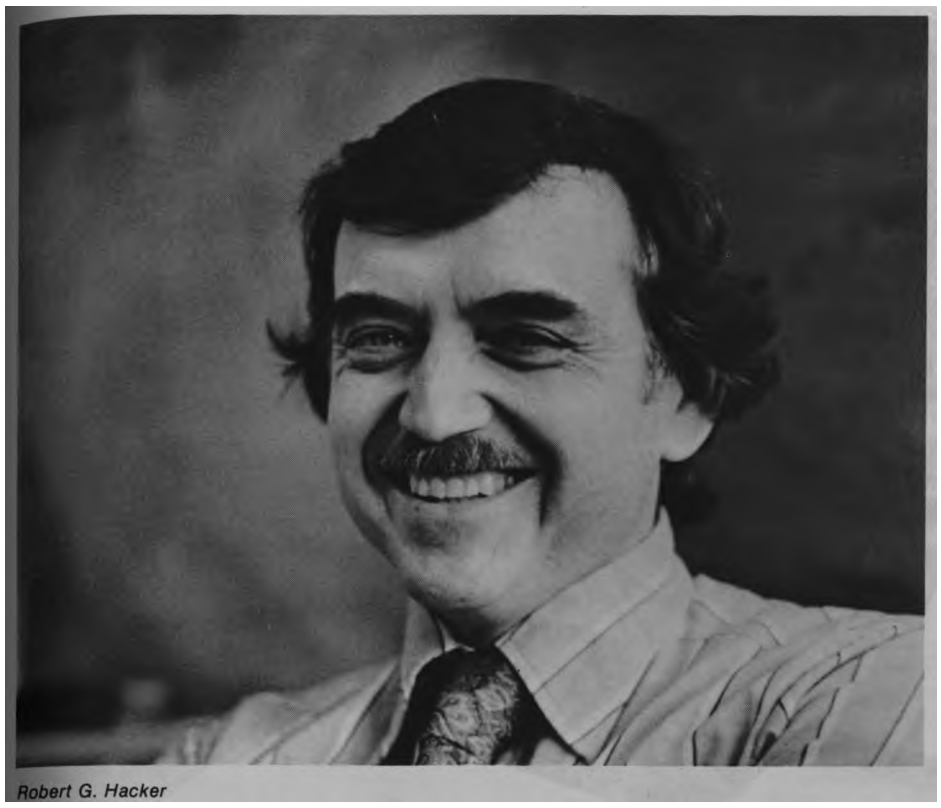
The program is formulated to allow the individual student to specialize in a particular area and develop research skills, The goal of the program is to educate students who will have, in addition to a broad understanding of the procedures and theoretical concepts in printing processes, an appreciation of particular problems in special areas at an advanced level. This can normally be completed in six academic quarters.

Special libraries
Special libraries housed in the college include the Graphic Arts Research Center Library, and the Melbert B. Cary, Jr. Graphic Arts Collection. The latter contains over 3,500 volumes including many rare books and other materials illustrating past and present fine printing, book design and illustration, papermaking, and other aspects of the graphic arts. The Frederick W. Gogdy—Howard W. Coggeshall Memorial Workshop contains letters, papers, photos, memorabilia and cases of Goudy types which can be seen and used only at RIT, since matrices for their manufacture were destroyed by fire in 1939.

The majors
The student may major in either printing technology or printing education. There is a program in the technology major for the student who has an undergraduate degree in printing as well as a program for the student who has an undergraduate degree in another area. These programs are normally followed by those whose career will be in the printing industry or as specialists in related fields.

The graduate programs in printing are designed on a two-fold basis: to provide extended competence for persons with an interest in entering an area of printing technology, and to offer an opportunity for furthering and expanding the education of individuals who wish to teach printing.

The printing education major offers two options, related to certification. The printing education major emphasizing teacher preparation for the secondary **school**



Robert G. Hacker

Our philosophy is to provide the opportunity for graduate study in depth, in a primary interest area for our students. Our approach is to treat printing as an information processing and conversion system and analyze it from that standpoint.

The laboratory and lecture classes are formulated to give background while providing opportunity for detailed study. We hope our graduate students learn to "think" and not just engage in pure assimilation of diverse bits of information.

Robert G. Hacker (475-2633)
Graduate Program Coordinator
School of Printing

has separate programs for the student with an undergraduate degree in printing, in education, or ir some different field. Upon successful completion of this printing education major program the student will qualify for permanent New York State certification as a teacher of graphic arts as a trade subject. Included in this program is one year's experience in actual printing which must be arranged by the student to meet state certification requirements. This program culminates in a master of science for teachers degree. Students wishing to Pursue the MST degree should note this in the appropriate place on the Graduate application form.

The printing education major emphasizing teacher preparation for the two-year college has a program for students with varying undergraduate backgrounds. This culminates in the MS degree.

Those teachers within the secondary school system who already hold permanent certification will normally follow a program leading to the MS degree.

The printing education programs are designed to develop teachers with sufficient breadth in printing-technology education so that they will be equipped to encourage and assist students who are interested in printing as a career, whether at the high school or two-year college level. Such development is necessary to support the growth of the printing industry. It is desirable for students entering the education major programs to have taken basic courses in psychology and sociology at the undergraduate level.

A goal of the technology major is to graduate students with well-rounded backgrounds in both the theoretical and practical aspects of graphic arts technology. An additional goal is to provide graduates with the education to approach printing problems by an orientation to processes and materials based on systematic analysis.

Technology majors' preparation is for entry as a professional into the printing field in areas such as production, administration, research and development, sales, etc. The printing field is extremely varied and requires an interdisciplinary approach. In this regard, students are encouraged to broaden their backgrounds in a variety of academic areas.

All students may elect certain graduate courses which will be beneficial in introducing them to particular areas of the graphic arts, updating their knowledge in the area, and helping them with their research problems. However, regardless of the major which the student chooses, there is a core of instructional areas vital to advanced instruction.

This "core" is to develop:

1. An increased awareness of an emerging theory of graphic reproduction and an appreciation of how this theory may be applied to graphic arts procedures in the future.
2. An understanding of the importance and value of statistical techniques as they apply to the graphic arts today.
3. An understanding of how computer technology can be applied to graphic arts management and reproduction at the present time and what potential the computer has in the future for reproduction, management, and educational applications.
4. An ability to carry through an acceptable research project on either an experimental or survey basis.

Admission

Prior to being admitted to the master of science degree program applicants must satisfy the Graduate Admissions Committee of the School of Printing that their previous training, ability, and practical experience indicate a reasonable chance of success. Applicants may be admitted who hold a baccalaureate degree from an accredited institution. The School of Printing encourages applicants with undergraduate records at the "B" (3.0) level or higher. All applicants are required to take the Graduate Record Examination. An on-campus interview is encouraged for all applicants.

Degree requirements

The master of science degree program in printing requires the completion of 70 quarter credit hours of study including eight hours for the thesis. Normally this study would be completed in six quarters. Depending on the student's graphic arts experience, however, the total number of hours may be reduced. Programs are individually tailored for each student according to his or her needs, interests, and educational-industrial experience. A typical distribution of credits might be:

	Quarter Credit Hours
Core to the program	13
Core to the major	20
Electives	29
Thesis	8

Core Courses: Printing graduate programs

Required for all majors and programs
- Computers in the Graphic Arts-PPRM-701
- Graphic Reproduction Theory-PPRT-702
- Statistical Inference-PPRT-703

Technology major: undergraduate degree in printing (MS)
- Application of Mechanics/ Electronics-PPRT-705, 706. 707
- or
- Introduction to Systems Analysis-PPRT-708
- Research Methods in the Graphic Arts-PPRT-701
- Design of Experiments-PPRT-704
- Thesis-PPRT-890

Technology major: undergraduate degree other than printing (MS)
- History of Printing Technology-PPRT-709
- Introduction to Paper-PPRT-710
- Tone and Color Analysis-PPRT-711
- Research Methods in the Graphic Arts-PPRT-701
- Eight prerequisite graduate printing courses
- Thesis-PPRT-890
- One graduate printing elective

Education major: required for all education programs
- Introduction to Graphic Arts Education-PPRE-701

Education major: undergraduate degree in education (MS)
- Typographical Procedures-PPRE-713
- Layout and Printing Design-PPRT-716

or
- Copy Preparation-PPRT-717
- Photographic Reproduction Technology-PPRE-720
- Printing Plate Methodology PPRT-712
- or
- Relief Press Methodology-PPRT-714
- Screen Printing Methodology (or elective)-PPRE-721
- Composition Technology-PPRT-719
- Two graduate printing electives
- Thesis-PPRT-890
- or
- Two graduate electives

Education major: undergraduate degree other than printing or education (MST) Trade-Technical Certification Program
- Educational Psychology-GSSP-702
- History of American Educational Thought-GSHH-701
- Educational Sociology-GSSS-701
- Teaching Methods in the Graphic Arts-PPRE-702
- Practice Teaching in the Graphic Arts-PPRE-860
- History of Printing Technology-PPRT-709
- Thesis-PPRT-890
- Six araduate printing electives

Education major: undergraduate degree in printing (MST) Trade-Technical Certification Program
- Teaching Methods in Graphic Arts Education-PPRE-702
- Practice Teaching in the Graphic Arts (secondary)-PPRE-860
- History of Printing Technology-PPRT-709
- History of American Education Thought and Practice-GSHH-701
- Educational Psychology-GSSP-702
- Educational Sociology-GSSS-701
- Thesis-PPRT-890
- Two graduate printing electives

Two-year college education major: undergraduate degree in printing (MS)
- The Two-Year College-IJCG-701
- The Student in the Two-Year College-IJCG-702
- Instructional Techniques-IJCG-704
- Teaching Internship (Two-Year College)-IJCG-840
- Thesis-PPRT-890
- Two graduate printing electives

Core courses—two-year college education major: undergraduate degree other than printing (MS)
- The Two-Year College-IJCG-701
- The Student in the Two-Year College-IJCG-702
- Teaching Internship-IJCG-840 I
- Instructional Techniques-IJCG-70[4] j
- Thesis-PPRT-890
- Six graduate printing electives

Printing Education

PPRE-701 **Introduction to Graphic Arts Education**
Registration #0908-701
A prerequisite course for most students working the the printing education major. A study of historical trends along with the development and overview of philosophy and methodology, including a survey of current industrial education teaching problems.

Credit 4

PPRE-702 **Teaching Methods in Graphic Arts**
Registration #0908-702 **Education**
The study of the criteria necessary for selecting the methods, procedures, and materials relevant to planning and executing an effective lecture or demonstration lesson.

Credit 4

PPRE-712 **Lithographic Press Methodology**
Registration #0908-712
A study of the principles, materials, and equipment used in lithographic presswork, set-up and operation of sheet-fed presses. An independent graduate research project is required.

Credit 4

PPRE-713 **Typographical Procedures**
Registration #0908-713
An introductory course in the basic tenents of traditional typography. Areas that will be covered are: terminology, style, copyfitting, point systems, legibility, initials and typeface recognition. Laboratory demonstrations will be given to illustrate the theoretical areas covered in the lectures.

Credit 4

PPRE-714 **Color Separation Photography**
Registration #0908-714
Color separation and color corrections; color theory, masking requirements, tone reproduction for color, color proofing systems, electronic scanner. An independent graduate research project is required.

Credit 4

PPRE-720 **Photographic Reproduction**
Registration #0908-720 **Technology**
The fundamental principles, procedures, techniques, and applications of the photographic process as it is related to the production of negatives for the major printing processes. An independent graduate research project is required.

Credit 4

PPRE-721 **Screen Printing**
Registration #0908-721
Theory and Practice of screen printing including preparation of positives, frames, fabrics, stretching of fabrics, stencil methods, fillers, squeegees, inks, presses, and dryers; experiences in printing of papers, plastics and irregular shapes. An independent graduate research project is required.

Credit 4

PPRE-880 **Practice Teaching in the Graphic Arts**
Registration #0908-860
A 10-week teaching experience in a school offering an appropriate exposure for the student teacher in the areas of student relationships and understanding, development of teaching methods and procedures, and a supervised involvement in the duties of the cooperating teacher.

Credit 12

Printing Management

PPRM-701 **Computers in the Graphic Arts**
Registration #0910-701
introduction to basic computer characteristics; functions of hardware components in relation to software requirements; discussion of computer languages as they relate to applications in Printing. An independent graduate research project is required.

Credit 4

PPRM-702 **Computers in Management**
Registration #0910-702
Disscussion of printing requirements in relation to computer system configurations; applications of computers to management and production control problems; investigation of computer-oriented production control techniques. (PPRM-701)

Credit 4

Printing Technology

PPRT-701 **Research Methods in Graphic Arts**
Registration #0911-701
Theory and application of principles of laboratory oriented research in the graphics arts, analysis of research techniques, interdisciplinary relationships, conditions for technology transfer and synergism; status of research in the graphic arts including organization, basic vs. applied research and organization of literature including patents, illustrations of techniques and research programs and methods followed in various research situations; systematic study theory of scientific methods including induction, deduction, hypothetico-deduction, hypothesis formation, theory development, etc.

Credit 4

PPRT-702 **Graphic Reproduction Theory**
Registration #0911-702
Analysis of the basic theories of graphic reproduction and study of the principles underlying prevalent and proposed printing processes; special topics such as classification and description of the various light-sensitive systems as applied to the graphic arts, ink transfer theory, present and proposed systems of printing based on electrostatics, electrolysis, magnetism and lasers; study of hybrid systems and the significance and application of interdisciplinary methods.

Credit 4

PPRT-703 **Statistical Inference**
Registration #0911-703
Descriptive statistics, patterns of variability, measures of variability, working with the normal curve, tests, of hypotheses for means, test of hypotheses for variance, internal estimates for means, internal estimates for variance, sample size for variables, introduction to analysis of variance, and applications of applied statistics to graphic arts.

Credit 5

PPRT-704 **Design of Experiments**
Registration #0911-704
Analysis of variance, components of variance, crossed vs. nested experiments, studying individual effects, introduction to matrix algebra, regression analysis, planning experiments from a statistical point of view, basic experimental designs, factorial experiments, fractional factorials, determination of optimum conditions, introduction to nonparametrics and quality control concepts (as time allows).

Credit 5

PPRT-705, 706, 707 Applications of Mechanics and Electronics
Registration #0911-705, 706, 707 to Materials, Machine Design,
and Processes in Printing
Force systems, elementary dynamics, work, power, and energy. Relations to stress and strains, particularly as applicable to printing equipment and processes; torsion stresses of printing materials; design of machine elements; bearings, gears, shafts, fasteners, and frames; application of basic circuits to electronic devices in and systems.

Credit 4/Qtr.

PPRT-708 **Introduction to Systems Analysis**
Registration #0911-708
Problems of systems analysis in printing operations for the highest quality product at the minimal cost including optimal floor designs and methods study. (PPRM-701)

Credit 4

PPRT-709 **History of Printing Technology**
Registration #0911-709
A study of the forces which have influenced the development of printing with emphasis upon the technological factors involved; examinations of the relationships of aesthetics and craft concepts to modern industrial techniques.

Credit 4

PPRT-710 **Introduction to Paper**
Registration #0911-710
A study of the interrelationships of paper, ink and printing processes; emphasis is placed upon physical and optical properties of paper, including the pulping and papermaking, paper testing and problem solving. An independent graduate research project is required.

Credit 4

PPRT-711 Tone and Color Analysis
Registration #0911-711
Methods of instrumentation necessary for the evaluation and process control of printed tone and color and the photographic intermediate images required for the photomechanical reproduction of tone and color.

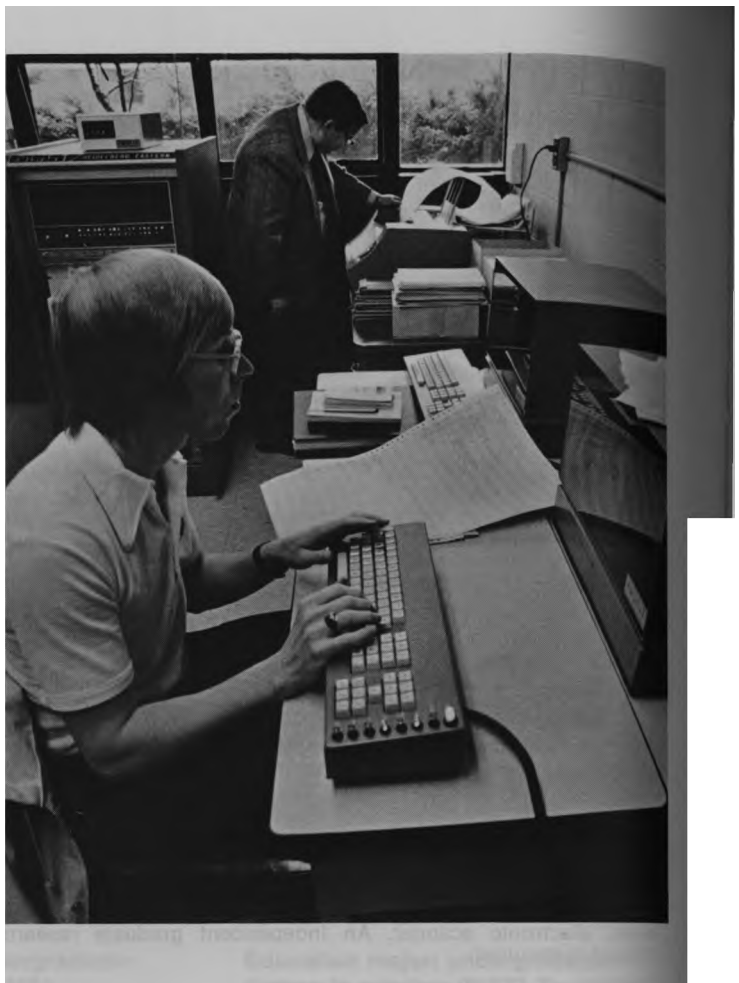
Credit 4

PPRT-712 Printing Plate Methodology
Registration #0911-712
Elements of platemaking procedures for letterpress, flexographic and lithographic plates, and gravure cylinders; theoretical study plus practical involvement in making of various plates. An independent graduate research project is required.

Credit 4

PPRT-714 Relief Press Methodology
Registration #0911-714
Theory and practice of letterpress presswork using platen and cylinder presses; techniques, mechanics of equipment, care of equipment and materials used; application of special techniques on letterpresses, die cutting, scoring, numbering, perforating, embossing; makeready methods for line and halftone printing; prepress preparation of various plates for printing; introduction to flexographic printing. An independent graduate research project is required.

Credit 4



Graduate Faculty School of Printing

Mark F. Guldin, Ph.D., University of Iowa—Director, Professor School of Printing

Sven Ahrenkilde, MS, Polytechnical University, Denmark, Research Associate, Graphic Arts Research Center

Brent Archer, AAS, Rochester Institute of Technology—Research Associate, Graphic Arts Research Center

Bekir E. Arpag, BS, Rochester Institute of Technology—Associate Professor, Photo-Mechanical Reproduction Processes

Edward A. Brabant, BS, Rochester Institute of Technology—Professor, Gravure Technology

William H. Birkett, MBA, University of Michigan, C.M.A.—Assistant Professor, Printing Management

Joseph E. Brown, Jr., MS, Kansas State—Associate Professor, Paper Technology

Walter A. Campbell, M Ed, MBA, University of Rochester—Associate Professor, Printing Management

W. Frederick Craig, M Ed, University of Rochester—Associate Professor, Newspaper Production Management

Chester J. Daniels, BS, MS, Rochester Institute of Technology-Senior Technologist, Graphic Arts Research Center

Zenon A. Elyjiw, Senior Technologist—Graphic Arts Research Center

Clifton T. Frazier, M Ed, University of Rochester—Associate Professor, Photo-Lithography Technology

Robert G. Hacker, Ph.D., University of Iowa—Coordinator, MS Program; Professor, Computer Applications.

Walter G. Horne, M Ed, University of Rochester-Professor, Printing Plate Technology

Alfred F. Horton, AAS, Rochester Institute of Technology—Associate Professor, Layout and Design

James I. Horton, M Ed, University of Rochester—Associate Professor, Layout and Design

Richard N. McAllen, AAS, Rochester Institute of Technology—Director, Web Offset Laboratory, Graphic Arts Research Center

Joseph L. Noga, MS, Bridgeport-Associate Professor, Reproduction Photography

Milton Pearson, BS, Rochester Institute of Technology—Senior Technologist, Graphic Arts Research Center

Irving Pobboravsky, MS, Rochester Institute of Technology—Senior Technologist, Graphic Arts Research Center

Archibald D. Provan, M Ed, University of Rochester—Associate Professor, Typography

Harry Rab, MSME, Newark College of Engineering—Assistant Professor, Electro-Mechanics of Printing

Albert D. Rickmers, M Ed, St. Bonaventure; MS, Rochester Institute of Technology—Professor, Statistics

Emery E. Schneider, M Ed, University of Rochester—Assistant Professor, Phototypesetting, Machine Composition

Anthony R. Sears, BS, Rochester Institute of Technology—Professor, Photo-Lithography Technology

Julius L. Silver, Ph.D., Connecticut-Associate Professor, Ink Technology, Graphic Theory

Miles F. Southworth, M Ed, University of Rochester—Professor, Reproduction Photography

Hector H. Sutherland, MA, New York University—Professor, Educational Foundations

James R. Walsh, M Ed, University of Rochester—Associate Professor, Printing Management

Robert J. Webster, MS, Ball State-Associate Professor, Photo-Mechanical Reproduction Processes

Charles J. Weigand, MS, SUNY at Oswego—Assistant Professor, Relief Press Technology

faster of Science degree in photographic Science and Instrumentation

The basic objective of this program is to prepare men and women holding a baccalaureate degree in science or engineering for higher level positions in the photographic industry or in the application of photography to problems of science and engineering. Formal course work includes the physics and chemistry of radiation-sensitive materials and processes, geometrical and physical optics as applied to photo-optical systems, the mathematics of image forming systems, and the statistics of experimental design and quality control. Technical electives at the graduate level may be selected from courses offered in engineering, science, mathematics, graphic arts, and photographic science and instrumentation. A thesis is required.

Faculty members within the division supervise research in areas of the chemistry and physics of radiation-sensitive materials and processes, photo-optical instrumentation, and objective and subjective image evaluation. Thesis work may be done in the field of graphic arts in conjunction with the Graphic Arts Research Center. Other interdisciplinary efforts are possible with the Colleges of Engineering and Science. Opportunities also exist to perform thesis work under the direction of selected scientists and engineers in local industries who act as adjunct faculty.

The division offers three programs of study leading to the master of science degree in photographic science and instrumentation:

1. Bachelor of Science and Master of Science in Photographic Science and Instrumentation

This program offers qualified undergraduate students in the division the opportunity to obtain both the bachelor of science and master of science degrees simultaneously after five years of study. Admission into this program must be requested by the student at the end of the third year, at which time permission may be granted to replace the normal fourth year departmental required courses and thesis by technical electives. If qualified, the student will be formally admitted to the graduate program at the end of the fourth year. Upon completion of the required graduate courses and thesis, the bachelor of science and master of science degrees are awarded simultaneously. A description of both the undergraduate and graduate phases of this program is given in the undergraduate bulletin. Persons interested in this program should request information through the coordinator of the graduate program.

2. Master of Science in Photographic Science and Instrumentation (Full-time)

This program is designed for persons holding a bachelor of science degree in physics, chemistry, or engineering.

Before admission to candidacy and beginning in the graduate level courses in photographic science, the student must have an adequate foundation in principles of photographic science. This knowledge may be acquired by enrolling in the full-time summer course, Principles of Photographic Science, PPHS-700. This course begins in June and runs for 10 weeks.

Although the 45 graduate credits required can be accumulated in three quarters, it has been found that only in exceptional cases is this time sufficient for successful completion of the experimental work on the thesis and for the preparation of the report. Hence full-time students should plan on at least five quarters of residence, beginning with the Summer Quarter.

3. Master of Science in Photographic Science and Instrumentation (Part-time)

This program is identical to the full-time program except that the requirements can be met on a part-time basis. The necessary knowledge in the principles of photographic science may be obtained by taking Principles of Photographic Science, PPHS-701, 702, 703, which is equivalent to PPHS-700 in content. This sequence is offered during the evening, with Saturday laboratory sessions. Part-time students must plan to complete the requirements within seven years from registration. The courses will be offered in alternate years on a schedule such that part-time students may complete them in three or four years.

Information concerning the particular courses to be offered during a particular academic year may be obtained from the Graduate Program coordinator.

Admission
Admission to the full-time or part-time programs will be granted to graduates of accredited degree granting institutions whose undergraduate studies have included at least the following courses in the major areas of study: mathematics through calculus; a full-year, college-level course in physics, with laboratory; a similar course in chemistry.

Applicants must demonstrate to the Graduate Committee (MS) of the School of Photographic Arts and Sciences that they have the capability to pursue graduate work successully. Normally this will include an interview, the submission of a statement of purpose, presentation of the undergraduate academic record, letters of evaluation from individuals familiar with the applicant's capabilities, and any other pertinent data furnished by the applicant. While previous high academic achievement does not guarantee admission, such achievement or other unusually persuasive evidence of professional promise is expected.

Requirements for the degree
For graduation, 45 credits in graduate-level courses are required. Of this total, 36 credits must be in courses other than Research and Thesis Guidance and must include the courses shown in the following table, the submission of an acceptable thesis, and an oral examination.

Certain upper class elective courses in supporting areas may be accepted toward the degree requirements in photographic science, provided they were agreed to in writing by the Graduate Program coordinator prior to the beginning of the course.

The thesis
The thesis is to be based on experimental evidence obtained by the candidate in an appropriate field as arranged between the candidate and his or her advisor. The minimum number of thesis credits required is nine. The thesis requirement may be fulfilled by experiments in Institute laboratories. In some cases, the requirement may be fulfilled by work done in other laboratories. An example might be the candidate's place of employment, under the following conditions: 1. The results must be fully publishable.
2. The candidate shall have an advisor assigned by the School of Photographic Arts and Sciences.
3. The thesis must be based on the candidate's independent,original work, as it would be if the work were done in Institute laboratories. The work shall not have started prior to the assignment of the advisor.
4. In exceptional cases, it may be possible that the candidate is able to present published results of orginal work or non-classified work done outside of RIT which can be accepted in lieu of a thesis, and essentially fulfill the requirements for a completed thesis. Then, the thesis requirements may be substituted by elective courses.

Grades
The average of the grades for all courses taken at the Institute and credited toward a master's degree must be at least a "B" (3.0). Research and Thesis Guidance does not carry a letter grade and, hence, is not included in the average.

Course title and number	Quarter Credit Hours		
	Fall	**Winter**	**Spring**
Principles of Photographic Science—PPHS-700 or PPHS-701, 702, 703*	No Graduate Credit +		
Theory of the Photographic Process—PPHS-711, 712, 713	3	3	3
Mathematics and Statistics for Photographic Systems—PPHS-721, 722	4	4	
Instrumental and Photographic Optics—PPHS-731, 732, 733	3	3	3
Analysis and Evaluation of Imaging Systems-PPHS-741, 742, 743	3	3	3
Research and Thesis Guidance—PPHS-890	**1**	**1**	

'The three quarters cover respectively; photographic chemistry, radiation and color, and sensitometry and tone reproduction. Courses PPHS-700 and PPHS-701, 02, 03, are intended for students who previously received acceptance into the MS program in photographic science. Other students are welcome to participate if they have the necessary background in physics, mathematics, and chemistry. They need the consent of the Graduate Coordinator.
+Each quarter carries 5 undergraduate credits. PPHS-700, a total of 15. The remaining 7 credits are distributed as required by project work.

John Carson Coordinator, MS Program (475-2781)


John F. Carson

"The photographic science and instrumentation graduate program is currently designed to give the student a general background in the field with an opportunity to specialize in a particular area through the research project," says Associate Professor John F. Carson, coordinator of the program.

"One of the most interesting courses in the program is PPHS 700—Principles of Photographic Science, our summer transfer course. It presents an enormous amount of very basic information and provides access to an astonishing number of fields that use photography in some way, such as microelectronics, remote sensing, micrographics, graphic arts, photographic manufacturing, and many others. We are always delighted to have students from other disciplines take the course and apply the information to other fields."

Carson is a graduate of the Electrical Engineering Department of the Massachusetts Institute of Technology where his introduction to photographic work was in the laboratory of Professor Harold Edgerton, a pioneer in photographic instrumentation.

Seminar with Susan Sontag *Anthony M. Ward*

Master of Fine Arts

degree in

Photography

The master of fine arts program in photography emphasizes photography as an art form, with the intention of inspiring and nurturing the individuality of each student as a creative, productive person. It is rooted in the belief that the study of photography as a fine art can be enhanced by the study of photography as an applied art, as a liberal art and as a technical art. The Program provides each student an opportunity to pursue graduate study in photography as a means to Personal, aesthetic, intellectual and career development.

The MFA curriculum is not based °n a fixed pattern of study, but rather on a flexible one which is continually sensitive to the needs of ᵉach student and builds upon the strengths that he or she brings to |he program. Flexibility extends beyond what is to be learned to where it can be learned and how [11] can be learned and validated.

Three majors are available within the program; Still Photography, Filmmaking, and Museum Practice. Successful completion of the program enables a student to pursue careers in education, museums, business and as self-employed professionals.

Major and Minor Areas

The filmmaking major is oriented toward production.

The museum practice major includes the Photography Core course and an internship at the International Museum of Photography, George Eastman House.

Minor concentrations may be pursued in almost any area with the exception of museum practice. This includes areas in art, printing, film, television, education and courses such as filmmaking, printmaking, bookbinding, typography, reproduction photography, platemaking, photojournalism, color photography, nature photography, portrait photography, advertising photography, sensitometry, perception, computer graphics, materials and processes of photography. Minors must be planned with the MFA coordinator and approved by him.

The Faculty

The MFA photography program is supported by a staff of 50 diverse faculty members within the School of Photographic Arts and Sciences and several adjunct faculty members at the International Museum of Photography, George Eastman House. Faculty and course work are also available from the School of Printing, College of Fine and Applied Arts and the College of General Studies. Resource personnel from RIT's Graphic Arts Research Center also support the program by providing students with technical advice and by serving as members of their thesis board.

Admission

Applicants should hold baccalaureate degrees from an accredited degree granting institution or have appropriate demonstrable equivalent experience. The Office of Admission will supply a list of the materials to be submitted.

Applicants are accepted with diverse educational backgrounds and there are no specific photographic prerequisites required in their bachelor's programs. However, some photographic competence is required, both visually and

technically, and the MFA faculty will evaluate this from a submitted portfolio.

The portfolio should be mailed directly to: Coordinator MFA Program, School of Photographic Arts and Sciences. Please enclose a cover letter stating application date and the purpose of the portfolio. Return postage must also be enclosed.

Prerequisites

Most applicants are required to successfully complete a summer preparatory course. Photography and museum practice students will take Fundamentals of Photographic Communications (PPHG-700), while those who plan to major in filmmaking will take Motion Picture Workshop (PPHF-711, 712).

Course Descriptions

For a description of courses, turn to the course description section.

Student Status

Entrance into the program is on a full-time basis. Extenuating circumstances, however, sometimes necessitate a temporary part-time basis.

Full-time student status requires a minimum of 12 quarter credit hours per quarter. A maximum of 18 quarter credit hours is allowable with the approval of the coordinator.

Part-time student status involves from 1 to 11 quarter credit hours at a cost of $98 per credit hour.

Transfer Credit

Course work taken prior to admission to the program should be submitted for approval upon entrance into the program. Up to nine quarter credit hours of B or better (six semester hours) of graduate work is transferable toward the degree with the approval of the coordinator. Up to 12 quarter credit hours of credit by examination may also be included in the program and can be arranged for with the coordinator.

Portfolio

Selection of candidates for the graduate program is a difficult process. Along with written records of accomplishment and recommendations, the portfolio serves to inform the faculty of the applicant's photographic accomplishments. It is a pictorial statement of the candidate's performance to date in terms of her or his photographic skills and visual sophistication. Presentation, as well as content, is important. The images should provide a representative sampling of one's pictorial abilities. They could include black-and-white images, color prints and transparencies, non-silver images, photographic derivations, paintings, drawings, graphics, computer-generated images, etc. A reasonable number of images would be about 20 or 30.

Candidates interested in filmmaking as a major are invited to submit films and videotapes of their best work as well as any experimental efforts in film or video. They may also submit still photographs.

The portfolio should reflect photographic excellence, visual awareness and some diversity. If highly personal statements are being attempted in the photographs or films, some written information would be helpful in placing the images into a context and forming judgments.

Advisors

The MFA Coordinator is the advisor for all candidates.

Thesis

The thesis should be an original body of work appropriate to the major commitment of the degree candidate. A thesis of record will be prepared for inclusion in the library. Specific directions are available in the MFA handbook, which is given to the student upon entrance into the program.

Degree Requirements
The MFA degree in photography normally requires a minimum of two years of full-time resident graduate study. A minimum of 81 quarter credit hours of graduate work is outlined below. These minimums may be exceeded through the intent of the candidate or as a result of necessity to cover certain areas of study.

The 81 hours do not include undergraduate work required by action of the MFA admission committee in accepting a particular applicant, or undergraduate course prerequisite for graduate courses.

	Quarter Credit Hours
Major Concentration	30
Minor	15
History and Aesthetics	9
Humanities	15
Thesis	12

Distribution of work within these guidelines is subject to modification based upon the candidate's background, abilities, and interests. An individualized course of study will be prepared with the help of the MFA coordinator and made a matter of record. Modifications in this prescribed program thereafter must be approved and recorded.

Humanities
The required 15 quarter credit hours of humanities courses are usually taken in the College of General Studies. Depending upon the student's academic background, part or all of this requirement can be waived (but need not be), and the credit hours can be used elsewhere. Should hours become available in this fashion, students can either explore an additional area, or can improve their involvement in either their major or their minor field.

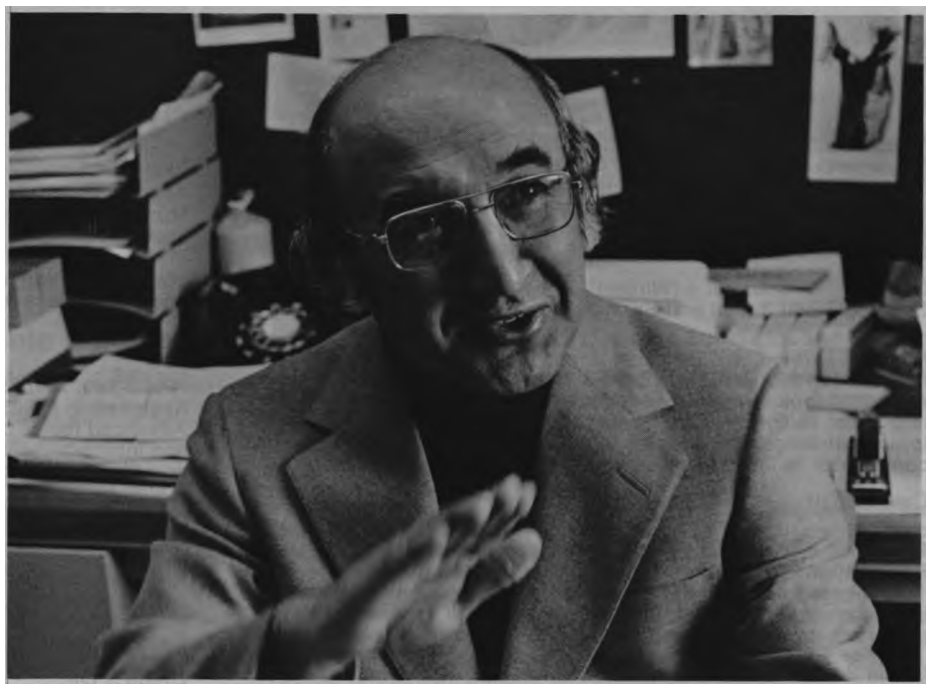
Grade and Time Limit
The *average* of all grades for graduate courses taken at the Institute must be at least a "B" (3.0) to qualify for the MFA Photography degree.

Thesis hours are usually taken over several quarters. Only the letter "R" is recorded, indicating a thesis in process. No letter grade is assigned. Acceptance or rejection of the thesis is made by the candidate's thesis board.

All course work, including an accepted thesis must be completed within seven years of entrance into the program.

MFA Gallery
The Gallery, which is part of the MFA center, is used to exhibit graduate thesis work, student work and works of contemporary photographers. A conference telephone is available in the Gallery area to conduct seminars with photographers whose work is being exhibited. Telephone seminars were recently conducted with Barbara Morgan and Arthur Taussig while many of their major photographs were on exhibition in the MFA Gallery.

Visiting Artists
Through the assistance of grants from the National Endowment for the Arts (NEA) prominent personalities in the field of photography are brought to campus to enrich the program. They usually give a lecture on campus Thursday evening, which is open to the public, and then meet on Friday morning in a two-hour seminar with MFA students. The most recent speakers have been Peter Bunnell, Don Doll, Emmet Gowin, Eva Rubinstein, Ralph Gibson and Duane Michaels.



Richard Zakia

Richard Zakia Coordinator, MFA Program (475-2616)

"Rochester is a unique place for anyone seriously interested in a broad pursuit of photographic studies. Photography touches upon many other disciplines, and the opportunities for study are limited only by the student's interest. The Rochester area is blessed with outstanding physical and human resources. In addition to those located in the College of Graphic Arts and Photography at RIT, there are resources to be found in two major additional institutions heavily involved in photographic education and innovation: the International Museum of Photography at the George Eastman House and the Visual Studies Workshop, which has just moved into a new facility.

The MFA program in photography at RIT is unique in that it is the only such program housed in a School of Photographic Arts and Sciences with a support faculty of 50 highly specialized and diverse instructors. The program is designed to reflect this diversity. A student has a wonderful opportunity to study photography as a fine art and as a visual probe to human expression and understanding.

The student is encouraged to make the most of the resources at RIT as well as those in the community and is reminded that a camera and film no more make a photographer than a paint brush and canvas make an artist."

Zakia is a native of Rochester and holds a BS degree in photographic science from RIT and a Ed.D in educational psychology from the University of Rochester. Prior to joining RIT in 1959 he was employed as a photographic engineer with Eastman Kodak. He has also served as director of Instructional Research and Development at RIT.

Photographic Arts & Sciences
(Fifth year of five-year program)

PPHS-711, 712, 713 **Theory of the Photographic**
Registration #0907-711, -712, -713 **Process**
Physical structure and optical properties of the silver halide emulsion and their relations to the characteristics curve; chemistry and preparation of emulsions; treatment of theory of sensitivity and latent image formation: chemistry and kinetics of processing, chemistry and physics of selected non-silver processes.

Class 3, Credit 3/Qtr.

PPHS-731, 732, 733 **Instrumental and**
Registration #0907-731, -732, -733 **Photographic Optics**
The principles of geometrical and physical optics with application to photographic instrumentation systems. First-order imaging, aberrations and geometrical image evaluation, mirror and prism systems, the eye and vision characteristics, radiometry of optical images, basic instrument systems, electromagnetic waves, polarization, interference and interferometers, coherence, Fraunhofer and Fresnel diffraction, transfer function description of imaging system performance.

Class 3, Credit 3/Qtr.

PPHS-741, 742, 743 **Analysis and Evaluation**
Registration #0907-741, -742, -743 **of Imaging Systems**
Complex variables and Fourier analysis with application to the evaluation of imaging systems; properties of optical images, structure of photographic images; methods of photo-optical system evaluation.

Class 2, Lab. 6, Credit 4 (Winter)
Class 3, Credit 3 (Fall and Spring)

PPHS-751, 752, 753 **Special Topics in**
Registration #0907-751, -752, -753 **Photographic Science**
Advanced topics of current or special interest, varying from quarter to quarter, selected from the field of photographic science. Specific topics announced in advance. (Not offered every quarter. Consult coordinator of the photographic science graduate program.)

Credit 3/Qtr.

PPHS-890 **Research and Thesis Guidance**
Registration #0907-890
Thesis based on experimental evidence obtained by the candidate in an appropriate field as arranged between the candidate and his or her advisor.

Credit 9 minimum for MS

Master of Fine Arts in Photography

PPHG-700 **Fundamentals of Photographic**
Registration #0907-700 **Communication**
A summer course for students entering the graduate program with insufficient undergraduate credits in photography and/or the visual arts.
An intensive survey of photographic materials, processes, equipment and practice; workshop in the application of photography to the solution of problems in visual communication and design.
Undergraduate credit (15 hours) will be granted upon completion.

Credits not applicable to MFA requirements.

PPHG-701, 702, 703 **History and Aesthetics**
Registration #0903-701, -702, -703 **of Photography**
An intensive inquiry into the history and aesthetics of photography to the present. Some of the areas of exploration: the rise and development of portrait, architectural and landscape photography in the 19th and 20th centuries; a survey of old and recent processes and how they affect the image-making of their particular period; exploring new frontiers; the photographers of the geological and geographical U.S. surveys and NASA moonscapes; "straight" photography vs. pictorialism: 135-year battle; the document and Robert Frank's ***Americans*** and the evolution of color photography.

Credit 3/Qtr.

PPHG-705, 706, 707 **Student/Faculty Seminar**
Registration #0903-705, -706, -707
An all purpose weekly meeting to facilitate communication among all members of the MFA community

Credit 1/Qtr.

PPHG-720 **Photography Workshop**
Registration #0903-720
Photographic communications workshop. Individually planned studies in photographic visual communication as determined by faculty-student consultation based on the student's personal objectives. Research, group critiques, seminars, studio and laboratory practice, field trips.

Credit 1-9

PPHG-725, 726, 727 **Photography Core**
Registration #0903-725, -726, -727
Major emphasis is placed on the individual's learning to generate and intensify his or her personal statement through photography. Some of the projects are assigned while others are selected by the candidate.
Required for still photography majors.

Credit 3/Qtr.

PPHG-730, 731, 732 **Cinematography**
Registration #0903-730, -731, -732
Film making workshop. Individually planned studies in cinematography, as determined by faculty-student consultation, group critiques, seminars, studio and laboratory practice, field trips.

Credit 3-9

PPHG-740, 741, 742 **Photographic Museum Practice**
Registration #0903-740, -741, -742
Museum internship workshop, still or motion picture; research, assigned projects, seminars in history, function and administration of museums, with emphasis on photographic curatorial duties; practice in exhibition planning and development; field trips. This cannot be selected as a minor concentration.

Credit 3-9

PPHG-750, 751, 752 **Special Topics Workshop**
Registration #0903-750, -751, -752
Advanced 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.

Credit 3-6/Qtr.

PPHG-7 **Perceptual Principles**
Registration #0903-7
An advanced course which provides an applied psychological framework for the ways we select, code, organize, store, retrieve and interpret visual images.

Credit 3 Qtr.

PPHG-799 **Independent Project**
Registration #0903-799
The student proposes an advanced project to an individual instructor. The student and the instructor are jointly responsible that the material to be covered is appropriate to the student's program and that the number of credits proposed are justified. Both will sign the proposal which must also be approved by the graduate coordinator and the director of the school.

Credit 1-9

Credit 889 **Pre-Thesis Seminar**
Registration #0903-889
Development and statement of written thesis proposal with emphasis on research required and exposure to various concepts of MFA thesis possibilities.

Credit 1

PPHG-890 **Research and Thesis**
Registration #0903-890
Research, execution of a creative project and presentation of an acceptable exhibition with emphasis on technique, design, and communication. The candidate will select his or her thesis subject with the approval of the graduate committee and will deposit a suitable report and record of the thesis with the Institute. Museum majors will plan, assemble and take full responsibility for mounting a major photographic exhibit under the sponsorship of Rochester Institute of Technology, or a major museum or educational institution. The announcement, catalog, reviews and a satisfactory ir lustrated report of the project must be deposited with the Institute.

Credit 1-9

Credit 9 minimum for MS

Seminar with Ralph Gikson *Anthony M. Ward*

Master of Science in Photographic Science

PPHS-700 **Principles of Photographic Science**
Registration #0907-700
A course intended for students who have completed their undergraduate programs in engineering or the sciences and who desire to prepare themselves for entry into the graduate program in photographic science and instrumentation or who desire a working knowledge of photographic science at an undergraduate level. It is an intensive course, assuming working knowledge of undergraduate mathematics, physics and chemistry. Course topics include radiation and radiometry, properties of radiation-sensitive materials, chemistry of photographic processing, sensitometry, tone reproduction, principles of color measurement, color photographic systems, image microstructure, and photographic instruments. The course includes both lectures and laboratory work. (Registration requires consent of the graduate coordinator.)

Credit 15 (Summers Only)

(Not applicable to the 45 required credits in the photographic science and instrumentation graduate program)

PPHS-701, 702, 703 **Principles of Photographic**
Registration #0907-701, -702, -703 **Science**
Equivalent to PPHS-700, but offered in the evening and Saturdays during the regular Fall, Winter and Spring Quarters. Admission to MS program in photographic science or consent of graduate coordinator)

Credit 5/Qtr.

(Not applicable to 45 required graduate credits)

PPHS-711, 712, 713 **Theory of the Photographic**
Registration #0907-711, -712, -713 **Process**
Physical structure and optical properties of the silver halide emulsion and their relations to the characteristic curve; chemistry and Preparation of emulsions; treatment of theory of sensitivity and latent image formation: chemistry and kinetics of processing, chemistry and physics of selected non-silver processes.

Class 3, Credit 3/Qtr.

PPHS-721, 722 **Mathematics and Statistics**
Registration #0907-721, -722 **for Photographic Systems**
A special graduate course in mathematics and applied statistics involving those areas of direct concern in design, analysis, and evaluation of photographic systems.

Credit 4/Qtr.

PPHS-731, 732, 733 **Instrumental and**
Registration #0907-731, -732, -733 **Photographic Optics**
The principles of geometrical and physical optics with application to photographic instrumentation systems. First-order imaging, aberrations and geometric image evaluation, mirror and prism systems, the eye and vision characteristics, radiometry of optical images, basic instrument systems, electromagnetic waves, polarization interference and interometers, coherence, Fraunhofer and Fresnel diffraction, transfer function description of imaging system performance.

Class 3, Credit 3/Qtr.

PPHS-741, 742, 743 **Analysis and Evaluation**
Registration #0907-741, -742, -743 **of Imaging Systems**
Complex variables and Fourier analysis with application to the evaluation of imagine systems; properties of optical images, structure of photographic images; methods of photo-optical system evaluation.

Class 2, Lab. 6, Credit 4 (Winter)
Class 3, Credit 3, (Fall and Spring)

PPHS-751, 752, 753 **Special Topics in**
Registration #0907-751, -752, -753 **Photographic Science**
Advanced topics of current or special interest, varying from quarter to quarter, selected from the field of photographic science. Specific topics to be announced in advance. (Not offered every quarter. Consult coordinator of the photographic science graduate program.)

Credit variable

PPHS-890 **Research and Thesis Guidance**
Registration #0907-890
Thesis based on experimental evidence obtained by the candidate in an appropriate field as arranged between the candidate and his or her advisor.

Graduate Faculty

College of

Graphic Arts and

Photography

Lothar K. Engelmann, Ph.D., J. W. Goethe University, Germany—Dean, Professor

School of Photographic Arts and Sciences

Russell Kraus, Ed.D., Massachusetts—Director, School of Photographic Arts and Sciences

David A. Engdahl, M.Ed., University of Rochester—Associate Director, School of Photographic Arts and Sciences, Professor

Mohammed Abouelata, MS, University of Tennessee—Assistant Professor, Photographic Science and Instrumentation.

Sven Ahrenkilde, MS, Polytechnical University, Denmark, Research Associate, Graphic Arts Research Center

Brent H. Archer, AAS, Rochester Institute of Technology—Research Associate, Graphic Arts Research Center

Charles A. Arnold, Jr., MFA, Rochester Institute of Technology—Professor, Photography

Owen B. Butler, BFA, Rochester Institute of Technology—Assistant Professor, Photography

Burt H. Carroll, Ph.D., University of Wisconsin—Professor, Photographic Science and Instrumentation

John F. Carson, MSEE, Massachusetts Institute of Technology—Associate Professor, Photographic Science and Instrumentation

Neil Crom, M.Ed., Syracuse—Professor Photography

Andrew Davidhazy, MFA, Rochester Institute of Technology—Assistant Professor, Photography

Robert Doherty, MFA, Yale—Director, International Museum of Photography, George Eastman House; Lecturer, Photography

William W. DuBois, M.Ed., Bowling Green State University—Assistant to the Director, Assistant Professor

Lothar K. Engelmann, Ph.D., J. W. Goethe University, Germany—Dean, Professor

Andrew H. Eskind, MS, Illinois Institute of Technology—Assistant to the Director, International Museum of Photography, George Eastman House; Lecturer, Photography

Richard Floberg, MS, Boston University—Associate Professor, Photography

Ronald Francis, Ph.D., Massachusetts Institute of Technology—Professor, Photographic Science and Instrumentation

Thomas T. Hill, BS, University of Wisconsin—Associate Professor, Photographic Science and Instrumentation

Bradley T. Hindson, MFA, Ohio State—Assistant Professor

William Jenkins, MFA, SUNY at Buffalo—Associate Curator, George Eastman House

James E. McMillion, Jr., MFA, Ohio State—Professor, James E. McGhee Professor in Photographic Management

Frank Moser, MS, Minnesota—Lecturer Photographic Science and Instrumentation

Beatrice Nettles, BFA, Florida; MFA, Illinois—Visiting Assistant Professor

John Pfahl, MA, Syracuse—Associate Professor, Photography

Irving Pobborasvsky, MS, Rochester Institute of Technology—Senior Technologist, Graphic Arts Research Center

Martin A. Rennalls, MS, Boston University—Associate Professor, Photography

Albert D. Rickmers, M.Ed., St. Bonaventure; MS, Rochester Institute of Technology—Professor, Photographic Science and Instrumentation

David J. Robertson, MS, Columbia—Professor, Photography

Elliott Rubenstein, MFA, University of Buffalo; MA, St. John's University—Instructor, Photography;

Gerhard W. Schumann, Ph.D., J. W. Goethe University, Germany—Professor, Photographic Science and Instrumentation

William S. Shoemaker, MS, University of Miami—Professor, Photographic Science and Instrumentation

Robert A. Sobieszek, MA, Stanford-Associate Curator and Director, Research Center, International Museum of Photography, George Eastman House; Lecturer, Photography

Leslie D. Stroebel, BS, Ed.D., University of Rochester—Professor

Charles C. Werberig, BFA, MS, Syracuse—Assistant Professor

Richard D. Zakia, BS, Rochester Institute of Technology, Ed.D., Rochester—Coordinator, MFA Photography Program, Professor

College of Science

Thomas P. Wallace, Dean, College of Science

Robert E. Gilman, Department Head, Chemistry (475-2497)

Terence C. **Morrill,** Graduate Advisor (475-2544)

Gerald A. Takacs, Chairman of Chemistry Graduate Committee (475-2047)

Master of Science in Chemistry

The Chemistry Department offers graduate programs leading to the master of science degree in chemistry on either a part-time or full-time basis with a variety of program options designed to fill the needs of both the practicing chemist in the Greater Rochester industrial community and the full-time graduate student.

Objectives
The objectives of the program are, through course work and research experience, to increase both the breadth and depth of the graduate student's background and to provide an opportunity for the student to attack scientific problems on his or her own initiative with a minimum of supervision.

Five program options are available to cover the differing needs of graduate chemists.

Admission
Admission to the program will be granted to qualified graduates who are holders of a bachelor's degree from an accredited college or university. Before a student is admitted to candidacy for the MS degree, one must have experience equivalent to a full year's course in each of the following: analytical chemistry, organic chemistry, physical chemistry, physics, and calculus.

The student must further demonstrate mastery of analytical, organic, and physical chemistry in qualifying examinations administered by the RIT Chemistry Department.

Full-time graduate work
A limited number of teaching assistantships are available to qualified students to undertake full-time graduate work that would include research experience. The Chemistry Department has a vigorous, research oriented faculty and excellent equipment and facilities to enable full-time graduate students to carry on a program of independent study which will develop their ability to attack scientific problems at the research level.

Students enrolled in the full-time program are expected to complete 45 hours of course work and submit an independent research thesis. A full-time student is permitted to take a maximum of 16 credits per quarter.

Part-time study
The Department of Chemistry encourages practicing chemists in the Greater Rochester industrial community to pursue a program toward the master of science degree in chemistry without interrupting their work at their place of employment. Consequently, most of the courses in the graduate programs in chemistry are scheduled in the late afternoons or early evenings.

Students employed full-time in industry are normally limited to a maximum of two courses or eight credits each quarter.

The part-time MS program does not require a research thesis.

Internship option
The Department of Chemistry recognizes that the in-plant experience of a number of chemists employed in local industry includes independent, creative research. This experience may be applied, to a maximum of 16 hours of research credit, towards the completion of the master of science degree in chemistry in either the full- or part-time program.

The industrial research submitted for research credit must be originated by the graduate student and be presented to the scientific community as either a published paper, presentation at a professional meeting, or a report to the RIT Chemistry Department.

Cooperative education option
The cooperative education option is to accommodate students at the master's level who have or are able to obtain industrial employment which allows for quarters of full-time academic work. If industrial employment permits research, up to 16 of the 45 required credits may be obtained through the industrial internship option. If industrial employment does not permit research, research credits may be obtained within the Department of Chemistry.

Community college teacher option
To better prepare the graduate student for a career as a chemistry instructor in a two-year college, the Department of Chemistry provides an opportunity through course work and actual teaching experience at two-year colleges, to obtain experience in the development of course material and instructional ability at the community college level.

This instructional development is provided in addition to the requirements of the full-time master of science in chemistry program which includes both independent research experience and a thesis.

Program
Each student, together with an advisor, will arrange a program best suited to the student's interests and needs. This program will be subject to the approval of the department head and the chairperson of the Graduate Committee.

A deliberate effort will be made to strengthen any areas of weakness indicated by the student's undergraduate records and/or the qualifying examinations.

In order to qualify for the MS degree, a candidate must satisfy the following requirements:

A minimum of 45 quarter credits beyond the bachelor's degree. Courses in chemistry will be chosen from those with SCH-700 and SCH-800 numbers and should include one or more representing each of the four fields: analytical, inorganic, organic and physical. Each student must take or have demonstrated proficiency in the areas represented by the following courses: SCHI-763, SCHA-711, SCHO-737 or 739 and SCHP-741. As part of the required credits, each student must have one or two quarter credit hours in seminar SCHC-870, and six quarter credit hours in upper division courses from related departments.

2. A minimum of nine quarter credit hours in research and submission of a satisfactory thesis. This may be waived for part-time students.
3. A foreign or computer language requirement.
4. The passing of an oral thesis defense or comprehensive examination.

Additional information
More information may be obtained by phoning the graduate advisor (716) 475-2544, the chairperson of the Graduate Committee (716) 475-2047, or the Department of Chemistry (716) 475-2497.

Master of Science in Clinical Chemistry

Thomas P. Wallace, Dean, College of Science
Edward B. Stockham, Director, School of Health Related Professions
William A. Burns, Head, Clinical Sciences Department (475-2978)
Robert E. Gilman, Acting Program Director, Clinical Chemistry (475-2497)

The clinical chemistry program is designed for either full-time or part-time graduate study. All courses required are offered at least once each year during the late afternoon or evening.

Objectives
The program is designed to provide formal educational background for individuals aspiring to careers in middle management in clinical chemistry laboratories.

Admission
Qualified graduates who hold a bachelor's degree in chemistry, biology, medical technology, nuclear medicine technology, or a related field from an accredited college or university are invited to apply.

Program and counseling
The required courses and their quarter credits are Biochemistry-3, Metabolism-3, Advanced Physiology-3, Advanced Clinical Chemistry-12, Electronics-3, Statistics-3, Computer Applications-3, Management of Clinical Laboratories-4, Management and Organization-4, Survey of Physical Chemistry-3, and Clinical Chemistry Research-3. Because of the diversity of backgrounds among candidates to the program, interested individuals are encouraged to write or phone the Clinical Sciences Department (716) 475-2978 regarding individual program planning, prerequisites, transfer credits, and course sequencing. Two oral examinations must be passed during the program. The first relates to the student's overall academic and clinical chemistry background and the proposal of the clinical chemistry research project. The second oral examination deals with the final research project. The presentation of a thesis is optional. Fifty quarter credits are required for completion of the MS in clinical chemistry degree program. A minimum clinical experience requirement may be met either by an internship or by prior experience.

Science courses

Department of Chemistry
Master of Science in Chemistry

SCHA-711 **Instrumental Analysis**
Registration #1008-711
Theory, applications and limitations of instrumental methods in qualitative, quantitative, and structural analysis. Topics covered include flourescence and phosphorescence, Raman, mass spectrometry, nuclear magnetic resonance, X-ray and radio-chemistry, and electrochemistry. (SCHA-312)

Class 3, Lab 5, Credit 5

SCHB-702 **Biochemistry**
Registration #1009-702
Introduction to biological chemistry. Chemical structures, reactions and physiological functions of molecular components of cells: amino acids, sugars, lipids, nucleotides and selected biopolymers. Solution behavior, catalytic properties and structure of proteins and enzymes. (SCHO-433 or SCHO-232)

Class 3, Credit 3

SCHB-703 **Biochemistry—Metabolism**
Registration #1009-703
Bioenergetics principles; catabolism of carbohydrates, fatty acids and amino acids; photosynthesis, biosynthesis of carbohydrates, lipids, and nitrogenous compounds; active transport; metabolic diseases. (SCHB-702)

Class 3, Credit 3

SCHB-704 **Biochemistry—Nucleic Acids and**
Registration #1009-704 **Molecular Genetics**
The biochemistry of inheritance, expression of genetic information, protein biosynthesis, differentiation, viral and bacterial infection and the “origin of life.” (SCHB-702)

Class 3, Credit 3

SCHC-772 **Special Topics—Chemistry**
Registration #1010-772
Advanced courses which are of current interest and/or logical continuations of the course already being offered. These courses should be structured as ordinary courses and should have specified prerequisites, contact hours, and examination procedures.

Class variable, Credit variable

SCHC-850 **Media Design Project**
Registration #1010-850
Students in small groups will design, produce, test and evaluate a media form or device for use in the teaching of science at the two-year college level.

Credit 2-4

SCHC-851 **Media Design Seminar**
Registration #1010-851
A seminar workshop on evaluation and critique, human information processing, and instructional systems management as applied to media production.

No Credit

SCHC-852 **Internal Internship**
Registration #1010-852
Students in small groups will be assigned to a particular general chemistry course for a minimum of one quarter for the purpose of investigating more efficient utilization of the instructional media, recitation/laboratory periods, and computer aided instruction. Various ways will be explored to assist hearing-impaired and first-year students with remedial work as well as provide advanced work for rapid learners and those with advanced high school preparation.

Credit 2

SCHC-859 **Internship Research**
Registration #1010-859
Industrial internship research.

Credit 0-16

SCHC-870 **Chemistry Seminar**
Registration #1010-870

Credit 1

SCHC-879 **Research** and **Thesis** Guidanc*
Registration #1010-879 e
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

SCHC-899 **Independent Study—Chemistry**
Registration #1010-899 1

Credit variable

SCHI-762, 763 **Inorganic Chemistry**
Registration #1012-762, -763
The properties and structures of the elements and their compounds in relation to electronic and stereochemical principles; inorganic laboratory techniques (SCHO-443 and SCHP-443)

Class 3, Lab. (Optional) 3, Credit 3 or 4/Qtr.

SCHO-736 **Spectrometric Identification**
Registration #1013-736 **of Organic Compounds**
This course is concerned with the theory and application of nuclear magnetic resonance, infrared, mass spectrometry, and ultraviolet spectra as applied to organic structure determination. The use of C-13 nmr is included. (SCHO-433)

Credit 2

SCHO-737 **Advanced Organic Chemistry**
Registration #1013-737
Several of the following advanced topics in organic chemistry are covered: polyfunctional compounds, modern synthetic methods, stereochemistry, conformational analysis, free radical reactions; natural and synthetic polymers. (SCHO-433)

Class 3, Credit 3

SCHO-738 **Systematic Identification** of
Registration #1013-738 **Organic Compounds**
The laboratory utilizes systematic chemical and spectral tests to deduce the structure of organic compounds. (SCHO-433)

Credit 2

SCHO-739 **Advanced Organic Chemistry**
Registration #1013-739
Selected topics in physical organic chemistry including: techniques for elucidation of mechanism (kinetic, linear free energy relationships, isotope effects), molecular orbital theory, electrocyclic reactions. (SCHO-433 and SCHP-443. Note: SCHO-737 is recommended but not required)

Class 3, Credit 3

SCHO-832 **Stereochemistry**
Registration #1013-832
Advanced treatment of steric relationships and stereoisomerism in organic compounds. (SCHO-433, SCHP-443)

Class 3, Credit 3

SCHO-833 **Heterocyclic Chemistry**
Registration #1013-833
The preparation, properties, and reactions of heterocyclic systems, especially heteroaromatic rings. (SCHO-433)

Class 3, Credit 3

SCHO-835 **Organic Chemistry of Polymers**
Registration #1013-835
Introduction to the chemistry of synthetic, high molecular weight polymers and a survey of their diverse structures and properties, Mechanisms of condensation, free radical and ionic polymerization. (SCHO-433)

Class 3, Credit 3

SCHP-741 **Chemical Thermodynamic***
Registration #1014-741
A study of the basic fundamentals of thermodynamics and their use in deriving the interrelationships of thermodynamic functions. Thermodynamic properties of gases will be calculated based on spectroscopic data. (SCHP-443 and SMAM-307)

Class 3, Credit 3

SCHP-742 Survey of Physical Chemistry
Registration #1014-742
This course will present the elements of physcial chemistry to students whose interests are in those areas (such as biology, health related professions, printing, photography, etc.) in which they may have had a minimal exposure to physical chemistry. Molecular structure, thermodynamics, and kinetics will be discussed with a minimum of mathematics.

(SCHG-215, 216, 217; SCHO-231, 232 or consent of instructor)

SCHP-743 Chemical Kinetics
Registration #1014-743
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. (SCHP-443)

Class 3, Credit 3

SCHP-744 Quantum Mechanics
Registration #1014-744
Matrix formulation of quantum mechanics, variations and perturbational methods, the uncertainty relations, particle in a box, tunneling, harmonic oscillator, angular momentum and magnetic resonance, the hydrogen atom and more complex atoms. (SCHP-433)

Class 3, Credit 3

SCHP-745 Quantum Chemistry
Registration #1014-745
Application of quantum mechanics to problems of chemical interest. Group theory; calculations of vibrational frequencies and selection rules for complex molecules; molecular orbital energies of complex molecules. (SCHP-744)

Class 3, Credit 3

SCHP-746 Physical Chemistry of Polymers
Registration #1014-746
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. (SCHP-443)

Class 3, Credit 3

SCHP-747 Principles of Magnetic Resonance
Registration #1014-747
A development of the principal ideas of magnetic resonance including the theory of resonance line shapes, magnetic interactions, experimental considerations, and spectral analysis. These concepts are discussed in terms of nuclear magnetic, nuclear quadrupole, and electron spin resonance spectroscopy. (SCHP-443)

Class 3, Credit 3

School of Health Related Professions Department of Clinical Sciences Master of Science in Clinical Chemistry

SHPC-820 Advanced Clinical Chemistry I
Registration #1023-820-01
Toxicology, therapeutic drug monitoring, electrolytes acid-base, vitamins, oncology, hepatitis, coagulation and various standard methods. (Permission of instructor)

Class 2, Lab 0, Credit 2

SHPC-820 Advanced Clinical Chemistry Laboratory I
Registration #1023-820-30
Comparison of current methods for analysis of toxicology samples— gas-liquid chromatography, radioimmunoassay, enzyme multiplied immunoassay. (Permission of instructor, class size limited to 12)

Class 0, Lab 6, Credit 2

SHPC-821 Advanced Clinical Chemistry II
Registration #1023-821-01
Proteins, enzymes, hemoglobins, iron, renal function, lipids, quality control, automation, and method selection. (Permission of instructor)

Class 2, Lab 0, Credit 2

SHPC-821 Advanced Clinical Chemistry Laboratory II
Registration #1023-821-30
Comparison of current methods for separation and determination of isoenzymes. (Permission of instructor, class size limited to 12)

Class 0, Lab 6, Credit 2

SHPC-822 Advanced Clinical Chemistry III
Registration #1023-822-01
Radioimmunoassay, hormones, fetal-placental unit, integration of laboratory data. (Permission of instructor)

Class 2, Lab 0, Credit 2

SHPC-822 Advanced Clinical Chemistry Laboratory III
Registration #1023-822-30
Methods for the development, improvement, and trouble shooting of radioimmunoassay analyses. (Permission of instructor, class size limited to 12)

Class 0, Lab 6, Credit 2

SHPC-859 External Clinical Chemistry Research

SHPC-879 Clinical Chemistry Research
Registration # 1023-879

Credit 0-16

SHPC-899 Independent Study
Registration #1023-899

Credit variable

Graduate Faculty
College of Science

Thomas P. Wallace, Ph.D., Clarkson—Professor and Dean

Department of Chemistry

Robert E. Gilman, Ph.D., University of Michigan—Department Head, Professor, Organic Chemistry: organic synthesis and mechanisms in cyclophane, thiophene, and xanthate systems

Jerry M. Adduci, Ph.D., Pennsylvania State—Assistant Professor, Organic Chemistry: organic mechanisms, polymer synthesis, and chemical technology

William N. Bigler, Ph.D., University of Colorado—Associate Professor, Biochemistry: regulatory enzymes, radiation sensitivity, and metabolic control

Robert L. Craven, Ph.D., University of Michigan—Director of Chemical Technology, Professor, Organic Chemistry: organic mechanisms and stereochemistry

James E. Frey, Ph.D., Lehigh—Assistant Professor, Analytical and Inorganic Chemistry: liquid chromatography and transition metal complexes

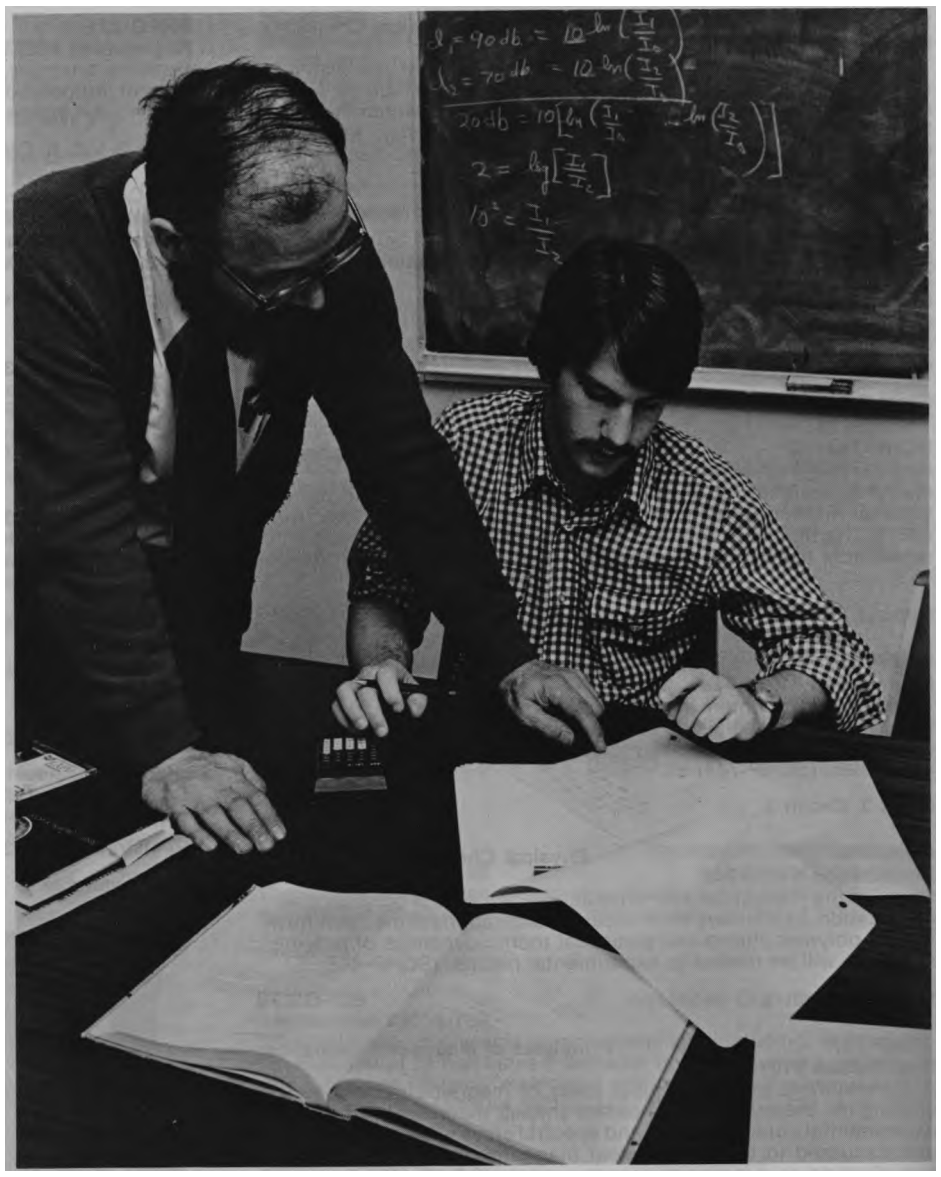
William J. Hayles, Ph.D., Iowa State—Professor, Physical and Inorganic Chemistry: chemical kinetics and computer applications to chemistry

David A. Hilborn, Ph.D., Cornell—Assistant Professor, Physical and Biophysical Chemistry

Earl Krakower, Ph.D., University of British Columbia—Professor, Physical Chemistry: nuclear magnetic resonance, structure, and properties of molecules, media development, and Chemical Technology

Joseph L. Lippert, Ph.D., University of Colorado—Associate Professor, Physical Chemistry: laser-raman spectroscopy and biophysical chemistry

Terence C. Morrill, Ph.D., University of Colorado—Graduate Advisor, Professor, Organic Chemistry: stereochemistry and mechanism of organic reactions, and organic structure effects upon lanthanide-induced shifts in NMR spectrometry; Computer Assisted Instruction



Nina M. Sandberg, Ed.D., University of Florida—Associate Professor, Science Education

Gerald A. Takacs, Ph.D., University of Wisconsin—Chairman Chemistry Graduate Committee, Assistant Professor, Physical Chemistry: chemical kinetics, mass spectrometry, atmospheric chemistry and photochemistry

Craig VanAntwerp, Ph.D., Stanford University—Visiting Assistant Professor, Organic Chemistry: synthesis and C-13 nmr spectra of organic model systems

Thomas P. Wallace, Ph.D., Clarkson—Dean, Professor, Physical Chemistry: emulsion polymerization, characterization of polymers, light scattering, and centrifugation techniques

James Wilson, Jr., Ed.M., University of Rochester—Professor, Organic Chemistry: qualitative organic analysis and chemistry of the graphic arts

School of Health Related Professions

Edward B. Stockham, Ph.D., University of Pennsylvania—Associate Professor and Director **(475-2488)**

Department of Clinical Sciences

William A. Burns, MS, Elmira—Department Head, Associate Professor

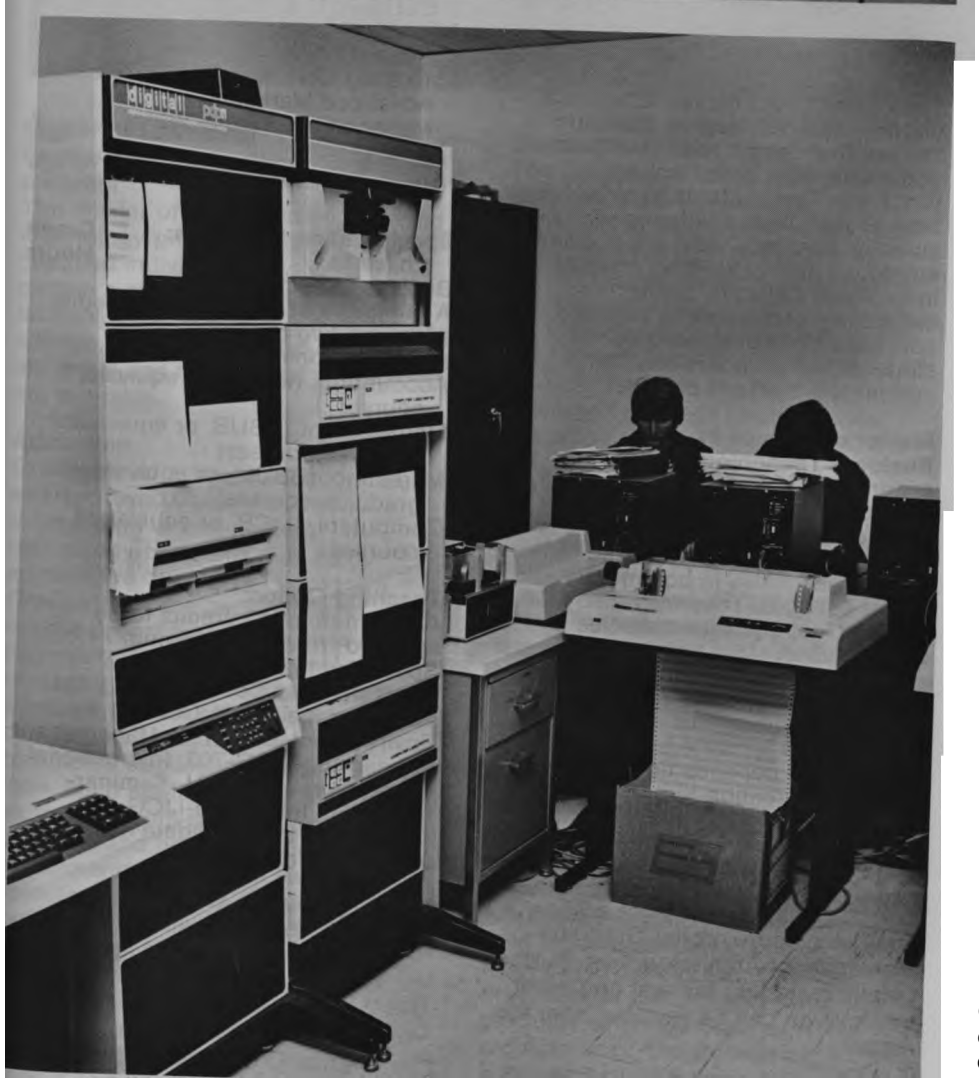
Robert E. Gilman, Ph.D., University of Michigan—Professor and Acting Program Director of Clinical Chemistry

Richard M. Bayer, Ph.D., Rutgers University—Rochester General Hospital, Adjunct Clinical Assistant Professor

Norman P. Kubasik, Ph.D., Syracuse University—Upstate Medical Center-The Genesee Hospital, Adjunct Clinical Assistant Professor

Harrison E. Sine, Jr., Ph.D., SUNY at Buffalo—The Genesee Hospital Adjunct Clinical Assistant Professor

Institute College



Roy I. Satre, Jr., Dean

New, innovative, flexible, unique—are all adjectives that describe the graduate and undergraduate program of RIT's newest college. Established in 1973, Institute College is composed of five units: The Center for Community/Junior College Relations, School of Computer Science and Technology, Department of Instructional Technology, Department of Packaging Science, and the School of Engineering Technology. With its beginnings in the Center for Community College Faculty Development, started in 1968, the programs offered through this unusual college have evolved and grown in number until today there are 17 distinct curricula and five options.

Programs included within Institute College are usually one-of-a-kind in the regional, state or even national educational communities. An example is the master of science in engineering technology external degree, the first of its type nationally. Students entering computer science have four undergraduate and three graduate programs to select from; and others will follow in succeeding years. Another first is the Career Information program begun in 1977. Programs in instructional technology are answering the demand for skilled and professional systems oriented training and educational technologists.

The following graduate programs are currently offered in Institute College.

Master of Science degree in Engineering Technology

The objective of this program is to prepare faculty members for the nation's two-year colleges. Courses are offered in both graduate technology and in the science of teaching and counseling at the college level. Attention is paid to curriculum development, establishing course objectives, measurement devices, institutional hierarchies, and budgeting in the two-year colleges.

The MS (ET) degree is offered for those wishing to teach in a community/junior college and for those already employed in these institutions.

Because of the recognized inability of employed adults to readily attend the Institute on a year-long basis, an external degree, MS (ET) has been in existence since 1973. Students contract with the appropriate faculty committee to complete a portion of

courses in other institutions, credit is given by examination, and exemplary experiences in the field of engineering technology are evaluated for credit purposes.

The core series of courses relating to instruction in the two-year colleges are available to other students within the Institute who wish to teach their technical area in the community/junior colleges, (i.e., chemistry, printing, fine arts).

Master of Science degree in Business Technology
Planned for the graduate of a business program who wishes to teach in the two-year college, the MS (BT) has developed out of the expressed needs of the community/junior colleges for faculty persons educated in the broadest aspects of business education.

Master of Science degree in Computer System Management
This curriculum, the first of its kind in the United States, is designed to prepare competent personnel for the mangement of computer installations. Graduate management courses and computer courses are combined in such a way that the student concentrates in areas where he or she has the least experience, and is strengthened in those areas of knowledge already acquired. Both full-time and part-time students are enrolled in this curriculum.

Master of Science degree in Computer Science
Graduates of computer science programs who wish to pursue advanced technical and theoretical studies in the field, for purposes of employment or further graduate study (at the doctoral level), will find this curriculum offers the opportunity to tailor a program that will satisfy their goals. Both day and evening courses are available.

Master of Science in Instructional Technology
Instructional technology is a relatively new field. IT graduates are employed in business, industry, educational institutions/community colleges, and the allied health fields. The RIT program currently consists of two options, one planned for the preparation of instructional developers in the two-year colleges, the other for developers in health sciences. Each program may be pursued on a full- or part-time schedule.

Master of Science degree in Career Information
This program provides the necessary courses and internship experiences to enable the graduate to serve in a variety of positions related to career education: public schools, community/junior colleges, business and industry, and service organizations. Extensive use is made of persons from personnel and training, as well as other employment areas in business, industry and education. Serving as faculty members and internship supervisors, they bring to the courses the practical as well as the theoretical sides of their professions. Upon completion of the program, the graduate has a well-rounded knowledge of the goals, procedures and fundamentals of the various career fields.

Center for Community/Junior College Relations

Richard L. Rinehart, Director

The center offers master of science degrees and non-degree graduate studies that have a relationship to community and junior college functions. The students may be full-time or part-time, academic year or summer enrollees, who are currently employed and/or seeking positions in two-year colleges. Some individuals participate in selected courses as non-matriculated students, while others plan to complete a master's degree.

Master of Science in Business Technology program
Graduates of this program will be able to teach a variety of business courses, seminars and related learning activities in community and junior colleges. They may also plan and instruct equivalent studies in business/industrial training programs.

Other graduates teach business courses in public and private high schools, however, the extent of qualification for state teaching certification depends upon the individual situation.

Admission
In addition to the basic requirements and procedures for graduate studies at RIT, the applicant must achieve a qualifying score on the Graduate Management Admission Test. Further details regarding the test and other information can be secured from the center.

Curriculum

Foundation Courses Phase I	**Credit Hours**
These courses may be waived for those having a grade of "B" or better in appropriate undergraduate courses, using guidelines established by RIT.	
Financial Accounting-BBUA-701	4
Behavioral Science in Management-BBUB-744	**4**
Economic Environment of American Business-BBUF-745	**4**
Statistical Analysis I-BBUQ-781	4
Concepts in Computer Utilization-BBUQ-792	4
	0 to **20**

Core Courses: Phase II	**Credit Hours**
These are required of all MS (BT) students, and follow as a general prerequisite, the completion of Phase I.	
Management & Organization-BBUB-741	4
Personnel Systems-BBUB-750*	4
Legal Environment of Business-BBUB-751 *	4
Financial Management-BBUF-722	4
Marketing Concepts-BBUM-761	4
Advanced Marketing Management-BBUM-762*	4
'Or approved electives in the field.	**24**

Specialization & Options: Phase III	**Credit Hours**
Business Specializations:	
A minimum of 16 additional credits spanning two of the following specializations:	
Accounting, (BBUA, or equivalent courses)	
Management (BBUB, or equivalent graduate courses)	
Marketing, (BBUM, or equivalent graduate courses)	
Computers, (IJCB, or equivalent courses)	
Teaching Option:	
A minimum of 12 credits to be selected from the following: Specialized graduate courses. The Two-Year Colleges-IJCG-701, Teaching, Learning, Content & Environment-IJCG-702, Management of Learning-IJCG-703, Instructional Techniques-IJCG-704, Seminar-IJCG-750, Internship-IJCG-840 (required if the candidate has insufficient experience)	

Master of Science in Engineering Technology program

The master of science in engineering technology program is designed for qualified individuals who wish to pursue a career as an engineering technology educator at a community college. Programs of study in electrical and mechanical technology are available.

Admission

Graduates of appropriate accredited and approved baccalaureate engineering or engineering technology programs may be admitted to the MS (ET) program. Graduates of the baccalaureate degree programs in other fields may be required to take additional undergraduate coursework before admission to the MS (ET) program is considered. In addition to the completed application for admission form, each applicant must submit (1) transcripts from previous undergraduate and graduate study, (2) recommendations, (3) a statement of objectives and goals, including evaluation of how the MS (ET) program will aid in achieving them and (4)other materials that can be considered to determine the probability of success. Applicants are not required to take the Graduate Record Examination.

Each application for admission is considered by the graduate committee and will be either approved or disapproved.

Curriculum

The program of study for the MS (ET) degree program requires a minimum of 48 quarter credits. The distribution of credits is to be as follows: (1) a minimum of 24 quarter credits in the field of specialization (2) a minimum of 12 quarter credits in an allied field (3) a minimum of 10 quarter credits in the CCJCR community college course series. Any three of the four courses IJCG-701, IJCG-702, IJCG-703, or IJCG-704 will satisfy this requirement.

A teaching internship requirement must be satisfied. Internships normally carry from three to six quarter credits which are applicable to the field of specialization requirements.

No specific program of study is required for all students in the MS in engineering technology program. Students choose courses according to their needs and objectives subject to the approval of the department chairperson and also subject to the constraints of prerequisite knowledge and scheduling. Courses to satisfy the specialized and allied field requirement may be selected from the following list. Courses may also be selected from the graduate offerings of other RIT colleges (e.g., the College of Engineering) with the approval of the appropriate individuals.

The courses listed below are offered on a rotating schedule that is designed to satisfy demand to the extent possible.

IJCT-705 Thermodynamics
IJCT-707 Engineering Concepts
IJCT-708 Engineering Technology Analysis
IJCT-710 Science and Technology of Materials
IJCT-711 Microelectronics
IJCT-713 Computers in Engineering Technology I
IJCT-714 Computers in Engineering Technology II
IJCT-714 Electromechanical Systems I
IJCT-716 Electromechanical Systems II
IJCT-717 Electrical Measurements
IJCT-718 Application of Linear Integrated Circuits
IJCT-719 Communication Theory
IJCT-720 Integrated Physics
IJCT-721 Digital Fundamentals
IJCT-722 Digital Integrated Circuits
IJCT-725 Numerically/Controlled Machines
IJCT-727 Advanced Electrical Measurements
IJCT-728 Active Filter Design
IJCT-730 Electric Power Transmission
IJCT-731 Mechanical Design
IJCT-732 Manufacturing Organization and Management
IJCT-751 Engineering Technology Seminar
IJCT-770 Minicomputers in Engineering Technology
IJCG-750 Seminar
IJCG-840 Internship
IJCG-850 Special Projects

Master of Science in Engineering Technology external degree program

The external degree option of the master of science in engineering technology program is uniquely designed for qualified individuals who are interested in a career as an engineering technology educator at a community college. The program of study for the external degree is unique in that it allows the individual to take maximum advantage of previous formal education at the graduate level as well as other formal and informal learning experiences.

Salient features of the program include:

1. A maximum of 30 (of the required 48) quarter credits may be earned by some means other than by actually taking courses at RIT.
2. Credit may be granted for such things as attendance at summer institutions (NSF, VEA, etc.) workshops and seminars. Credit may also be given by examination for measureable knowledge gained through work-related experience.
3. Approved graduate level courses may be taken at other approved institutions and the credit transferred to RIT.

Admission

Individuals who hold a baccalaureate degree in an appropriate technological field and who are either teaching or industrially employed are considered for admission. Applicants who do not meet these criteria may be considered for admission in some circumstances. The external degree program is normally not appropriate for individuals who have just recently completed their baccalaureate degrees. However, exceptions to this are possible.

Personal contact (which may be by telephone) with the CCJCR is required before an application for admission to the external degree program will be acted upon by the graduate committee.

Each application for the external degree program is considered by the graduate committee and will be either approved or disapproved.

For each approved application, an evaluation committee is formed. The purpose of the evaluation committee is to approve and oversee the program of study for the candidate. The chairperson of Graduate Engineering Technology normally chairs this committee.

A candidate for the external degree has from three to five years to complete his or her program of study. The determination is made by the evaluation committee on the basis of entering credit allowed. The following guidelines are used: fewer than **12** credits allowed: five years to complete; 13 to 24 credits allowed: four years to complete; 25 to 30 credits allowed: three years to complete.

Curriculum

Each candidate for the external degree must come to agreement with his or her evaluation committee on a curriculum contract which details the program of study requirements. The curriculum contract will outline a combination of courses and other evaluable experiences (transfer credits, credits by examination, etc.) such that sufficient depth and breadth in the identified field is provided. The following guidelines will be used to establish this contract:

1. A minimum of 48 quarter credits is required for the completion of degree requirements unless the student is registered as a licensed professional engineer. A minimum of 45 credits is required for students who have state registration as a licensed professional engineer.
2. The program of study must include a minimum of 24 quarter credits in a field of specialization—either electrical or mechanical engineering technology. A minimum of **12** credits in the field of specialization must be taken at RIT. Normally these are selected from the list of CCJCR technical course offerings, but graduate level courses offered by other departments may be taken if approved, and if they are compatible with the background and goals of the individual.
3. The program of study must include a minimum of **12** quarter credits in an allied field of technology or physical sciences.
4. A minimum of six quarter credits is required in appropriate education, community college teaching, or specifically approved psychology courses.
5. A minimum of 18 quarter credits is to be earned in residence at RIT.

Special charges

Applicants accepted as external degree candidates are assessed a nominal fee for those quarters in which they are not taking coursework in residence at RIT. The special charges are detailed elsewhere in this bulletin.

Other

Courses to satisfy the in-residence requirement of the external degree program are offered by the Center for Community/Junior College Relations. For the most part, all courses are offered periodically throughout the regular academic year and summer.

Master of Science in Career Information

Full-time and part-time students in the program would be either improving and expanding their functions in existing employment (in-service), or seeking employment (pre-service). The potential employers for both types of students would include: community/junior colleges, K-12 school systems, large corporation personnel and training divisions, governmental agencies that provide career information services, quasi-governmental and independent agencies/organizations whose clients need career planning and change information, and educational information centers.

A goal of the program is to give the student a sufficiently broad knowledge of careers to be able to explain: the educational involvements, characteristics of career clusters, the satisfactions and rewards of different career patterns, the realities of work in most specializations, the validity of published information, and the aptitudes or talents needed for success in diverse fields. This broad knowledge must be such that the graduate can provide a sense of perspective and the range of opportunities to others. The knowledge must also include an understanding or feeling for the expectations of employers and clients.

A graduate of the program should possess the leadership skills needed to establish and operate cooperative activities related to career education. The activities could include educational career centers (as described in current federal legislation), and other projects that require the involvement of several levels of educational organizations, business and industrial organizations, and social agencies that deal with career planning and advisement. The skills needed are the personal ability to facilitate cooperative efforts, the ability to overcome barriers in solving problems, the technical skills needed for particular activities, and the management skills related to cooperative ventures.

Students in the program will be taught to be able to help clients investigate career options, to identify the skills and interests that are needed for various jobs, and to translate career trends and opportunities into valid and viable information.

Since much of this work will be in groups, and include teaching functions, he or she will be able to be effective and efficient in the needed group dynamics and teaching competencies.

The program will help the student to be able to assist others in conducting new program feasibility studies; providing perspective; demonstrating and understanding curriculum planning; and being able

to conduct or guide the needed studies.

The graduate of the program should be aware of special problems in career advising and be able to organize and implement his or her own continuing education. The individual will recognize the need for continued learning and have the motivation for it.

The graduate, through his or her selected electives will study the particular characteristics and special expectations of one group of employing institutions.

Admission

Admission decisions for this program will be based upon the requirement of a baccalaureate degree, undergraduate grades, interviews, a personal goals statement, work experience, and test. (Recommended: Miller Analogies).

It is expected that the applicant will have had at least three years of experience as a full-time employee, or the equivalent of prorated part-time work. At least two years of full-time experience outside of education is desired. Individuals not having these minimum work experiences will be given lower priority in selection, and if selected, will be required to complete one additional quarter of internship prior to graduation.

Normally, either a "B" average or better in the most recent year (senior year) of undergraduate studies, or "B" or better grades in at least 12 graduate credits, will be required. Satisfactory scores, however, will offset a lower than desired grade point average.

Interviews and the personal goals statement are evaluated in terms of their relating program goals to the individual's personality and aptitudes for functioning as a career information specialist.

Degree Requirements

A minimum of 48 credits of combined required and elective courses is required for the degree.

A maximum of 9 (of the 48) credits may be transferred from other graduate institutions.

A maximum of 18 credits may be satisfied by the combination of transfer credits and credit by examination. Opportunities for credit by examination will depend upon documentation of related work experience and other learning.

Variable credit courses are arranged to accommodate persons who may have demonstrated a prior mastery of parts of the general courses.

Curriculum
foundation studies

These are specific educational competencies that are expected of individuals in the program. They may be satisfied by prior documentable mastery in non-credit courses, approved experience, and competency examinations, and/or by graduate or undergraduate courses.

A. Basic Statistics
B. Basic Sociology
C. Basic Psychology
D. Basic Economics
E. Testing & Measurements

Required Courses:*

702 Teaching, Learning, Content & Environment	1-3
704 Instructional Techniques	1-4
741 The Nature of Work	2
742 Career Decision Making Concepts	3
743 Educational/Business/ Industry Interrelationships	2
744 Legal Aspects of Career Plans	2
745 Career Concepts: Production	3
746 Career Concepts: Commerce	3
747 Career Concepts: Services	3
748 Information Retrieval Systems in Career Planning	3
749 Manpower Forecasting Fundamentals	4
755 Career Internship Project/ Experience	1-5
842 Current Issues & Selected Counseling Skills	3
850 Special Projects - Independent Research	1-6

Approved Elective Courses:**

701 The Two-Year Colleges	1-3
703 Management of Learning	1-4
732 Manufacturing Organization & Management	3
750 Seminar - Teaching	2
756 Career Internship - Business/Industry	1-5
757 Career Internship - Services/Education	1-5
762 Career Education Seminar - Women	4
763 Career Education Seminar - Handicapped	3
770 Interpersonal Communications	2

** Waivers for particular studies may be made on the basis of documented learning through experience, non-credit workshops, etc., or undergraduate studies. Individuals having waivers will, however, need to complete a minimum of 48 graduate credits (including approved transfer credit). These individuals may complete additional elective courses or increase the credits in variable credit required courses.*

"Other courses and studies may also be accepted as electives if they are an appropriate part of an integrated degree program for the individual.

School of Computer Science and Technology

The School of Computer Science and Technology offers two distinct Master of Science degree programs—MS degree in computer science and MS degree in information sciences.

The spectrum of the computer science program ranges from practical to theoretical aspects of computers, computing, and information systems.

The Master of Science degree in computer science offers two options. The MS degree in computer system management is designed to prepare students as computer center managers. The MS degree in computer science offers students opportunities to be specialized in areas such as system analysis, automata theory, data base systems, computer graphics, system software, computer architecture, and programming languages.

The Master of Science degree in information sciences is designed to provide students with graduate training in computerized information science. Graduates will be prepared to enter employment on the staff of information science centers such as public, private, and university libraries, medical information centers, lawyer's libraries and law enforcement data centers. Their job functions will be analyzing, designing, and programming the informations storage, retrieval, and display systems.

In addition to the MS degree, a sixth year certificate program in information sciences is offered.

This program is intended for persons with an MS degree in library science or the equivalent who need training in computer automated information processing.

The School of Computer Science and Technology is staffed with competent faculty members with excellent academic preparation and professional experience. The main computer system at RIT is a Honeywell Sigma-9 system with one megabyte main storage, supports batch processing, and over one hundred time sharing terminals. The School of Computer Science and Technology is equipped with a PDP 11/34 system, two IBM 360/30 systems, IBM 1500 CAI system, Interdata 7/16 system, Microdata 1600D, Cromeco Z2, Intel MCS80 and other minicomputers and microcomputers.

All of the computer equipment is available to computer science and information sciences students.

Graduate courses may be taken during the day or evening hours through course offerings by the School of Computer Science and Technology.

Master of Science in Computer Science

Stewart Shen, Coordinator

This program provides students with professional competence in technical and theoretical areas of computer science. Graduates will be prepared to enter employment in industrial, educational and governmental institutions. Their job titles would be senior programmer, systems programmer, data base administrator, computer specialist and instructor. Graduates will also be prepared to enter doctoral degree programs in computer science.

Entrance requirements
A baccalaureate degree earned from an accredited institution with a major in computer science, mathematics, physical sciences, engineering or the equivalent is required. Applicants must have a solid background in one or more high level programming languages, one or more assembly languages, and data structure analysis. Students without adequate background must take additional courses to make up for the deficiencies.

Graduation requirements
The master of science degree in computer science requires the successful completion of a minimum of 44 quarter credits of course work and four credits of thesis research. The thesis requirement may be substituted by taking two additional graduate computer science courses followed by a comprehensive examination. A graduate student must maintain a grade point average of "B" or better to graduate.

Curriculum
Curricula for entering students differ, depending on their undergraduate programs. However, in each case 24 credits must be graduate computer science courses and **20** credits may be electives in either mathematics, science, engineering or computer science. If a student enters with prerequisite deficiencies, the undergraduate credits which make up the deficiencies will not be counted toward the MS degree. A student may take courses and complete the MS degree through day or evening offerings. Sample programs are available in the graduate computer science handbook.

Each student is required to select an area of concentration, such as operating systems, data bases, programming languages, systems analysis, systems programming, etc. Students with undergraduate preparation in other than computer science will typically be required to take additional undergraduate computer science courses to satisfy the prerequisites of the specific concentration.

Master of Science in Computer System Management

Michael Atkins, Coordinator

This program provides students with professional competence in managing a computer installation or complex. Graduates will be prepared to enter employment in industrial, educational and governmental institutions, where they would direct or assist to direct computer installations.

Entrance requirements
A baccalaureate degree earned from an accredited institution with a record of acceptable academic achievement is required. Also required is a background in a high level programming language and an assembly language. Entering students without an adequate background will be advised to take additional courses to make up for deficiencies.

Graduation requirements
The master of science degree requires the successful completion of 48 quarter credits, of which a minimum of 24 credits are in graduate computer science courses and 12-24 credits are in management and free electives. A graduate student must maintain an average of "B" or higher to graduate.

Curriculum
Curricula for entering students differ, depending on their undergraduate programs. However, a set of required core courses must be taken in order to complete the MS degree. If a student enters with prerequisite deficiencies, the undergraduate credits which make up the deficiencies will not be counted towards the MS degree. A student may take day and/or evening courses through the School of Computer Science and Technology.

Computer science courses (ICSS-725, I CSS-730, ICSS-745, ICSS-750, I CSS-755, ICSS-775, ICSS-780, ICSS-785) can be used as technical graduate electives.

Further information about the program is contained in the Computer Science Graduate Student Handbook, available from the school office.

MS, Computer System Management: Sample Program

Quarter	Courses
1	ICSM-710 Computer Systems Software BBUQ-781—Mangerial Decision Making I
2	ICSM-715—Computer Systems Hardware BBUQ-782—Managerial Decision Making II
3	ICSM-703—Data Management Concepts BBUF-745—Economic Environment of American Business
4	ICSM-740—Computer System Personnel and Management BBUA-713—Basic Financial & Managerial Accounting
5	ICSM-765—Advanced Computer Utilization BBUF-722—Financial Management
6	ICSM-790—Seminar

Master of Science in Information Sciences

Richard T. Cheng,
Acting Coordinator

This program provides students with sufficient background in computer automated information systems. Graduates will be proficient in areas of data base systems, data management, information storage, information retrieval, library management, information media and displays. Potential employers include public libraries, university and college libraries, medical information centers, law libraries, law enforcement data centers and more.

Entrance Requirements:
A baccalaureate degree earned from an accredited institution with a major in library science, information sciences or the equivalent is required. In addition, a student must have three courses in library science from a previously attended institution.

Graduation Requirements:
The Master of Science degree in information sciences requires the successful completion of 48 quarter credits of course work. A graduate student must maintain a grade point average of B or better to graduate.

Curriculum:
A minimum of 48 quarter credit hours is required for the Master of Science degree in information science. Of the 48 credits, 36 must be taken in the computer science and information science field. The remaining 12 credits may be taken from a related discipline. Statistics is highly recommended as an elective area. Curriculum for each individual student differs depending on undergraduate preparation.

Curriculum MS Degree in Information Science

A. Core Requirement (24 Credits)

Course Title and Number	Credit
Data Base Concepts—ICSS-485	4
Data Base System Implementation—ICSS-636	4
Data Base Systems—I CSS-736	4
Information Storage & Retrieval—ICSS-746	4
Library Automation & Management ICSI-722	4
Information Media and Design—ICSI-733	4

B. Recommended Electives (12-24 Credits)

Course Title and Number	Credit
Data Structure and Analysis—I CSS-320	4
Sorting and Searching Techniques—ICSS-321	4
Data Communication Systems—I CSS-420	4
Operating Systems—I CSS-440	4
Intro, to Management Info. Systems—ICSS-465	4
Microprocessor and Microcomputers—ICSS-621	4
Discrete Simulation—I CSS-630	4
On-Line Information Systems Design—ICSS-635	4
Computer Communication Networks—ICSS-640	4
Assemblers, Interpreters, & Compilers—ICSS-725	4
Minicomputer Systems & Applications—ICSS-775	4
MS Thesis—ICSI-890	4-8

Sixth Year Certificate Program in Information Sciences
This program is designed for students who hold a Master's degree in library science or the equivalent. It is highly recommended for librarians and data managers who wish to enhance their knowledge in computer automated information systems.

Entrance Requirement:
A Master's degree in library science or equivalent earned from an accredited institution is required. RIT MS graduates in computer science or information science are not accepted.

Curriculum
Curricula differ among entering students depending on their preparation. The faculty advisor will work together with each student on the one year certificate program. The certificate program requires 36 quarter credit hours of course work. Among the 36 credits, 24 credits must be in graduate computer science or information science. The remaining 12 credits are electives in a related area (statistics courses are highly recommended) or in computer science undergraduate courses.

Curriculum Sixth Year Certificate Program

A. Core Requirement (16 credits)

Course Title and Number	Credit
Data Base Concepts—ICSS-485	4
Information Storage & Retrieval—ICSS-746	4
Library Automation & Management—ICSI-722	4
Information Media and Design—ICSI-733	4

B. Recommended Electives (20 Credits)

Course Title and Number	Credit
Computer Languages—ICSS-700	4
Data Structure Analysis—ICSS-320	4
Sorting and Searching Techniques—ICSS-321	4
On-Line Information Systems Design—ICSS-635	4
Data Base System Implementation—ICSS-636	4
Computer Communication Networks—ICSS-640	4
Assemblers, Interpreters, & Comp.—ICSS-725	4
Minicomputer Systems & Applications—ICSS-775	4

Instructional Technology

Clint Wallington, Chairperson

Instructional technology is a new, rapidly growing field concerned with the ways to prepare training programs and instructional materials for a wide variety of learners and teaching situations. Instructional technology emphasizes a systematic application of principles of learning and teaching to the development of instruction. An extension of audiovisual communications, instructional technology covers such areas as: learner behavior, instructional techniques and systems, media and communications, management of media centers and learning resources, and the evaluation of materials, programs and learners. Instructional technology takes a broad view of instruction ranging from individualized and personalized instruction through large group instruction.

The program is concerned with several areas: instructional development (particularly as it applies to the training of health professional and community college faculty); management of media distribution and production (particularly in educational media centers or training divisions); selection and evaluation of instructional materials and programs. Students interested in these areas are individually advised and a program of studies is developed to suit individual needs and career goals.

The program is pragmatically oriented without sacrificing adequate coverage of the new literature and theory of instructional technology. Students must complete many projects of different types and styles. These may include developing programmed instruction materials, producing validated instructional modules, or reviewing the specific body of the literature. The projects are intended to demonstrate competence in the student's selected career area (e.g., health sciences or industry). In order to reinforce this concept, the department encourages each student to produce a portfolio of work which will represent the skills acquired during his or her study for the MS. The portfolio might contain items such as research papers, abstracts of the literature, mediated presentations, or programmed materials.

The Health Science option

The field of health science education is currently witnessing a revolution. Health science training institutions are reexaming their goals, the nature of the student body, and most importantly their curriculum methodologies. The facilitator of change in health science training is often the instructional developer, an individual skilled in the identification, specification, analysis, and solution of instructional problems.

The Department of Instructional Technology curriculum is concerned with training individuals to successfully practice the principles and processes of instructional technology in a health science training institution, including allied health fields, e.g., schools of medicine, dentistry, nursing, veterinary science, podiatry, optometry and dental hygiene. Students interested in the health science option of the master of science degree in instructional technology should have an earned academic degree in a health science area or be able to establish significant work experience in a health science environment.

The Community College option

The other major focus of the department is to prepare individuals for successful employment in community colleges either as teaching faculty or instructional material center employees. The department encourages students in this option to refine their production skills by taking advanced production courses in other RIT graduate programs. Students are also advised to take the core courses of the Center for Community/Junior College Relations. These courses include Teaching, Learning, Content and Environment, The Two-Year Colleges and Instructional Techniques.

Requirements

As can be readily seen from the course listing, the department does not emphasize media production skills. It is assumed the students entering the program are proficient in the fundamentals of such areas as photography, filmmaking, audio and television production and graphics. Students without these basic skills are encouraged to obtain them through course work or personal projects. Persons interested in being admitted to the department should have a baccalaureate degree or equivalent. It is not uncommon for a person to make a career change by pursuing the MS degree. Hence, specifying the content area of the baccalaureate degree is in most cases irrelevant. A person should have a strong interest in instructional technology and is urged to contact the department for an interview if there are any questions.

The degree requires completing 48 quarter credit hours. Of these, the equivalent of nine quarter credit hours can be transferred from other non-RIT graduate programs. Independent study, research project and internship courses are available for students to pursue their own interests. In all three cases, a project proposal must be submitted prior to registration for the units. Guidelines for the proposal are available from the department office. A maximum of 10 credit hours can be earned using these three courses. The interests of some students may best be met by taking a few graduate courses in other RIT departments. Students are individually advised about this matter and, if appropriate, encouraged to take advantage of the unique educational opportunities at RIT. A maximum of 10 credit hours can be earned in this manner.

Applicants must take and report scores on the Miller Analogies Test; however, no minimum score is required for entry.

A full-time student should be able to complete the MS degree in one year, i.e. usually four, but sometimes three quarters. Part-time students are welcome and will be able to complete their degree during the evenings or through intensive summer sessions.

Application materials may be obtained from the department or from the Office of Admission.

For further information, contact Dr. Clint Wallington, chairperson.

Course Title and Number	Credit Hours
Introduction to Instructional Technology-ICIT-700*	2 or 3
Training Health Professionals-ICIT-703	2
Sources of Information in Instructional Technology-ICIT-705	3
Sources of Visual Information-ICIT-706	3
Programmed Instruction-ICIT-710	4
Computer Assisted Instruction-ICIT-712	4
Instructional Television-ICIT-715	4
Research in Instructional Technology-ICIT-720	4
Research Project-ICIT-722	1-4
Psychology of Learning and Teaching-ICIT-735	4
Instructional Facility Design-ICIT-745	3
Instructional Development I and II, ICIT-750-751*	4+
Instructional Development III-ICIT-752	4
Techniques of Work Analysis-ICIT-757	2
Management and Budgeting in Instructional Technology-ICIT-762	4
Individual Learning Style Analysis-ICIT-765	4
Interpersonal Communications-ICIT-770*	2
Selected Topics in Instructional Technology-ICIT-780*	2
Internship-ICIT-840	1-4
Independent Study-ICIT-850	1-4

Quarter hours required for MS: 48
Maximum of 9 hours may be transferred from non-RIT graduate programs.
Maximum of 10 hours may be taken in other RIT graduate programs.
Maximum of 10 hours may be cumulatively taken in Research, Project, Internship, and Independent Study.

'Required for graduation

Institute College Courses

Center for Community/Junior College Relations

Note: Graduate courses applicable to the MS in business technology are listed under College of Business. A more detailed statement of courses objectives, assumed prior knowledge, and topics to be covered are available through the CCJCR office.

IJCG-701 **The Two-Year Colleges**
Registration #0604-701
The study of the philosophies, organizations, developments, finance, goals, curricula, and spirit of the two-year college.

Credit variable (1-3)

IJCG-702 **Teaching, Learning, Content,**
Registration #0604-702 **and Environment**
Advising/counseling relationships, learning styles, student activities, motivations, developmental education, and the implications of the "open door" policy are investigated.

Credit variable (1-3 credits)

IJCG-703 **Management of Learning**
Registration #0604-703
Systems of curriculum planning, and cognitive styles, goals, objectives, evaluation, measurement, and productivity are studied as they relate to the accountability of faculty, students, and administration.

Credit variable (1-4 credits)

IJCG-704 **Instructional Techniques**
Registration #0604-704
To develop professional competence in direct applications and uses of various learning styles, including television, special audiovisuals, prepared lectures, seminars, computer assisted instruction, and programmed learning.

Credit variable (1-4 credits)

IJCG-750 **Seminar**
Registration #0604-750
This is a series of interdisciplinary discussions led by course participants from different teaching disciplines and outside resource persons. The topics concern the challenges involved in teaching, and in educational planning, leading to a better understanding of the total learning by the two-year college students.

Credit 2

IJCG-752 **Goal Projections and New Developments**
Registration #0604-752 **in Selected Career Disciplines**
This is a series of specialized seminars on new knowledge, trends, and projected competency goals for different career curricula. Each scheduled section of this course will concentrate on an identified cluster of associate degree-certificate programs.

The participants will understand the current and projected knowledge and be able to apply such information to their own teaching.

Credit 2

IJCG-760 **Collective Bargaining in**
Registration #0604-760 **Community Colleges**
An introduction to the collective bargaining process. This workshop course includes various role implications, legal aspects, impact analysis, strategies, preparations, procedures, and mock negotiation sessions.

Credit 2

IJCG-761 **Administration of**
Registration #0604-761 **Technology Education**
This course introduces the student to the various administrative techniques and roles that are expected of technology department chairmen in the two-year colleges. Topics such as management by objectives, human relations, budgeting, equipment and facility planning, union contracts and negotiating are included. Other topics may be included according to the needs and desires of the class. Guest lecturers and discussion leaders will be invited to address the class as appropriate.

Credit 4

IJCG-840 **Internship**
Registration #0604-840
An individual arrangement with an appropriate community or junior college will be made for those persons not having sufficient experience. This will provide definite teaching assignments and responsibilities, together with participation in other faculty functions, including advising, committee work, planning, and student evaluation on a full semester or term basis at a two-year college. Supervision, assistance, and evaluation will be provided by a mentor in the participating college and by the CCJCR.

Credit 3 to 6

IJCG-850 **Special Projects**
Registration #0604-850
This course provides for independent study, investigation, or research activity in subject matterareas notformalized by the Center's program, but having specialized value to the field of community college teaching. Projects may be directed at teaching, curriculum development, or instructional technology. Proposals require approval by the director.

Credit variable (1-6)

IJCT-705 **Thermodynamics**
Registration #0606-705
The first and second laws of thermodynamics are applied to fundamental problems in mechanical engineering technology.

Credit **4**

IJCT-707 **Engineering Concepts**
Registration #0606-707
A special graduate level course to update knowledge in statics and dynamics of rigid bodies. Modern mathematical techniques, i.e., vectors, matrices, and Cartesian tensors are used.

Credit **4**

IJCT-708 **Engineering Technology Analysis**
Registration #0606-708
A comprehensive review of differential and integral calculus. Other topics included are partial differentiation, multiple integration, dot product, cross product, solution of first and second order differential equations; LaPlace transforms and Fourier series. The course provides the mathematical background needed by engineering technology faculty. Selection of topics to be emphasized is based on the preassessment of course participants' understanding. This course is a prerequisite for most other courses in the IJCT series.

Credit **4**

IJCT-710 **Science and Technology of Materials**
Registration #0606-710
The intent of this course is to develop in the student an understanding of the properties of crystalline and non-crystalline materials, metals, alloys, polymers, ceramics, and glass, based on their micro or macro structures.

Credit 3

IJCT-711 **Microelectronics**
Registration #0606-711
Principles of physical basis of active and passive solid state devices are introduced; manufacturing processes of assembly of passive circuit elements and active solid state devices into a unified circuit package; discussion of thick/thin film circuit techniques, hybrid circuit assembly, and integrated circuit techniques.

Credit 3

IJCT-713 **Computers in Engineering Technology I**
Registration #0606-713
Introduction to digital computer programming and the application of computer programs to the solution of technical problems in engineering technology education. Programming languages such as FORTRAN, BASIC, and APL are introduced and used as appropriate based upon the pre-assessment of student knowledge. Prerequisite knowledge should include mathematics through college calculus.

Credit **4**

IJCT-714 **Computers in Engineering**
Registration #0606-714 **Technology II**
This course continues the study, use, and application of digital computers to solve engineering technology problems. Additional programming languages and programming techniques are included. Programming assignments are pertinent to the student's area of specialty.

Credit 4

IJCT-715 Electromechanical Systems I
Registration #0606-715
Introduction to the concepts and principles of electromechanical systems and components. The underlying unifying concepts of electrical, fluid, mechanical and thermal systems are examined. Various types of transducers such as temperature, displacement, force, electropneumatic and electrohydraulic are studied. Other topics include thermistors, thermocouples, strain guages, control valves, open and closed loop systems and digital systems.

Credit 3

IJCT-716 Electromechanical Systems II
Registration #0606-716
The study of the major components and subsystems required for the operation of numerically controlled machines and other industrial applications of electromechanical technology.

Credit 3

IJCT-717 . Electrical Measurements
Registration #0606-717
This course presents the various fundamental electrical measuring devices, instruments, and transducers which the mechanical engineer is likely to encounter. Basic principles and applications are stressed.

Credit 3

IJCT-718 Applications of Linear
Registration #0606-718 Integrated Circuits
Linear integrated circuits including operational amplifiers, voltage regulators, and commercial amplifiers. Examination and analysis of manufacturer specifications for standard units. Includes numerous examples of practical applications.

Credit 3

IJCT-719 Communication Theory
Registration #0606-719
To provide the student with the basic principles and applications of communication theory in system design.

Credit 3

IJCT-720 Integrated Physics
Registration #0606-720
The course objectives include the synthesis and integration of a wide variety of physics topics that are the basis of electrical, mechanical, and optical technology, and the understanding of their common concepts, structures, and terminology.

Credit 4

IJCT-721 Digital Fundamentals
Registration #0606-721
Boolean algebra with extensive applications to digital systems.

Credit 3

IJCT-722 Digital Integrated Circuits
Registration #0606-722
A comprehensive introduction to modern techniques of digital logic circuit design incorporating MSI and LSI devices. Specific devices to be included are multiplexers, demultiplexers, read-only memories, programmable read-only memories and programmable logic arrays; introduction to microprocessors; the 6800 system as well as the 8080 system will be examined. (0606-721 or the equivalent)

Credit 3

IJCT-725 Numerically Controlled Machines
Registration #0606-725
Basic principles and capabilities of N/C; N/C machine and its controls; increment and absolute systems, point-to-point and continuous path systems, manual programming; use of computers and programs for N/C, N/C turning; design criteria and managing of N/C; non-machining applications.

Credit 3

IJCT-727 Advanced Electrical Measurements
Registration #0606-727
A continuation of Electrical Measurements (IJCT-717) stressing current industrial applications, electronic instrumentation, and troubleshooting. Biomedical applications will be included.

Credit 3

IJCT-728 Active Filter Design
Registration #0606-728
This course deals with modern approaches to the design of frequency selective filters. Concepts of transfer functions, poles and zeros, and graphical evaluation of frequency response are discussed. Following this, the classical filter approximations (e.g., Butterworth, Chebyshev, and Elliptic) are developed for low pass, band pass, and high pass passive designs. The final portion of the course includes the design of active R-C filters using operational amplifiers.

Credit 3

IJCT-730 Electric Power Transmission
Registration #0606-730
A survey of modern power systems including symmetric components, transmission line constants, relaying and control techniques, system stability and economic operation. The impact of large power solid state electronics and ecological studies is discussed.

Credit 3

IJCT-731 Mechanical Design
Registration #0606-731
The study of the static and dynamic failure of machine elements; the design and analysis of fasteners, springs, shafts, bearings, gears, clutches, and brakes.

Credit 3

IJCT-732 Manufacturing Organization
Registration #0606-732 and Management
The study of the principles of manufacturing organization and management as they relate to teaching the material in the two-year college.

Credit 3

IJCT-751 Engineering Technology Seminar
Registration #0606-751
A series of discussions to analyze and propose solutions for instructional problems peculiar to teaching technical courses. Guest discussion leaders are invited at appropriate times. Individual projects are assigned.

Credit 1

IJCT-770 Minicomputers in Engineering Technology
Registration #0606-707
An introduction to minicomputer hardware and software. Includes practical examples of suitable applications in community college engineering technology education. Emphasis on programming, basic architecture and interfacing, and system maintenance. A working knowledge of basic digital electronics is assumed.

Credit 4

Career Information Specialist

IJCC-741 The Nature of Work
Registration #0615-741
This course deals with historical analyses of work, diverse and changing work-leisure values, economic and political factors, and the influence of science and technology. Topics include: work from the artisan through cottage industries to the large conglomerates and multinational companies of today, the advance of science and technology will be analyzed in terms of its impact on society as a whole and work in particular, the impact of industrialization, business cycles, new economic and political philosophies and their relationship to the changing concepts and possibilities of work. The changing nature of work in post-industrial America will be analyzed.

Credit 2

IJCC-742 Career Decision Making Concepts
Registration #0615-742
Based upon prior knowledge of basic sociological and psychological constructs, this course concentrates on the processes and influences involved in choices regarding careers. The relative and collective impact of peers, teachers, friends and relatives, immediate family, and professional advisors are analyzed. Additional course goals include applications of processes such as socialization; acculturation; assimilation; status and role playing; and perception to related activities such as career education-orientation-advising. Current psychological research relating personality/self concepts/motivation to career decision making will be studied. A special topic involves the problems of communicating information on emerging careers to individuals to effect real and valid perceptions.

Credit 3

IJCC-743 Education/Business/Industry Interrelationships
Registration #0615-743
A study of the interrelationship of the world of formal education to the business, industrial, and labor communities. Constraints, problems, and values of cooperative effort will be studied in relation to organizations of varying size. Elementary, secondary and post-secondary education, differing size business organizations and industrial groups that involve differing levels of technical specialization are studied.

Credit 2

IJCC-744 Legal Aspects of Career Plans
Registration #0615-744
The principal goal is that the participant will have a sufficient knowledge of general law and government agency rulings that control career decisions. Topics include: constitutional law, affirmative action, union affiliation for closed and open shops, exempt and non-exempt employment, collective bargaining, theseveral labordepartments and their functions, job qualifications and requirements, handicapped persons, civil service regulations, laws relating to various cooperative education arrangements, and employment related liability. The student will then examine conflicts between the law and selected practices or procedures. (Assumed prior knowledge of the nature of constitutional, statutory, civil and common law.)

Credit 2

IJCC-745 Career Concepts: Production
Registration #0615-745

Credit 3

IJCC-746 Career Concepts: Commerce
Registration #0615-746

Credit 3

IJCC-747 Career Concepts: Services
Registration #0615-747

Credit 3

These three courses form a single set and are separated only to facilitate registration and scheduling flexibility.

Each of these three courses concentrates on particular careers. ***Production*** includes manufacturing, construction, mining, skilled trades, design and engineering related fieldss, and food processing fields of agriculture, fisheries, etc. ***Commerce*** covers general business, banking and finance, sales and advertising, communications, hospitality and tourism, retail and wholesale distribution and related fields. ***Services*** includes allied health careers, education, government and civil service, law and criminal justice careers, and other service careers.

Each course is designed to present a foundation view of several types of a particular employer. Investigated will be systems of career opportunities, managment, personnel policies, employer/employee relations, required training/educational levels, manpower long-range projections, philosophies, in-house education and training, competitive relationships, national/international affiliations, and civic/humanitarian expectations (Prerequisites: IJCC-741 and IJCC-742)

IJCC-748 Information Retrieval Systems
Registration #0615-748 in Career Planning
The primary goal is the ability to use several data based computer systems for the storage and retrieval of career information. This includes a sufficient understanding of the computer systems, languages and dictionaries for efficient utilization.

Additional goals are an awareness of other systems based upon media and print materials, and the ability to evaluate various systems.

Credit 3

IJCC-749 Manpower Forecasting Fundamentals
Registration #0615-749
Two different purposes that depend on a common base are goals for this course. The common base is an understanding of the techniques, theories and limitations of manpower forecasting as it applies to numbers in current occupations and to the probabilities of emerging careers.

The two purposes are: (1) the ability to provide, as a generalist having a broad knowledge of different careers, assistance to discipline specialists in feasibility studies for new educational programs, and (2) to assist people in making decisions in those careers for which insufficient information exists. The ability to assist people in making decisions about the pursuit of a career that is projected to be available several years later will be studied in order to develop a uniform and responsible judgement in those areas where probability statements are extremely important. (Satisfaction of all foundation studies).

Credit 4

IJCC-755 Career Internship
Registration #0615-755 Project/Experience
This is a variable credit (1 to 5) course that is required of all students unless they have had sufficient approvable experience as a career information specialist. It would be an opportunity to practice one or more of the defined functions of a career information specialist under RIT supervision.

Credit variable (1-5 credits)

IJCC-756 Career Internship:
Registration #0615-756 Business/Industry
This is an elective that is available only when satisfactory arrangements can be made to function as a specialist in business/industry. It is possible this would only be available for full-time students.

Credit variable (1-5 credits)

IJCC-757 Career Internship:
Registration #0615-757 Services/Education
This is identical to the 756 internship except that it applies to practice in educational and service occupation fields.

Credit variable (1-5 credits)

IJCC-762 Career Education Seminar:
Registration #0615-762 Women
An elective course for students in career information concentrating on the ability to provide effective counseling for women who wish to enter non-traditional career fields. Case studies, first person presentations, readings, media and discussions are used to develop the knowledge and skills needed. A project related to the elimination of bias and stereotyping in career counseling materials will be required.

Credit 4

IJCC-763 Career Education Seminar:
Registration #0615-763 Handicapped
An elective course for students in career information concentrating on the ability to provide effective counseling for handicapped persons who wish to plan and succeed in desired careers.

Credit 3

IJCC-842 Current Issues and Selected
Registration #0615-842 Counseling Skills
Different techniques will be explored with their functions as useful skills for a career information specialist, such as group couseling, role-playing, practice in listening, sensitivity and awareness training. The approach or practice for this training will be geared toward special interest groups: minorities, the mature worker, women, etc. Students will be given an opportunity to learn about special problems encountered by these groups.

The specific topics for each section will be selected with a knowledge of critical challenge and the capability needs of the participants. (IJCC-742)

Credit 3

Graduate Courses
Computer Science and Technology
Computer Systems Management

ICSM-700 Review of Programming Languages
Registration #0611-700
A review of programming techniques and the applications of FORTRAN and assembly language for the incoming graduate student with deficiencies in programming.

Credit **4**

ICSM-703 Data Management Concepts
Registration #0611-703
A study of computer data management concepts. Topics include data representation, data structures, searching and storage techniques, file structure and maintenance, data communication and generalized data management systems.

Credit 4

ICSM-710 Computer Systems Software
Registration #0611-710
A study of the wide spectrum of developing and existing system software. Topics discussed include supervisors, monitors, compilers, utility programs, I/O executives, communication processing systems, application programs, and minicomputer operating systems. Detailed studies in IBM and Xerox systems will be made and comparative studies between systems and the availability of various systems will also be covered.

Credit 4

ICSM-715 Computer Systems Hardware
Registration #0611-715
A study of the characteristics of computer system hardware. The topics discussed include speed, memory size, architecture, expandability, maintenance problems and software backup. Both case studies and comparative studies will be made to large, medium, and small scale computers, as well as to mini-computers.

Credit 4

ICSM-740 Computer System Personnel and Management
Registration #0611-740
A study of computer installation personnel and management structure. Topics include system programmer and system analyst qualification and selection, applications programmer qualification and selection, responsibility assignment, scheduling procedures, cost analysis, performance evaluation quality control and other behavioral aspects.

Credit 4

ICSM-765 Advanced Computer Utilization Techniques
Registration #0611-765
A study of advanced computer utilization techniques. Topics include resource allocation of available software in business, mathematical, and engineering application. Information storage and retrieval techniques as well as characteristics of some more frequently used programs are studied.

Credit 4

ICSM-790 Seminar
Registration #0611-790
Topics discussed include management problems, production problems, maintenance problems, hardware and software system problems, and invited topics given by Computer Center directors.

Credit 4

ICSM-799 Independent Study
Registration #0611-799

Credit variable (2-4)

Information Science

ICSI-722 Library Automation and Management
Registration #0616-722
This course summarizes the computer techniques applied to library automation and the study of management techniques and problems in a modern automated library. Case studies in current library systems will be included. Management models in selected libraries will be discussed.

Prerequisites: Graduate standing in Information Science, Computer Science or consent of instructor.

Credits: 4

ICSI-733 Information Media and Design
Registration #0616-733
A study of current information media and their design. Topics include microfilm system, video system, computer input and out devices, computer interface with media devices, and system design concepts and techniques in the application to libraries and information centers.

Prerequisites: Graduate standing in Information Science or Computer Science or consent of instructor.

Credits: 4

Computer Science and Technology

ICSS-610 EDP Auditing
Registration #0603-610
A study of the techniques and approaches used to audit computer data centers and systems. Topics include the methodology and tools of EDP auditing, internal departmental controls, program controls, input/output controls, data security, physical security, computer hardware controls and data communication control.

Credit 4

ICSS-620 Computer Architecture
Registration #0603-620
A study of computer architectural analysis and design. Topics include review of basic theories, hardware technology, parallel and distributive logic, asynchronous and synchronous machines and case study. (1CSS-315)

Credit 4

ICSS-621 Microprocessors and Microcomputers
Registration #0603-621
A study of microprocessors, microcomputers and theirapplications. Topics include microprocessor hardware, microcomputer organization, software, microcomputer programming, interface techniques and trend of development. Case studies will be provided. Intel 8080 will be extensively studied. Students must have background in assembly language programming and knowledge in microprogramming.

Credit 4

ICSS-630 Discrete Simulation
Registration #0603-630
Computer simulation techniques are examined. Topics include abstract properties of simulations, modeling, analysis of a simulation run, and statistics. At least one general purpose simulation language (GPDS) will be taught. Each student will be required to write at least one simulation program, run it on a digital computer, and present an analysis thereof.

Credit 4

ICSS-635 On-Line Information Systems Design
Registration #0603-635
Design of on-line informative systems. Topics include basic on-line system characteristics, design guidelines, hardware requirements, comparison of systems and languages, file organization concepts, the simultaneous access problem, file security and recovery, error recovery, system evaluation, and case studies. (Consent of department)

Credit 4

ICSS-636 Data Base System Implementation
Registration #0603-636
Requirements and characterization of generalized data base systems, the role of data base administrator, creation of a general data base, elements of data base management systems, data base management in multi-access environment, survey of data base management systems, selecting a data base management system, projects in data base systems implementation. (ICSS-485)

Credit 4

ICSS-640 Computer Communications Networks
Registration #0603-640
A study of hardware and software principles of computer communication networks. Topics include network configuration and vocabulary, network hardware components, network software components, network technologies, examples of existing networks, network utilization, measurement and evaluation.

Credit **4**

ICSS-655 Real-Time Computation
Registration #0603-655
Principles and applied problems in real-time computation. Topics include processor subsystems, communication networks, terminal sub-systems, A/D conversion, D/A conversion, interface, noise problems, the major cycle mode, message switching system, through-put rate calculations, system efficiency, and system optimization.

Credit 4

ICSS-670 Computer Graphics
Registration #0603-670
Theory and technology of computer graphics; display devices and processors; display files and transformations; interactive and three-dimensional graphics and graphic systems; graphic languages and systems design.

Credit **4**

ICSS-705 Fundamentals of Computing
Registration #0603-705
Computer systems, number representations, arithmetic operations and error analysis, structured programming, recursive programming, systems software, computer architecture and microprogramming. (ICSM-700 or equivalent)

Credit 4

ICSS-706 Foundations of Computing Theory
Registration #0603-706
Principles of computing theory; mathematical logic, set theory, relations; functions, grammars and languages, lattices and Boolean algebra, graph theory. (SMAM-431)

Credit 4

ICSS-715 Computational Complexity
Registration #0603-715
This course is concerned with the mathematical analysis of computer algorithms. Topics include matrix operations, combinatorial algorithms, integer and polynomial arithmetic, NP complete problems, and lower bounds on algorithms involving arithmetic operations. Background in analysis techniques is presumed. (ICSS-706)

Credit 4

ICSS-720 Computer Architecture
Registration #0603-720
The PMS and ISP descriptive systems; organization of processors, memories, switches, input-output devices, controllers, and communication links; basic theories, hardware technology, parallel and distributive logic, asynchronous and synchronous machines; computer families.

Credit 4

ICSS-725 Assemblers, Interpreters and Compilers
Registration #0603-725
A survey of the software processors. Topics include design and construction of programming language processors, relative merits vis-a-vis cost, user demands, ease of modification, conversational computing, large scale data reduction, and macro processors.

Credit 4

ICSS-726 Deterministic and Probability Models
Registration #0603-726 of Operating Systems
Concurrent processes control, processor scheduling models, computer sequencing problems, auxiliary and buffer storage models, storage allocation in paging systems, memory management of multiprogramming computers. (ICSS-440and SMAM-352orSMAM-522)

Credit 4

ICSS-736 Data Base Systems
Registration #0603-736
Data base concepts, information storage structures, data models and data sub-languages, the relational approach, the hierarchical approach, and the network approach, data security and integrity, performance and restructuring application and management issues. (ICSS-485)

Credit 4

ICSS-746 Information Storage and Retrieval
Registration #0603-746
Information structure and file organization; dictionary and thesaurus construction, utilization and maintenance; statistical and syntactic language analysis; question-answering systems; systems evaluation.

Credit 4

ICSS-750 Computability
Registration #0603-750
This course examines the theory of computation as it relates to computable functions. Topics include finite state machines. Turing machines, recursive function theory, and Post's symbol manipulation systems. The limitations of the notion of effective computability are examined. (ICSS-706)

Credit 4

ICSS-752 Coding Theory
Registration #0603-752
Study of error correcting codes. Topics include algebraic structure of group codes, linear switching circuits cyclic codes and the decoding problem. (ICSS-706)

Credit 4

ICSS-756 Theory of Parsing
Registration #0603-756
Application of theoretical concepts developed in formal language and automata theory to the design of programming languageand its processors; syntactic and semantic notation for specifying programming languages; theoretical properties of some grammars; general parsing; non-backtrack parsing; and limited backtrack parsing algorithms. (ICSS-480)

Credit 4

ICSS-760 Compiler Construction
Registration #0603-760
Language definition, lexical analysis, syntactic analysis, storage allocation and management, code generation, code optimization, diagnostic generation, bootstrapping. (ICSS-480 and ICSS-525)

Credit 4

ICSS-770 Computer Graphics
Registration #0603-770
Theory and technology of computer graphics; display devices and processors; display files and transformations; interactive and three-dimensional graphics and graphic systems; graphic languages and systems design.

Credit 4

ICSS-775 Minicomputer Systems and Applications
Registration #0603-775
A study of minicomputer hardware architecture, logical design, system interface, software organization, operation systems and applications in various areas. Hands-on experimentation on the PDP 11/10 and Microdata 1600D dual processing system is emphasized.

Credit 4

ICSS-780 Systems Programming
Registration #0603-780
Computer system programming techniques. Topics include system specifications, system generations, utility, service routines, operating systems language processors, resource allocation, system protection, and system efficiency optimization.

Credit 4

ICSS-785 Systems Programming Laboratory
Registration #0603-785
A follow-up study of systems programming to provide actual experience on a computer system.

Credit 4

ICSS-790 Seminar
Registration #0603-790

Credit variable 2-4

ICSS-799 Independent Study
Registration #0603-790

Credit variable 1-4

ICSS-890 MS Thesis
Registration #0603-890

Credit variable 4-8

Instructional Technology

ICIT-700 Introduction to Instructional Technology
Registration #0613-700
A modularized course which surveys various areas in instructional technology, including the definitions of instructional technology, the history, the research, leaders, funding, trends, health science applications and community college applications. Each module is worth one-half credit. Each student is required to complete at least two credits for graduation.

Credit 2 or 3

ICIT-703 Training Health Professionals
Registration #0613-703
Examines the various methods used to train physicians, nurses, dentists and other allied health personnel. Particular emphasis is placed on the role of instructional technology in current programs. Maximum use is made of field trips to various local training programs.

Credit 2

ICIT-705 Sources of Information in Instructional
Registration #0613-705 Technology
Examines the wealth of information sources available to instructional technologists, including catalogs of nonprint material, handbooks, newsletters, ERIC, hardware and software dealers, conference proceedings and books. Students are given problems to solve requiring the use of these sources.

Credit 3

ICIT-706 Sources of Visual Information
Registration #0613-706
Students develop general search techniques and strategies for finding information, evaluating it, and establishing a reference file for development of instructional materials. Specific application of these techniques is made to locating sources of original visual (graphic, photographic, print) material and of prepared visuals in secondary sources. Interpreting and following recent copyright regulations is discussed. Major search paper required.

Credit 3

ICIT-710 Programmed Instruction
Registration #0613-710
Students review principles and techniques of preparing programmed instruction; then design, produce and validate their own programmed instruction materials; includes research and development related to programmed instruction and sources of programmed materials.

Credit 4

ICIT-712 Computer-Assisted Instruction
Registration #0613-712
Students review the use of the computer for instruction (computer-assisted instruction) and then produce their own teaching programs actually using a computer. Examines research about computer-assisted instruction, various hardware and software configurations, programming languages and sources of already developed computer-assisted courses, also discusses various methods of course and lesson development. (Prerequisite: ICIT-710 or permission of department).

Credit 4 -

ICIT-715 Instructional Television
Registration #0613-715
Explores the various uses of television as an instructional medium, i.e., individualized instruction, instruction of mass audiences, stand-alone instruction, integrated instruction. Students must produce at least one television program. Surveys the hardware, technology and software of television.

Credit 4

ICIT-720 Research in Instructional
Registration #0613-720 Technology
Examines the fundamentals of educational research: hypothesis stating, design, statistical procedures, reporting techniques, and types of research. Specifically examines the research in instruction. Students learn to critique research articles and develop evaluation plans.

Credit 4

ICIT-722 Research Project
Registration #0613-722
A variable credit course which allows a student to conduct a research project based on the student's interests and with the advice and consent of a faculty member. A formal research proposal must be submitted before registering for this course. Proposal guidelines are available from the department.

Credit 1-4

ICIT-735 Psychology of Learning and Teaching
Registration #0613-735
Relates various theories of learning to actual teaching and training. Students review learning principles and apply them to practical instructional situations. Emphasis is on behavioral approach to developing instruction and training.

Credit 4

ICIT-745 Instructional Facility Design
Registration #0613-745
Designed to enable the instructional technologist to assist and participate in the design of spaces and related facilities for effective learning. Specific topics include acoustics, lighting, ventilation, electric circuits, planning for electronic distribution systems, equipment specifications, spatial relationships, together with architectural engineering and contracting procedures.

Credit 4

ICIT-750 Instructional Development I
Registration #0613-750
Covers the concepts and principles underlying the development of instructional programs and materials. Instructional development is the systematic solution of instruction and learning problems involving needs assessment, task analysis, specification of objectives, analysis and synthesis of instructional strategies, and methods of evaluation. A limited instructional development project is part of the course. Required for graduation. (Note: ICIT-700 must be taken prior to or concurrently with ICIT-750)

Credit 4

ICIT-751 Instructional Development
Registration #0613-751
A continuation of Instructional Development I (ICIT-750) in which instructional development principles are applied in an actual project selected by the student. More sophisticated means of development, evaluation, and revision are included along with strategies for media selection and development. Literature of the field is also covered. Project required for graduation. (Prerequisite: ICIT-750)

Credit 4

ICIT-752 Instructional Development III
Registration #0613-752
Stresses the difference between personnel/faculty development, instructional/program development and curriculum/organizational development and how the instructional developer or trainer becomes an agent for change. Examines the methods of dissemination and promoting the adoption of innovative methods and materials. Students research special problems related to selected areas of instructional development. (Prerequisites: ICIT-750 and 751)

Credit 4

ICIT-757 Techniques of Work Analysis
Registration #0613-757
Students learn a variety of job analysis and task analysis techniques based on functional job analysis. Data gathered from analyses is cast into various formats for job restructuring, writing job descriptions, establishing task and job hierarchies, and developing training programs. Students learn to develop job inventories and checklists for gathering task information for a number of interrelated purposes.

Credit 2

ICIT-762 Management & Budgeting In
Registration #0613-762 Instructional Technology
Applies basic theories of management to areas of instructional technology (such as production, audiovisual services) and to management of personnel in those areas. Examines the organizational structure of media centers and units within the center. Covers budgeting and actual financing for media center services and projects dealing with the use of media in training and instruction.

Credit 4

ICIT-765 Individual Learning Style Analysis
Registration #0613-765
Examines the ways different individuals learn and relates instructional strategies to learning styles. Covers cognitive style mapping, aptitude treatment interaction, application of norm and criterion referenced tests as they relate to individual learning styles. (Prerequisite: ICIT-735 or permission of department.)

Credit 4

ICIT-770 Interpersonal Communications
Registration #0613-770
Instructional development requires that instructional technologists be able to work well with people. Participants in the course are taught to be sensitive to others as well as to examine their own feelings in a group situation. Required for graduation.

Credit 2

ICIT-780 Selected Topics in Instructional Technology
Registration #0613-780
A seminar which provides a forum for a small group of students to examine various areas of interest to them. Each student selects a topic, examines it thoroughly, and presents the findings to the group. This course is required for graduation. (Prerequisite: ICIT-700 and 750 and 30-quarter hours or permission of department.)

Credit 2

ICIT-840 Internship
Registration #0613-840
Special opportunities may occur for students to obtain work experience in a job or environment similar or coincident with their career objectives. In fact, students are encouraged to locate such opportunities. This course recognizes this experience. A proposal, guidelines available from the department, must be submitted prior to registering for this course.

Credit 1-4

ICIT-850 Independent Study
Registration #0613-850
An opportunity for a student to explore, with a faculty advisor, an area of interest to the student. A proposal, guidelines available from the department, must be submitted prior to registering for this course.

Credit 1-4

Graduate Faculty Institute College

Roy I. Satre, Jr., BA, MA, Ph.D., Syracuse—Dean; Professor

Richard T. Cheng, BS, MSEE, Ph.D., Illinois—Director, School of Computer Science and Technology; Professor

Richard L. Rinehart, BS, MS, Ed.D., Michigan State—Director, Center for Community/Junior College Relations; Professor

Clinton James Wallington, BA, Ph.D., Southern California—Chairperson, Department of Instructional Technology; Associate Professor

Center for Community Junior College Relations

Richard L. Rinehart, Ed.D., Michigan State University, Director, Center for Community/Junior College Relations; Professor

Larry D. Hoffman, Ph.D., Iowa State University—Chairman, Graduate Engineering Technology; Associate Professor

Dennis C. Nystrom, Ed.,D., Texas A&M University—Industrial Education, Professor

Institute College Faculty Providing Major Services for CCJCR Programs

Donald D. Baker; Ed.D., University of Rochester

Lawrence W. Belle; Ph.D., University of Rochester

Paul Bernstein; Ph.D., University of Pennsylvania

Joan Green; M.Ed., Trenton State, MS, University of Rochester

Edward R. Johnson; Ph.D., Michigan State University

Paul Kazmierski; Ph.D., Syracuse University

Richard Zimmer; MFA, Rochester Institute of Technology

School of Computer Science and Technology

Hussein Abdel-Wahab, Ph.D., University of Waterloo—Assistant Professor; Systems Software, Language Processing, Theory of Computation

Michael Atkins, Ph.D., Case Western Reserve—Associate Professor Computer Graphics Applications, Minicomputer Systems

Rodger Baker, MS, University of Rochester—Associate Professor, Compilers, Programming Languages, Applications

Peter Bartram, Ph.D., Ohio State University—Assistant Professor, Real-time Computation, Mini-computer Systems

James Carbin, MS, Rensselaer Polytechnic Institute—Associate Professor, Systems Analysis, Applications, Programming Languages

Richard Cheng, Ph.D., University of Illinois-Urbana—Professor, Computer Hardware, Logical Design, Operating Systems

James Chmura, MS, Rutgers University—Instructor, Programming Languages

Evelyn Culbertson, MS, University of Syracuse—Assistant Professor, Computer Graphics, Simulation, Programming Languages

Roy Czernikowski, Ph.D., Rensselaer Polytechnic Institute—Associate Professor, Simulation, Micro-processors, Process Control

Henry Etlinger, MS, Syracuse University—Instructor, Applications, CAI

Guy Johnson, MS, Syracuse University—Assistant Professor, Theory of Computing, Algorithms

Kuang-Shin Lin, Ph.D., SUNY-Stonybrook—Assistant Professor, Logical Design, Systems Software

Michael Lutz, MS, SUNY-Buffalo—Instructor, Microprogramming, Operating Systems, Systems Software

Wiley McKinzie, MS, SUNY-Buffalo—Assistant Professor, Systems Software, Artificial Intelligence

Stewart Shen, Ph.D., Northwestern University—Associate Professor, Large Data Base Systems, Compiler Design

William Stratton, MS, SUNY-Buffalo—Assistant Professor, Data Base Systems, Minicomputer Systems

Adjunct Graduate Faculty Computer Science and Technology

Richard Black, MBA, Rochester Institute of Technology, Computer Management

James Iverson, Ph.D., Purdue University, Data Base

Ralph Longobardi, Ph.D., University of Syracuse, Coding Theory, Programming Languages, Atomata Theory

Walter Maurer, MS, Rochester Institute of Technology, BS, University of Wisconsin, EDP Auditing

T.C. Soong, Ph.D., Stanford University, Numerical Analysis, Applications

Department of Instructional Technology

Clinton J. Wallington, BA, Ph.D., University of Southern California—Chairperson, Associate Professor

Wallace S. Goya, BA, MS, Indiana University—Assistant Professor

Arthur R. Taylor, BA, MALS, Ed.S., Indiana University—Assistant Professor

The National Technical Institute for the Deaf

NTID graduate Anthony Spiecker is a recent graduate of the Institute College's master's degree program in electrical engineering technology. He received support services through NTID and currently teaches electromechanical technology courses to deaf students.

William E. Castle, Dean and Director

The National Technical Institute for the Deaf (NTID) was created to provide deaf students with technological education which will lead to meaningful employment in business, industry, government and education. Public Law 89-36, passed by the United States Congress in 1965, authorized the establishment of NTID, and Rochester Institute of Technology was chosen as the sponsoring institution in late 1966 by the Department of Health, Education and Welfare. In the fall of 1968, the first group of deaf students began their studies at NTID. Thus in the fall of 1978, NTID will have completed its first ten years of providing postsecondary education to deaf citizens from all parts of the nation.

While it is a national institution, NTID is also one of the nine colleges of RIT. Further, it is the nation's only technical college of its kind serving deaf students in comprehensive career-oriented postsecondary programs.

Graduate Programs for Deaf Students

NTID encourages deaf students qualified for admission to NTID and for admission to graduate programs at RIT to pursue master's degree programs at RIT. Such deaf persons who enter graduate programs at RIT will receive appropriate support services, through NTID, for their graduate studies. Support services available to these deaf students include: sign-language interpreting in classrooms, tutoring, notetaking, career counseling, personal/social counseling, and job placement assistance.

Deaf students enrolled from the outset in NTID make a distinct contribution to the educational processes of the Institute, and after completing appropriate prerequisites may pursue master's degrees through other colleges of RIT.

In addition NTID faculty teach in RIT graduate programs and share a wide range of technical expertise as well as knowledge of both deafness and education of deaf people.

For more information, contact the RIT Office of Admission or the NTID Office for Career Opportunities, One Lomb Memorial Drive, Rochester, New York 14623.

General Studies

General Studies
courses for graduate programs of other RIT colleges

GLLL-701 **Film History and Criticism**
Registration #0504-701
A critical examination of certain films as an integral part of modern culture. The emphasis of the course will be historical, with the development of cinema being traced through major films by important directors. There will bean opportunity to pursue individual interests.

Class 3, Credit 5

GSHF-703 **American Architecture**
Registration #0505-703
An examination of American architecture from the 17th century to the present designed for the graduate level of study. Emphasis will be placed on American building art in the late 19th and 20th century.

Class 3, Credit 5

GSHF-705 **Practice and Theories of**
Registration #0505-705 **Art Criticism**
A course for the art oriented graduate student centering on the student's search for a supportable and reliable basis for making value judgments about works of art as well as introducing the student to major concepts in aesthetics.

Class 3, Credit 5

GSHF-707 **Cubism to the Present**
Registration #0505-707
Cubism as a way of seeing and as an expression of 20th century thinking. Differences and similarities with art forms of earlier eras and other cultures.

Class 3, Credit 5

GSHF-708 **Oriental Art**
Registration #0505-708
A survey outlining the development of art in India, China and Japan and examining the philosophical circumstances that distinguish Eastern artistic traditions.

Class 3, Credit 5

GSHF-710 **Art, Music and Ideas**
Registration #0505-710
An introduction to an analysis of those ideas, philosophies and human attitudes that are associated with and expressed in major works of art from Giotto and des Prez to Stravinsky, Picasso and Wright.

Class 3, Credit 5

GSHF-711 **20th Century American Art**
Registration #0505-711
An investigation of American art from the Civil War to the present. Emphasis will be placed on the visual arts but many references will be made to music and architecture.

Class 3, Credit 5

GSHF-712 **Arts and Crafts in Tribal**
Registration #0505-712 **Societies**
A study of the function of "primitive" art and the techniques of its production, including the use of clay, stone, fibers, bark, wood, bronze, gold, etc. Hair-styling, body painting and scarification will also be discussed.

Class 3, Credit 5

GSHF-715 **Picasso**
Registration #0505-715
The impact of Picasso and his circle on twentieth century art. Affinities with modern scientific and philosophic attitudes.

Class 3, Credit 5

GSHF-716 **Rembrandt**
Registration #0505-716
A detailed analysis of the art and times of the Baroque master. Emphasis will be placed on the development of his style and technique, on his and other artists' relationship to their society and to the character of the Baroque outlook.

Class 3, Credit 5

GSHF-717 **Music Literature**
Registration #0505-717
A comparison of various musical styles from the 17th to the 20th century with emphasis on music's relationship to the other fine arts and its socio-cultural environments. Representative composers include Bach, Beethoven, Chopin and Stravinsky.

Class 3, Credit 5

GSHH-701 **History of American Educational**
Registration #0507-701 **Thought and Practice**
Traces the history of American education from the pre-Civil War years to the present.

Class 3, Credit 5

GSHH-703 **History of the Renaissance**
Registration #0507-703
The course will analyze the revival in society, literature, the arts, architecture, and political thought that occurred in Europe from 1300 to 1600. Major emphasis will be given European efflorescence associated with the ideal of Renaissance art and life.

Class 3, Credit 5

GSHP-704 **Ethics and Philosophy of**
Registration #0509-704 **Education**
To develop insights into various philosophies of education through a critical examination of their origins and viewpoints.

Class 3, Credit 5

GSSP-701 **Developmental Psychology**
Registration #0514-701
The course seeks to investigate the broad developmental patterns of normal human behavior, with emphasis on the growth of cognitive, personality, and culturally patterned behaviors.

Class 3, Credit 5

GSSP-702 **Educational Psychology**
Registration #0514-702
This course is designed to furnish students with an understanding of the basic psychological processes underlying the educational process, and to apply them to concrete situations that may arise for persons doing teaching.

Class 3, Credit 5

GSSP-710 **Visual Concepts for Visual Practitioners**
Registration #0514-710
An introduction to the analysis of basic principles of visual perception as they apply to the creation and interpretation of visual images, including 3-dimensional scenes, paintings, photographs, sketches, graphics, motion pictures and television. Emphasis will be on providing a structure for a better understanding on how the human visual system represents and relates visual information.

Class 3, Credit 5

GSSP-711 **Psychology of Creativity**
Registration #0514-711
A psychological investigation of the creative process and creative individuals with a focus on measures which stimulate creativity.

Class 3, Credit 5

GSSS-701 **Educational Sociology**
Registration #0515-701
The development of sociological and socio-psychological types of knowledge that have relevancy for or logical connection with educational processes. Based on substantive material about social phenomena making up the social order in which school systems are operating and by which they are influenced.

Class 3, Credit 5

College of General Studies

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Hertha Schulze, Ph.D., Minnesota, Assistant Professor, Fine Arts

H. David Shuster, Ed.D., Rochester, Assistant Professor, Economics

Houghton Wetherald, MA, Oberlin, Associate Professor, Fine Arts

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John E. Schubert, Chairman of the Board, The Community Savings Bank

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'Member of Honorary Board

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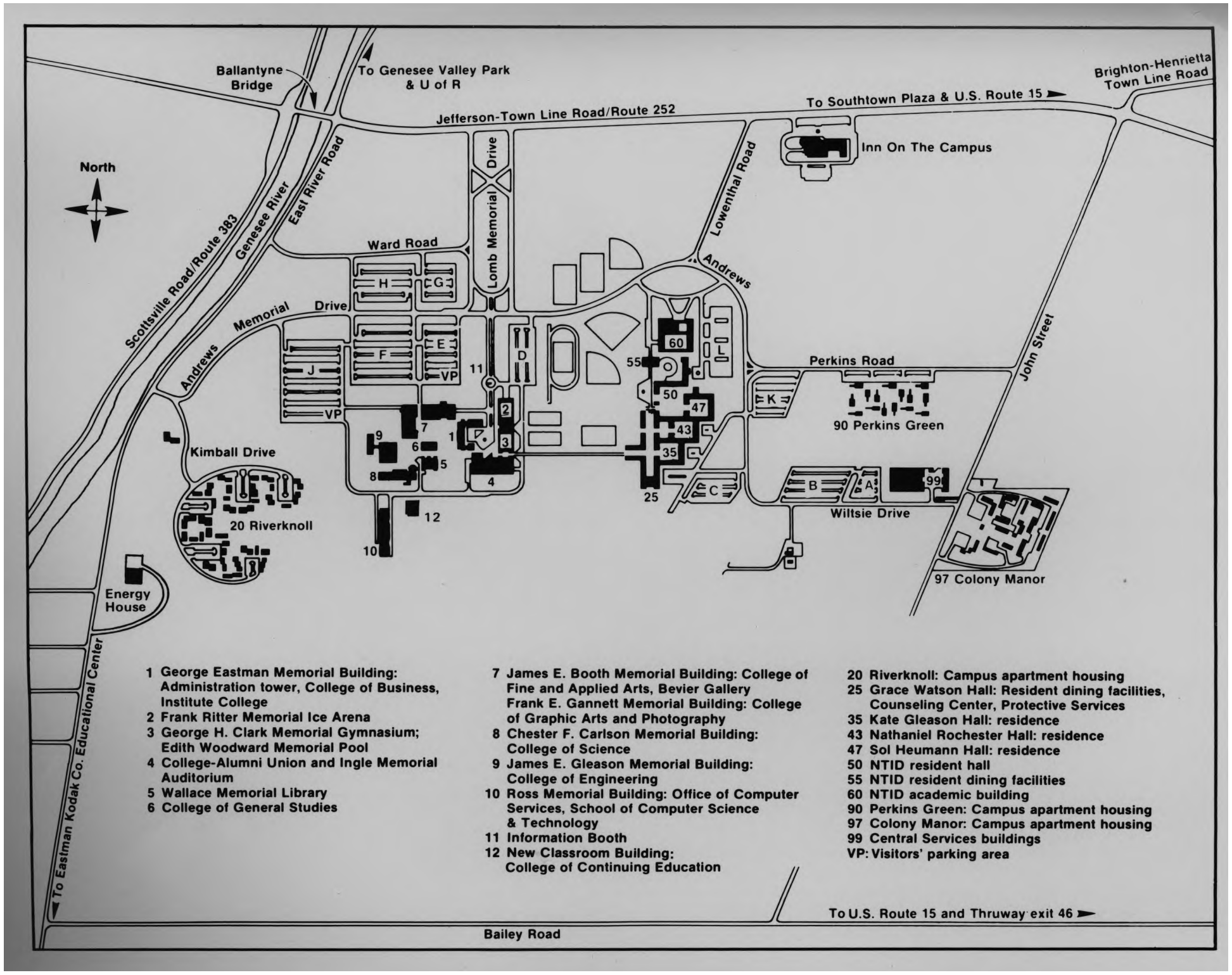
Ballantyne Bridge
To Genesee Valley Park & U of R
Jefferson-Town Line Road/Route 252
To Southtown Plaza & U.S. Route 15
Brighton-Henrietta Town Line Road
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To Eastman Kodak Co. Educational Center
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Bailey Road
1 George Eastman Memorial Building: Administration tower, College of Business, Institute College
2 Frank Ritter Memorial Ice Arena
3 George H. Clark Memorial Gymnasium; Edith Woodward Memorial Pool
4 College-Alumni Union and Ingle Memorial Auditorium
5 Wallace Memorial Library
6 College of General Studies
7 James E. Booth Memorial Building: College of Fine and Applied Arts, Bevier Gallery
Frank E. Gannett Memorial Building: College of Graphic Arts and Photography
8 Chester F. Carlson Memorial Building: College of Science
9 James E. Gleason Memorial Building: College of Engineering
10 Ross Memorial Building: Office of Computer Services, School of Computer Science & Technology
11 Information Booth
12 New Classroom Building: College of Continuing Education
20 Riverknoll: Campus apartment housing
25 Grace Watson Hall: Resident dining facilities, Counseling Center, Protective Services
35 Kate Gleason Hall: residence
43 Nathaniel Rochester Hall: residence
47 Sol Heumann Hall: residence
50 NTID resident hall
55 NTID resident dining facilities
60 NTID academic building
90 Perkins Green: Campus apartment housing
97 Colony Manor: Campus apartment housing
99 Central Services buildings
VP: Visitors' parking area

Rochester Institute of Technology

Office of Admission
One Lomb Memorial Drive
Rochester, NY 14623

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