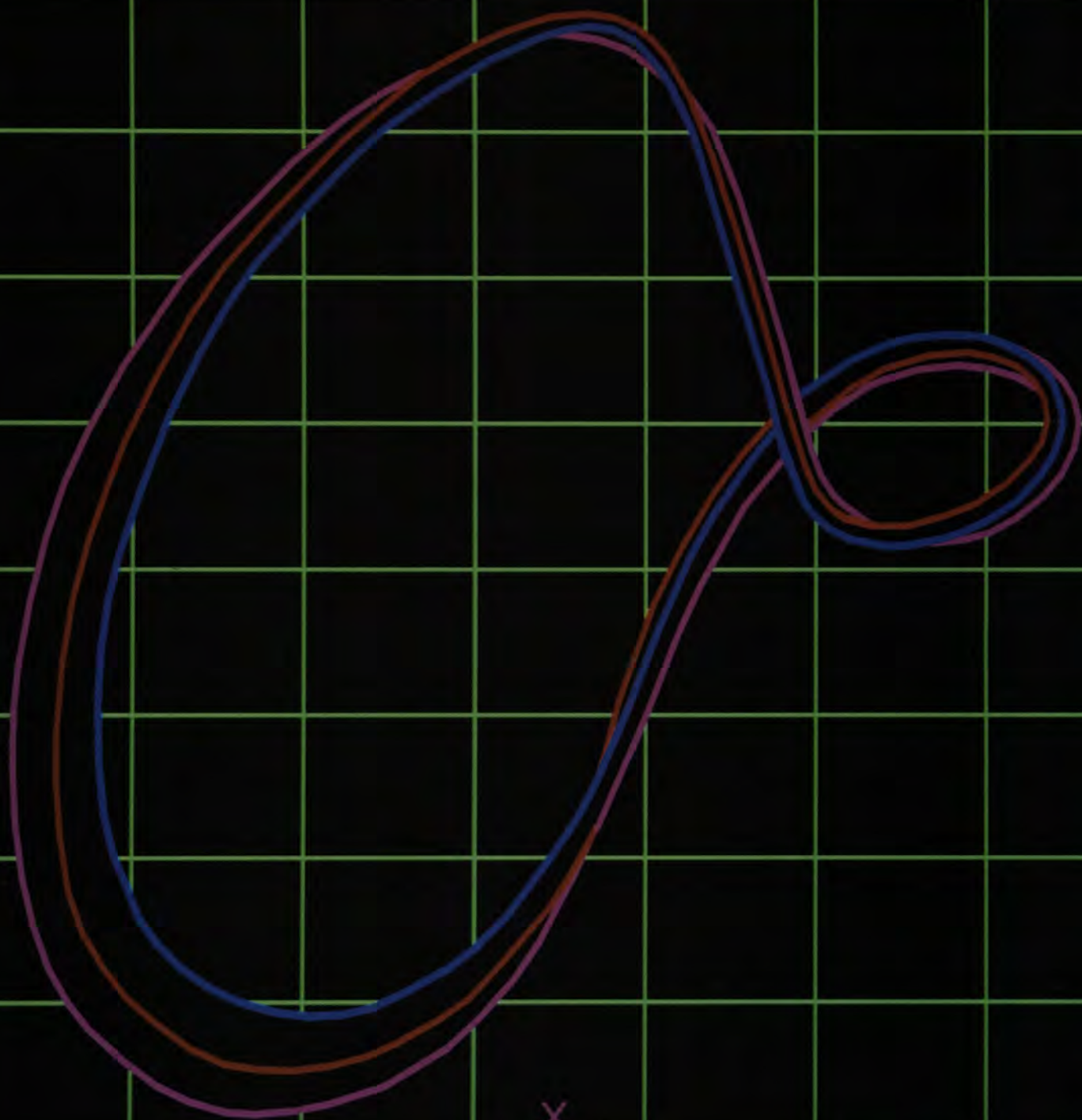


RIT OFFICIAL BULLETIN
ROCHESTER INSTITUTE OF TECHNOLOGY

G R A D U A T E S T U D Y



Rochester Institute of Technology Calendar 1982-83^AB

	Graduate Registration	No Classes	Non-Matriculated Student Registration	Classes Begin Day Colleges	Exam Week	Last Day of Quarter
Fall Quarter	Sept. 8, 9	Nov. 24-28	Sept. 10	Sept. 10	Nov. 19-23	Nov. 23
Winter Quarter	Nov. 29	Dec. 19-Jan. 2 Feb. 1 (day) Feb. 27-Mar. 6	Nov. 30	Nov. 30	Feb. 23-26	Feb. 26
Spring Quarter	March 7	May 22-30	March 8	March 8	May 17-20	May 20

Cover Graphic, Computer generated cover art produced by Lisa Hayward in cooperation with Genigraphics and James VerHague, College of Fine and Applied Arts. Art direction by RIT Communications.

Acknowledgements

Dean, Dr. Paul Bernstein

Editor, Karen Beadling

Art Director, John Massey

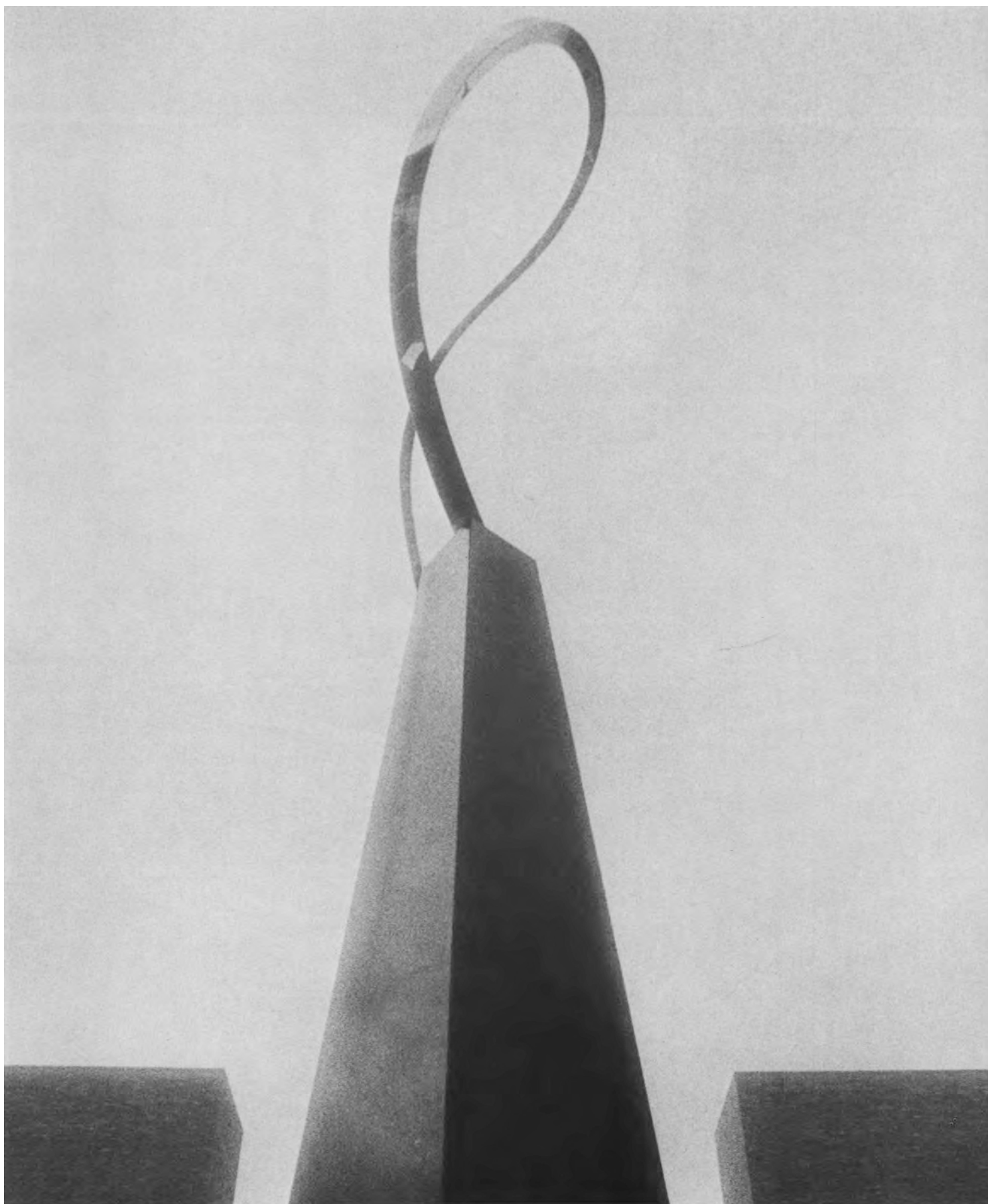
Graphic Designer, Walter Kowalik

Cover Consultants, Dr. Peter Giopulos and Dr. Richard Zakia

Photography, Jim Castelein, Rod Reilly, Sue Weisler

Composition, Total Typography, Inc.

Printed by Flower City Printing, Inc.

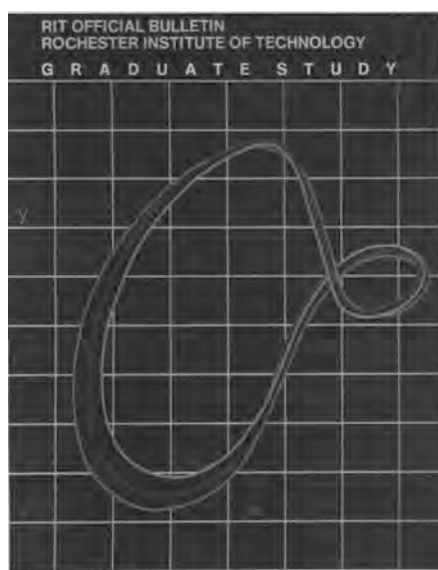


The computer graphic on the front cover is a representation of Jose de Rivera's stainless steel sculpture, located on the quadrangle adjacent to Wallace Memorial Library, the College of General Studies and the James E. Gleason Memorial Building.

De Rivera's sculpture itself is a representation of the Möbius strip, a one-sided surface that, at RIT, has come to symbolize the continuous nature of the educational process.

Graduate Study





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 contractual obligation with its students for the contents of this Graduate Bulletin.

RIT admits and hires men and women, veterans and disabled individuals of any race, color, national or ethnic origin, or marital status, in compliance with all appropriate legislation, including the Age Discrimination Act. The compliance officer is James Papero.

Graduate Study 1982-83 Produced by RIT Communications and the Graduate Council

Write or phone:

**Rochester Institute of Technology
Admissions Office
P.O. Box 9887
Rochester, NY 14623**

**(Postmaster: Send address changes
to above address)
(716) 475-6631**

©Copyright 1982 Rochester Institute
of Technology

Contents

Calendar (inside front cover)

Graduate Education at RIT.....	4
Accreditation.....	6
Programs of Study	7
Philosophy of Graduate Education at RIT.....	8
Admission.....	8
Costs.....	10
Steps Toward Degree	11
Student Services.....	14
Course Numbering	17
The College of Applied Science and Technology ..	18
The College of Business	32
The College of Continuing Education	46
The College of Engineering	52
The College of Fine and Applied Arts	66
The College of General Studies.....	76
The College of Graphic Arts and Photography.....	78
The College of Science	92
National Technical Institute for the Deaf.....	101
Officers and Deans.....	104
The Board of Trustees	104
Index	106

Campus map (inside back cover)

RIT Official Bulletin

Vol. LXXXII No. 4 July 1982

The RIT Official Bulletin (USPS 715-400) is published seven times annually by Rochester Institute of Technology, One Lomb Memorial Drive, P.O. Box 9887, Rochester, N.Y. 14623 in March, May, June, July and August. Second-class postage paid at Rochester, N.Y.

About RIT



Founded in 1829, Rochester Institute of Technology has been a pioneer in career-oriented and cooperative work-study higher education. RIT includes the modern 1,300-acre campus in Rochester, N.Y., the Eisenhower College campus in nearby Seneca Falls and the RIT City Center in downtown Rochester. The nonsectarian, coeducational, independent Institute prepares students for technical and professional careers in a changing world.

RIT consists of 10 colleges: Applied Science and Technology, Business, Continuing Education, Eisenhower, Engineering, Fine and Applied Arts, General Studies, Graphic Arts and Photography, Science, and the federally-funded National Technical Institute for the Deaf.

Graduate Education at RIT

About 20 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 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 were 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.

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 graphic 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.

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, the College of Applied Science and Technology now offers three programs through its School of Computer Science and Technology. These are the MS in computer science, the MS in computer systems management and the MS in information science. The college also offers an MS in career and human resource development, designed for school, business, and industrial personnel.

RIT has recently initiated a new MS interdisciplinary program involving science and engineering in the area

of materials science. Our College of Fine and Applied Arts also began an MS offering in medical illustration in 1981-82.

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	HEGIS* Code	For More information See Page
College of Applied Science and Technology	Master of Science	Career and Human Resource Development Computer Science Computer Systems Management Instructional Technology Information Science	0826 0701 0701 0699 0702	18
	Certificate	Information Science	0702	
College of Business	Master of Business Administration	Accountancy Business Options Listed on page 36	0502 0506	32
	Master of Science	Accountancy Human Services Management	0502 2199	
College of Continuing Education	Master of Science	Applied and Mathematical Statistics	1702	46
College of Engineering	Master of Science	Electrical Engineering Mechanical Engineering Materials Science and Engineering**	0909 0910 0915	52
	Master of Engineering	Engineering (EE, ME, IE)	0901	
College of Fine and Applied Arts	Master of Fine Arts or Master of Science for Teachers	Ceramics and Ceramic Sculpture	1009	66
		Graphic Design	1009	
		Industrial & Interior Design	1009	
		Glass	1009	
		Metalcrafts and Jewelry	1009	
		Painting	1002	
		Printmaking	1002	
		Weaving and Textile Design	1009	
		Woodworking and Furniture Design	1009	
		Medical Illustration	1299	
		Art Education	0831	
College of Graphic Arts and Photography	Master of Science	Printing Technology	0699	78
	Master of Science for Teachers	Printing Education	0806	
		Printing Education	0839	
	Master of Science	Photographic Science and Instrumentation	0999	
	Master of Fine Arts	Photography	1011	
College of Science	Master of Science	Chemistry	1905	92
		Clinical Chemistry	1223	
		Materials Science and Engineering**	0916	
National Technical Institute for the Deaf	None	Educational Specialists for the Deaf		101

Enrollment in other than registered or otherwise approved programs may jeopardize a student's eligibility for certain student aid awards. All the above programs are registered according to the indicated HEGIS* code.

*Higher Education General Information Survey

**Joint program of Colleges of Engineering and Science

Philosophy of Graduate Education at RIT

Graduate education has been part of the mission of the Rochester Institute of Technology since the first graduate program in Fine and Applied Arts was begun in 1958. During the ensuing years, student demand has led to the emergence of more than 40 graduate programs in such diverse areas as fine arts, business, engineering and career education. These offerings have drawn on the total resources of the Institute and have received wide acceptance.

From its beginnings as the Mechanics Institute, RIT has stressed both "earning a living and living a life." Its offerings have also emphasized the amalgam of formal education and experience, and have included a definitive commitment to career training in a context of social responsibility. In particular, RIT's graduate thrust has been oriented in the direction of technology and business, as well as the aesthetic content of the fine arts, photography, and printing.

RIT's graduate programs stress the applications of specialized knowledge that enable students to use their professional knowledge and skills to attain personal and career goals. Further, their graduate accomplishments at the Institute are basic to continuing lifelong learning, career development and personal satisfaction. In certain areas, the MS or MFA is the terminal degree in the field, while in others it provides the base for work at a higher level.

Another fundamental objective of graduate education at RIT is that it be characterized both by effective teaching and quality scholarship. Out of these concerns have risen selective research projects that aid education of students and provide continuing opportunities for professional growth. At RIT many of our research projects—including projects in energy, graphic arts, information and communication—are under the umbrella of the RIT Research Corporation. These projects bring industry experts to campus to interact with faculty and graduate students, give graduate students the opportunity to assist with research projects and keep faculty members up to date on current industry practices. In

addition, through the Research Corporation, graduate students utilize special libraries and research facilities as they study in their fields.

Graduate programs at RIT help students understand the conceptual structure and organization of knowledge of their chosen programs. Such an understanding is a necessity if our graduates are to cope with the accumulation of knowledge and technological change in the professions. These programs provide the educational base for additional learning, and offer access into and mobility within one or more professional areas. Through their education, RIT's graduate learners become equipped with the knowledge, skills, and attitudes to stay abreast in their professional fields.

Graduate study should help students to mature as perceptive problem-solvers who will emerge as professional and community leaders. It should provide a strong base for independent study and experimental learning. Above all, graduate education should help students become skillful and incisive professionals who perceive the human purposes that underscore all learning.

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 Admissions Office, according to the following procedures:

1. Inquiries about, and applications for, graduate study are directed to the Director of Admissions, Rochester Institute of Technology, One Lomb Memorial Drive, Rochester, New York 14623.
2. The Admissions 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 Admissions Office will prepare an applicant folder for him or her. All correspondence and admission data will be collected by the Admissions 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 Admissions Office.

6. The Admissions Office will notify the student of the admission decision.

RIT admits and hires men and women, veterans and disabled individuals of any race, color, national or ethnic origin, or marital status, in compliance with all appropriate legislation, including the Age Discrimination Act. The compliance officer is James Papero.

The basic entry requirements for master's degree candidates include the completion of a baccalaureate degree and whatever other evidence of the applicant's potential to successfully complete graduate studies may be required by the particular college. Rare exception to the baccalaureate requirement can be made in the case of candidates who have demonstrated unusual competence in their field of specialization. For these exceptions the recommendation of the department chairperson or director and the approvals of the appropriate dean and the Graduate Council are required.

In certain cases graduate students may be admitted prior to, but conditional on completion of, the baccalaureate degree. Applicants should not be considered for admission prior to the start of their final year of undergraduate study. The student must present a final transcript within one quarter after first registering for a graduate program.

Graduate applicants who do not fully satisfy all admission criteria as to grades, test scores or other credentials, but do show sufficient promise to qualify for a trial period of graduate study may be admitted on probation to the Institute. Such students must achieve a 3.0 ("B") program cumulative grade point average by the end of their first 12 quarter credit hours of graduate study. Those students who do not meet this criterion will be suspended. Responsibility for specific requirements and maintenance of the student's appropriate status rests with the department in consultation with the Admissions Office and the Registrar.

All applications are processed through the Office of Admissions. The applicant's file folder will include an RIT application, previous college or secondary school records, applicable test scores, recommendations (if required) and other documents that may support admission of the candidate.

Evaluation of transfer credit (see p. 12) is made by the academic school or department in question and the College of General Studies. For students applying to the College of Continuing Education, transfer credit will be evaluated within that college.

Graduate programs specialized and diverse



RIT President M. Richard Rose

RIT proud of link with Rochester, Dr. Rose asserts

"RIT means different things to different people," says Dr. M. Richard Rose, the Institute's seventh president. "For those of us who work and study here, it's a progressive academic citadel that always has been willing to take those extra steps necessary to maintain relevant career-oriented programs.

"For its alumni, RIT continues to provide an opportunity to improve themselves and their families educationally, professionally, financially and socially.

"RIT also is something special to those in the greater Rochester community who may never have studied or worked at any of our facilities. It's a special pride in having the main campus of the Institute here.

"For, in many ways, it symbolizes much of what we find so desirable about our community, particularly through its attractive blend of tradition, culture, innovation, business and education.

"RIT is progressive and relevant. It always has been willing to take chances if chances were necessary to further its unique career and professional approach to higher education. Yet, in many ways it has grown hand-in-hand with greater Rochester itself. Its very roots are in the area's early industry.

"It is this link with greater Rochester's history and growth that makes RIT a special place for the entire community. It's a link of which we're very proud. We hope you will share in the pride."



Dr. Paul Bernstein

"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. "Each is designed to fill a specific need in its respective field.

"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 materials science and engineering program. We perceived a real need for people in this area from our discussions with business and industrial leaders, and then proceeded to develop this interdisciplinary offering with their encouragement."

Costs

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

Full-time (12-18 credit hours)—

\$ 1790/quarter

Part-time (11 credit hours or less)—

\$ 152/credit hour

Master of Science (CCE)—

\$119/credit hour

Internship*—\$55/credit hour

In addition, any graduate student carrying over 18 credit hours of study will be charged the full-time tuition rate plus \$152/credit hour for each hour of study exceeding 18.

All full-time graduate students are required to pay a Student Activities Fee of \$15 per quarter.

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 6, 1982; Winter Quarter, October 29, 1982; Spring Quarter, February 4, 1983; Summer Quarter, April 29, 1983. 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 prices without prior notice.

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 percent 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 date of a Drop Form or Withdrawal Form shall be the date of official dropping of course(s) or official withdrawal from the Institute and shall be used to determine the applicable tuition charge.

the acceptable reasons for any refund during the quarter are:

Full refund:

1. Active military service: Students called to active military service during the term may receive full tuition refund. If called after the eighth week, they may elect to complete the course by making special arrangements with both their instructor and department advisor.

2. Academic reasons: Students sometimes register before grades from the previous quarter are available. If such students later find that they are subject to academic suspension or have failed a prerequisite course, they will be given a full refund upon dropping the prerequisite course. It remains the student's responsibility to contact their department to assure that the Drop Form and refund are properly processed.

3. If part-time students drop a course during the Official Drop Period (first 10 days of classes during that specific quarter), they may contact the Bursar's Office for a 100 percent refund for that course dropped. Courses dropped after the Official Drop Period will not result in any tuition refund.

Full- to part-time status

If students drop their course load from full-time (12 or more credits) to part-time (less than 12 credits) status during the Official Drop Period (first 10 days of classes for that specific quarter), they may contact the Bursar for a refund based on the differential between the full-time tuition payment and the total per-credit-hour charge for the part-time load. Courses dropped after the Official Drop Period will not result in any tuition refund.

Partial refund

A partial refund will be made during a quarter if *total withdrawal* from the Institute 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 (suspension)
3. Transfer by employer, making class attendance impossible
4. Total withdrawal from the Institute for academic or personal reasons at the request of the student; approved by the student's advisor or department representative and the Bursar

Partial refund of tuition in totally withdrawing from the Institute for the above reasons will be according to the following schedule:

90 percent during the first week of classes

75 percent during the second week of classes

60 percent during the third week of classes

50 percent during the fourth week of classes

No refund during the fifth and subsequent weeks of classes

In order for a refund to be processed the student must contact the Bursar's Office directly and provide it with a copy of the official Withdrawal Form.

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 prorated from the date of official withdrawal from the Institute.

90 percent of unused room charge during the first week of classes

75 percent of unused room charge during the second week of classes

60 percent of unused room charge during the third week of classes

50 percent of unused room charge during the fourth week of classes

Board charges will be refunded according to the following schedule:

75 percent of unused board charge during the first four weeks

50 percent of the unused board charge after the first four weeks

A specific rate schedule is available in the Housing Office.

Fees

Fees are not refundable.

Financial aid

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

*Applied only to the internship portion of the master of engineering degree in the College of Engineering, the industrial research option of the MS degree in the Department of Chemistry and the External Research Option in the MS in Clinical Chemistry in the Department of Clinical Sciences. It also applies to the MS degrees in business technology and career information in the College of Applied Science and Technology.

Note: Matriculated graduate students enrolled in CCE or Day College undergraduate courses will be charged the Day College graduate tuition rate.

In addition, RIT Graduate Scholarships will be offered in 1982-83 in the colleges of Graphic Arts and Photography, Science, Applied Science and Technology, and Business. Additional funds are available for minority applicants. For information, write to the Dean of Graduate Studies.

Tuition Assistance Program

(New York State Residents)

New York State residents who show ability to pursue a full-time program may receive awards from \$100 to \$600 as a graduate student.

Appeals process

An official appeals process exists for those who feel that individual circumstances warrant exceptions from published policy. The initial inquiry in this process should be made to Mr. Richard B. Schonblom, bursar. Matters which cannot be resolved will be referred for further action to Mr. William J. Welch, controller.

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.

Graduate degree program

A master's degree at RIT may be obtained in programs ranging from accountancy to photography, from computer science and technology to environmental design. (Please refer to p. 7 for a complete listing of graduate programs of study.)

Upon completion of the stipulated requirements, a student's academic department certifies him or her for a degree. A statement of requirement completion will be listed on the transcript in the appropriate term. After commencement, a statement verifying that a degree has been awarded will be posted to the transcript. Degrees for fall, winter and spring graduates are mailed during the Summer Quarter. Degrees for summer graduates are mailed during the Fall Quarter.

The steps toward earning your degree

Graduate registration

Matriculated graduate students are those who have applied and been formally accepted into a graduate program through the Office of Admissions. Such students may register for graduate level courses (700-800) that fit their home department approved programs. When registering for graduate courses outside the home department, not in the normally approved program, the approval of the department offering the course is also necessary.

Non-matriculated (undergraduate or graduate) students will be allowed to take graduate courses with the department's approval and with the knowledge that the course work completed while a non-matriculated student may not apply to any given baccalaureate or masters program.

Matriculated and non-matriculated graduate students may register for undergraduate level courses with the understanding that these courses may not always apply to an RIT master's program. In certain cases, where educationally sound programs will result, appropriate undergraduate courses as approved by the faculty advisor and by the department may be included in a master's program.

However, no more than nine undergraduate quarter credit hours (600 level or below) may be applied toward the 45 quarter credit minimum (12 undergraduate hours for those programs requiring 48 or more quarter credit hours). Where undergraduate work is allowed, it must be well planned and closely controlled. Careful and well-informed advisement should be employed to assure a quality program. In the majority of cases, most, if not all, course work will be at the graduate (700-800) level.

Credit requirements

The minimum credit requirement for a master's degree is 45 quarter (or 30 semester) credit hours. Students should refer to the section covering the college in which they will enroll to earn the credit hour requirements. At least 36 of these quarter credit hours must be earned at the graduate level in residence at the Institute.



External master's degree programs allow for varying amounts of acceptable graduate transfer credits. Thus, the residency requirement may be decreased, if approved by the Graduate Council and vice president for academic affairs. Other exceptions pertaining to a group of students must be approved by the Graduate Council.

Transfer credit

A maximum of nine quarter credit hours in a 45 credit hour program or 12 quarter credit hours in a 48 credit hour program or more 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. Only a grade of B (3.0) or better may be transferred.

Transfer credits are not calculated in the student's Grade Point Average (GPA) but will count toward overall credit requirements for the degree. Transfer credits do not count in the satisfaction of residency requirements.

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.

Thesis requirements

Included as part of the total credit hour requirement may be a research and thesis requirement as specified by each department. Some departments have requirements in place of a thesis. 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 the student's 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.

Candidacy for an advanced degree

A graduate student must be a candidate for an advanced degree for at least one 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 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.

Summary experience

The Graduate Council regards some form of integrative experience as necessary for candidates of advanced degrees. Such requirements as the comprehensive examination, the oral examination of the thesis and a summary conference are appropriate examples, provided they are designed to help the student integrate the separate parts of his or her total experience. The nature of the experience will be determined by the individual college or department.

Overlapping credit for second degree

At the discretion of the Graduate Committee in the specific degree area, 9-12 previous master's quarter credit degree hours can normally be applied toward satisfying requirements for a second master's degree. The use of a given course in two different programs can be allowed only if the course that applied for credit toward the first degree is a required course for the second degree. The course must be used in both programs within five years; i.e., no more than five years between time used for first degree and applied again toward second degree.

In no case shall less than the minimum 36 quarter credit hours of residency be accepted for the second degree. If duplication of courses causes a student to go below the 36-hour limit in the second degree program, he or she would be exempted from these courses but required to replace the credit hours with departmentally approved courses. An RIT student will not be admitted through the Admissions Office to the second degree program until the first program has been completed.

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 transcripts, degrees or recommendations from the Institute.

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

Summary of requirements for master's degree

1. Successfully complete all required courses of the Institute and the college. These requirements should normally be met within seven years of the time of initial registration for graduate study. Extensions of this rule may be granted through petition to the Graduate Council.
2. Complete a minimum of 45 credit hours for the master's degree. At least 36 quarter credit hours of graduate level course work and research (courses numbered 700-800) must be earned in residence at the Institute.
3. Achieve a program cumulative grade point average of 3.0 (B) or better. (See p. 13 for further details.)
4. Complete a thesis or other appropriate research or comparable professional achievement, at the discretion of the degree granting program.
5. Pay in full, or satisfactorily adjust, all financial obligations to the Institute.

Note: The dean and departmental faculty can be petitioned, in extraordinary circumstances, to review and judge the cases of individual students who believe the spirit of the above requirements have been met yet fall short of the particular requirement. If the petition is accepted and approved by the faculty, dean and vice president for academic affairs, a signed copy will be sent to the registrar for inclusion in the student's permanent record.

Definition of grades

Grades representing the students' progress in each of the courses for which they are registered are given on a grade report form at the end of each quarter of attendance. The letter grades are as follows:

A Excellent

B Good

C Satisfactory

D and F grades do not count toward the fulfillment of program requirements for a master's degree.

The grades of all courses attempted by graduate students will count in the calculation of the program cumulative grade point average. This program cumulative grade point average shall average 3.0 ("B") as a graduation requirement. The dean of the college or his designee must approve all applications for graduate courses a student wishes to repeat.

Quality points

Each course has a credit hour value based on the number of hours per week in class, laboratory or studio and the amount of outside work expected of each student. Each letter grade yields quality points per credit hour as follows:

A 4 quality points

B 3 quality points

C 2 quality points

D 1 quality point

E and F count as 0 in computing the grade point average (GPA). The GPA is computed by the following formula:

$$Gp_A = \frac{\text{total quality points earned}}{\text{total hours}}$$

There are other evaluations of course work that do not affect GPA calculations. Only I, W and R (as described below) can be assigned by individual faculty members at the end of a quarter.

Registered (R) - a permanent grade indicating that a student has registered for a given course but has yet to meet the total requirements of the course or has continuing requirements to be met. The grade is given in graduate thesis work.

Completion of this work will be noted by having the approved/accepted thesis title, as received by the registrar from the department, typed upon the student's permanent record. Full tuition is charged for these courses. "R" graded courses are allowed in the calculation of the residency requirement for graduate programs.

incomplete (I) - this grade is given when the professor observes conditions beyond the control of the student such that the student is not able to complete course requirements in the given quarter. This is a temporary grade that reverts to an F if the registrar has not received a "change of grade" form from the professor by the end of the second succeeding quarter. Full tuition is charged.

Withdrawn (W) - will be assigned in courses from which a student withdraws after the second week of classes or if a student withdraws from all courses in a given quarter. A student can change from credit to audit or from audit to credit status for a course only during the first 10 days of classes.

Audit (Z) - indicates a student has audited the course. The student need not take exams and full tuition will be charged. Audited courses do not count toward the residency requirement.

Transfer (T) (credit) - assigned through the admission process and, possibly, through later review (see p. 12 for details).

Credit by examination (X) - assigned for the successful completion of various external or Institute examinations provided such examinations cover or parallel the objectives and content of the indicated course. Credit must be assigned in advance of any credit received through registration for the indicated course. X graded courses do not count toward the residency requirement. A maximum of 12 quarter credit hours is allowed for graduate courses.

Exceptions to the maximum transfer credit or credit-by-exam for graduate programs can be granted by the dean of Graduate Studies in unusual circumstances upon appeal from the dean of the college involved.

Waived - Waived courses are those courses eliminated from the list of requirements that a student must take to graduate. For graduate students, required courses may be waived because of previously completed academic work, but in no case shall the resulting graduate program requirements be reduced below 45 quarter credit hours. In addition, waiver credit for graduate courses can be applied only towards required, not elective, courses. The process of waiving courses and

thereby reducing graduate program requirements is not to be confused with the process of exempting certain requirements that are then replaced by an equal number of credit hours, thus retaining the total number of credit hours in the specified program.

Changing grades - once a grade has been reported by a faculty member it is not within the right of any person to change this unless an actual error has been made in computing or recording it. If an error has been made, the faculty member must complete the appropriate form, and the completed form must be approved by the head of the department in which the faculty member teaches and the head of the department enrolling the student. When approved by both of these individuals, the form is to be forwarded to the registrar. There is, however, an appeal procedure for disputed grades through the Academic Grievance Committee of the college in which the course was offered, with final appeal to the Institute Hearing and Appeals Board.

Academic probation and suspension

Any matriculated graduate student whose program cumulative GPA falls below a 3.0 after 12 quarter credit hours or subsequently will be placed on probation and counseled by the departmental advisor concerning continuation in the graduate program.

Those students placed on probation must raise their program cumulative GPA to the 3.0 level within 12 quarter credit hours or be suspended from the graduate program.

Should it be necessary to suspend a graduate student for academic reasons, the student may apply for readmission to the dean of the college upon demonstration of adequate reason for readmission.

Student Services

The Wallace Memorial Library

Information comes in many forms other than printed pages bound between two covers. When a student wants to research a topic at Wallace Memorial Library, he or she will find not only a variety of print and non-print forms in which to locate information but also an on-line computer catalog where the search for references can be made.

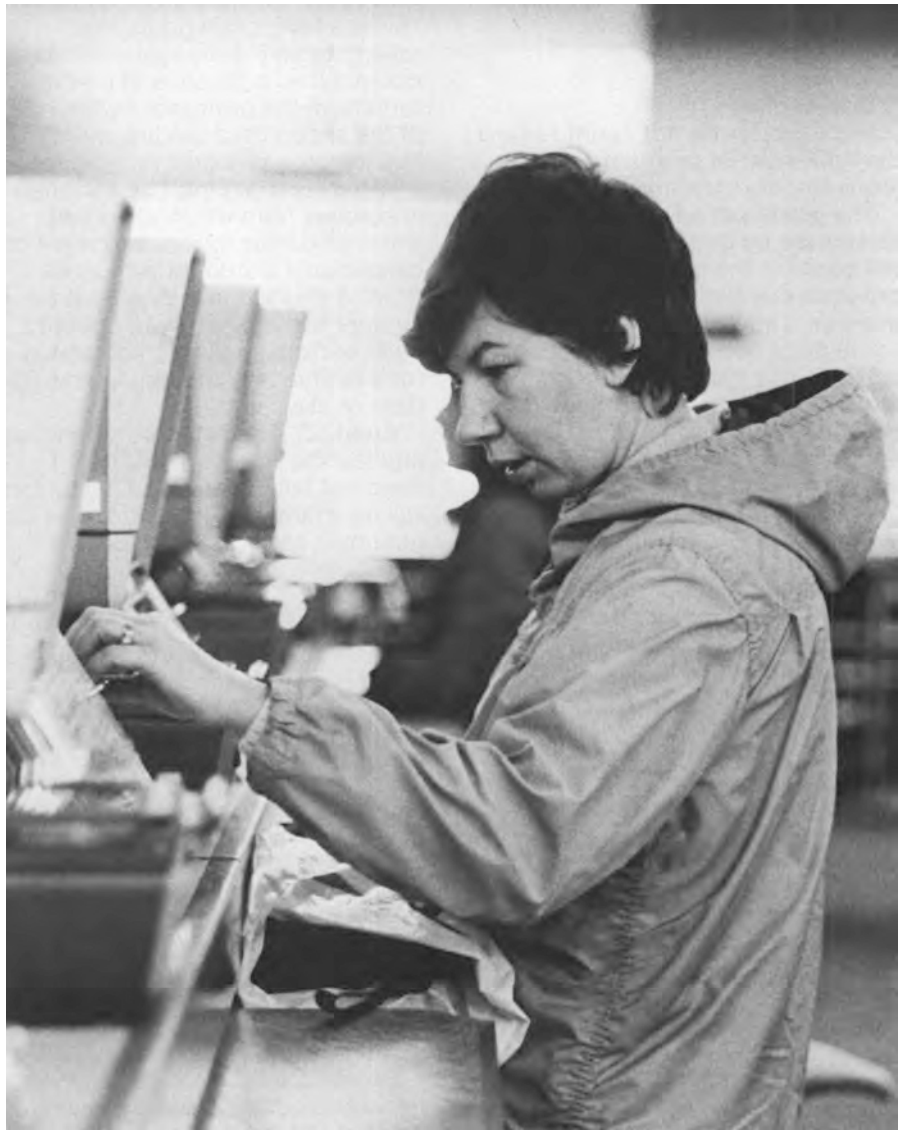
Particularly adapted to an institution of technology and the arts and sciences, the Wallace Memorial Library contains, in addition to material in the usual form of books, magazines, newspapers, and pamphlets, material in the form of microfilm, microfiche, films and slides. To assist students in the use of all of 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 Center, located in Grace Watson Hall, offers a variety of services to RIT graduate students.

These services include:

- Personal Counseling
- Career Counseling
- Career Resource Center
- SIGI
- Testing
- Research
- Developmental Programs
- Consultation

Counseling Center hours are 8:30 - 4:30, Monday through Friday. For more information about Counseling Center services, call 475-2261.

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 during the day 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.

Housing

RIT has four campus apartment complexes on the campus for both married and single students. You should apply through the Office of Off-Campus and Apartment Life, Rochester Institute of Technology, P.O. Box 9887, Rochester, N.Y. 14623. This should be done at your earliest convenience.

The residence halls are designed and programmed primarily for undergraduate students. Due to increased enrollment and the number of returning students living in the halls, they have been filled beyond capacity for the past several years. Entering students are frequently tripled.

There are several large apartment complexes within a short distance of the campus. Please call the Residence Life Office at 716-475-2572 for information.

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.

Automobile registration

Those students having automobiles on campus must register these vehicles with Campus Safety at the



time they first register for classes, or upon bringing the automobile onto campus for the first time.

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, N. Y., 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

RIT stresses the importance of student involvement with the "real world" not only upon graduation but during their years of study as well. Central Placement Services provides career counseling and guidance to both undergraduate and graduate students in developing appropriate employment strategies. Assistance is provided for part-time, summer, co-op/internship, graduating, and alumni placement.

Services to students seeking part-time employment, either on or off campus, begin as soon as a student is accepted into classes at RIT. Central Placement serves as an information base for students looking for these positions by maintaining job descriptions and application

procedures. Placement counselors also advise students on how to make successful contacts with employers.

Similar information and guidance is available for students seeking summer employment between academic school years.

Co-op placement services are provided to students enrolled in cooperative education programs in the College of Engineering, the School of Engineering Technology, School of Computer Science and Technology, the Packaging Science Department, School of Printing, and internship programs in the School of Photographic Arts and Sciences.

Graduating students from all programs at RIT are eligible for permanent placement services one year before the completion of their degree requirements. Finally, the alumni of RIT are eligible for continued assistance through Central Placement Services as they make job and career changes.

Six major services are provided to students in these areas.

Group sessions are conducted daily throughout the year to orient students to the services of CPS. These sessions and other workshops and seminars address specific topics such as resume writing, job hunting strategies, job interviewing techniques, and the second/plant interview.

Individual counseling allows students at any time to make an appointment with their respective counselors in Central Placement Services. In these strategy sessions, students can discuss their personal circumstances and decisions they face with respect to employment and career plans.

Resource Library materials provide students with additional information on industries and employers. Much of the information maintained is current data provided by employers from throughout the United States, and many helpful directories and other reference materials are available as well.

Campus interviews are made available by the active job development activities of the Central Placement staff. Through personal visits to employers as well as phone and correspondence contacts, an extremely active program of on-campus interviews brought over 1,000 employer representatives to campus last year.

Job listings complement campus interviewing as additional sources of available positions. Job descriptions are located in the reception area of CPS. Over 5,000 listings for part-time jobs on and off campus, summer job announcements, co-op opportunities, and permanent positions were received last year.

Reference services include the retention of recommendation for graduating students to be used in their applications to employers and to graduate schools.

These services resulted in over 80 percent of the 1981 graduating class securing permanent positions in their career field upon completion of their degrees.

Student Health

Primary care medical services are provided on campus by Student Health Services, located on the second floor of the George Eastman Memorial Building. The staff, including physicians, nurse practitioners, and registered nurses, are on duty Monday through Friday during the daytime hours posted at the Health Center. A registered nurse is on duty in Nathaniel Rochester Hall, Monday through Friday evenings. Services are provided to graduate students on a prepaid, quarterly fee basis (\$20 per quarter) or on a fee-for-service basis.

Emergency medical services are provided by the Emergency Medical Unit, a New York State certified ambulance service. This student group provides on-site care and emergency transportation to Student Health Services or an area hospital.

RIT requires all students to be protected by health insurance to cover costs incurred off campus. If you do not have insurance, student health insurance is available through the Institute.

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



Course numbering

Course Number

FADF-001

—Course Sequence-----
 ---- Course Level-----
 ---- Discipline-----
 ---- School of Art and Design-----
 ---- College of Fine and Applied Arts-

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

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

The alpha-numeric 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 means:

First letter: College offering the course

Second and Third letters: School or department of that college

Fourth letter: Discipline

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; 7, or 8 = Courses for graduate credit.

Second and Third numbers: Course differentiation and sequencing

0404-001

Registration Number

Directly below the alpha-numeric 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 cannot be read by the computer system. Course prerequisites are shown in parentheses after course descriptions.

College of Applied Science and Technology



Dennis C. Nystrom, Dean

Higher education in any of the technological disciplines requires commitment of both the student and the institution. The academic areas within the College of Applied Science and Technology represent RIT's commitment to curricular innovation, program flexibility and academic rigor. The College of Applied Science and Technology is composed of six units: School of Computer Science and Technology, Department of Instructional Technology, Department of Packaging Science, School of Engineering Technology, Department of Career and Human Resource Development, and School of Food, Hotel and Tourism Management.

Many College of Applied Science and Technology programs are academic leaders in the regional, state, or even national educational communities. Students entering computer science have three graduate programs from which to select; others will follow in succeeding years. The career and human resource development program provides a sound background for this emerging quantitative field. Programs in instructional technology answer the demand for skilled and professional systems oriented training and educational technologists.

The following graduate programs are currently offered in the College of Applied Science and Technology.

Master of Science degree in Career and Human Resource Development

This program provides the necessary courses and internship experiences to enable the graduate to serve in a variety of positions related to career education and human resource development. 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 various career fields. Full- or part-time study is available.

Master of Science degree in Computer Systems Management

This curriculum, the first of its kind in the United States, is designed to prepare competent personnel for the management 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, science, engineering, or business 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 degree in Information Science

The newest program offered by the School of Computer Science and Technology, Information Science, is designed to prepare the graduates for work in those areas of business, industry and education where

information is managed by data systems. The students coming from other educational programs will be given sufficient computer studies to move into automated data information positions in their academic field.

Master of Science in Instructional Technology

Instructional technology is a general name that covers the development of training and instruction in a variety of work areas. RIT graduates are employed in business, industry, educational institutions—particularly community colleges and health institutions. RIT's instructional technology program offers a graduate degree emphasizing instructional development with possible options in training and development, higher education, and allied health. The program may be pursued on a full- or part-time basis and allows flexibility in the selection of electives to meet individual needs. Most courses are offered in the evening hours to enable those already employed to pursue a degree.

Master of Science in Career and Human Resource Development

Clint Wallington, Director

This new integrative program has been designed to provide graduates with the background that is necessary to help organizations better utilize human resources, to plan and implement career education programs, and to help individuals make career choices. The program combines elements of business, guidance, instructional technology, statistics, and automated systems to meet the demands of this emerging field.

Two concentrations are offered to provide the student with the knowledge that is needed for a career in either the private business and industrial sector or in community based organizations and educational institutions.

Students who choose the human resource development concentration will be prepared to function in broad-based human resource development activities in the business and industrial sector. Skills in human resource forecasting, differential statistics, management

development, labor relations, and automated information systems are coupled with core competencies regarding the nature of work, career decision making and counseling skills. A knowledge of the basic functions of business also is provided. Emphasis is placed on the development of qualified career development experts who possess basic personnel administration competencies.

The students who choose the career education concentration will learn to help clients investigate career options, identify the skills and interests that are needed for various jobs, and translate career trends and opportunities into valid and reliable information. The student also will understand group dynamics and basic counseling skills. In addition, the program will provide useful skills in conducting new program feasibility studies, planning curriculum and teaching or facilitating career education programs. Potential employers include: community and junior colleges, four-year colleges and universities, K-12 school systems, social service agencies, and career information centers.

The master's program is not a classroom-only project. Students spend up to 200 hours working on a major project relating to their career goals. Many have found exciting internships in major corporations. Examples of research projects include: a nationwide search to determine why engineers reject certain job offers, the organization and development of career resource centers, career advisement for adults in continuing education programs, the organization of training programs, and the writing of position descriptions.

Summer option

Through summer full-time study (12 credit hours), a student can earn 36 credits during the three-year period toward the degree requirements. The additional 12 credits necessary for graduation may be completed through a special project and the transfer of other graduate studies appropriate to the degree goals. Students pursuing the human resource development concentration may need to take more time.

Admission

Admission decisions for this program are based on the review of the baccalaureate degree, undergraduate grades, interviews, a personal goal statement and work experience. It is expected that applicants will have at least three years of full-time work

experience or the equivalent of part-time work. Interviews and the personal goals statement are evaluated as they relate program goals to the individual's personality and aptitudes for functioning as a career development specialist.

Graduate assistantships

A limited number of research and graduate assistantships are available. These assistantships involve 10 to 15 hours of work a week.

Graduate scholarship

A limited amount of money is available in the form of tuition remissions for students on the basis of past performance and future potential.

Degree requirements

A minimum of 52 quarter hour credits of combined required and elective courses is required for the degree. A maximum of nine quarter hour credits may be transferred from other graduate institutions.

Curriculum foundation studies

Specific educational competencies that are expected of individuals in the program 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

Required Core	Credits
0615-741 Nature of Work	3
0615-742 Career Decision Making Concepts	4
0615-745 Career Concepts: 0615-746 Production, Commerce, 0615-747 Services (one course required)	3
0615-748 Information Retrieval Systems in Career Planning	4
0615-749 Manpower Forecasting Fundamentals	4
0615-760 Career Counseling Skills	3
0615-755 Career Development Project	2
0615-703 Management of Learning	2
0240-712 Fundamentals of Statistics II	3
0102-740 Organizational Behavior	4

32

Concentrations:

Students choose one concentration and follow the requirements indicated below.

Career Education Concentration	Credits
0615-743 Education/Business/ Industry Interrelationships	2
0615-745 Career Concepts: 0615-746 (one course in 0615-747 addition to the one taken as part of the required core) 3	
0615-753 Group Dynamics for Career Development	3
Electives	J2
Total	20

Human Resource Development Concentration

0102-741 Organization and Management	4
0102-746 Management Development	4
0102-748 Labor/Management Problems	4
0102-750 Personnel Systems	4
Electives	4
Total	20
Credits from Required Core	32
Credits from Concentration	20
	52

Electives

0615-752 Career Education in Colleges and Special Settings	3
0615-751 Occupational/Industrial Environments	5
0615-762 Career Education Seminar	3
0615-777 Career Internship 1 -5	
0613-757 Techniques of Work Analysis	2-3
0615-754 Human Resource Topics	1-6

Courses listed as required for one concentration may be taken as electives for the other concentration. Certain courses listed as required offer variable credit beyond what is required and can be used as electives:

0615-703 Management of Learning	1-4
0615-755 Career Information Project	1-5
0615-745, 746, 747 Career Concepts	

Additional courses may be used as electives if approved by the director.

School of Computer Science and Technology

Wiley R. McKinzie, Director

Peter G. Anderson, Chairman,
Graduate Studies

The School of Computer Science and Technology offers three graduate programs. The first leads to a master's degree in computer science, the second to a master's degree in computer systems management, and the third to a master of science in information science.

Master of Science in Computer Science: This degree program prepares students for a wide variety of computer related careers in business, industry, and academia. Graduates are prepared to work in computer system software design, specification, applications, and education.

This option is particularly suited to individuals who already have a strong background in a field in which computers are applied, such as engineering, science or business.

Master of Science in Computer Systems Management: This degree program is directed to individuals who will be taking positions in managerial leadership in computer systems installations, managing data processing centers, and leading programming projects.

Students who elect this option should have a background in the operation of modern data centers.

Master of Science in Information Sciences: This program provides students with a background in automated information systems. Specific emphasis is in the areas of data base systems, data management, information storage and retrieval, library management, information media and displays. Potential employers include public, university and college, and law libraries; medical information centers; law enforcement data centers; and information vendors.

Sixth-Year Certificate Program in Information Sciences: This program is intended for persons with an MS in library science, or the equivalent, who need training in computer automated information processing.

The main computing system at RIT is a network of four VAX-11/780 computers, one of which is devoted to engineering graphics applications.



The School of Computer Science and Technology is equipped with additional facilities, including a network of two VAX-11/780 computers, a PDP-11/70, and a PDP-11/45, all of which run the Unix (trademark of Bell Laboratories, Inc.) operating system. The PDP-11/34 is connected to three LSI-11 microcomputers, and the PDP-11/70 is connected to various microcomputers.

These computers are accessed from two remote batch stations and over 500 time sharing terminals distributed over the campuses (300 of these are intelligent terminals and also support color graphics).

All of the computer equipment is available to computer science and information sciences students.

Graduate courses may be taken during the day or evening through course offerings by the School of Computer Science and Technology.

Entrance Requirements

The student's application to the computer science graduate program *must* indicate how the prerequisites indicated below have been met:

Undergraduate degree: The applicant should have a baccalaureate or equivalent degree from an accredited institution and a minimum cumulative grade-point average of 3.0 (B).

Computer science and mathematics: Applicants must have a basic competence in mathematics (college algebra) and a familiarity with the concepts and facilities of modern computers (specifically, programming in some high-level language such as Pascal and programming in an assembly language).

Financial Aid

Some teaching assistantships are available in the School of Computer Science and Technology. Information may be obtained from:

Graduate Studies Chairman
School of Computer Science and
Technology
Rochester Institute of Technology
One Lomb Memorial Drive
P.O. Box 9887
Rochester, N.Y. 14623

Applications for these assistantships should be made by March 31 preceding the fall quarter in which the student will enroll.

The Curriculum

Graduate programs of study consist of four sections of courses for a total of 64 credits. These sections are: the Foundation Courses, the Computer Science Graduate Core (and Business Core for CSM students), electives, and concentration and thesis area.

Foundation Courses

an advanced programming course
(several are available)

ICSS-703 Algorithms & Data Structures

BBUQ-781 Statistical Analysis

SMAM-265 Discrete Mathematics

Students who have covered this material in their undergraduate programs may have one or more of the Foundation Course requirements waived.

Computer Science Core

ICSS-720 Computer Architecture

ICSS-706 Foundations of

Computing Theory

ICSS-708 Software Architecture

ICSS-709 Programming Language Theory

Computer systems management students also must take the following Business Core courses.

BBUA-701 Financial Accounting

BBUQ-780 Quantitative Analysis

BBUB-740 Organizational Behavior

Information sciences students must take:

ICSS-836 Data Base Systems

ICSS-736 Data Base System Implementation

Electives: Elective courses provide breadth of experience in computer science and applications areas. Students may include graduate courses outside computer science in this section (e.g., science, engineering, or business). The following (as well as many other courses contained in this catalog) are typical computer science electives:

ICSS-710EDP Auditing

ICSS-721 Microprocessors & Microcomputers

ICSS-730 Modeling & Simulation I

ICSS-740 Computer

Communication Networks

EECC-655 Real-Time Computation

ICSS-770 Fund, of Computer

Graphics

ICSS-846 Information Storage & Retrieval

ICSS-852 Coding Theory

The concentration section consists of an integrated sequence of courses and a related thesis. Possible concentration sequences include:

ICSS-836 Data Base Systems

ICSS-736 Data Base Systems

Implementation

ICSS-846 Information Storage & Retrieval

ICSS-856 Theory of Parsing

ICSS-860 Compiler Construction

ICSS-730 Modeling & Simulation I

ICSS-731 Modeling & Simulation II

ICSS-770 Fundamentals of

Computer Graphics

ICSS-771 Advanced Topics in

Computer Graphics

ICSS-440 Operating Systems

ICSS-826 Models of Operating Systems

ICSS-540 Operating Systems Lab.

ICSS-721 Microprocessors

EECC-721 Advanced Computer Architecture

EECC-655 Real-Time Computation

ICSS-850 Computability

ICSS-851 Computational

Complexity

ICSS-856 Theory of Parsing

Students in the computer systems management program form their concentration sequence from the following list of courses:

ICSM-720 Data Processing

Administration

ICSM-725 System Development & Comp. Oper. Tech.

ICSM-765 Adv. Computer Utilization

Students in the information sciences program form their concentration sequence from the following:

ICSS-846 Information Storage & Retrieval

ICSI-722 Library Automation & Management

ICSI-733 Information Media & Design

Students' programs of study must be designed cooperatively with a graduate advisor.

The Master's Thesis

The thesis is the capstone of each graduate program. Before registering for ICSS-899 (thesis) a student must submit an acceptable thesis proposal to a three-member faculty committee.

Bridge Program

Certain prospective graduate students, whose undergraduate record is good (i.e., more than a 3.0 GPA) but who have little or no computer science or mathematics background, may spend one year in this program.

The courses may be taken in RIT's College of Continuing Education (CTDP, CTDS, CTAM) or in the undergraduate day school (ICSP, ICSS, SMAM).

CTDP-208 or ICSP-208 Intro, to Programming

CTDP-210 or ICSP-210 Program Design & Validation

CTDP-305 or ICSP-305 Assembly

Language Programming

CTAM-210 or SMAM-204 College Algebra

CTAM-711 Fund, of Statistics

CTDS-230 or SMAM-265 Discrete Structures

ICSS-703 or ICSS-320 Data Structures

Students who successfully complete this sequence and whose applications are otherwise in order will be admitted to the master's program waiving the following Foundations Courses:

Advanced programming

SMAM-265 Discrete Mathematics

BBUQ-781 Statistics I

ICSS-703 Algorithms & Data Structures

Sixth Year Certificate Program

Information Sciences

This program is highly recommended for librarians and data managers who wish to enhance their knowledge in computer automated information systems. *A master's degree in library science or the equivalent from an accredited institution is required.*

Prerequisites and Required Courses

College mathematics, programming in a high-level language (Pascal is recommended) and programming in assembly language are prerequisites. The following five courses (20 credits) are required:

ICSS-703 Algorithms & Data Structures

ICSS-709 Programming Languages

ICSS-836 Data Base Concepts

ICSS-846 Information Storage & Retrieval

ICSI-722 Library Automation

Twelve credits of electives, chosen cooperatively with a graduate advisor, complete this certificate program.

Department of Instructional Technology

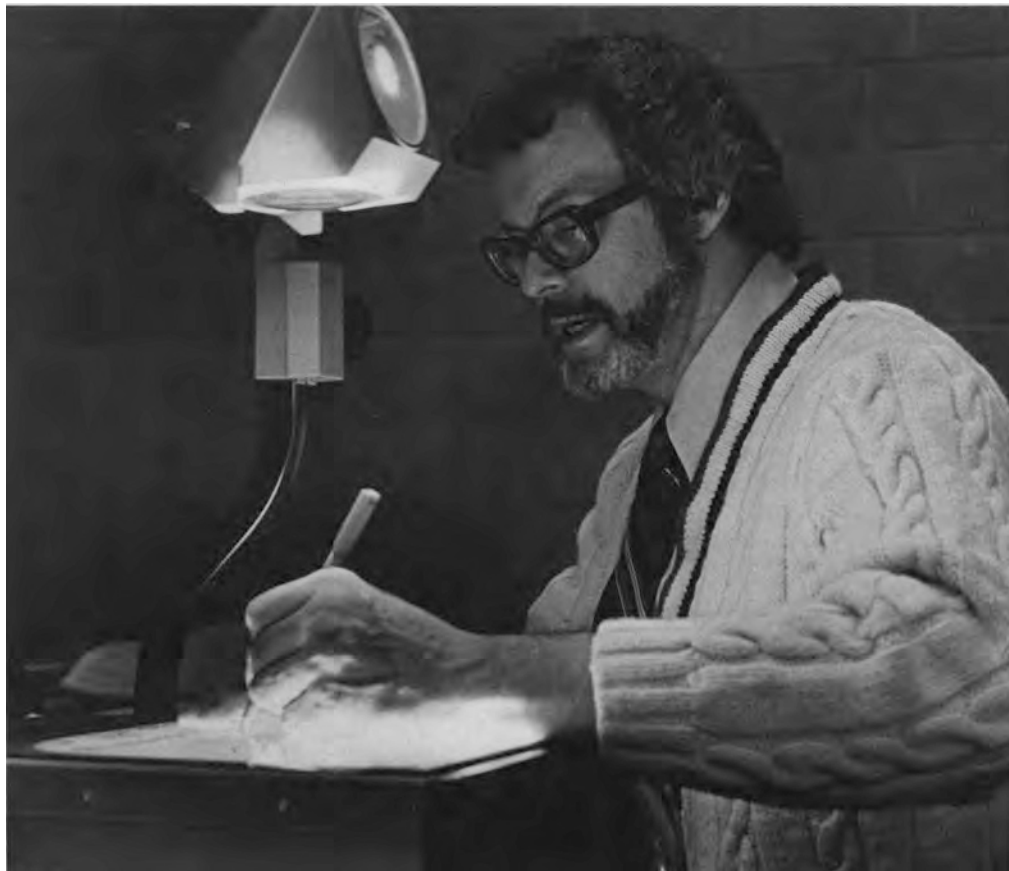
Clint Wallington, Director

Instructional Technology is a general name used to cover the development of instructional programs in a wide variety of settings—business, industry, government, and education. While each area has its own specialized name and application, the general field is based on adult learning and a systematic approach to instruction. Instructional technology covers such areas as needs assessment, instructional goals and objectives, course and lesson development, instructional techniques and materials, formative and summative evaluation, and management of instructional programs.

While the term *instructional program* can include everything from a complete curriculum to a seminar or workshop, the RIT program specializes in the development of courses, especially in technical and management skills. The emphasis is on self-instructional courses that maximize the resources needed to develop them.

The RIT program is concerned with training and development—instructional development as it is practiced in the private sector. The program also includes options in allied health and higher education for those with backgrounds and interests in those areas. While the emphasis is on training and development, for which there is a special option, students are not required to take any particular option and may select electives in any area as long as the general requirements are met.

The program is practically oriented without sacrificing adequate coverage of the new information and theories of instructional technology. Students must complete an actual instructional development project and develop instructional modules as part of the project. The projects are intended to demonstrate competence in the student's selected career area—for example, training or health sciences. The department encourages each student to produce a portfolio of work that represents the skills acquired during his or her study for the MS degree. The portfolio will contain such items as the instructional needs analysis studies, evaluation plans, course development, and training materials.



Training and development option

The training and development option is designed primarily for trainers and developers in business, industry, and government. Organizations today are discovering an increasing need for effective and efficient training. Companies are developing technical skills training and are looking toward other training activities to increase workers' job satisfaction, motivation, and productivity. The training and development professional, a key figure in the development of instruction in these areas, must be proficient in analyzing training needs, designing effective and cost-efficient courses and training packages, setting up evaluation procedures, and maintaining information systems about the organization's training efforts. RIT's training and development option is designed to help students learn not only the instructional design and management skills but also the interpersonal communications skills vital to working on a training team.

As much as possible, experiential learning through work-related

projects and internships is integrated into the program of study.

Higher education option

Community colleges, four-year colleges and universities are beginning to recognize the merits of instructional technology and instructional development, particularly in instances where the institution must increase productivity. Developed in conjunction with RIT's Career and Human Resource Development program, the higher education option emphasizes instructional development in the context of postsecondary education. The option gives instructional developers added preparation in the areas of learning resource centers and the design of instructional facilities. As with the training and development option, students are required to complete a major project, either in their work outside the Institute or with RIT's own instructional development and media services or one of its colleges.

Health science option

Instruction in the field of health science education is undergoing major changes. Health science training institutions are re-examining their goals, their students, and their instructional methods. Many are turning to instructional technology, particularly instructional development, as a way to improve their instruction. The instructional developer plays a key role in the development process. The Instructional Technology Department is concerned with training individuals to successfully apply the principles and processes of instructional technology in health science training—from nursing and medical technology to medicine and dentistry. Because of the nature of health science training, students interested in this option should have earned an academic degree in health science or a directly related field or have significant work experience in the health sciences.

Requirements

Persons interested in admission to the program must have a baccalaureate degree or equivalent from an accredited institution. Because it is not uncommon for a person to make a career change by pursuing the MS degree, the content area of the baccalaureate degree is not specified. A strong interest in instructional technology is assumed, and applicants are encouraged to contact the department for personal guidance.

As can be seen from the course listing, the department does not emphasize media production skills. Students entering the program are assumed to have some skill in or knowledge of media production. Students without these basic skills are encouraged to acquire them through course work or personal projects.

The degree requires the completion of 48 quarter hours at the graduate level. Of the 48 hours, 18 hours (6 core courses) are required of all students. Students taking a specific option—training and development, higher education, health science—must also meet the credit hour requirements of that option. No matter which option (if any) is chosen, students without previous training and development experience or instructional development experience should also take ICIT-755 and ICIT-756, Criterion Referenced Instruction and Technical Training I

and II, early in their programs. ICIT 750 and 751, Instructional Development I and II, must be taken before a student has completed 18 hours of the program. The courses for a typical degree are:
Required Core Courses: 18 hours
CR II and II: 6 hours
Options and Department Electives: 12 hours (minimum)
Free Electives: 12 hours (maximum)
CR I and II may be waived on the basis of previous experience. If so, an additional 6 hours of elective courses are taken.

Students may tailor their electives to their own needs and career choice within the following constraints. Departmental elective courses begin with ICIT and IJCC-702, IJCC-703, and IJCC-704. Of the maximum hours (12 or 18) of free electives allowed, no more than 10 total hours may be taken in RIT departments outside of instructional technology (although IJCC-702, -703, and -704 count as ICIT courses). No more than nine graduate hours may be transferred from another college or university. No more than eight hours may be taken in any combination of special project courses—ICIT-722, -840, or -850. Because of their nature, ICIT-755, -756, and -758 count as free elective courses.

Applicants are evaluated on previous grade point average, the Graduate Record Examination, personal references, and previous work and school experience. Non-matriculated students may, with special permission, take 10 hours, or 3 courses, (whichever comes first) before matriculation. Successful completion of the course does not change any requirements for entry into the program nor does the department necessarily count any such courses toward degree requirements. An individual interview with the department director prior to application is strongly recommended in order to clarify program requirements.

A full-time student entering in the fall or summer quarter should be able to complete the MS degree in one year (usually four quarters, but sometimes three). Part-time students are welcome and will be able to complete their degree during the evenings, when most courses are offered. Students are individually advised and should develop a tentative program prior to or immediately after acceptance into the program.

Application materials may be obtained from the department or from the Office of Admissions. For further information, contact Dr. Clint Wallington, director.

Required Courses	Credit Hours
Introduction to Instructional Technology I—ICIT-700 required	Variable credit, 2
Psychology of Learning and Teaching—ICIT-735	4
Instructional Development I—ICIT-750	4
Instructional Development II—ICIT-751	4
Interpersonal Communications—ICIT-770	2
Selected Topics in Instructional Technology—ICIT-780	2

Training and Development Option

Core Courses (minimum 10 hours of courses below are required)	
Applications of Behavioral Psychology to Training and Adult Learning—ICIT-736	4
Criterion Referenced Instruction and Technical Training I and II—ICIT-755 and -756	each 3
Techniques of Work Analysis—ICIT-757	2-3
Developing Instructional Modules—ICIT-758	3

Higher Education Option

Core Courses (minimum of 8 hours required)	
Sources of information in Instructional Technology—ICIT-705	3-4
Evaluation of Training and Instruction—ICIT-721	4
Management and Budgeting in Instructional Technology—ICIT-762	4
The Two-Year Colleges—IJCG-701	1-3
Education/Business/Industry Interrelationships—IJCG-743	2

Health Science Option

Core Courses (minimum of 8 hours required)	
Evaluation of Training and Instruction—ICIT-721	4
Applications of Behavioral Psychology to Training and Adult Learning—ICIT-736	2 or 3
Criterion Referenced Instruction and Technical Training I and II—ICIT-755 and 756	6

Career and Human Resource Development

All courses are offered on demand with sufficient enrollment.

Note: Graduate courses applicable to the program are also listed under the College of Business.

IJCC-701

The Two-Year Colleges

Registration #0615-701

The study of the philosophies, organizations, developments, finance, goals, curricula, and spirit of the two-year college.

Credit 3

IJCC-702

Teaching, Learning, Content, & Environment

Registration #0615-702

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)

IJCC-703

Management of Learning

Registration #0615-703

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 (1-6 credits)

IJCC-704

Instructional Techniques

Registration #0615-704

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)

IJCC-741

The Nature of Work

Registration #0615-741

Analysis of the changed meaning of work throughout history with emphasis on the 20th century. Different theoretical and practical approaches to job satisfaction and work motivation will be studied as well as recent efforts to redesign work and/or apply alternative time patterns. New work trends and the changed work-leisure relationship also will be explored.

Credit 3

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 impacts 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 4

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-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

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 fields, and food processing and the field 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. Service 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, management, 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.

Credit 3

IJCC-748

Information Retrieval Systems In Career Planning

Registration #0615-748

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. (CTAM-712 or equivalent)

Credit 4

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. (CTAM-712 or equivalent)

Credit 4

IJCC-750

Seminar

Registration #0615-750

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

IJCC-751

Occupational/Industrial Environments

Registration #0615-751

This course offers educators firsthand exposure to industrial/and or occupational work environments, with focus on the various components of the work force such as research, skilled trades, computer-related areas, production supervision, finance and retailing. Students will have presentations from executives, training directors, employment personnel and workers about skills required for entry-level jobs, application and interview procedures, scope of work, economic benefits, salary and wage scales, employment outlook, and worker and employment expectations.

Credit 5

IJCC-752

Career Education in Colleges & Special Settings

Registration #0615-752

The course goals are to develop the abilities and knowledge necessary to function effectively in college career education and information centers and other organizations helping adults develop career plans. Topics include career education components in community/junior and four year colleges and universities; multiple, middle, and late careers; advocacy; spouse and family concerns; and special settings for career assistance.

Credit 3

ICSS-721	Microprocessors and Microcomputers
Registration #0603-721	
<p>A study of microprocessors, microcomputers, and their applications. Topics include microprocessor hardware, microcomputer organization, software, microcomputer programming, interface techniques and development trends. Case studies will be provided. Programming projects will be required (ICSS-720)</p>	
Credit 4	

ICSS-730 Modeling and Simulation I**Registration #0603-730**

Computer simulation techniques are examined. Topics include abstract properties of simulations modeling, analysis of a simulation run, and statistics. One or more general purpose simulation languages will be taught. Programming projects will be required. (ICSS-320 or ICSM-703; Statistics)
Credit 4

ICSS-731 Modeling and Simulation II**Registration #0603-731**

Design and validation of systems models using advanced statistical methods and queuing theory. Programming languages that support simulation and procedural applications (e.g., Simscript, Simula, SLAM). Continuous system simulation and programming packages. Applications to world population models, computer operating systems, etc. Programming projects will be required. (ICSS-530 or ICSS 730)
Credit 4

I CSS-735 On-Line Information Systems Design**Registration #0603-735**

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. (ICSS-320 or ICSM-703 and ICSP-305; background in systems analysis is recommended)
Credit 4

ICSS-736 Data Base System Implementation**Registration #0603-736**

Requirements and characterization of generalized data base systems, the role of the data base administrator, creation of a general data base, elements of data base management systems, data base management in a multi-access environment, survey of data base management systems, selecting a data base management system. Projects in data base systems implementation will be emphasized. (ICSS-836)
Credit 4

ICSS-740 Computer Communication Networks**Registration #0603-740**

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. (ICSS-720 and Statistics)
Credit 4

ICSS-770 Fundamentals of Computer Graphics**Registration #0603-770**

Topics include basic concepts, 2-D transformations, windowing, clipping, interactive and raster graphics, 3-D transformations and perspective, hidden line and hidden surface techniques, graphical software packages and graphics systems. Programming projects will be required. (ICSS-320 or ICSM-703)
Credit 4

ICSS-771 Advanced Topics in Computer Graphics**Registration #0603-771**

Animation techniques and packages. Modeling of solids, including shading, perspective, hidden line and surface removal. Three-dimensional graphics software packages; algorithms and heuristics. Special purpose computer hardware for graphics. Programming projects will be required. (ICSS-570 or ICSS-770)
Credit 4

I CSS-826 Models of Operating Systems**Registration #0603-826**

Deterministic and stochastic models of operating systems. Concurrent process control, processor scheduling models, computer sequencing problems, auxiliary and buffer storage models, storage allocation in paging systems, memory management of multiprogramming computers. (ICSS-706 and I CSS-708)
Credit 4

ICSS-836 Data Base Systems**Registration #0603-836**

Topics include data organization and structure; relational, hierarchical, and network approach; data security and recovery. Comparison of the data base approach with traditional file organization and access methods, performance and management issues. Existing data base systems will be studied. (ICSS-320 or ICSM-703)
Credit 4

ICSS-846 Information Storage and Retrieval**Registration #0603-846**

Topics include an overview of history, development and traditional approaches of information storage and retrieval, automatic text analysis, automatic classification, file structures, search strategies, probabilistic retrieval, system evaluation. (ICSS-320 or ICSM-703)
Credit 4

ICSS-850 Computability**Registration #0603-850**

The theory of computation as it relates to computable functions is examined. Topics include finite state machines, Turing machines, recursive function theory, Post's symbol manipulation systems, the limitations of the concept of effective computability. (ICSS-706)
Credit 4

I CSS-851 Computational Complexity**Registration #0603-851**

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. (ICSS-706)
Credit 4

I CSS-852 Coding Theory**Registration #0603-852**

Study of error correcting codes and their applications. Topics include algebraic structure of group codes, linear switching circuits, cyclic codes and the decoding problem. (ICSS-706)
Credit 4

I CSS-856 Theory of Parsing**Registration #0603-856**

Application of theoretical concepts developed in formal language and automata theory to the design of programming languages and their processors, syntactic and semantic notation for specifying programming languages, theoretical properties of some grammars, general parsing, non-backtrack parsing, and some limited backtrack parsing algorithms. (ICSS-706)
Credit 4

I CSS-860 Compiler Construction**Registration #0603-860**

Language definition, lexical analysis, syntactic analysis, storage allocation and management, code generation, code optimization, diagnostic generation, bootstrapping. (ICSS-706 and ICSS-709)
Credit 4

I CSS-880 Systems Programming**Registration #0603-880**

A study of systems program organization and systems programming techniques. Topics include systems programming languages, assemblers, macro processors, linkage editors and loaders, compilers, text processors. Programming projects will be required. (ICSS-320 or ICSM-703 and ICSP-305)
Credit 4

ICSS-885 Systems Programming Laboratory**Registration #0603-885**

Systems programming techniques applied to the design and implementation of a large systems program or module. Past projects have included floating point simulators, a small data base system, system utilities, and a command language interpreter. Programming projects will be required. (I CSS-880)
Credit 4

I CSS-890 Seminar**Registration #0603-890**

Current advances in computer science.
Credit 2-4

ICSS-895 MS Thesis**Registration #0603-895**

Capstone of the master's degree program. Student must submit an acceptable thesis proposal in order to enroll.
Credit 4-8

ICSS-899 Independent Study**Registration #0603-899**

Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to study computer science topics in greater depth and more detail. (Faculty approval is required prior to registration.)
Credit 2-4

Computer Systems Management

ICSM -700

Review of Programming

Registration #0611-700

This course is intended for the incoming student with programming deficiencies. Topics include assembly language programming; high-level languages in general and one high-level language in particular; design, construction, and testing of programs; programming technique and style. Programming projects will be required. (ICSP-208 or equivalent)

Credit 4

ICSM-703

Algorithms and Data Structures

Registration #0611-703

Topics include data representation, data structures such as: linked lists, trees, stacks, queues, hash tables, sparse matrix techniques. Searching and sorting techniques, file structure and maintenance. Programming projects will be required. (ICSP-210 or ICSM-700)

Credit 4

ICSM-720

Data Processing and Administration

Registration #0611-720

A study of management topics as related to data processing, management planning, computers and profits, security and privacy, data processing planning, and managerial development. Other selected topics will be discussed based upon specific interests of class participants. (Graduate Computer Science Core)

Credit 4

ICSM-725

Systems Development

Registration #0611-725

A study of technically oriented data processing management, operations, cost control, and standards and documentation. Other selected topics will be discussed based upon specific interest of class participants. (ICSM-720)

Credit 4

ICSM-765

Advanced Computer Utilization

Registration #0611-765

A study of advanced computer utilization techniques. Topics include resource allocation of available software in business, mathematical and engineering applications. Information storage and retrieval techniques as well as characteristics of some more frequently used programs are studied. (ICSM-720)

Credit 4

ICSM-790

Seminar

Registration #0611-790

Current advances in computer science.

Credit 2-4

ICSM-799

Independent Study

Registration #0611-799

Faculty directed study of appropriate topics on a tutorial basis. This course will generally be used to enable an individual to study computer science topics in greater depth and more detail. (Faculty approval is required prior to registration.)

Credit 2-4

Information Science

ICSI-722

Library Automation

Registration #0616-722

and Management

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. (Graduate Computer Science Core)

Credit 4 (Offered upon sufficient demand)

ICSI-733

Information Media and Design

Registration #0616-733

A study of current information media and their design. Topics will include microfilm systems, video systems, computer input and output devices, computer interface with media devices, and system design concepts and techniques for applications in libraries and information centers. (Graduate Computer Science Core)

Credit 4 (Offered upon sufficient demand)

Department of Instructional Technology

All courses in the Department of Instructional Technology are taught at least once every three years and/or upon sufficient demand.

ICIT-700

Introduction to Instructional Technology I

Registration #0613-700

An overview of the basic elements of instructional technology including: technology and its application to instruction; instructional development; past, present, and future trends in instructional technology; and, instructional objectives. The course is a mix of self-instructional modules and seminars. Completion of modules and seminars on topics above are required (2 cr.). Additional modules cover specialized areas of instructional technology such as health sciences and community college applications, television and instruction, training and development. Course credit varies with the number of modules completed. Course required for graduation.

Credit variable (2-4)

ICIT-701

Introduction to Instructional Technology II

Registration #0613-701

A continuation of ICIT-700 offering the student an opportunity to complete additional modules as described in ICIT-700 course description. (ICIT-700)

Credit variable (1-3)

ICIT-705

Sources of Information in Instructional Technology

Registration #0613-705

Students develop general search techniques and strategies for finding information, evaluating it, and establishing a reference file. Sources of print material include journals and periodicals related to instructional technology, books, research reports and conference proceedings, catalogues and commercial information, and automated information systems. Interpreting recent copyright changes is also covered. Actual search problems are given and an information search project is required. To receive 4 credits, the student applies the general search techniques to sources of visual materials and completes a search for primary and secondary sources of prepared visual material relating to training and instruction.

Credit variable (3-4)

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. (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, e.g., 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 Technology

Registration #0613-720

Examines the fundamentals of educational research: hypothesis stating, designs, 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-721 **Evaluation of Training and Instruction**
Registration #0613-721

A course to train students in the development and application of testing methods used in measuring performance, principally cognitive and psychomotor skills, as well as methods to determine overall course effectiveness. Covers methods for both formative and summative evaluation, test construction, and means of validating instructional materials and instructional systems.

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 (guidelines available from the department). (ICIT-750, 751, and 720 or 721)

Credit variable (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. Course required for graduation.

Credit 4

ICIT-736 **Applications of Behavioral Psychology to**
Registration #0613-736 **Training and Adult Learning**

The course distinguishes between counseling, coaching, and training, stressing task-related interpersonal and cognitive skills such as working with a subject matter expert or job counseling. Includes methods of interaction to maintain communications and to shape behavior.

Credit 3

ICIT-745 **Instructional Facility Design**
Registration #0613-745

Designed to enable the instructional developer 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 before or simultaneously with ICIT-750; must be taken before 18 hours of program are completed.)

Credit 4

ICIT-751 **Instructional Development II**
Registration #0613-751

A continuation of Instructional Development (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. 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 disseminating and promoting the adoption of innovative methods and materials. Students research special problems related to selected areas of instructional development. (Prerequisite: ICIT-750 & 751)

Credit 4

ICIT-755
Registration #0613-755

Credit 3

Criterion Referenced Instruction and
Technical Training I

ICIT-756
Registration #0613-756

Credit 3

Criterion Referenced Instruction and
Technical Training II

A two-course sequence which applies the principles of instructional development specifically to those areas of training in which performance criteria can be precisely stated and accurately measured. Such training usually tends to be in technical skill areas where procedures or product are predetermined or can be clearly specified. The course is largely self-paced and self-instructional and the student must complete a project in the technical training area.

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. Students must complete two additional job analyses to receive 3 credits.

Credit variable (2-3)

ICIT-758 **Developing Instructional Modules**
Registration #0613-758

The course is designed to follow either ICIT-756 and/or ICIT-751 to give the student extended practice in the development, evaluation, and revision of self-instructional materials. The course, largely self-instructional and project oriented, emphasizes structuring the module, actual module writing, and tryout and revision procedures. Students must have already selected a content area and developed objectives, a course plan, and criterion tests. (ICIT-750 & 751 or ICIT-755 & 756)

Credit 3

ICIT-762 **Management & Budgeting in**
Registration #0613-762 **Instructional Technology**

Applies basic theories of management to areas of instructional technology and to management of personnel of those areas. Examines the organizational structure of instructional development units. Covers budgeting and actual financing for services and projects.

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 style. (ICIT-735)

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-772 **Group Development and**
Registration #0613-772 **Organizational Change**

Similar in format to ICIT-770, the course extends the concept and practice of interpersonal communications to the area of work- and task-oriented team-building and organizational change. The course stresses actual personal interaction in a training laboratory environment while including some of the theoretical aspects of causing work-oriented, personal and organizational change. Offered on demand. (ICIT-750, 751, 757, 770)

Credit 3

ICIT-780**Selected Topics in Instructional Technology****Registration #0613-780**

This seminar provides a forum for a small group of students to examine various areas of interest to them. Students select topics, examine them thoroughly, and present the findings for group consideration. Required for graduation. (30 hours course work)

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. (ICIT-750, 751 and 20 hours of course work)

Credit variable (1-3)

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. (ICIT-750, 751 and 20 hours of course work)

Credit variable (1-3)



Graduate Faculty College of Applied Science and Technology

Dennis C. Nystrom, Ed.D., Texas A&M University—Dean; Professor

Donald D. Baker, Ed.D., University of Rochester—Associate Dean, Associate Professor

Donna McDonough, MS, Rochester Institute of Technology—Assistant to the Dean

Wiley R. McKinzie, MS, SUNY at Buffalo—Director, School of CS & T, Associate Professor

Clinton James Wallington, Ph.D., Southern California—Director, Department of Instructional Technology and Career and Human Resource Development, Professor

School of Computer Science and Technology

Wiley R. McKinzie, MS, SUNY at Buffalo—Director, School of Computer Science and Technology, Professor

Peter G. Anderson, Ph.D., Massachusetts Institute of Technology—Chairperson, Graduate Studies; Professor

Rodger Baker, MS, University of Rochester—Associate Professor

Mehmet Baray, Ph.D., University of California, Berkeley—Associate Professor

John A. Biles, MS, University of Kansas—Instructor

James R. Carbin, MS, Rensselaer Polytechnic Institute—Associate Professor

William Carithers, MS, University of Kansas—Instructor

James A. Chmura, MS, Rutgers University—Assistant Professor

Evelyn Culbertson, MS, Syracuse University—Associate Professor

Roy Czernikowski, Ph.D., Rensselaer Polytechnic Institute—Associate Professor

John L. Ellis, Ph.D., University of Toledo—Assistant Professor

Henry Etlinger, MS, Syracuse University—Assistant Professor

Jack Hollingsworth, Ph.D., University of Wisconsin—Professor

Guy Johnson, MS, Syracuse University—Associate Professor

Michael J. Lutz, MS, SUNY at Buffalo—Assistant Professor

Peter Lutz, Ph.D., SUNY at Buffalo—Assistant Professor

Rayno Niemi, Ph.D., Rensselaer Polytechnic Institute—Associate Professor

Kenneth Reek, MS, Rochester Institute of Technology—Assistant Professor

Margaret Reek, MS, Rochester Institute of Technology—Instructor

William Stratton, MS, SUNY at Buffalo—Assistant Professor

Adjunct Faculty - School of Computer Science and Technology

Vishwas Abhyankar, Ph.D., University of Rochester

Michael J. Ciaraldi, MS, Rochester Institute of Technology

Teiji Furugori, Ph.D., SUNY at Buffalo

James Hammerton, MBA, New York University

Kenneth Kelsen, BS, Syracuse University

Walter Maurer, MS, Rochester Institute of Technology

Patrick Moyer, MS, Pennsylvania State University

Michael Mino, MBA, Rochester Institute of Technology

Werner Schenk, MBA, University of Rochester

T. C. Soong, Ph.D., Stanford University

William Thiel, MS, Rochester Institute of Technology

Department of Instructional Technology

Clinton J. Wallington, Ph.D., University of Southern California—Director, Professor

Lawrence W. Belle, Ph.D., University of Rochester—Associate Professor

Russell Kraus, Ed.D., University of Massachusetts—Associate Professor

Thomas H. Zigon, MS, Rochester Institute of Technology—Lecturer

Career and Human Resource Development

Adjunct Faculty

James Austin, MS, Rochester Institute of Technology

Donald D. Baker, Ed.D., University of Rochester

Lawrence W. Belle, Ph.D., University of Rochester

Paul Bernstein, Ph.D., University of Pennsylvania

Terry L. Dennis, Ph.D., MSIA, Purdue University

Joan Green, M.Ed., Trenton State; MS, Rochester Institute of Technology

Ronald J. Hilton, Ph.D., Syracuse University

Paul Kazmierski, Ph.D., Syracuse University

Nancy Neville, MA, Fordham University

Richard L. Rinehart, Ed.D., Michigan State

Stuart Steiner, MSW, University of Pennsylvania

College of Business



Dr. Walter F. McCanna, Dean
Dr. Thomas E. Comte, Assistant
 Dean, Graduate Programs
Dr. Janet C. Barnard, Associate
 Director, Graduate Programs

RIT's graduate programs in management include the master of business administration, the master of science in accountancy, and the master of science in human services management. 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 relevant to profit and non-profit organizations,

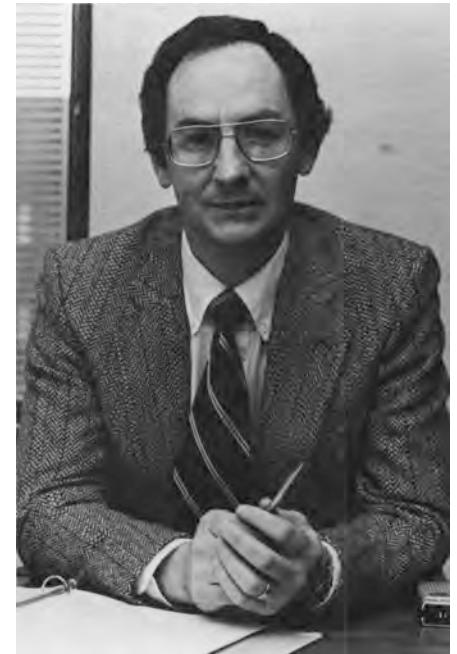
Tomorrow's manager must be able to handle highly complex problems set in an ever-changing environment. Recognizing this need, RIT's programs offer a broad management education that requires the individual to master a diverse combination of knowledge, skills and techniques. Underlying this educational mix is the belief that effective management requires effective integration of specialized knowledge, analytical problem solving and sensitivity to the behavioral realities of organizations.

The overall goal of RIT's graduate management programs is to provide an educational foundation for future professional growth, provide an applied program in state-of-the-art

management techniques and develop in the student systematic and practical problem solving skills.

"Every scenario for the next 20 years describes an environment in which managers must be adaptive, creative and growing. We have set for ourselves the goals of preparing students for that changing environment and providing them with the knowledge and tools such that they can apply what they've learned directly to their work," says Dr. Thomas E. Comte, assistant dean of graduate programs in the College of Business at RIT.

The faculty in the College of Business bring to the classroom a blend of quality academic preparation and strong business background. Most of the professors have previous and continuing business experience, are active consultants, maintain memberships on numerous boards of



directors and are engaged in research. "The breadth and depth of our faculty," says Dr. Comte, "provide the applied orientation and theoretical foundations that serve our students so well."

Since RIT graduated its first class of graduate business students in 1970, classes have grown consistently. During the past academic year, more than 700 students were enrolled. "And," Comte says, "full-time enrollment in the program is steadily increasing.

"The majority of our students are people who've done undergraduate work in other areas—like social work, graphic arts, liberal arts, or engineering—and see the need to enroll in a graduate program in

management. Our programs are seen as a vehicle for professional growth and advancement."

Comte is a graduate of the University of California at Davis (BS, chemistry), Columbia University (MBA, production systems) and the University of Missouri (Ph.D., management). He has been at RIT since 1978. He has experience in the pharmaceutical industry and began his academic career in 1972.

Facilities

The College of Business is housed in the Max Lowenthal Memorial Building on RIT's Rochester campus. Facilities include a Learning Support Center, time-sharing computer terminals on-line with RIT's new computer system and extensive software support, and an up-to-date business collection of texts, periodicals and reference services in the Wallace Memorial Library.

Master of Business Administration

The master of business administration program is designed to provide the student with a basic core of the disciplines of management in behavioral science, economics, statistics and quantitative analysis and of the functional areas of responsibility in accounting, finance, marketing and operations. These are followed by advanced courses, which require integration of the core courses and allow for continued intellectual growth in a specialty area.

The faculty successfully utilizes a combination of lectures, conferences, case method, and simulations in its approaches to presentation of information and the analysis of managerial problems.

Curriculum

The master of business administration requires 72 quarter credit hours and is designed so that a student will progress through the program in a logical sequence and will be allowed some program flexibility. Initially, students must demonstrate their ability in foundation courses, either by taking graduate coursework or by waiving up to 24 quarter credit hours of foundation courses, based on having taken appropriate undergraduate courses or having successfully challenged them by examination.

In the second phase the professional level is reached and students are exposed to the various functional areas of business through a series of six required courses (24 quarter credit hours). Coincident with or following the core courses, students may pursue one of six options in which six courses (24 quarter credit hours) concentrating in accounting, decision science, finance, management, marketing or general business are chosen. Except for the registered accounting program, 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 assistant dean for Graduate Business Programs.



Graduate programs in Accountancy

Increasing demands on the professional accountant have produced a need for broad 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.

Graduates of these programs 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. The specific requirements are described in detail in a later section.

Proper selection of electives within an accounting program will prepare a student for a number of possible accounting careers other than public accounting. The curriculum allows a student to prepare for the Certificate in Management Accounting examination as administered by the Institute of Management Accounting of the National Association of Accountants. Students desiring to pursue an accounting major should consult the Graduate Office to ensure that 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 without an extensive background in accounting or business at the undergraduate level. The program 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 in accountancy is an intensive 48 quarter credit hour program and is specifically designed for students who desire to continue their accounting studies at an advanced level. Those students lacking the prerequisite undergraduate hours in accounting may be able to pursue the MS degree by making up those courses, at the graduate level, in which they are deficient. This program 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.

Master of Science in Human Services Management

The master of science in human services management program is designed to prepare students for managerial responsibilities in a human service setting. The curriculum is designed for persons whose professional focus is in the public or private not-for-profit organization. The program utilizes the diverse capabilities of the College of Business, and the School of Human Services.

The curriculum is organized in four basic phases from which 72 quarter credit hours (18 courses) are required. In the first two phases, foundation and core, 11 courses provide the basic knowledge and techniques necessary to effective management. The third phase, the interdisciplinary core, requires four courses that cover the Interventive, interpersonal and communication skills essential for effective interaction with the community, other organizations, and colleagues. The fourth phase provides three electives, which may be taken in management, social work, criminal justice or related areas.

The MS in human services management is available to persons holding a variety of undergraduate degrees.

General Information and Procedures

Admission

Any individual who wishes to study in the graduate business programs must first be admitted. 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 their potential to successfully complete graduate business studies through their achievements in their undergraduate program, through the results of the Graduate Management Admission Test, or, in the case of the MS in human services management, either the Graduate Management Admission Test or Graduate Record Exam, and applicable professional experience.

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.

You do not have to have had any undergraduate work in business to be admitted to, or successful in, the program. College of Business graduate programs are appropriate to persons holding a wide variety of undergraduate degrees.

Students who have been accepted in a program and who do not enroll in the quarter for which they have been accepted will be allowed to defer enrollment (admission) for two quarters (the quarter of the initial acceptance and the following quarter). If a student wishes to defer enrollment beyond two quarters, his credentials will be re-evaluated on the basis of current admission standards.

Mathematics competency

All students entering the program are required to take a mathematics diagnostic test prior to registration to demonstrate that they have the math competencies needed for successful completion of graduate studies. Students whose math competencies are inadequate must successfully complete the (non-credit) math course designed for the programs during their first quarter of study.



Applicants from foreign countries where a degree or diploma is granted by an institution not holding accreditation may be admitted provided that their study and performance approximates the standards of an accredited bachelor's degree and an ability to meet graduate standards is indicated. The TOEFL score must be submitted by applicants with limited or no experience in an academic program in the United States.

Procedures

To be considered for admission it is necessary to file an application and submit transcripts of all previous undergraduate and graduate work, and results of the Graduate Management Admission Test or, for the MS in human services

management, the Graduate Record Examination or the Graduate Management Admissions Test. Information may be obtained from the College of Business or by writing the Graduate Management Admission Test, Educational Testing Service, Box 966, Princeton, N.J., 08540, or Graduate Record Examination, Educational Testing Service, Box 955, Princeton, N.J., 08541. 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 Assistant Dean, 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. For the part-time MS in human services management student, scholarship aid is available in the form of a tuition remission.

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

Students seeking employment after graduation should register with RIT's Central Placement Services 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.

Credit hour requirement

Credit hour requirements vary depending on the particular program and a student's prior academic achievements. Normally, 72 quarter credit hours are required in the master of business administration program and the master of science in human services management. The master of science in accountancy program requires a minimum 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 or MS in human services management program, carrying a grade of "B" or better, may waive some or all of the foundation courses and thus reduce the total required hours accordingly. Certain courses may be exempted in the MS in accountancy program; however, they must be replaced by approved electives to maintain the 48 quarter credit total.

Transfer credit

A maximum of 12 quarter credit hours may be awarded as transfer credit from other graduate programs provided the courses in question carry a grade of "B" or better. Any questions concerning waiver or transfer credit should be referred to the assistant dean, Graduate Business Programs.

Academic Standards

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.

Full-time program

Those students desiring to minimize their time in school will find that four or five quarters of intensive study will allow them to complete degree requirements, if previous undergraduate or graduate work permits maximum course waivers and a 12 credit hours per quarter course load is carried.

Actual credit hour requirements will vary depending on the student's background and the major concentration.

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 local and national business and non-profit organizations.

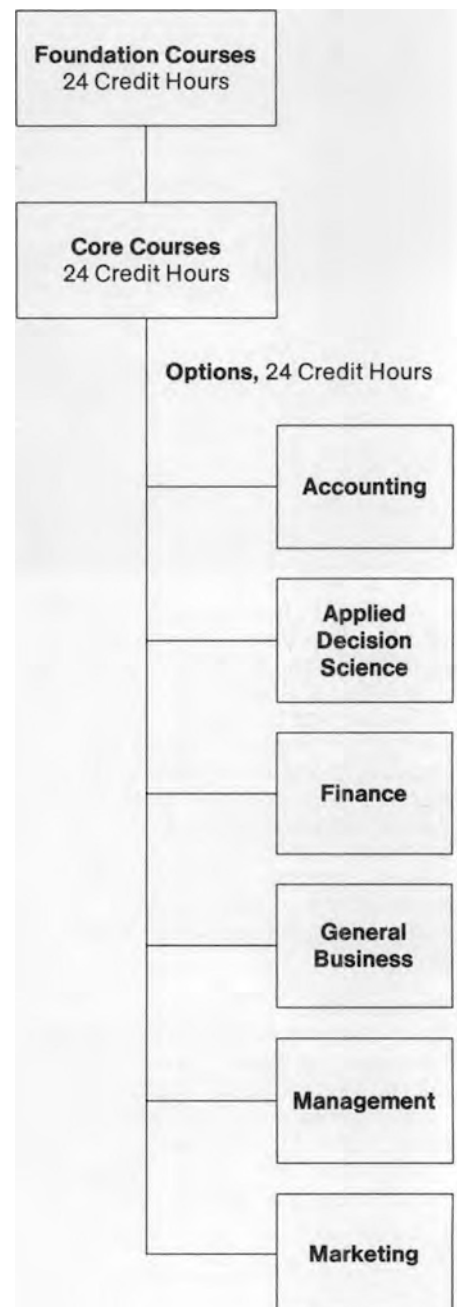
Full-time students will find that, while certain courses may be scheduled during the day, they will take most courses during the evening hours and that each evening course meets once a week.

Part-time program

In addition to full-time study, all graduate programs are available on a part-time basis. 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 feasible course load for the part-time student is one to two courses per quarter, permitting program completion in approximately two to three years if no courses are waived. Credit hour requirements and curriculum will be found in the following material. The student is expected to complete the program within seven years of initial registration.

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 or that courses will be offered in a particular quarter or sequence.



Master of Business Administration curriculum

Foundation Course: Phase I

Course Number and Title	Credit Hours
BBUA-701 Financial Accounting	4
BBUA-702 Cost & Managerial Accounting	4
BBUB-740 Organizational Behavior	4
BBUQ-781 Statistical Analysis I	4
BBUQ-780 Quantitative Analysis	4
BBUF-745 Economic Environment of American Business	4
	<u>24</u>

Core Courses: Phase II

Course Number and Title	Credit Hours
BBUQ-782 Statistical Analysis II	4
BBUF-721 Financial Management I	4
BBUB-741 Organization & Management	4
BBUB-743 Operations Management	4
BBUM-761 Marketing Concepts	4
BBUB-759 Integrated Business Analysis	4
	<u>24</u>

Option Courses: Phase III

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 assistant dean of Graduate Business Programs. In addition to elective courses, students may earn up to eight hours of research option credit in fulfilling elective requirements.	
	<u>24</u>
Total hours	72

Note that the required foundation courses must be completed before a student attempts core or option courses. However, as a student approaches completion of the foundation courses, the last foundation courses may be combined with appropriate core courses to maintain a full schedule. Students must adhere to the pre-requisite sequencing that appears in the course descriptions.

Accounting Option

Course Number and Title	Credit Hours
*BBUA-704 Accounting Theory I	4
*BBUA-705 Accounting Theory II	4
BBUA-707 Advanced Accounting	4
BBUA-708 Auditing	4
*BBUA-709 Basic Taxation Accounting	4
BBUB-751 Legal Environment of Business	4
BBUF-722 Financial Management II	4
	<u>28</u>
*Can be exempted with equivalent undergraduate courses and approval of the assistant dean. If exempted these courses must be replaced by 800 level accounting course(s).	

Note: In addition to the above option courses, CPA candidates must also take the following courses to comply with the program registered by the New York State Education Department:

BBUA-810 Advanced Taxation Accounting	
BBUA-811 Auditing Theory	
BBUA-813 Financial Accounting Theory	

If BBUF-745 is exempted it must be replaced with another graduate economics course.

Decision Science Option

Course Number and Title	Credit Hours
BBUB-770 Business Research Methods	4
BBUQ-785 Applied Regression Analysis	4
Three courses from Group A or other quantitative related electives approved by graduate program assistant dean	
One graduate elective from College of Business or approved by graduate program assistant dean	12
	<u>4</u>
	24

Group A

BBUQ-784 Decision Analysis
BBUQ-786 Mathematical Programming
BBUQ-788 Survey Design and Sampling
BBUQ-789 Simulation
BBUQ-793 Business Forecasting
BBUQ-794 Multivariate Methods in Business
BBUQ-795 Seminar in Decision Sciences

Finance Option

Course Number and Title	Credit Hours
BBUF-722 Financial Management II	4
BBUF-723 Theory of Finance and Research	4
BBUF-767 Advanced Microeconomic Theory	4
BBUF-768 Advanced Macroeconomic Theory	4
Two electives from Group A	<u>8</u>
	24

Group A

BBUF-724 Problems in Financial Management
BBUF-725 Securities and Investment Analysis
BBUF-729 Seminar in Finance

General Business Option

Course Number and Title	Credit Hours
BBUB-770 Business Research Methods	4
Five graduate electives from the College of Business or approved by graduate programs assistant dean	
	<u>20</u>
	24

Management Option

Course Number and Title	Credit Hours
BBUB-750 Personnel Systems	4
BBUB-770 Business Research Methods	4
Three courses in Group A	12
One graduate elective from the College of Business or approved by graduate programs assistant dean	<u>4</u>
	24

Group A

BBUB-742 Business and Society
 BBUB-746 Management
 Development
 BBUB-748 Labor/Management
 Problems
 BBUB-751 Legal Environment
 of Business
 BBUB-758 Seminar in Management
 BBUB-765 Managerial Economics

Marketing Option

Course Number and Title	Credit Hours
BBUM-762 Advanced Marketing Management	4
BBUB-770 Business Research Methods	4
BBUM-763 Consumer Behavior or	4
BBUM-765 Sales Management	4
Two courses from Group A	8
One graduate elective from the College of Business or approved by graduate program assistant dean	4
	<u>24</u>

Group A

BBUF-767 Advanced
 Microeconomic Theory
 BBUM-763 Consumer Behavior
 Seminar
 BBUM-764 Marketing Logistics
 BBUM-765 Sales Management
 BBUM-766 International Marketing
 BBUM-767 Marketing
 Communications
 BBUM-769 Seminar in Marketing
 BBUQ-785 Applied Regression
 Analysis
 BBUQ-788 Survey Design and
 Sampling
 BBUQ-793 Business Forecasting
 Methods

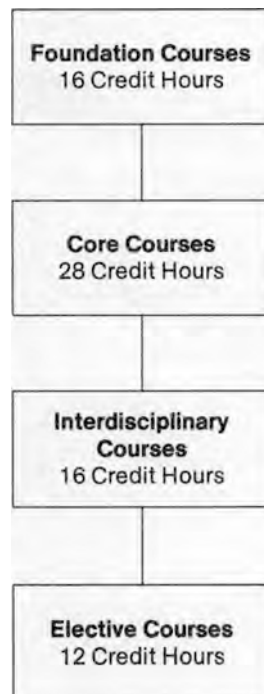
Master of Science in Accountancy Curriculum**Prerequisites: (undergraduate hours or equivalent)**

Accounting (21 Sem. Hrs.)
 Business Law (6 Sem. Hrs.)
 Finance (6 Sem. Hrs.)
 Statistics (6 Sem. Hrs.)
 Economics (9 Sem. Hrs.)

Advanced Courses

Course Number and Title	Credit Hours
BBUQ-782 Statistical Analysis II	4
BBUB-740 Organizational Behavior	4
BBUB-741 Organization and Management	4
BBUF-721 Financial Management I	4
BBUF-722 Financial Management II	4
BBUF-765 Managerial Economics (or BBUF-767 Advanced Microeconomic Theory)	4
BBUA-810 Advanced Taxation Accounting	4
BBUA-811 Auditing Theory	4
BBUA-813 Financial Accounting Theory	4
Approved Electives	<u>12</u>
	48

BBUB-740, Organizational Behavior, may be exempted with appropriate undergraduate background. However, if exempted, it must be replaced with an approved course to maintain the 48 quarter credit hours minimum. Deficiencies of more than two courses will extend the degree requirements beyond the 48 quarter credit hour minimum.

Master of Science Human Services Management

Foundation courses should be completed before attempting core or interdisciplinary courses. Students must adhere to prerequisite sequencing.

Foundation Courses: Phase I

Course Number and Title	Credit Hours
BBUA-701 Financial Accounting 4	
BBUB-740 Organizational Behavior	4
BBUQ-781 Statistical Analysis I	4
BBUH-701 Economic Environment of Human Services	4
	<u>16</u>

Core Courses: Phase II

Course Number and Title	Credit Hours
BBUF-721 Financial Management I	4
BBUB-741 Organization and Management	4
BBUQ-782 Statistical Analysis II	4
BBUH-711 Law and the Administrative Process	4
BBUH-712 Bureaucracy in Modern Society	4
BBUB-770 Business Research Methods and one of the following 3 courses	4
BBUH-721 Organization Management in Criminal Justice	4
BBUH-722 Administration in the Social Work Setting	
BBUB-750 Personnel Systems	4
	<u>28</u>

Interdisciplinary Courses: Phase III (Choose 4 of 5)

Course Number and Title	Credit Hours
BBUH-731 Intervention in the Community	4
BBUH-732 Cooperation and Conflict	4
BBUH-733 Interpersonal Skills 4	
BBUH-734 Deviance, Conformity and Criminal Behavior	4
BBUH-735 Special Populations	4
	<u>16</u>

Electives: Phase IV

Students may select electives from courses in management, social work or criminal justice or other RIT graduate offerings. Electives, offered on demand, will include such topics as grant writing, evaluation, current issues in the legal system, etc.

12

Total hours 72

Business Administration Courses

Accounting Group

BBUA-701

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 (offered each year)

Financial Accounting

BBUA-702

Registration #0101-702

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. (BBUA-701)

Credit 4 (offered each year)

Cost and Managerial Accounting

BBUA-704

Registration #0101-704

A comprehensive exposure at an intermediate level to accounting theory and practice. Emphasis is placed on applying underlying accounting theory to complex accounting problems. The effects of alternative methods are considered throughout the course. (BBUA-701)

Credit 4 (offered each year)

Accounting Theory I

BBUA-705

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 (offered each year)

Accounting Theory II

BBUA-707

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)

Credit 4 (offered each year)

Advanced Accounting and Theory

BBUA-708

Registration #0101-708

The theory and practice of auditing 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 auditing techniques by statistical sampling and electronic data processing applications (BBUA-705)

Credit 4 (offered each year)

Auditing

BBUA-709

Registration #0101-709

Study of federal income taxation of individuals. 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. (BBUA-701)

Credit 4 (offered each year)

Basic Taxation Accounting

BBUA-712

Registration #0101-712

Course content will differ by instructor and quarter. Topics covered: taxation, international accounting and accounting for non-profit organizations. (Permission of instructor)

Credit 4 (offered upon sufficient demand)

Seminar in Accounting

BBUA-810

Registration #0101-810

A study of federal income taxation as it relates to corporate tax planning; reorganization, merger, and liquidation; partnership, estates, trusts, and gifts. Problems of the special corporation—Subchapter S, Personal Holding company—are examined. Tax planning for the individual, tax shelters, estate and gift taxes are studied and discussed. Emphasis will be on the need for tax planning in the complex business or personal situation. (BBUA-709 or admission to MS in accountancy)

Credit 4 (offered each year)

Advanced Taxation Accounting

BBUA-811

Registration #0101-811

Advanced course in auditing where classical auditing cases, uses of computer and statistical accounting techniques, current official auditing pronouncements and changes in legal and ethical considerations are fully explored. (BBUA-708 or admission to the MS in accountancy.)

Credit 4 (offered each year)

Auditing Theory

BBUA-812

Registration #0101-812

A variety of advanced accounting topics covered, depending on the instructor. Topics included would be; CPA problems, SEC accounting, small business accounting, internal auditing. (BBUA-705 or admission to the MS in accountancy)

Credit 4 (offered each year)

Accountancy Seminar

BBUA-813

Registration #0101-813

An advanced course in financial accounting theory that examines the basic assumptions, principles and postulates upon which current practice rests; and alternative theories of valuation and measurement. Critical analysis of the historical cost model and the several major current value models is the main emphasis throughout discussions of financial statements and their individual components. (BBUA-707 or admission to the MS in accountancy)

Credit 4 (offered each year)

Financial Accounting Theory

Business Group

BBUB-740

Registration #0102-740

Organization analysis through the study of individual and group behaviors within organizations. The implications of studies from psychology and social psychology are stressed. Topics include motivation, leadership, group dynamics, conflict, communication, stress, and individual and group development.

Credit 4 (offered each year)

Organizational Behavior

BBUB-741

Registration #0102-741

Develops the analyses of organizations by studying the systems and subsystems that make up the organization. These systems include the technological, structural and managerial subsystems as well as the environmental suprasystem. Included are topics such as organization effectiveness and organization development. (BBUB-740)

Credit 4 (offered each year)

Organization and Management

BBUB-742

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 (offered upon sufficient demand)

Business and Society

BBUB-743

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. (BBUB-740, -782)

Credit 4 (offered each year)

Operations Management

BBUB-746 Management Development
Registration #0102-746
 Concepts of career development; overview of present individual and group procedures; implications of current technological development for training, replacement, and advancement. (BBUB-741)
 Credit 4 (offered each year)

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 (offered upon sufficient demand)

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 laws as they influence wage levels and wage structure. (BBUB-740, BBUB-745)
 Credit 4 (offered each year)

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 (BBUB-740, BBUB-782)
 Credit 4 (offered each year)

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 (offered each year)

BBUB-752 Comparative Organizations
Registration #0102-752
 A course providing a critical evaluation of a wide range of current management theory and research concerned with organizations of all types; public and private, profit and non-profit. Appropriateness of the body of knowledge for managing different types of organizations is a primary concern. Focus on comparative analysis of a variety of organizations to understand differences and similarities and to determine whether research and theory can be generalized across organizations. Particular emphasis is placed on non-profit organizations. (BBUB-741)
 Credit 4 (offered upon sufficient demand)

BBUB-753 Small Business Administration
Registration #0102-753
 A course providing students with the opportunity to act in a consulting capacity with a given business firm. Under an arrangement with the Small Business Administration and working with faculty, teams of students provide management consulting to small businesses. (BBUA-702, BBUB-721, BBUM-761).
 Credit 4 (offered each year)

BBUB-758 Seminar in Management
Registration #0102-758
 This course will take on different content depending on the instructor and quarter when offered. Topics that may be covered include management thought, systems theory and application, and behavioral aspects of management. Specific content for a particular quarter will be announced prior to the course offering. (Permission of instructor)
 Credit 4 (offered each year)

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 formulation and implementation of business policy as viewed by top management. The case method is used extensively. (All other core courses plus two electives preferred)
 Credit 4 (offered each year)

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. Introduces the use of multivariate techniques as a means for data reduction and the analysis of complex data bases. (Foundation courses, BBUB-782; BBUM-761 preferred)
 Credit 4 (offered each year)

BBUB-771,772 Research Option
Registration #0102-771, 772
 A practicum or thesis alternative permitting the student to confront a real management problem. Requirements include steps from design to completed management report. (Core courses and one of the following: BBUB-770, BBUB-723, BBUB-784)
 Credit 4 or 8 (option to be developed with selected faculty)

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 of information, and the economics of information. (BBUB-743)
 Credit 4 (offered upon sufficient demand)

BBUB-799 Independent Study
Registration #0102-799
 A supervised investigation and report within a business area of professional interest. The exact content should be contained in a proposal for review, acceptance, and assignment to an appropriate faculty member, who will provide supervision and evaluation. Appropriateness to written career objectives and availability of faculty will be included in the review and considerations for acceptance. (Foundation and appropriate Core Courses plus permission of dean)
 Credit 1-4 (variable) (offered subject to review)

Finance and Economics Group

BBUB-721 Financial Management I
Registration #0104-721
 Critical examination of the financial elements and systems of the firm. The emphasis is on asset management to include valuation theory and analysis, cost of capital, current asset management, and capital budgeting. Portfolio approaches to security and project selection and management. (BBUA-701, BBUB-781 & 782, BBUB-745)
 Credit 4 (offered each year)

BBUB-722 Financial Management II
Registration #0104-722
 Liability and equity management receive primary emphasis; to include short and intermediate term financing, long term financing leases, capital structure, dividend policy, and bankruptcy and reorganization. Theory and application approaches are shared. (BBUB-721)
 Credit 4 (offered each year)

BBUF-723**Theory of Finance and Research****Registration #0104-723**

This course involves a study of the current literature and most recent development 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, BBUF-767)

Credit 4 (offered each year)

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-723)

Credit 4 (offered each year)

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 (offered each year)

BBUF-729**Seminar in Finance****Registration #0104-729**

This course will take on different content depending on the instructor and quarter when offered. Topics that 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 instructor)

Credit 4 (offered upon sufficient demand))

BBUF-745**Economic Environment of American Business****Registration #0104-745**

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. (BBUQ-780)

Credit 4 (offered each year)

BBUF-757**Seminar in Economics****Registration #0104-757**

Content will differ depending on the quarter and instructor. Topics that may be covered include international finance, monetary theory, labor economics and market structure. (Permission of instructor)

Credit 4 (offered each year)

BBUF-765**Managerial Economics****Registration #0104-765**

Analysis of the economic conditions facing the firm. Topics include: demand and cost analyses, resource utilization, pricing, market structure, and other selected topics. (BBUF-745, BBUA-702, BBUB-743 recommended)

Credit 4 (offered each year)

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 (offered each year)

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 in 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 growth; reality and macroeconomic disequilibrium; and wage-price policies. (Foundation courses)

Credit 4 (offered each year)

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 (offered each year)

BBUB-762**Advanced Marketing Management****Registration #0105-762**

Advanced study of selected problems that 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 (offered each year)

BBUB-763**Consumer Behavior****Registration #0105-763**

A study of the market in terms of the psychological and socio-economic determinations of buying behaviors, including current trends in purchasing power and population movements. (BBUM-761)

Credit 4 (offered each year)

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 (offered upon sufficient demand)

BBUM-765**Sales Management****Registration #0105-765**

An examination of selling and sales management as they pervade both the marketing process and the management communications process. Topics covered relate to building and managing an effective sales force and to selling philosophy and techniques creating managerial "win-win" situations with both superiors and subordinates. (BBUM-761)

Credit 4 (offered each year)

BBUM-766**International Management****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 (offered upon sufficient demand)

BBUM-767**Marketing Communications****Registration #0105-767**

A study of inter-relationships of three communications mix functions: public relations, advertising, and sales promotion. Topics covered will center on the use of these functions in the development of models for persuasive communications and their inter-relationships with other elements of the marketing mix. (BBUM-761)

Credit 4 (offered each year)

BBUM-769**Seminar in Marketing****Registration #0105-769**

This course will take on different content depending on the instructor and quarter when offered. Topics that 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 instructor)

Credit 4 (offered each year)

Quantitative Group**BBUQ-780****Quantitative Analysis****Registration #0106-780**

An introduction to quantitative approaches to decision making. Topics covered include linear programming, decision theory, computer simulation, and calculus-based solution procedures. The emphasis is not on the techniques per se, but rather on showing how quantitative approaches can be used to contribute to a better decision making process. (BBUQ-781 or concurrent registration)

Credit 4 (offered each year)

BBUQ-781**Statistical Analysis I****Registration #0106-781**

A study of probability and statistics including discrete and continuous probability distributions, sampling distributions, point estimation, and interval estimation. Applications are made to the managerial decision making situation. The use of SPSS in analyzing data will be introduced. (Knowledge of undergraduate algebra is presumed)

Credit 4 (offered each year)

BBUQ-782**Statistical Analysis II****Registration #0106-782**

A continuation of topics from classical statistics including hypothesis testing, nonparametric tests, analysis of variance, regression and correlation analysis. All students will analyze several data sets using SPSS. (BBUQ-781)

Credit 4 (offered each year)

BBUQ-784**Decision Analysis****Registration #0106-784**

An introduction to decision analysis for the manager. Emphasis will be on structuring the problem in terms of alternatives possible, decision attributes, and operational constraints; quantifying the manager's judgments as probabilities; assessing the utility of the manager's preferences; analyzing the problem via evaluation of the alternatives and checking the sensitivity of the solution(s). Single and multiple attribute cases under certainty will be covered. (BBUQ-782)

Credit 4 (offered upon sufficient demand)

BBUQ-785**Applied Regression Analysis****Registration #0106-785**

The primary objective of this course is to teach the student how to effectively utilize a variety of data analysis techniques commonly referred to as regression analysis. Emphasis will be placed on model formulation and analysis. All students will be required to analyze several large data sets using SPSS. Relevant theory will be introduced to enable the student to pursue further study in data analysis. (BBUQ-782)

Credit 4 (offered each year)

BBUQ-786**Mathematical Programming****Registration #0106-786**

An in-depth investigation of several mathematical programming techniques with an emphasis upon model development and the decision making process. Specific topics include linear programming, goal programming, and integer programming. (BBUQ-780)

Credit 4 (offered upon sufficient demand)

BBUQ-788**Survey Design and Sampling****Registration #0106-788**

The following topics in survey design and sampling are covered: questionnaire development; types of sampling techniques; determination of sample size; methods for increasing the response rate; interpretation of results and report preparation. Students will be required to design a questionnaire, administer it, and analyze the results. (BBUQ-782)

Credit 4 (offered upon sufficient demand)

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. (BBUQ-782)

Credit 4 (offered upon sufficient demand)

BBUQ-793**Business Forecasting Methods****Registration #0106-793**

An introduction to quantitative and qualitative forecasting methods and their use in business forecasting. The student will be taught how to recognize which forecasting procedure to use based upon an analysis of problem characteristics. A significant part of the course will involve analyzing several data sets using a set of interactive forecasting or econometric programs such as SIBYL/RUNNER and TSP. (BBUQ-785 or permission of the instructor)

Credit 4 (offered each year)

BBUQ-794**Multivariate Methods in Business****Registration #0106-794**

An introduction to the use of multivariate techniques, other than multiple regression analysis, and their use in analyzing business data. The major objective will be to demonstrate the proper use of a variety of multivariate techniques for large-scale data sets. Students will be required to use a standard statistical package (SPSS, BMDP, TSP) to carry out the analytical procedures. A major emphasis is placed on the interpretation of analytic output in terms of the decision making situation underlying the problem being investigated. (BBUQ-770)

Credit 4 (offered each year)

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: multivariate analysis, simulation, operations research, linear programming and Bayesian techniques. Specific content for a particular quarter will be announced prior to course offering. (Permission of instructor)

Credit 4 (offered each year)

Human Services Group**BBUH-701****Economic Environment of Human Services****Registration #0115-701**

Studies of the macroeconomic forces impacting the agency environments, such as funding and service populations, and the microeconomic concepts which can be used to aid agency resource allocation decisions and in the analysis of alternate agency policies. Topics include national income concepts and policies and economic demand for services and benefit/cost considerations. (BBUQ-781)

Credit 4 (offered each year)

BBUH-711 Law and the Administrative Process**Registration #0115-711**

Practices, problems, and issues in the implementation of public policy. Civil law, regulation, and statutes affecting contracts, internal and external public, employee welfare, and fiduciary responsibilities. The exercise of governmental power and control over administrative action. Specific legal areas such as rule making, licensing, adjudication, and judicial review will be examined. (BBUH-701, BBUH-712)

Credit 4 (offered each year)

BBUH-712 Bureaucracy in Modern Society**Registration #0115-712**

The nature of bureaucratic organization in modern Western societies, especially the United States; business corporations, trade unions, the military, hospitals, law enforcement agencies. Problems resulting from conflicts and values, constituencies, and theories among these institutions. (BBUB-740)

Credit 4 (offered each year)

BBUH-721 Organization and Management in Criminal Justice**Registration #0115-721**

Considerations of organization, management, and planning as tools of the administrator with emphasis on bureaucracy, authority, power, decision making, and tactics and strategies of effective management. Special consideration will be given to the problems of management in criminal justice agencies, law enforcement agencies, and correctional institutions. (BBUB-741)

Credit 4 (offered on demand)

BBUH-722 Administration in the Social Work Setting**Registration #0115-722**

Application of administrative skills and methods applicable to the social worker, with attention to the needs determined by the non-profit organizational structure. Topics include areas of administration and management concerns, planning, development, the various supervisory roles, personnel, evaluation, and special concerns arising from funding considerations. (BBUB-741)

Credit 4 (offered on demand)

BBUH-731 Intervention in the Community**Registration #0115-731**

Methods of agency intervention in specific problem areas, identified as needed by the community, with focus on the role of management. Covers approaches to community intervention with special attention focused on such problems areas as crime, poverty, health, mental health, education, cultural resources, and population conflict. Issues will regard the manner in which agencies formulate interventive strategies and implementation, particularly as the process involves the management role. (BBUA-712)

Credit 4 (offered each year)

BBUH-732 Cooperation and Conflict**Registration #0115-732**

Establishing working relationships between various providers of services and the resolution of system conflict. Topics to be covered include: the development of conflict between and within agencies, the evolution of a cooperative system of services, incompatible interest groups, competition among providers, problems of limited funding, and problems associated with the growth or decline of services. Emphasis is placed on the manager in the resolution of conflict. (BBUB-741, BBUH-712)

Credit 4 (offered each year)

BBUH-733 Interpersonal Skills**Registration #0115-733**

The development of skills related to leadership, group dynamics, public relations, and aspects of personal growth. Self-awareness for the person in a managerial role will be stressed, particularly as this involves interaction with colleagues both within and outside the agency of employment. Management styles will be analyzed for strengths and weakness to develop an increased awareness of the particular characteristics leading towards beneficial managerial outcomes. (BBUB-740)

Credit 4 (offered each year)

BBUH-734 Deviance, Conformity, and Criminal Behavior**Registration #0115-734**

A study of the social and psychological factors identified with the genesis of specific social pathologies which are exhibited by groups and individuals. The course presents an analysis of the various forms of deviance including deviance from professional rules and norms; deviance from expected interaction patterns and traditional areas of deviance such as crime, alcoholism, mental illness, homosexuality, prostitution, counter culture, and revolutionary activities; methods of social reaction to deviance. (Foundation Courses)

Credit 4 (offered each year)

BBUH-735 Special Populations**Registration #0115-735**

The needs of special populations such as the elderly, youth, ethnic minorities, women, the educationally disadvantaged, poor, and others. The course will address the particular considerations relevant to programming for these specific populations. Historical considerations will be raised. (Foundation Courses)

Credit 4 (offered each year)



Graduate Faculty, College of Business

Walter F. McCanna, Ph.D., University of Wisconsin-Madison—Dean; Professor, Management

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

Thomas E. Comte, Ph.D., University of Missouri; MBA, Columbia—Assistant Dean, Graduate Programs in Business; Associate Professor, Management

Janet C. Barnard, Ed.D., University of Rochester—Associate Director, Graduate Programs in Business; Assistant Professor, Management

Department of Management, Marketing and Management Science

Andrew J. DuBrin, Ph.D., Michigan State; MS, Purdue—Professor and Chairman

Management Faculty

Robert J. Barbato, Ph.D., Michigan State—Assistant Professor, Management

Kenneth Graham, Jr., Ph.D., MBA, Union College—Assistant Professor, Management

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

Robert Pearce, Ph.D., University of Chicago—Distinguished Lecturer, Management

G. Hollister Spencer, DBA, Arizona State; MBA, Harvard—Professor Emeritus, Management

Nathan B. Winstanley, Ph.D., Purdue University—Lecturer, Management

Management Adjunct Faculty

Brian C. Arnold, Ph.D., Colorado State—Lecturer, Management

Arnold J. Berman, MSW, Syracuse University; MA, New York University

Paul Bernstein, Ph.D., University of Pennsylvania—Dean, Graduate Studies

John R. Golden, MS, University of Kansas—Lecturer, Management Science

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

Nomene B. Robinson, MBA, Harvard University—Lecturer, Management

Robert F. Zogas, JD, Duke University—Lecturer, Law

Management Science Faculty

Donald E. Burlingame, D.Sc., Washington University—Lecturer, Management Science

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

Bernard J. Isselhardt, MS, Southern Illinois—Assistant Professor, Operations Systems

Thomas F. Pray, Ph.D., Rensselaer Polytechnic Institute—Associate Professor, Operations Systems

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

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

Thomas A. Williams, Ph.D., Rensselaer Polytechnic Institute—Professor, Management Science

Management Science Adjunct Faculty

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

Robert M. Gluckman, MS, Carnegie-Mellon—Lecturer, Statistics

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

Daniel R. Strang, Ph.D., Cornell University—Lecturer, Management Science

Madhusudan C. Trivedi, Ph.D., University of Rochester—Lecturer, Management Science

William H. Williams, Ph.D., Syracuse—Lecturer, Information Systems

Marketing Faculty

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

Dean C. Siewers, Ph.D., North Carolina-Chapel Hill; MBA, Duke University—Assistant Professor, Marketing

Patricia A. Sorce, Ph.D., MS, University of Massachusetts—Assistant Professor, Marketing and Behavioral Science

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

Stanley M. Widrick, Ph.D., Syracuse; MBA, SUNY Buffalo—Assistant Professor, Marketing

Julian E. Yudelton, Ph.D., Northwestern; MBA, Emory—Associate Professor, Retailing/Marketing

Marketing Adjunct Faculty

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

Jeffrey S. Gutenberg, DBA, University of Southern California—Lecturer, Marketing

William Repp, MA, University of Rochester—Lecturer, Marketing

Harold P. Scheinkopf, Ph.D., New York University—Lecturer, Marketing

R. Wayne Walvoord, MIM, American Graduate School of International Management—Lecturer, Marketing

Jerald L. Weaver, Ph.D., Florida State University—Lecturer, Marketing

Department of Accounting, Finance and Economics

E. James Meddaugh, Ph.D., Pennsylvania State; MBA, Drexel; CPA, Professor and Chairman

Accounting Faculty

Stanley M. Dye, BA, Haverford, CPA—Distinguished Lecturer, Accounting; Former Partner, Coopers, Lybrand

Paul A. Lebowitz, MS, Rochester Institute of Technology; CPA—Assistant Professor, Accounting

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

Daniel D. Tesson, MS, Clarkson; CPA—Assistant Professor, Accounting

Robert J. Warth, BS, Rochester Institute of Technology; CPA—Lecturer, Accounting; Former Partner, Touche Ross & Co.

Lorraine P. Wolch, MBA, Rochester Institute of Technology; CPA—Lecturer, Accounting

Accounting Adjunct Faculty

Christopher W. Baldwin, JD, Case-Western, CPA—Lecturer, Accounting

James E. Benz, MBA, University of Rochester, CPA—Lecturer, Accounting

Daniel S. Ehrman, Jr., MBA, Michigan; CPA—Lecturer, Accounting

Donald J. Onimus, MBA, Syracuse; CPA—Lecturer, Accounting

Economics

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

Steven C. Gold, Ph.D., SUNY Binghamton—Assistant Professor, Economics

John A. Helmuth II, Ph.D., South Carolina—Assistant Professor, Economics

Frederick B. Rodgers, MS, University of Rochester—Assistant Professor, Economics

Finance

James C. Galloway, Ph.D., University of Virginia; MBA, Pennsylvania—Assistant Professor, Finance

Michael Hertz, MS, University of Rochester—Lecturer, Finance

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

Lawrence E. McLean, MBA, University of Chicago—Assistant Professor, Finance

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



College of Continuing Education

Master of Science Degree in Applied and Mathematical Statistics



John D. Hromi, Chairman and Frederick H. Minnett Professor
Department of Applied and Mathematical Statistics: 475-2002

Objectives

Statistics today is defined as the science of making decisions in the face of uncertainty. To aid those needing the basic statistical tools to collect and analyze data and to make predictions, and to aid those needing to update their present statistical skills, the graduate program in statistics is offered by the College of Continuing Education at RIT.

Candidates

Specifically, the students are engineers, managers, scientists, auditors, production and inspection personnel and those interested in industrial research, quality control, reliability, metrology, and testing. Generally, the degree offers opportunity for immediate advancement in many early careers, and for career changes. The uniqueness of the program is its intent to help on the job today, or in the near future.

Part-time evening program

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. Classes meet once a week for three hours 6:30-9:30 p.m. unless otherwise arranged, with approximately six hours of homework. Normally, it takes two years to complete the program, attending two nights a week. 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.

Independent study

In addition to serving those in the Rochester area with graduate education in statistics, the College of Continuing Education offers an MS in applied and mathematical statistics on an independent study basis for those who cannot attend formal classes. It now becomes possible for students anywhere in the world, who hold an undergraduate degree, to obtain the master of statistics degree without actually coming to the campus. Transfer credits are granted in accordance with existing Graduate Council policies.

Registration for a course (or courses) as an independent study student will not be accepted by the Registrar's Office unless accompanied by an authorization form signed by the chairman of the Statistics Program. This authorization form may be obtained by contacting the chairman to discuss the applicant's eligibility.

No entrance exam

Courses are offered on an open enrollment basis which is supportive of the RIT commitment to recurrent education. There are no entrance exams, and the program is self-contained at RIT.

A practical program

Both teachers and students work to put job experience and class studies together. For example, thesis and papers often have job supervisor's approval and wind up being put into effect rather than into the library. Theory is used for understanding, but is not an end in itself. It is

sometimes perceived as being only mathematical and proof-oriented. In this program, "theory" means gaining knowledge of the principles and learning how to solve problems intelligently rather than in "cookbook" style. The degree is considered as "terminal." Additional and higher level mathematics, not presently part of the program, are required for the Ph.D. degree.

Requirements

For the master of science in applied and mathematical statistics degree, the satisfactory completion of the following quarter courses is required:

Two basic courses:

(These may be waived by the departmental chairperson upon evidence of equivalent learning, experience, or competency.)
CTAM-711 and 712 Fundamentals of Statistics I & II

Eight core courses:

CTAM-801 and 802 Design of Experiments I & II
CTAM-821 and 822 Theory of Statistics I & II
CTAM-841 and 842 Regression Analysis I & II
CTAM-851 Nonparametric Statistics
CTAM-881 Bayesian Statistics

Seven electives:

Taken from other courses listed under "Course Descriptions" in such areas as quality control, managerial decision making, multivariate analysis, sample surveys, reliability, and probability theory.

The total of 15 or 17 courses, each counting 3 quarter credits, comes to 45 or 51 credits depending on whether the basic courses (711-712) are waived. As indicated above, studies are normally completed in two to four years by attendance one or two nights a week.

Levels of courses

There are 700 and 800 courses. The 700 level 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. Generally, the 800 level is more advanced. From time to time, special courses are offered in topics of particular interest when requested by the students or as new fields of statistics open up.

Career guidance

The minimum of 24 credits in the 800 series (core courses above) is required. All other courses are elective. In consultation with a departmental advisor, a total program structured to achieve individual professional objectives is worked out with each person interested in such guidance.

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 matriculate in the regular graduate program.

Although students are encouraged to begin their graduate studies at any time, it is highly advisable to formally seek admission to the program no later than after completion of six courses. This will assure proper selection of courses, adequate administrative time for transcripts, etc., and an early oral exam to indicate student capability to attain the MS degree.

Procedure

To be considered for admission it is necessary to file an application, submit transcripts of all previous undergraduate and graduate work, obtain two letters of recommendation, and pay a \$25 application fee. RIT graduates do not have to pay this fee. Forms and instructions, including quarterly offerings and registration forms, may be obtained by writing to:

Director of Admissions
Rochester Institute of Technology
One Lomb Memorial Drive
Rochester, NY 14623

Transfer and interdisciplinary credits

Credit for courses of graduate stature in statistics, mathematics, computer programming, operations research, and other quantitative 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, to insure credit toward the degree, candidates should write the chairperson indicating courses for which he or she would like transfer credit for work in the past and obtain prior approval of courses for which transfer credit is sought. While these matters would be discussed with either the candidate's advisor or the department at various times during the advisement process, it is essential that all agreements be documented *in writing*. A letter to the departmental chairperson will assure proper recognition of outside work accomplished toward the degree.

Non-matriculated students

It is not necessary to be formally admitted or matriculated into the MS in statistics program in order to register for course offerings. Those who are eligible, however, should matriculate as early as possible, as recommended above. Those who do not have college degrees may be admitted to courses in fields of their special interest by consent of the department chairperson.

Grades, exams and theses

The candidate must attain an overall average grade of 3.0 (B) for graduation. An oral examination is required at the end of six courses to assure subject matter and verbal proficiency as well as ability to perform as a statistician in a working environment. Successful completion of each quarter course normally requires passing a final exam, submission of a written paper or thesis, or completion of a group project, as determined by the instructor. Students are encouraged to develop their writing and speaking skills as well as to use the computer as ways to improve their knowledge.

Location

Courses are offered at the Rochester campus, at selected off-campus locations, and at in-plant training facilities. Those students pursuing individual courses of special interest work under the independent study option, can, of course, complete their courses at home.

Plans of study

Students may, with the permission of the departmental chairperson,

secure credits toward the master's degree in three ways:

First, a student may complete the required 45 or 51 quarter credits, depending on whether the basic "Fundamentals" courses are waived by formal *classroom* attendance and receipt of satisfactory grades.

Second, three, six or nine of these credits may be obtained by submission of a satisfactory research project and *thesis*. The project and credits must be approved by the departmental chairperson prior to registration. A letter outlining the project and requesting this approval must be addressed to the chairperson by the candidate prior to the regular registration periods. The depth of the project will determine the number of credits received. Generally this type of credit should be sought at the end of the program after sufficient knowledge of the subject is available for use. CTAM-896, 897, and 898 are the registration numbers used for thesis work.

Third, credits may be obtained by Independent Study. Under this option, students who register for a course must complete the readings, homework assignments, examinations, assigned papers, and projects by the end of the quarter, but without the necessity of attending formal classroom sessions. Contact with the instructor is maintained by visits, telephone, or mail. Local area residents will be asked to take final exams at the Rochester campus. Out of town students will take these examinations at suitable locations by arrangement with proctors. Any course may be taken on an independent study basis provided the chairperson agrees to accept the student as qualified to do the work on his own.

Faculty

Two full-time and some 15 adjunct faculty normally teach in the master's program in applied and mathematical statistics. All instructors have an industrial background. This is reflected in their realistic approach to the subject matter. Many of the faculty hold jobs which require them to apply daily what they teach at night; e.g., the quality control instructor installs quality control systems for his

company's suppliers. As with many others dedicated to continuing education, faculty members have a commitment to give evening students personal attention. This often involves career counseling.

The faculty select textbooks, determine subjects to be taught, and keep students up to date with new developments in their fields. Quarterly meetings of the faculty provide a continuous avenue of communication. An Industrial Advisory Committee periodically advises the Chairperson and collegiate administrators on academic and administrative matters. It assists in the determination of how RIT can best serve local and regional needs.

Program tries to serve local industry

It has been said that "security is an illusion; the only security people have is their trade." With this in mind, Dr. John D. Hromi and all faculty members are resolved to help employees of local firms stay secure in their positions by keeping their statistical skills polished.

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

Hromi, a recognized expert in the field of statistical quality control, has headed the Applied Mathematics Division at U.S. Steel Company's Research Center, has managed the Engineering Methods Department on Engineering Staff at Ford Motor Company, and has chaired the Mechanical Engineering Department at Lawrence Institute of Technology. He still does counseling for private industry and is president of the American Society for Quality Control.

His approach to teaching places emphasis on statistics as a valuable tool which, when properly applied to design, manufacturing, and service-type problems, will result in cost savings, higher quality and enhanced productivity.

Dr. Hromi points out that, "a typical graduate program at the master's level generally is designed to lead to further study in the field. Ours is an interdisciplinary program that is immediately useful and, as experience has shown, serves local industry successfully."

"Leading researchers at Eastman Kodak Company and at Xerox Corporation facilities provide considerable input to the structuring of the program...they guide us toward teaching what industry needs."

"The faculty are top-notch practitioners about whom we get feed-back quarterly from course evaluations prepared by their students."

Technological advances and social pressures add to the challenge of those responsible for the design and production of quality goods or the provision of quality services in the '80s. The effective use of our human resources coupled with technological change will require the imaginative use of statistical methods to ensure a competitive edge and profitability. The RIT program is ready to assist the industrial and business worlds to meet that challenge—the challenge of the '80s.



Graduate Courses in Applied and Mathematical 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 (offered each quarter)

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.)

Credit 3 (offered each quarter)

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 (offered in Fall and Spring Quarters)

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 (offered in Winter and Summer Quarters)

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 department.)

Credit 3 (offered in Fall Quarter)

CTAM-761

Reliability

Registration #0240-761

A methods course in reliability practices; what a reliability engineer must know about reliability prediction, estimation, analysis, demonstration, and other reliability activities. Covers most methods presently being used in industry.

Topics: applications of normal, binomial, exponential, and Weibull 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 (offered in Spring Quarter)

CTAM-801

Design of Experiments I

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 (offered in Winter, Spring and Summer Quarters)

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 (offered in Fall, Spring, and Summer Quarters)

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 department)

Credit 3 (offered in Fall Quarter)

CTAM-822

Theory of Statistics II

Registration #0240-822

Continuation of CTAM-821

Topics: Supporting theory for, and derivation of, sampling distribution models; applications and related material. Point estimation theory and applications, the multivariate normal probability model, its properties and applications; interval estimation theory and applications.

Credit 3 (offered in Winter Quarter)

CTAM-830

Multivariate Analysis

Registration #0240-831

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, so 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 (offered in Spring Quarter)

CTAM-831

Multivariate Analysis II

Registration #0240-831

A continuation of CTAM-830, this course covers the use of advanced multivariate techniques. Topics include Principal Component analysis, cluster analysis, multi-dimensional contingency tables, discrete discriminant analysis, multi-dimensional scaling, and regression with errors in the independent variables. Practical applications will be emphasized. (CTAM-830)

Credit 3 (offered in Summer only)

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 (offered in Winter Quarter)

CTAM-842**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 (offered in Spring Quarter)

Regression Analysis II**CTAM-851****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 (offered in Fall, Spring, and Summer Quarters)

Nonparametric Statistics**CTAM-853****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 (offered in Winter Quarter)

Managerial Decision Making**CTAM-871****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 (offered in Winter and Summer Quarters)

Sampling Theory and Applications**CTAM-881****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, tests of significance and goodness of fit from Bayesian point of view; handling several variables; straightline analysis. A potpourri of applications; reliability, acceptance sampling, decision-making etc. (CTAM-712 or equivalent.)

Credit 3 (offered in Fall Quarter)

Bayesian Statistics**CTAM-886****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. (CTAM-712 or equivalent.)

Credit 3 (offered in Summer Quarter)

Sample Size Determination**CTAM-891, 892, 893****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. (offered upon sufficient demand; usually in Fall Quarter)

Special Topics in Applied Statistics**CTAM-895****Registration #0240-895**

This course or sequence of courses, provides for one or more quarters of independent study and research activity. 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 (offered each quarter)

Statistics Seminar**CTAM-896, 897, 898****Registration #0240-896, -897, -898**

For students working for the MS degree in applied and mathematical statistics who use a research project and thesis for three, six or nine credits. (Consent of the department.)

Credit 3 (offered each quarter)

Thesis

Graduate Faculty College of Continuing Education

Robert Clark, BS, MIT; Ph.D.,
University of Maryland—Associate
Professor, Dean

John D. Hromi, BS, Carnegie-Mellon
University; BEE, Clemson University,
M. Litt., University of Pittsburgh, D.
Engr., University of Detroit—Frederick
H. Minett Professor, Chairman of
Statistics

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

Anne Barker, BA, Nazareth College;
MS, Rochester Institute of Technology

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

David Farnsworth, BS, Union
College, MA, Ph.D., University of
Texas

Robert Kringle, BS, MS, University of
Wisconsin

Michael Lotti, BA, MA, Western
Michigan University

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

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

Paul A. Marble, BS, MS, Florida State
University

Charles S. Masick, BS, MS, MBA,
University of Rochester

Robert M. Meisel, BS, ME,
Rensselaer Polytechnic Institute, MS,
Rochester Institute of Technology

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

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



Barbara Rose, BA, Roberts
Wesleyan, MA, SUNY, Geneseo

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

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

William A. Swagler, Jr., BSIE,
General Motors Institute, MS,
Rochester Institute of Technology

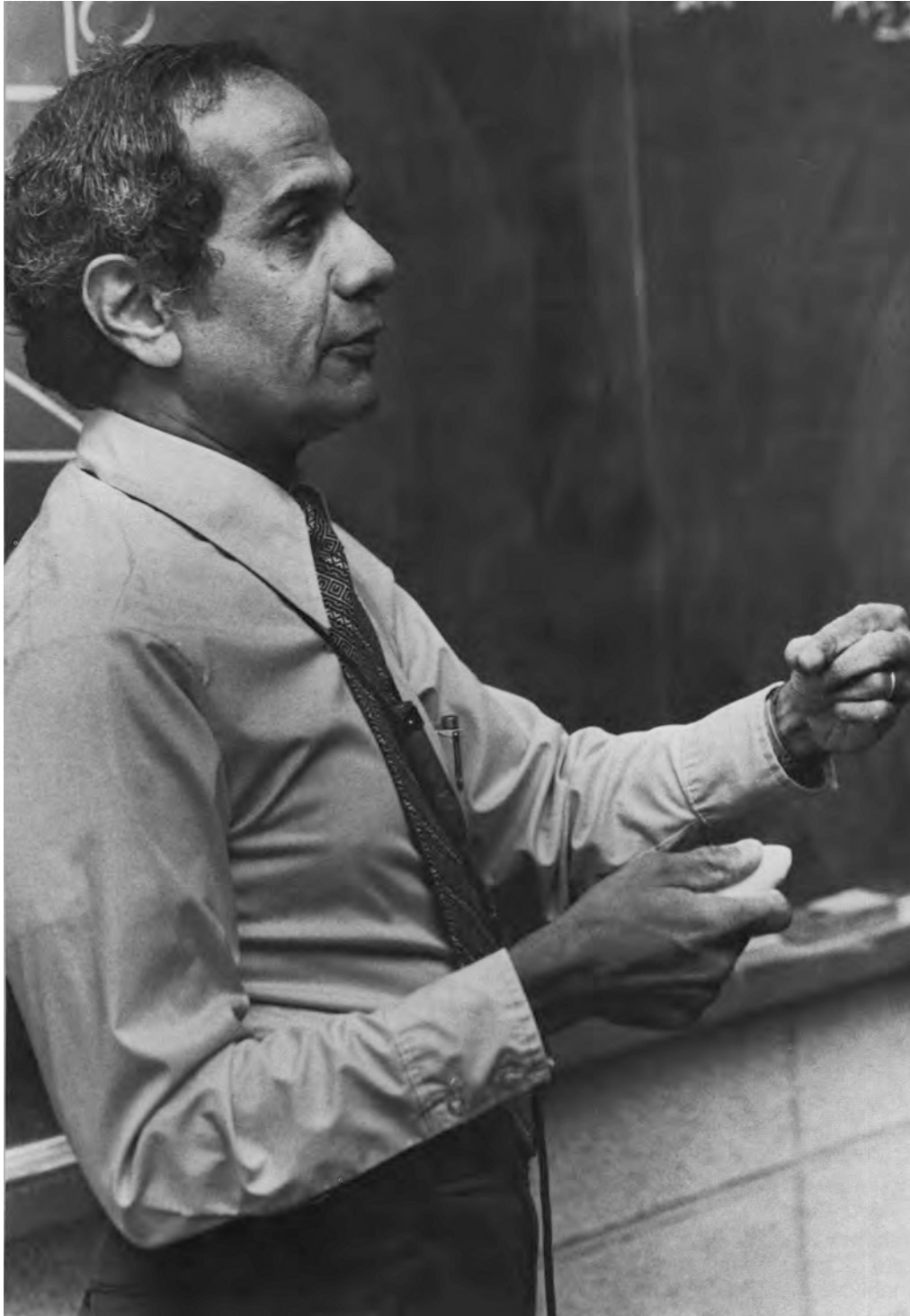
Allan F. Toth, BS, Widener College;
MS, Rochester Institute of Technology

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., BS, Rochester
Institute of Technology; MSEE,
Pennsylvania; MA, University of
Rochester

College of Engineering



Richard A. Kenyon, Dean
Swaminathan Madhu, Associate
 Dean for Graduate Studies

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.

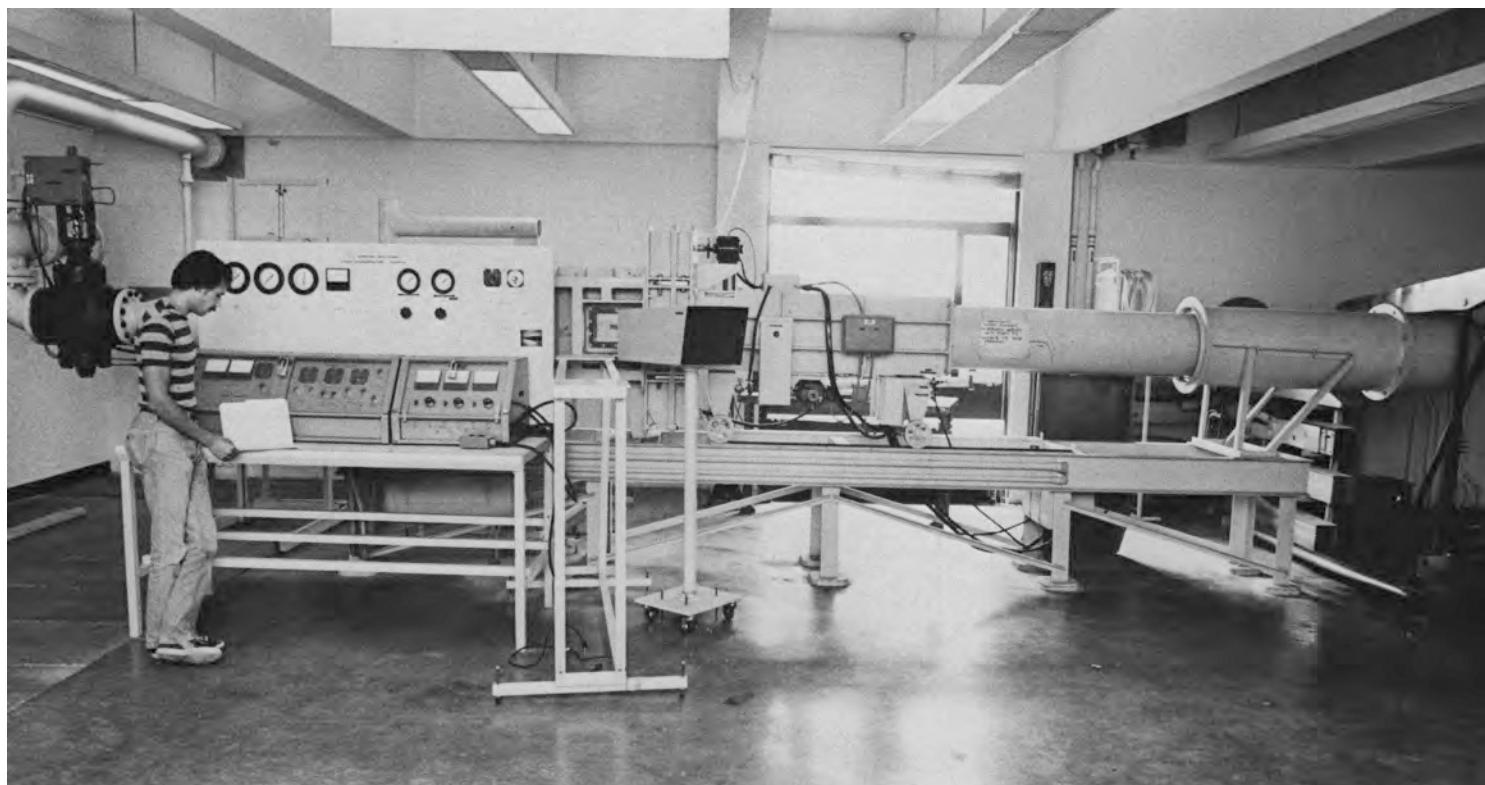
Students employed full-time in industry are limited to a maximum of two courses or eight credits each quarter. A student who wishes to register for more than eight credits while employed in full-time industry must obtain the permission of his or her advisor and the approval of the department head.

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 wish 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.



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.

Financial aid

A limited amount of financial aid is available to the full-time student. Detailed information on aid can be obtained from the individual department heads.

In plant graduate courses

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.

Admission

Admission

Any student who wishes to become a candidate for the master's degree must first be formally admitted to the appropriate graduate program. Formal admission to a graduate program gives matriculated status to a student.

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.

Graduate applicants who do not fully satisfy all admission criteria (such as appropriate baccalaureate degree, grades, and other credentials) may be considered for admission with the condition that they will be required to take additional undergraduate courses to make up their deficiencies. Such courses will not normally count toward the graduate credits required for the master's degree.

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 undergraduate and graduate study, and two letters of recommendation.

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 can usually be applied toward the master's degree when the student is formally admitted to the graduate program at a later date. However, the number of credits that will be transferred to the degree program from courses taken at RIT as a non-matriculated student will be limited to an absolute maximum of 12 credits.

An applicant who wishes to enroll in a graduate course as a non-matriculated student must obtain permission from the person in charge of the graduate program in each department and the appropriate faculty member.

Graduate Record Examination

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

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 in a 45 credit hour program or 12 quarter credits in a 48 credit hour program 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.

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. The policy on probation and suspension is explained in the section "Steps Toward Degree" in this Bulletin. The student must pay careful attention to that policy. If a student fails 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 the right to withdraw any course for which enrollment is insufficient, or to make any changes in the schedule of courses if necessary.



The solar panels and energy-efficient design of RIT's Energy House (left) are most effectively shown in an aerial view. Below, heat for the drying shed used by woodworking and furniture design students is wind generated.





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 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 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 is selected to reflect each student's primary professional interest and is integrated with his or her curriculum.

In a limited number of cases, where a regular internship is not practical due to extraordinary circumstances, case studies may be substituted for internship. Such a substitution has to have the prior approval of the department head

and the director of graduate programs.

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.

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.

Master of Science Degree in Materials Science and Engineering

A degree program leading to the master of science degree in materials science and engineering is offered jointly by the colleges of Engineering and Science. A detailed description of this program is contained in the College of Science section of this bulletin.

For information

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

Specific questions on the individual department programs:

Electrical Engineering 475-2167

(Dr. Madhu)

Industrial Engineering 475-2990

(Dr. Sung)

Mechanical Engineering 475-2163

(Dr. Karlekar)

Questions on course schedules and registration:

Electrical Engineering 475-2164

Industrial Engineering 475-2598

Mechanical Engineering 475-2163

Computer Engineering Department

Roy Czernikowski, Department Head

The Computer Engineering Department offers several graduate courses, which should be of interest to graduate students in engineering or computer science. At present, there is no master of science degree program in computer engineering.

Electrical Engineering Department

Harvey E. Rhody, Department Head
Master of Science degree program

The master of science degree in electrical engineering is awarded upon the successful completion of an approved graduate program consisting of a minimum of 45 credit hours. Under certain circumstances, a student may be required to complete more than the minimum number of credits.

Core Courses

Three courses are required of all candidates for the MS degree in Electrical Engineering: EEEE-754, -755, -756 Analytical Techniques I, II, III. A waiver of any of the above courses can be granted to a student who can clearly demonstrate to a designated faculty member that he or she has a solid background in the topics covered in them.

In addition to the above three courses, students with a baccalaureate degree in electrical technology will also be required to take EEEE-757 (Network Theory).

A graduate student will be expected to take the required core courses during the first year of his or her program, since they are prerequisites for many of the other graduate courses.

Elective Courses

A maximum of 12 credits can be chosen from graduate or advanced undergraduate courses offered by any department of RIT with the *prior approval* of the faculty advisor. The remaining credits for the degree must be earned from graduate courses in electrical engineering.

Thesis

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 21 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 graduate paper is to enable the student to undertake an independent and in-depth literature search, and write a report summarizing the findings. A faculty member interested in the topic of the paper will serve as the student's supervisor and direct the scope and depth of the paper as well as the format of the final written version. The student must first consult a faculty member about a suitable topic for the paper and obtain consent. The course number EEEE-800 Graduate Paper is 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.

Course Calendar

The core courses are offered every academic year: EEEE-754 Fall; EEEE-755 Winter; EEEE-756 Spring. Most of the other courses are offered on alternate years. A calendar of courses (on a two-year cycle) that should help a student set up a plan of study can be obtained from the department office.

Industrial Engineering Department

N. Richard Reeve, Department Head

Although there is no master of science degree in industrial engineering at present, the master of engineering degree can be earned with specialization in the following fields: industrial engineering; systems engineering; engineering management. Close cooperation with the College of Business and the School of Computer Science assures the master of engineering candidate of a wide selection of courses and a unique opportunity to build a program tailored to her or his professional interests and goals. The practice of emphasizing computer methods to realistic problem solving is employed in all the above specialties.

Mechanical Engineering Department

Bhalchandra V. Karlekar,
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 45 quarter credit hours. A minimum of 33 credits are to be earned in course work, while the thesis as independent work carries a minimum of four credits and a maximum of 12 credits.

Independent Work

There are four options offered by the department with regard to completing the requirements of the master of science degree. Each student is free to select a design project, literature search, a research thesis, or additional work with a comprehensive examination. A minimum of four credits is to be earned by doing an independent piece of work if a student does not elect to take a comprehensive examination. Detailed information can be obtained from the department head.

Each student completing an independent work will be required to make a successful oral presentation of the work. The comprehensive examination when elected by a student, will be in his major field and it 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-871 Mathematics for Engineers	4
EMEM-872 Mechanics	4
EMEM-873 Heat Transfer	4
EMEM-874 Numerical Methods	4
EMEM-875 Instrumentation and Experimental Analysis	4
EMEM-876 Engineering Materials	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 or award transfer credit for the appropriate course. The maximum number of transfer credits permitted is nine.

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 following elective courses are available to the student for graduate credit.

Course Number and Title Credits

EMEM-812 Theory of Plates and Shells	4
EMEM-815 Experimental Stress Analysis	4
EMEM-816 Finite Elements	4
EMEM-821 Vibration Theory and Applications	4
EMEM-833 Heat Exchanger Design	4
EMEM-845 Turbomachines	4

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 description catalog as EMEM-6XX (for example, Advanced Strength of Materials, Turbomachinery, Nuclear Power, and Stress Analysis). However, a maximum of two such courses are allowed for graduate credit.

A student also may earn a limited number of credits by doing an independent study with guidance from a member of the graduate faculty. Some of the areas for independent study are selected topics in applied mathematics, theory of elasticity, energy methods in mechanics, analytical mechanics, lubrication, convective and radiative heat transfer, thermodynamics, fluid mechanics, wind and solar energy, and control systems.

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 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 \$3,200 per academic year. Applicants for financial aid should write directly to the department head for details.

Course calendar

The core courses are offered every quarter so that, in a given academic year, a student can fulfill the core requirements. The elective courses are generally given at least every other year. For further information on current course offerings, the student should contact the office of the Mechanical Engineering Department (716-475-2163).

Engineering Courses

Courses numbered 700 and above are normally open only to students who have been formally admitted to a graduate engineering program. Students with a baccalaureate degree in engineering or science may be permitted to enroll in such courses as non-matriculated students provided they have the requisite background. Undergraduate students may be permitted to take courses numbered 700 or above provided they are fifth-year students and have completed the prerequisites. The permission of the department is required for enrolling in such courses except for matriculated graduate students in engineering.

Whenever a prerequisite is stated in terms of specific course numbers, the phrase "or equivalent" is always implied. Prerequisite courses, when appropriate, are shown in parentheses following the description of each course.

Engineering Courses

Electrical Engineering

EECC-722

Registration #0306-722

Function, structure and performance of computer systems. Bus systems. Concurrency, multiprocessing. High level language based systems. Dataflow machines. Microsystems. (ICSS-720, ICSS-545)

Credit 4

Special Topics in

Computer Architecture

EECC-773

Registration #0306-773

Formal models and concepts in fault diagnosis. Test generation and minimization. Redundant and self checking systems. Fault tolerant hardware and software based computer systems. (ICSS-400 or EEEE-650)

Credit 4

Fault Tolerant Computer Systems

EEEE-723

Registration #0301-723

An introductory course in semiconductor physics for engineering students. The emphasis in this course is semiconductor materials rather than semiconductor devices. Topics include band gap theory, equilibrium carrier concentrations, transport mechanisms, deep and shallow impurities and properties of silicon, GaAs, Ge and other semiconductors.

Credit 4

Semiconductor Physics

EEEE-724

Registration #0301-724

A basic course dealing with the physics of semiconductor devices. Topics include evaporation, sputtering, epitaxial growth, diffusion, ion implantation, oxidation of silicon, photolithography, pattern generation, layout of silicon integrated circuits, resistors, MOS capacitors, isolation techniques, and in-process measurement and testing. (EEEE-723)

Credit 4

Physics of Semiconductor Devices I

EEEE-725

Registration #0301-725

An intermediate level course in semiconductor device physics for engineering students. Limitations of bipolar and field effect transistors are studied. The physics of pnpn devices, solid state optical devices, interface devices, and others are also discussed. (EEEE-724)

Credit 4

Physics of Semiconductor Devices II

EEEE-726

Registration #0301-726

A course in the analysis and design of bipolar and MOS analog integrated circuits. Topics include device models, amplifiers, current sources and active loads, output stages, operational amplifiers, and analog circuit design in MOS-LSI. Course will involve circuit design and computer simulation projects.

Credit 4

Analog IC Circuits

EEEE-727

Registration #0301-727

Design of very large scale integrated circuits at the level of Mead and Conway's *VLSI Design*. Topics include MOS devices and circuits, n-channel MOS process, data and control flow in systematic structures, implementing integrated system design, system timing, and examples of LSI computer systems. (EEEE-724, -670, and a course in computer architecture)

Credit 4

VLSI Design

EEEE-728

Registration #0301-728

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, -754, -755)

Credit 4

IC Operational Amplifiers

EEEE-744

Registration #0301-744

The effective application of microprocessors in the design of digital systems requires a knowledge of both hardware and software. This course will develop an understanding of assembly language programming and hardware design techniques. The role of macro-assemblers, editors, linking loaders, and other system software aids used in microcomputer development systems to produce efficient modular code will be covered. Several aspects of hardware/software organization of input/output programs will be considered including interrupts and direct memory access. The use of special LSI interface devices to allow a microcomputer to operate with peripheral devices such as A/D and D/A converters, CRT terminals, floppy disks, etc., will be studied. Laboratory sessions will be used to provide experience in the use of software development systems, and logic analyzers in developing and testing a microcomputer system design. (EEEE-665)

Credit 4

Advanced Microprocessor Systems Design

EEEE-745, -746

Registration #0301-745, -746

Topics will be selected on different aspects of digital systems design. Some of the proposed topics are signature analysis, bit slice processors, timing problems, reliable systems design, and designing for maintainability. (EEEE-650)

Credit 4

Topics in Digital Systems Design I, II

EEEE-747

Registration #0301-747

A selection of topics on various theoretical aspects of switching circuits will be presented. Topics such as decomposition of combinational switching functions, experiments on sequential circuits, and regular expressions will be covered. (EEEE-650)

Credit 4

Topics in Switching Theory

EEEE-748

Registration #0301-748

The use of microcomputers in process control and instrumentation to achieve intelligent industrial operations will be discussed. Topics include concepts of control, analog vs. digital controllers, sensors, A/D and D/A converters, dc motor and stepper motor controllers, real-time systems, microcomputer bus standards, and the local networks. Lab work may include temperature, pressure, and optical controllers, stepper motor controllers, and robotics control. (EEEE-744)

Credit 4

Microcomputers in Control and Instrumentation

EEEE-754

Registration #0301-754

Complex variable theory including conformal mapping; the Laurent expansion; residues; and the evaluation of contour integrals. The Nyquist stability criterion. The LaPlace transform, its existence and convergence; use in the solution of differential equations; the transfer function and its properties.

The Z transform and the solution of difference equations. Relationship between the LaPlace and the Z transforms.

Credit 4 (Offered every fall)

Analytical Techniques I

EEEE-755

Registration #0301-755

Fourier analysis. Signal and power spectra; the Fourier transform related to the LaPlace transform. The convolution integral.

Determinants and matrices; linear transformations; eigenvalues and eigenvectors; the solution of matrix differential equations; introduction to state variable approach for continuous and discrete systems. (EEEE-754)

Credit 4 (Offered every winter)

Analytical Techniques II

EEEE-756

Registration #0301-756

Vector Analysis; Gauss's law and Stokes's theorem; curvilinear coordinates.

Random variables. Probability densities and distributions; functions of random variables; moments; parameter estimation; statistical decision theory.

Credit 4 (Offered every spring)

Analytical Techniques III

EEEE-757

Registration #0301-757

Classification of networks, network topology, equilibrium equations, network theorems. Properties of one-port and two-port networks. Stability and passivity of two-port networks. Scattering matrix, Gain-phase analysis. The treatment will be on a formal and rigorous level. (EEEE-754, -755)

Credit 4

Network Theory

EEEE-760**Registration #0301-760****Practical R&D Management**

The course is intended to help engineers currently in industrial R&D or engineering and students interested in R&D management careers, understand the concepts and practical aspects of project and organizational management and planning in RD&E environment. Topics to be discussed will include: objectives of industrial R&D, types of R&D organizations, selection of new products for development, long- and short-range planning, methods of project scheduling and control, communication within R&D and with other organizations, task assignment, problem solving in R&D, financial controls and budget preparation, proposal and report writing. The participants will be expected to carry out planning, organization and control of a simulated R&D project.

Credit 4 (Offered upon sufficient demand)

EEEE-761**Registration #0301-761****Modern Control Theory**

Review of state-space formulation of SISO systems; solution of state equations; STM and its properties. Application of state-space concepts; state variable design. Multivariate systems: preliminaries; systems of least order; stability and control. (EEEE-754, -755, -613)

Credit 4

EEEE-762**Registration #0301-762****Nonlinear Control Systems**

An introduction to the physical nature and mathematical theory of nonlinear control systems' behavior using phase plane techniques, Liapunov theory (including Aizerman's method, 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-761)

Credit 4

EEEE-763**Registration #0301-763****Stochastic Estimation and Control**

Stochastic control and optimization; estimation and filtering techniques such as Wiener filtering and Kalman filtering; stochastic stability; applications. (EEEE-756, -761)

Credit 4

EEEE-764**Registration #0301-764****Digital Control Systems Design**

Introduction to the analysis and design of control systems in which microcontroller plays a principal role. Topics include: sampled data systems, Z and W-plane analysis and design, algorithm generation, and the effect of computer word length on noise and stability. The student will be expected to make use of the digital computer in the implementation of design procedures. (EEEE-754, -755)

Credit 4

EEEE-765**Registration #0301-765****Optimal Control**

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-761)

Credit 4

EEEE-767**Registration #0301-767****Thyristor 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, sine wave 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; cyclo-converter; frequency conversion using SCR's phase-controlled cycloconverters; cyclo-converter controls. Modeling and simulation of thyristor circuits; thyristor models; approximations, digital simulation of choppers, inverters and cycloconverters, areas of further research.

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

Credit 4

EEEE-772, -773, -774**Registration #0301-772, -773, -774****Special Topics in Electrical Engineering**

Topics and subject areas that are not among the courses listed here are frequently offered under the title of Special Topics. Such courses are offered in a normal format, that is, regularly scheduled class sessions with an instructor.

Credit 4 per course (No regular course schedule)

EEEE-775**Registration #0301-775****Optical Engineering I**

An introduction to the properties of optical components and their combination into systems, primarily from a geometrical optics point of view, but with reference to the wave nature of light where appropriate. Refracting and reflecting components. Radiation sources. Object-image relations. Stops and energy. Ray tracing and matrix methods of analysis and design. Discussion of common optical devices and instruments.

Credit 4

EEEE-776**Registration #0301-776****Electro-optics**

An advanced treatment of optical systems through the use of Maxwell's equations describing light interaction will be considered. Lens systems, optical modulation, laser operation, optical detection and associated noise problems will be discussed. Classroom work will be complemented by demonstrations. (EEEE-775, -471)

Credit 4

EEEE-777**Registration #0301-777****Optical Engineering II**

A continuation of EEEEE-776, Electro-optics, that emphasizes the application of wave optics to optical systems. Interference and interferometers. Thin films. Diffraction. Partial coherence. Fourier optics. Discussion of holography, optical data processing, imaging and other topics of current interest. (EEEE-776)

Credit 4

EEEE-778**Registration #0301-778****Fiber Optics**

The objective of this course is to educate the engineer in the applied optics field. Fundamentals of the fiber waveguide are treated using geometrical optics and Maxwell's equations. Other topics include design criteria, practical coupling techniques, discussion of optical sources and detectors used in fiber optical systems. Applications to communications and other areas will be discussed. (EEEE-775, -776, -777)

Credit 4

EEEE-779**Registration #0301-779****Digital Image Processing**

Introduction to digital image processing concepts, image digitization, 2D discrete Fourier transforms; topics on image enhancement including contrast equalization, false color displays, and edge enhancement techniques; topics in image reconstruction to include causes of image degradation, deblurring procedures, and homomorphic filters; 3D image reconstruction from 2D projections. (EEEE-754, -755)

Credit 4

EEEE-780**Registration #0301-780****Independent Study**

This course number should be used by students who plan to study a topic on an independent study basis. The student *must* obtain the permission of the appropriate faculty member *before* registering for the course.

Credit 4

EEEE-781**Registration #0301-781****Electromagnetic Fields**

Development of electromagnetic theory from basic postulates leading to Maxwell's equations in differential and integral forms. Solution to Maxwell's equations for the plane waves, transmission lines, waveguides, and antennas.

Credit 4

EEEE-782**Registration #0301-782****Boundary Value Problems**

Techniques for solving boundary value problems. Numerical methods, analog and relaxation methods, Green's function, special methods making use of symmetries, images, inversion, and conformal mapping; introduction to integral equations. Wiener-Hopf and Watson transformations. Saddlepoint integration. Variational techniques. (EEEE-754, -755, -756)

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**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

Mathematical Programming**EIEI-705****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

Survey of Operations Research**EIEI-710****Registration #0303-710**

Methods of modeling and simulating man-machine systems. Model validation, design of simulation experiments, variance reduction techniques, random number generation and distribution generation are discussed. However, emphasis is placed on the G.P.S.S. simulation language.

Credit 4

Systems Simulation**EIEI-718****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

Inventory Design**EIEI-720****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 is encouraged.

Credit 4

Production Control**EI EI-723****Registration #0303-723**

Principles of plant layout and material handling. Topics covered include criterion selection, cost elements, the layout design process, SLP, computerized plant layout and quantitative plant layout and material handling techniques relating to operations research.

Credit 4

Facilities Planning**EIEI-725****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

Technological Forecasting**EIEI-730****Registration #0303-703**

Basic functional anatomy and physiology. Human body systems. Anthropometry. Applications on the design for man and man-machine systems. Work physiology. Industrial biomechanics.

Credit 4

Biotechnology and Human Factors I**EIEI-731****Registration #0303-731**

Effect of mechanical and physical environment on: physiology, behavior, performance of man. Design considerations to protect man against environmental effects (thermal environment, noise, vibration, acceleration, light, altitude).

Credit 4

Biotechnology and Human Factors II**EIEI-732****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

Biotechnology and Human Factors III**EIEI-733****Registration #0303-733**

Measurements of human performance. Functions that man performs in man-machine systems. Techniques to quantify man's behavior at work.

Credit 4

Biotechnology and Human Factors IV**EIEI-734****Registration #0303-734**

Accident study of the human component in occupational systems. Product systems safety analysis. Approaches in accident prevention.

Credit 4

Systems Safety Engineering

Special courses related to a particular student's interest can be arranged via the following course:

EIEI-771, 772, 773, 774**Registration #0303-771, -772, -773, -774**

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)

Special Topics in Industrial Engineering**Mechanical Engineering**

The courses EMEM-871, EMEM-872, EMEM-873, EMEM-874, EMEM-875, and EMEM-876 are offered every year. The other courses will be offered every other year (except those listed as "offered on sufficient demand").

EMEM-692***Registration #0304-692***

Partial differentiation, chain rule, and total differential; multiple integration and manipulation of multiple integrals; linear constant coefficient ordinary differential equations; vector algebra and differentiation of vectors or complex variables.

Credit 4 (F)

Analysis for Engineers**EMEM-693*****Registration #0304-693***

Thermodynamic properties and processes, ideal and real gas, vapors and gases; laws of thermodynamics and selected power cycles; fluid statics; control volume and conservation of mass, momentum and energy; Bernoulli's equation; viscosity, loss of heat due to friction (flow through pipes), concept of boundary layer; basic law of conduction; convection; radiation.

Credit 4 (T.B.A.)

Thermo Fluid System Analysis**EMEM-697*****Registration #0304-697***

Methods currently employed in component and system analysis of the static and dynamic behavior of rigid and elastic bodies. The topics will include a review and advanced studies of vector statics and dynamics of rigid and elastic bodies and systems.

Credit 4 (T.B.A.)

Applied Mechanics System Analysis**EMEM-812****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-685 or equivalent)

Credit 4 (T.B.A.)

Theory of Plates and Shells

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 (T.B.A.)

EMEM-816 Finite Elements**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. (EMEM-694 or equivalent)

Credit 4 (T.B.A.)

EMEM-821 Vibration Theory and Applications

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 situations.

Credit 4 (T.B.A.)

EMEM-828, 829 Special Topics in 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-833 Heat Exchanger Design**Registration #0304-833**

The course covers analytical models for forced convection through tubes and over surfaces, experimental correlations for the Nusselt number and pressure drop; design of single and multiple pass shell and tube heat exchangers; compact, baffled, direct contact, plate, and fluidbed bed heat exchangers; radiators, recuperators, and regenerators. (EMEM-514)

Credit 4 (T.B.A.)

EMEM-845 Turbomachinery**Registration #0304-845**

One-dimensional analysis of centrifugal pumps, water turbines, and axial flow turbines and compressors. Emphasis on blending the application of physical principles, dimensional analysis, and empirical data to design turbomachines. (EMEM-516)

Credit 4 (T.B.A.)

EMEM-848, 849 Special Topics in Thermo 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) (T.B.A.)

EMEM-858, 859 Special Topics in 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) (T.B.A.)

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 (T.B.A.)

EMEM-871 Mathematics for Engineers**Registration #0304-871**

Vector calculus, directional derivative, gradient, divergence, curl, Gauss, Green and Stokes Theorem, solutions to ordinary differential equations using the method of Frobenius, and Laplace transforms, and an introduction to complex numbers. (SMAM-308, EMEM-692, or equivalent)

Credit 4 (W)

EMEM-872 Mechanics**Registration #0304-872**

Advanced dynamics and vibrations are emphasized. Newtonian vector mechanics and energy formulations are applied to two- and three-dimensional problems of single and multi-degree of freedom. The concepts of Virtual Work, Hamilton's Principle, and Lagrange's equations are covered. The vibration of discrete multi-mass systems includes the formulation and eigenvalue solutions by computer, and the method of finite elements are included. The vibration of continuous systems and discrete modeling is introduced. (SMAM-308 or EMEM-692 and EMEM-543)

Credit 4 (Sp)

EMEM-873 Heat Transfer**Registration #0304-873**

Formulation of the heat conduction equation, solution of the one-dimensional, unsteady heat conduction equation by separation of variables; Sturm-Liouville system, orthogonal functions, generalized Fourier series, Bessel functions. Solution of the two-dimensional, steady heat conduction equation; Cartesian and cylindrical geometry. (SMAM-308, EMEM-514)

Credit 4 (Sp)

EMEM-874**Numerical Methods****Registration #0304-874**

The course emphasizes the use of digital computers for obtaining solutions to practical engineering problems through numerical techniques. Algebraic and transcendental equations, systems of linear algebraic equations using matrix manipulations and iterative methods, numerical integration and differentiation, ordinary differential equations including initial value and boundary value problems, partial differential equations including elliptic, parabolic, and hyperbolic with stability analysis. Extensive use of the computer will be required. (Graduate standing and experience in the use of digital computers)

Credit 4 (F)

EMEM-875**Instrumentation and Experimental Analysis****Registration #0304-875**

Various displacement, strain, velocity, acceleration, pressure transducers will be discussed along with the associated electronic equipment and recorders to measure and record the variables. A laboratory session will be substituted in place of class when experiments are assigned. The static and dynamic characteristics of the instruments will be obtained as these instruments are mathematically modeled and subjected to impulse, step and ramp frequency functions of time. (Graduate standing)

Credit 4 (W)

EMEM-876**Engineering Materials****Registration #0304-876**

Review of the physical metallurgy, effects of alloying elements in steel, corrosion, fatigue, fracture, high and low temperature behavior, plastics, welding. (EMEM-344)

Credit 4 (F)

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) (F, W, Sp, Su)

Courses will be offered in the following areas if there is sufficient demand.

Introduction to Continuum Mechanics
Theory of Elasticity
Energy Methods in Mechanics
Advanced Finite Elements
Analytical Mechanics
Advanced Vibration Theory
Lubrication
Advanced Heat Transfer
Thermodynamics
Statistical Thermodynamics
Fluid Dynamics
Gas Dynamics
Automatic Control Systems
Optimal Control Systems Design
Thermal Stresses
Solid Waste Management



Graduate Faculty College of Engineering

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

Swaminathan Madhu, Ph.D., University of Washington—Associate Dean, Graduate Studies; Professor, Electrical Engineering

Wendy L. Baker, Ph.D., Michigan State University—Assistant Dean

Electrical Engineering Department

Harvey E. Rhody, Ph.D., Syracuse—Professor, Communication Theory, Department Head

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

John F. Carson, MS, MIT—Associate Professor, Optical Engineering

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

Soheil A. Dianat, Ph.D., George Washington University—Visiting Assistant Professor, Control Systems

Lynn Fuller, Ph.D., Buffalo—Associate Professor, Solid State Devices and Microelectronics

Kenneth Hsu, Ph.D., Marquette—Assistant Professor, Microcomputers and Control Systems

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

Robert Houde, Ph.D., University of Michigan—Visiting Associate Professor, Communication Systems

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

A.V. Mathew, Ph.D., Queens University (Ontario)—Visiting Professor, Control Systems

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

David Perlman, MS, Cornell University—Associate Professor, Electronics

Sadasiva S. Rao, Ph.D., Mississippi—Visiting Assistant Professor, Electromagnetic Theory

Pratapa Reddy, Ph.D., Indian Inst. of Tech.—Visiting Assistant Professor, Digital Systems

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

Tapan K. Sarkar, Ph.D., Syracuse—Associate Professor, E.M. Fields, Antenna Theory

A. Chandra Sekar, Ph.D., Indian Inst. of Tech.—Visiting Associate Professor, Power Systems

Ronald B. Standler, Ph.D., NM State Institute of Mining and Technology—Assistant Professor, Electromagnetic Theory

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

Raman M. Unnikrishnan, Ph.D., Missouri—Associate Professor, Power Electronics, Control Systems

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

Adjunct Faculty in Electrical Engineering

Louis Gabello, MS, RIT—Eastman Kodak Company, Filter Design

Alex Martens, MS, Rochester—Vice President, Bausch and Lomb, R&D Management

Douglas Sargent, Ph.D., NTID, Digital Signal Processing and Microcomputers

James Schueckler, MS, RIT—Eastman Kodak Company, Microcomputers

Industrial Engineering Department

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

Barbara J. Brenner, MSIE, Purdue University—Instructor, Simulation, Organizational Behavior, Work Measurement

Rajendra B. Nalavade, Ph.D., Ohio State University—Assistant Professor, Statistics, Man-Machine Systems

Sudhakar R. Paidy, Ph.D., Kansas State University—Associate Professor, Statistics, Reliability, and Operations Research

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

Kai Sung, Ph.D., Case Western Reserve—Distinguished Visiting Professor, Systems Engineering, Operations Research

Mechanical Engineering Department

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

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

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

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

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

Amitabha Ghosh, Ph.D., Mississippi State University—Visiting Assistant

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

Ray C. Johnson, M.S., University of Rochester—James E. Gleason Professor, Optimal Design

Satish G. Kandlikar, Ph.D., Indian Institute of Technology—Assistant Professor, Thermal Systems and Energy

Richard Kenyon, Ph.D., P.E., Syracuse—Professor, Thermodynamics and Fluid Mechanics

Hyun W. Kim, Ph.D., University of Toledo—Visiting Assistant Professor, Fluid Mechanics, Mathematics

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

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

Frank Sciremammano, Jr., Ph.D., University of Rochester—Assistant Professor, Geophysical Fluid Dynamics and Environmental Control

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 & Applied Arts



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 industrial and interior design, graphic design, medical illustration*, painting and printmaking 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 prepares graduates to teach at colleges and at secondary levels through a concentration in art education.

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; it stimulates and encourages work of the highest quality. Students of superior ability who possess a baccalaureate degree in art, crafts or design 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, industrial and interior design, painting, sculpture, printmaking, or one of the five 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, seminars, 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 may be taken in nine studio areas and in art education. The art education concentration leads toward permanent art N-12 certification to teach in the public schools of the State of New York and involves pedagogical studies and student teaching. The master of science for teachers may also be pursued in the studio areas of graphic design, industrial and interior design,

*Only MFA in Medical Illustration.



painting, printmaking, ceramics and ceramic sculpture, glass, metalcrafts and jewelry, weaving and textile design and woodworking and furniture design. This MST in studio may also lead to certification if provisional or temporary certification has been previously earned as an undergraduate. Students may select the three summer option or one year full-time study for this studio concentration.

The second graduate degree is the master of fine arts, considered the highest degree of study in the studio arts. This involves the presentation of a thesis and usually requires two years of full-time study.

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, craftsmen and teachers who can meet the needs of the environmental condition through high standards of personal discipline.

Requirements for admission to the MST degree programs

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 education, or industrial arts education. Applicants with different backgrounds 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 a minimum of 10 quarter credit hours in liberal studies or humanities.

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

Requirements for admission to the MFA degree programs

The applicant should hold the baccalaureate degree in a field of the arts, science 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 12 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. Extended study may require additional time on campus.

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. A 3.0 grade point average must be maintained.

Teacher education 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 (studio concentration) 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.

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 12 quarter credits (nine 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 preceding years.

Policy regarding student work

The College of Fine and Applied Arts reserves the right to retain student work for educational use or exhibition for a period of time not to exceed one and one-half quarters beyond the year the object has been made.

Bevier Gallery

During the year, the Bevier Gallery presents a continuing series of important exhibitions planned to present new directions in the fields of 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 90 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. 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 the MST course of study.

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: graphic design, industrial and interior design, painting, printmaking, ceramics, metals, textiles, wood or glass. Three summer sessions can accommodate teachers seeking permanent certification through study in an art area. The art education concentration has a September start, and is earned in one academic year.

Attendance regulations

The programs of the college utilize the studios and shop experiences as an essential part of the educational program; therefore it is imperative that the student regularly attend all classes unless specifically excused for special projects or activities by the instructors. Failure to attend classes, and to complete assignments, will be taken into consideration in grading.



Peter Giopulos

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 and Design, but all of them, Giopulos, says, have "depth within the major and allow for a minor sequence and electives, which are available from many other programs."

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., Ph.D.). He has been on the faculty of the College of Fine and Applied Arts for 14 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:

1. Major concentration 30 cr.
Designed to give depth of experience in the area of the student's major interest and chosen from one of the ten areas: ceramics and ceramic sculpture, metalcrafts and jewelry, woodworking and furniture design, weaving and textile design, glass, industrial and interior design, graphic design, fine art (painting), fine art (printmaking), medical illustration.
2. Minor Concentration* 15
From the above, to consist of studio and related electives, or internship, other than major.
3. Electives 18
4. Graduate Forum 3
5. Humanities, art history 10
6. Thesis 14
- Total 90 cr.

The 15 credits of minor for Medical Illustration are required in Instructional Technology: ICIT-715, Instructional TV; ICIT-700, Introduction to Instructional Technology; ICIT-703, Training Health Professionals; ICIT-762, Management Budgeting; ICIT-757, Techniques of Work Analysis; ICIT-719, Programmed Instruction. See College of Applied Science and Technology for course descriptions.

Another minor concentration can be arranged for those interested in teaching at a two-year collegel. The three required courses concern: 1) the student; 2) the institution; and 3) methods, along with 11 weeks of teaching in an area community college.

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

MST ART EDUCATION

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



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

MST STUDIO

2. 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.

Major Concentration:	
Studio art, or crafts	24 cr.
Art history and humanities	10
Minor Concentration	9
Electives	5
Total	48 cr.

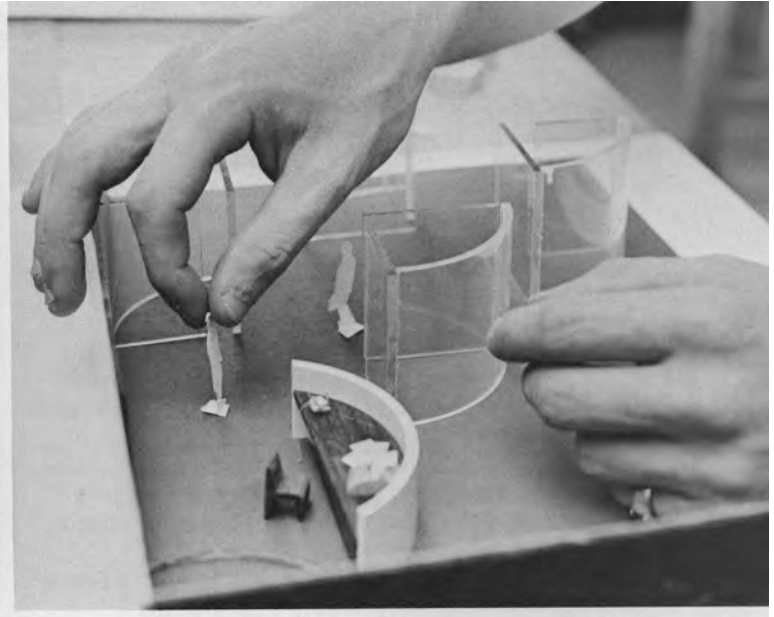
The City Center

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.

	MFA	MST STUDIO	MST ART EDUCATION
Major	30 credits	24 credits	22 credits
Minor	15	14	
Humanities	10	10	20 Social Sciences
Graduate Forum	3		
Electives	18		6
Thesis	14		
	90 credits	*48 credits	**48 credits

*One year or three summers
**September start only

*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.



Portfolio Guidelines For Graduate Applicants

The following guidelines are presented for all graduate students applying to the College of Fine and Applied Arts* Presentation of the portfolio is one of the requirements used in totally assessing the performance and academic capabilities of the applicant.

1. The portfolio should contain examples of at least 20-24 pieces of the applicant's best work—35mm slides are preferred, displayed in an 8 1/2" x 11" vinyl slide protector page.
2. Slides will be returned by the College of Fine and Applied Arts only when return postage is enclosed.
3. While every precaution will be taken to insure proper care and handling, the Institute assumes no responsibility for loss or damage to slides.
4. Identify slides by name and address. Please send portfolio and all other application materials to:

Rochester Institute of Technology

Office of Admissions
One Lomb Memorial Drive
Box 9887
Rochester, New York 14623
Telephone: (716) 475-6631

industrial and interior design and art education majors are offered only during Fall, Winter and Spring Quarters. Art education applicants should arrange a personal interview with Dr. Peter Giopulos, associate dean, College of Fine and Applied Arts (716) 475-2634.

School of Art and Design

Beginning September 1982, the Communication Design program name has been changed to Graphic Design, and Environmental Design has been changed to Industrial and Interior Design.

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 (MST) **Methods and Materials in Art Education**
Registration #0401-701, -702 **(Major)**
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 (offered every year-Fall, Winter)

FADA-820 (MST) **Seminar in Art Education**
Registration #0401-820 **(Major)**
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 (offered every year-Spring)

FADA-860 (MST)
Registration #0401-860

Practice Teaching in Art
(Major)

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 (offered every year-Spring)

Graphic Design

Beginning September 1982, the Communication Design program name has been changed to Graphic Design, and Environmental Design has been changed to Industrial and Interior Design.

FADC-750 (elective, minor)
Registration #0402-750

Graphic Design

Advanced creative problem solving experiences in graphic design imagery. Professional problems in visual techniques for communication media. Media Center facility available for extension of studio problems.

Lab. 6, Credit 3 (offered every quarter)

FADC-780
Registration #0402-780

Graphic Design
(Major)

Advanced creative problem-solving experiences relating to graphic design imagery. Formal design values are emphasized and utilized in communications applications. Studio involvement is directed toward the solution of individual, group and assigned graphic design problems. Specification of the program is developed in accordance with the professional goal of the individual student and work leading toward the master's thesis. Media Center facilities are available for application of studio imagery.

Lab. 9-27, Credit 3-9 (offered every quarter)

Industrial and Interior Design

FADD-750 (elective, minor)
Registration #0403-750

Industrial and Interior Design

The reasoned application of theoretical and practical background to advanced projects in industrial and interior design.

Lab. 6, Credit 3 (offered every quarter)

FADD-780
Registration #0403-780

Industrial and Interior Design
(Major)

Selected projects in industrial or interior design which allow individual application of design methodology and technical skills toward professional goals. Selection of the projects is directed at providing an adequate background for development of the master's thesis.

Lab. 9-27, Credit 3-9 (offered every quarter)

Painting

FADP-750 (elective, minor)
Registration #0405-750

Painting

The study of the techniques and concepts of present day painting and its relation to the great sweep of the painting of the past for those who intend to paint and to teach.

Lab. 6, Credit 3 (offered every quarter)

FADP-780
Registration #0405-780

Painting
(Major)

The pursuit of the pertinent, the ecstatic, the beautiful, by a small group of those dedicated to the art. The student will become familiar with the trends and questings of modern painting, and by strengthening both intellectual and technical facilities, be prepared for a career as a professional painter. The work leads toward the master's thesis.

Lab. 9-27, Credit 3-9 (offered every quarter)

Printmaking

FADR-750 (elective, minor) Registration #0406-750

Advanced techniques in etching, lithography and woodcutting, as well as in many experimental areas including color processes, photo-etching, photo-lithography, paper making and combination printing. 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. 6, Credit 3 (offered every quarter)

FADR-780 Registration #0406-780

Contemporary and historical printmaking concepts are presented as stimulant and provocation for the development of an individual approach to expression. Advanced techniques are demonstrated in intaglio, relief and lithography with resources available in non-silver photo processes, paper making and combinations. A complete understanding of the development and maintenance of the print studio is supportive for the professional artist. The work leads toward the master's thesis.

Lab. 9-27, Credit 3-9 (offered every quarter)

Printmaking

Printmaking (Major)

Thesis

FADM-784

Registration #0408-784

Medical Illustration Surgical II (MFA Major)
A continuation of Surgical Illustration I, wherein students: work and communicate closely with the surgeon. Interpret medical terminology and recognize relevant issues and problems affecting the illustration. Develop an analysis of theoretical concepts when planning, executing, and evaluating surgical illustrations for the doctor and the publisher.

Lab. 6, Credit 3 (offered each year)

FADM-785

Registration #0408-785

Medical Illustration Exhibits and Design (MFA Major)
Students will learn to plan cost, analyze and design three-dimensional illustrations for in-house presentation or for traveling displays. Practical experience will be given in the problems of collaborating with clients, selecting appropriate display techniques and modes, and developing a manageable display for the health services.

Lab. 6, Credit 3 (offered each year)

PPHB-781

Medical Illustration Photography (MFA Major)

See description under School of Photography

Sculpture

FADS-7S0 Registration #0407-7S0

Sculptural concepts are approached through a variety of processes and materials. The studio work is executed in paper, wood, fabrics, metal, stone, clay and plastics.

Lab. 6, Credit 3 (offered each year)

Sculpture

Medical Illustration

FADM-781 Registration #03408-781

Medical Illustration Topics (MFA Major)
This is an introductory course, designed to acquaint the illustration student with art techniques commonly used in medical illustration, and with the medical library and audio-visual television supporting milieu in which the medical illustrator works. Emphasis will be placed upon the anatomical relationships of the cadaver pertinent to illustrating operative procedures.

Lab. 6, Credit 3 (offered each year)

FADM-782 Registration #0408-782

Medical Illustration Graphics (MFA Major)
A course emphasizing the use of titles, animation, charts and graphs, schematics, and illustrative procedures as vehicles for meeting instructional and communicative needs. Students will learn the various techniques available and will apply those techniques to needs presented, culminating in a personal project dealing with "real world" contingencies.

Lab. 6, Credit 3 (offered each year)

FADM-783 Registration #0408-783

Medical Illustration Surgical I (MFA Major)
Students will apply their knowledge of anatomy to illustrating operative procedures. Emphasis will be placed on techniques for surgical illustration and situations wherein those techniques are appropriated. Students will learn to simplify and highlight complex procedures. Finally, they will select illustrative techniques best suited for reproduction in medical journals, texts, motion pictures and television.

Lab. 6, Credit 3 (offered each year)

Medical Illustration Surgical I (MFA Major)

Research and Thesis Guidance

FAD (C, D, P, R or M)-890 Registration #040 (2, 3, 5, 6 or 8)-890

The development of a thesis project instigated by the student and supervised by a faculty committee. Primarily creative production, the thesis must also include a written report. The thesis must be accepted by a majority of the three-man committee as well as meet the approval of the Special Assistant to the Dean for Graduate Affairs and the Dean of the College of Fine and Applied Arts.

Credit 12 (offered every quarter)

School for American Craftsmen

Ceramics and Ceramic Sculpture

FSCC-750 (elective, minor)
Registration #0409-750

Ceramics and Ceramic Sculpture

Basic instruction and experience in ceramic design, fabrication and production of ceramic forms is undertaken. This study provides ceramic technology and terminology and gives experience with clays along with fundamental forming techniques. The development of design awareness is encouraged through lectures and critiques.

Lab. 6, Credit 3 (offered every quarter)

FSCC-780
Registration #0409-780

Ceramics and Ceramic Sculpture (Major)

A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. There will be a strengthening of ceramic techniques, design fundamentals and encouragement of personal ceramic expression. The student will be encouraged to evaluate new techniques, materials and concepts. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

Lab. 9-27, Credit 3 (offered every quarter)

Glass

FSCG-720 (elective minor)
Registration #0411-720

Stained Glass

This elective explores stained glass designing, cutting, soldering, foiling, leading, glazing, and other fabrication techniques.

Lab. 6, Credit 3 (offered each year)

FSCG-750 (elective, minor)
Registration #0411-750

Glass

Various techniques in both cold and hot glass will be considered: casting, slumping, faceting, blowing, cutting, electroplating, lamp working, enameling, and sculptural construction.

Lab. 6, Credit 3 (offered every quarter)

FSCG-780
Registration #0411-780

Glass (Major)

The study and manipulation of hot glass, including refinement of traditional and innovation of new techniques will be undertaken: design, cold glass, sagging, slumping, casting, industrial and studio glass lines, copper wheel and stone engraving along with glass technology and history. The program is structured on individual needs, interests and background preparation as they may be determined through faculty counseling. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

Lab. 9-27, Credit 3-9 (offered every quarter)

Metalcrafts and Jewelry

FSCM-750 (elective, minor)
Registration #0412-750

Metalcrafts and Jewelry

This is the study and manipulation of metals for hollow ware/jewelry. Design sensitivity and concepts are approached through the raising, forming and planishing or casting, forging, and fabricating techniques.

Lab. 6, Credit 3 (offered every quarter)

FSCM-780
Registration #0412-780

Metalcrafts and Jewelry (Major)

A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. Both hollow ware and jewelry areas will be explored. It is designed to give the student a broad exposure to metal working techniques, expand the student's knowledge of applied design, strengthen perceptual and philosophical concepts and develop an individual mode of expression. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

Lab. 9-27, Credit 3-9 (offered every quarter)

Weaving and Textile Design

FSCT-750 (elective, minor)
Registration #0413-750

Weaving and Textile Design

This is the study and appreciation of weaving and textile techniques, soft sculpture, off loom weaving and printing. Design approaches are stressed.

Lab. 6, Credit 3 (offered every quarter)

FSCT-780
Registration #0413-780

Weaving and Textile Design (Major)

A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. Techniques offered are combination weaves and pattern design, double weave, embroidery and stitchery, finn-weave, ikat, multiple layer, dyeing, non-loom, pile rug, printed surface, silkscreen, tapestry, and soft sculpture. Design concepts are compliments to the techniques. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

Lab. 9-27, Credit 3-9 (offered every quarter)

Woodworking and Furniture Design

FSCW-750 (elective, minor) **Woodworking and Furniture Design**
Registration #0414-750

This is a course in woodworking techniques and procedures. It enables the student to gain design competency through wood and an individual solution to wood projects based on suggested needs.

Lab. 6, Credit 3 (offered every quarter)

FSCW-780
Registration #0414-780

Woodworking and Furniture Design (Major)

A program structured on the basis of individual needs, interests and background preparation as they may be determined through faculty counseling. This provides an opportunity for technical, aesthetic and design competency to grow through the exploration of hand and machine tools; solid wood theory, joinery and practice; veneer theory, and practice; production theory; chair, table, cabinet design and construction. This sequence leads to the master's thesis, suggested by the student and approved by the faculty.

Lab. 9-27, Credit 3-9 (offered every quarter)

Thesis

FSC (C, G, M, T or W)-890

Research and Thesis Guidance

Registration #04 (09,11,12,13 or 14) -890

Research and presentation of an acceptable thesis with afocus on technique, design, production, or a combination of these approved by a faculty committee. Primarily creative production, the thesis must also include a written report. The thesis must be accepted by a majority of the three-man committee as well as meet the approval of the Special Assistant to the Dean for Graduate Affairs and the Dean of the College of Fine and Applied Arts.

Lab. 27, Credit 12 (offered every quarter)

Graduate Faculty College of Fine and Applied Arts

Robert H. Johnston, Ph.D., Pennsylvania State University—Dean

Peter Giopulos, Ph.D., Pennsylvania State University—Associate Dean

Philip W. Bornarth, MAE 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 Craftsmen

Hans Christensen, Diploma, National College of Arts and Crafts, Copenhagen—Charlotte Fredericks Mowris Professor of Contemporary Crafts, School for American Craftsmen

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

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

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

Graham Marks, MFA, Alfred University, Assistant Professor, Ceramics, School for American Craftsmen

Craig McArt, MFA, Rochester Institute of Technology—Professor, Industrial and Interior Design, School of Art and Design

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

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

Robert Schmitz, MFA, University of Wisconsin; MS, Alfred University—Associate Professor, Ceramics, School for American Craftsmen

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, Industrial and Interior Design, School of Art and Design

James C. Ver Hague, Jr., MFA, State University of New York at Buffalo; MS, Rensselaer Polytechnic Institute—Associate Professor, Graphic 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



College of General Studies



Mary Sullivan, Dean

The college provides a number of graduate courses as part of some of the master's degree programs of Rochester Institute of Technology. A primary objective of the course offerings is to complement the professional emphasis of these programs by contributing humanistic perspectives; that is, by exploring the humanistic implications embodied in these programs. In this way these courses play an integral role in professional education by making a direct and distinctive contribution to the student's preparation for a specialized career.

General Studies

Graduate Courses

GLLL-702

Film and Society

Registration #0504-702

An inquiry concerning the relationship between motion pictures and society that will use historical, humanistic, and social science research to achieve an understanding of movies as a social force, industry, and art form.

Class 3, Credit 5 (offered occasionally)

GSHF-702

Film History and Criticism

Registration #0505-702

A critical examination of key aspects of film criticism and of the development of film as an art. The emphasis of the course will be historical, with the development of cinema being traced through major films by important directors. There will be an opportunity to pursue individual interests.

Class 3, Credit 4 (offered occasionally)

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 centuries.

Class 3, Credit 5 (offered occasionally)

GSHF-705

Theories of Aesthetics and Art Criticism

Registration #0505-705

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 4 (offered occasionally)

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 will be discussed.

Class 3, Credit 5 (offered occasionally)

GSHF-708

Oriental Art

Registration #0505-708

A seminar exploring the philosophical and cultural perspectives underlying traditional Far Eastern art as a prelude to examining selected topics in Indian, Chinese and Japanese art. Emphasis will be placed on the application of research techniques and critical methods to an individually selected area of interest which may serve as a foundation for continuing study.

Class 3, Credit 5 (offered occasionally)

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 (offered occasionally)

GSHF-712

Arts and Crafts in Tribal Societies

Registration #0505-712

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 (offered occasionally)

GSHF-713

Contemporary Issues in Art

Registration #0505-713

This course offers the graduate art student the opportunity to investigate those aspects of 20th century art that question the very nature of art and the role of the artist in today's and tomorrow's society.

Class 3, Credit 5 (offered occasionally)

GSHF-714**Art: Vision and Concept****Registration #0505-714**

Though the course will develop chronologically from the Renaissance to the present, emphasis will be placed on a close analysis of (1) selected works of art, including paintings, sculpture and architecture, and (2) the development of the unique oeuvre of selected artists. Topics chosen for study will be limited in number but treated in depth. Topical choices will be based on richness and import of the formal and/or conceptual content embodied therein. Some background in the history of art is helpful but not necessary.

Class 3, Credit 5 (offered occasionally)

GSHF-715**Picasso****Registration #0505-715**

The impact of Picasso and his circle on 20th century art. Their affinities with modern scientific and philosophical attitudes will also be discussed.

Class 3, Credit 5 (offered occasionally)

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 (offered occasionally)

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 (offered on sufficient demand)

GSHH-701**History of American Educational Thought and Practice****Registration #0507-701**

This course traces the history of formal and informal education in America from the colonial era to the present. It examines the growth of progressive education and the evolution of the open education movement of the 1960's and 1970's. The course evaluates the role of education among women and ethnic and religious minorities. Emphasis is given to such educative institutions as family, television, churches, factories, business corporations, public libraries and art galleries.

Class 3, Credit 5 (offered occasionally)

GSHP-705**Seminar in Aesthetics****Registration #0509-705**

A range of questions will be addressed in the seminar. What is it to perceive something aesthetically? Are there any essential or defining properties shared by all works of art? Are our evaluations and interpretations of art works objective or subjective? Are an artist's intentions relevant factors in critical arguments? Understanding how answers to these questions are constrained by features of actual art works will be an important part of discussion.

Class 3, Credit 5 (offered occasionally)

GSSP-701**Developmental Psychology****Registration #0514-701**

This course seeks to investigate the broad development patterns of human behavior with emphasis upon the cognitive and moral aspects of development, personality and culturally patterned behaviors. Consideration is given to major theoretical perspectives. It is strongly suggested that students have a background in introductory psychology before taking this course.

Class 3, Credit 5 (offered annually)

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 help students apply them to concrete situations that may arise when teaching. Students will find the material covered in Developmental Psychology (GSSP-701) useful for this course.

Class 3, Credit 5 (offered annually)

GSSS-701**Educational Sociology****Registration #0515-701**

This course is designed to furnish students with an understanding of the basic sociological processes underlying the educational process and to help students apply them to concrete situations that may arise for teachers.

Class 3, Credit 5 (offered annually)

Graduate Faculty College of General Studies

Mary Sullivan, Ph.D., Notre Dame—
Dean, Professor

Robert Golden, Ph.D., Rochester—
Associate Dean, Associate
Professor

Dane Gordon, MA, Cambridge and
Rochester—Associate Dean,
Professor

Bruce Austin, Ph.D., Temple
University—Assistant Professor,
Communications

Douglas Coffey, MA, Case Western
Reserve—Associate Professor, Fine
Arts

Kathleen Chen, Ph.D., Pennsylvania
State—Professor, Psychology

Morton Isaacs, Ph.D., Yeshiva—
Professor, Psychology

Tina Lent, MA, University of
California, Los Angeles—Instructor,
Fine Arts

Salvatore Mondello, Ph.D., New York
University, Professor, History

Linda Nagle, Ph.D., Rutgers—Visiting
Assistant Professor, Philosophy

Houghton Wetherald, MA, Oberlin—
Professor, Fine Arts

Hans Zandvoort, MFA, Royal
Academy of Fine Arts, The Hague—
Professor, Fine Arts

College of Graphic Arts And Photography

Master of Science degree in Printing



Mark F. Guldin, Dean

Technology in the printing industry continues to evolve rapidly with the incorporation of innovative materials and concepts from other disciplines. This evolution covers all aspects of graphic communication as well as such non-communicative graphics as circuit printing and textile

decorating. The graduate program is designed to help the student remain current after leaving RIT.

The graduate program is specifically arranged for students so that completion prepares them for participation in a volatile industry whether in production, research or

other functions, as well as for the possibility of a career in teaching. In this regard, the program rests on theory and the applications of basic theory along with training in the use of modern equipment. The student must complete a thesis allowing him or her to bring to bear acquired knowledge on a specific problem. Thesis work affords the student the opportunity to contribute to the knowledge of the printing technologies. This work is done under the guidance of faculty experienced in that area of printing on which the student has chosen to focus.

The graduate program recognizes the value of aesthetics in the graphic arts and allows opportunity for the student to bring technology to bear on design and attractive form. Those students whose interests run heavily to this aspect of printing, such as book design, are encouraged to master the technology so that thesis work can apply technology to aesthetic goals. The program remains a technical one, however, with strongest attraction for the students primarily interested in technology.

The Program

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. Candidates who do not have adequate undergraduate work in printing must make up foundation courses prior to matriculating into the program.

The printing technology major provides graduate level study in printing technology and in research methods. The program is not intended to give a broad exposure of the printing field, but to provide the student an opportunity to specialize in a particular area, and to develop research skills useful to the graphic arts. This objective is accomplished through the program's core courses, selection of electives, and the development of the thesis. The goal of the program is to educate students who will have, in addition to an understanding of the procedures and theoretical concepts in printing processes, an appreciation of particular problems in special areas at an advanced level. The students wishing to take additional course work to explore areas beyond the course requirements of the program are encouraged to take additional course work to broaden their experience in the printing field.

The printing technology major is a full-time master's degree program. The length of time required to earn a degree varies according to the student's undergraduate preparation in printing, mathematics, and science. All students must earn 48 credits as a graduate student, 36 of which must be taken at RIT, to earn the master of science degree. The program generally requires one academic year at the graduate level. Candidates who wish to enter the program, but lack adequate preparation, must take as many as 30 credits of foundation courses in printing, mathematics and science prior to matriculation. Foundation courses can be accomplished in two quarters, or one quarter and the Summer Session. With foundation course work completed, the candidate will normally start the graduate program sequence with the Fall Quarter. Some flexibility in the program does allow candidates to enter at other times during the school year.

Program Objectives

The goal of the technology major is to graduate well-educated students in both the theoretical and practical aspects of graphic arts technology. The program will provide graduates with the necessary education to approach solutions to printing problems by an orientation to processes and materials based on systematic analysis.

Preparation in the technology major provides entry as a professional into the printing field in areas such as production management, research and development, technical sales representative, quality assurance, administration, marketing, etc. Because the printing industry is large and extremely varied, the student's overall preparation, interest and background, would allow for entry level positions in these and in a number of other areas in the printing industry.

The Foundation Program

The technology major is designed for the candidate with an undergraduate degree in printing, or for the candidate who has an undergraduate degree in a discipline other than printing. The program offers an excellent opportunity for the individual who wishes to change his or her career goals, by preparing them for entry level positions in the printing field. Candidates with the necessary undergraduate course work will start the program as a matriculated graduate student.



Joseph Noga (center)

Candidates without adequate undergraduate work in printing must take foundation courses *prior* to matriculation into the graduate program. These students will enter the School of Printing as "Special Students." This will help identify the candidate in foundation courses, and allow for guidance from the program coordinator.

In addition to basic printing courses, course work in mathematics and science is expected if these courses are not indicated on the candidate's transcript. A technology degree requires entering students to have a minimum level of competency in mathematics and science. This will be helpful in the program and in the student's research activities. Basic knowledge of printing before matriculation will be helpful in giving the student more direction in terms of career goals, and assist in the development of a thesis topic at an early stage in the graduate program. Students who require foundation courses must take as many as 30 credits in printing, mathematics, and science. In the process of creating a foundation, however, they may find it desirable to draw upon the rich array of undergraduate offerings at the School of Printing by taking more courses than the minimum requirements. Six basic undergraduate printing courses, two in mathematics and one course in the physical sciences are required.

Because foundation course work can be made up in two quarters or

one quarter plus the Summer Session, most of the foundation courses are offered each quarter. To aid the candidate with the science requirement, a special chemistry course is offered in the School of Printing's Summer Session program, Chemistry Preparation for Printing Graduate Study.

Foundation courses must be completed before a student can matriculate into the graduate program, and the student must earn an overall B average in these undergraduate foundation courses to be matriculated. As students approach completion of the foundation course work, they will each petition for matriculation. Only under unusual circumstances will a student be allowed to combine a foundation course with the program core courses in order to maintain a full schedule. This will require approval of the program coordinator.

Foundation Courses

The courses listed below represent the graphic arts areas required to meet foundation course requirements.

Printing (Six Courses)

PPRT-200 Introduction To Printing
OR

PPRT-207 Printing Plates
PPRT-206 Reproduction

Photography
PPRT-208 Lithographic Press
PPRT-311 Imposition and Finishing
PPRM-301 Application of
Computers To The Graphic Arts
PPRT-201 Typography I

Special Libraries

Students may use two special libraries related to the school. The Technical and Education Center of the Graphic Arts maintains a library of current printing-related information. Some students find employment in the center writing abstracts for its publications. The School of Printing has the Melbert B. Cary, Jr. Graphic Arts Collection, composed of more than 9,000 volumes including many rare books and other materials illustrating past and present fine printing, book design and illustrations, papermaking, and other aspects of the graphic arts. The Frederick W. Goudy-Howard W. Coggeshall Memorial Workshop contains letters, papers, and memorabilia of Mr. Goudy along with cases of Goudy types that can be seen only at RIT, because matrices for their manufacture were destroyed by fire in 1939.

Additional information

Joseph L. Noga
Acting Graduate Program
Coordinator
School of Printing
(716) 475-2766

NOTE: These are the only printing subject areas acceptable to meet the foundation course requirements. Printing courses in other subject areas will not be accepted.

Mathematics (Select Two Courses)

SMAM-204 College Algebra
SMAM-214 Introductory Calculus
PPRM-210 Financial Controls I
BBUA-210 Financial Accounting
BBUA-215 Survey of Accounting Concepts

Physical Science (Select One Course)

General College Chemistry
General College Physics
Chemistry Preparation for Printing Graduate Study

Program Requirements

The master of science degree program in printing technology requires the completion of 48 quarter credit hours of study including eight hours for the thesis. If foundation courses are not required, the program can be completed in one academic year. Students who are qualified in one or more of the required courses may substitute other course work with the permission of the program coordinator.

Technology Major

Required Courses	Credits
701-Research Methods	4
709- Trends in Printing Technology	4
702- Graphic Reproduction Theory	4
703-Statistical Inference	4
713- Photo Typography Procedures	4
711-Tone and Color Analysis	4
754- Ink, Color and Substrates	4
- Electives	12
890- Thesis	8
Total	48

A Typical Schedule of Courses

Fall

702- Graphic Reproduction Theory	4
703-Statistical Inference	4
713- Photo Typography Procedures	4
- Elective	4
Total	16

Winter

701-Research Methods	4
709- Trends in Printing Technology	4
- Electives	8
Total	16

Spring

711-Tone and Color Analysis	4
754-Ink, Color and Substrates	4
890-Thesis	8
Total	16

Admissions Requirements

Prior to being admitted to the master of science degree program, applicants must satisfy the Graduate Admission 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. Applicants are also encouraged to take the Graduate Record Examination (GRE) as an aid in counseling during the development of the individual's program of studies. Requirements are:

- Written RIT application
- Earned baccalaureate degree
- Official undergraduate transcript
- Two recommendations
- An on-campus interview when possible
- Undergraduate GPA of 3.0 or higher
- Foundation course work 3.0 or higher, if required
- TOEFL score of at least 525 (international students)

If the applicant's credentials are in order, except for the necessity to take foundation courses, the candidate will be accepted as a Special Student. The applicant will be notified as to which courses will be needed to meet foundation requirements. When all of the required foundation courses have been completed (with an overall B average), the student will petition for matriculation as a graduate student.

Summer Session

The School of Printing operates a unique Summer Session program that offers undergraduate course work in two-week, concentrated sessions. This allows the candidate for the graduate program to take several foundation courses, including the special foundation course in chemistry. It also provides an opportunity for the student to take part in a wide assortment of the school's undergraduate course offerings, beyond the required foundation courses. There are no graduate courses offered during the Summer Session.



Printing Courses

Foundation Printing Courses

PPRT-200

Registration #0911 -200

For packaging science students; study of different printing processes; analysis of process advantages and disadvantages relative to a variety of applications; examination of procedures for each process, from design through finished product; practice of basic operations necessary for the production of a simple package printing job.

Class 2, Lab. 3, Credit 3

Introduction to Printing

PPRT-201

Registration #0911-201

Conventional rules of good traditional typography are reviewed through familiarization with basic terminology, type classification and typeface recognition; course includes lectures and laboratory exercises.

Class 2, Lab. 3, Credit 3

Typography I

PPRT-207

Registration #0911-207

An introductory course in the principles and practices of platemaking for letterpress, flexographic, planographic, and gravure printing processes. It covers a survey of major printing processes with emphasis on their plate characteristics and platemaking requirements; important physical as well as chemical principles that are applicable to the plate image-forming process; laboratory work that deals with plate processing variables; also an introduction to recent development in printing plate technology.

Class 2, Lab. 3, Credit 3

Printing Plates

PPRT-206

Registration #0911-206

A basic course in the fundamental principles, procedures, techniques, and applications of the photographic process as it is related to the production of film negatives or film positives for the major printing processes.

Class 2, Lab. 3, Credit 3

Reproduction Photography

PPRT-208

Registration #0911-208

An introductory study of the principles and methods of offset presswork; press functions; operations and care of presses; exercise in running simple jobs.

Class 2, Lab. 3, Credit 3

Lithographic Press

PPRT-311

Registration #0911-311

Printing production planning to correlate pre-press and post-press operations. Topics include preparing layouts, forms and a study of how they are affected by various bindery operations. Laboratory experiments include the operation of modern bindery equipment, evaluation and application of adhesives, binding materials and book performance testing. Several projects are followed through from design, signature layout to a finished product, including a gold stamped, hardcover bound book.

Class 2, Lab. 3, Credit 3

Imposition and Finishing

PPRM-301

Registration #0910-301

A study of the applications of electronic computer systems to the graphic arts industry. Topics include fundamental data processing concepts, software development, and technical and managerial graphic arts applications.

Class 4, Credit 3

Application of Computers to the Graphic Arts

Foundation Math Courses

SMAM-204

Registration #1016-204

Topics include a review of the fundamentals of algebra; solution of linear, fractional and quadratic equations; functions and their graphs; polynomial, exponential, logarithmic and trigonometric functions; systems of linear equations.

Class 4, Credit 4 (offered every year) (F, S)

College Algebra

SMAM-214

Registration #1016-214

A non-rigorous introduction to the study of differential calculus. The following topics will be covered: functions and graphs, limits, continuity, the derivative and its significance, the algebra of derivatives, chain rule, related rates, maxima and minima. (SMAM-204 or equivalent)

Class 3, Credit 3 (offered every year) (F, W)

Introductory Calculus

PPRM-210

Registration #0910-210

Gives the line manager an understanding of the firm's financial accounting system so that he or she can work with the accountant to use that system effectively. Includes balance sheet, income, funds and cash statements, ratio analysis and asset vs. expense decisions.

Class 4, Credit 3

Financial Controls I

BBUA-210

Registration #0101-210

Basic accounting principles and techniques within a framework of sound modern theory. Methods of accounting for revenues, costs, property and debt. Typical records for various types of business enterprise. Preparation and use of classified financial statements.

Class 4, Credit 4

Financial Accounting

BBUA-215

Registration #0101-215

A course for non-business majors. An introduction to the purposes and functions of accounting in a dynamic society. Emphasis is placed upon essential financial and managerial accounting concepts necessary for management planning and control.

Class 4, Credit 4 (offered upon demand)

Survey of Accounting Concepts

Foundation Science Course

PPRT-

Registration #0911 -

Chemical Preparation for Printing

Graduate Study

A study of the fundamentals of chemistry with emphasis on its relationship to printing sciences and technology. An emphasis on the role of material properties in printing processes with regard as to how chemistry determines such properties.

Class 4, Credit 4 (Summer Session Only)

Course only for Graduate Program Candidates

Printing Technology

PPRT-701

Registration #0911-701

Theory and application of principles of laboratory oriented research in the graphic 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, hypothesis-deduction, hypothesis formation, theory development, etc.

Credit 4

Research Methods in Graphic Arts

PPRT-702

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

Graphic Reproduction Theory

PPRT-703

Registration #0911-703

Descriptive statistics, patterns of variability, measures of variability, working with the normal curve, tests of hypotheses for means, tests 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 4

Statistical Inference

PPRT-709

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

Trends in Printing Technology

PPRT-711**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

Tone and Color Analysis**PPRT-713****Registration #0911-713**

An introductory course in the basic tenets 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. Emphasis is placed on photo composition and the systems approach.

Credit 4

Photo Typography Procedures**PPRT-890****Registration #0911-890**

An experimental survey of a problem area in the graphic arts.

Credit variable

Research and Thesis Guidance**PPRT-754****Registration #0911-754**

A study of the physics of light and color, basic color theory, color measurements and color systems. Included are applications of color theory to the graphic arts. The chemistry and physics of ink and substrates and their interaction will be covered. Emphasis is given to the problems of color, ink and substrates in each printing process.

Credit 4

Ink, Color and Substrates**PPRT-708****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 of study. (PPRM-301)

Credit 4

Introduction to Systems Analysis**PPRT-850****Registration #0911-850**

Individualized research projects in which independent data is collected by the student, followed by analysis and evaluation. A comprehensive written report is required. Consent of advisor required.

Credit 1 to 4

Research Projects**PPRM-702****Registration #0910-702**

Discussion 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-301)

Credit 4

Computers in Management

Graduate elective courses can also be taken in the other schools of the Institute with the approval of the graduate program coordinator. Each student can select up to 12 undergraduate credits from the School of Printing to meet degree requirements.

Elective Graduate Courses

PPRT-704**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 4

Design of Experiments

Graduate Faculty School of Printing

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

Sven Ahrenkilde, MS, Polytechnic University, Denmark—Research Associate, Technical and Education Center of the Graphic Arts

William H. Birkett, MBA, University of Michigan, C.MA—Associate Professor, Printing Management

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

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

Robert Y. Chung, MS, Rochester Institute of Technology—Instructor, Printing Plate Technology

Chester J. Daniels, MS, Rochester Institute of Technology—Senior Technologist, Technical and Education Center of the Graphic Arts

Robert G. Hacker, Ph.D., University of Iowa—Paul and Louise Miller Professor in Newspaper Management, Computer Applications

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

Irving Pobboravsky, MS, Rochester Institute of Technology—Senior Technologist, Technical and Education Center of the Graphic Arts

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

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

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

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

Hermann Zapf, Calligrapher and Type Designer—Adjunct Professor



Associates of the Graduate Faculty

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

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

Zenon A. Elyjiw, Senior Technologist—Technical and Education Center of the Graphic Arts

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

Charles A. Goodykoontz III, BS, Rochester Institute of Technology—Instructor, 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

Jack D. Jenkins, BS, Rochester Institute of Technology—Assistant Professor, Newspaper Production Management

Herbert J. Johnson, BS, Rochester Institute of Technology—Melbert B. Cary, Jr. Professor in Graphic Arts, Book Design

Richard N. McAllen, AAS, Rochester Institute of Technology—Director, Web Offset Laboratory, Technical and Education Center of the Graphic Arts

James V. Mannino, BS, Rochester Institute of Technology—Instructor, Typography

Milton Pearson, BS, Rochester Institute of Technology—Senior Technologist, Technical and Education Center of the Graphic Arts

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

Werner Rebsamen, Diploma, Academy of Fine Arts, Zurich—Associate Professor, Imposition and Finishing

Emery E. Schneider, M Ed, University of Rochester—Associate Professor, Phototypesetting

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

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

Robert S. Tompkins—Assistant Professor, Composition Specialist

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



Master 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 Technical and Educational Center of the Graphic Arts. 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-600. 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 in 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-601, 602, 603 which is equivalent to PPHS-600 in content. This sequence is offered during the evening, with Saturday laboratory sessions. Part-time students must plan to complete the graduate requirements within seven years. 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 successfully. 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 original work or non-classified work done outside of RIT which can be accepted in lieu of a thesis, and essentially fulfills 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. "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.

"One of the most interesting courses in the program is PPHS-600 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."



Dr. Ronald Francis

Course title and number

Principles of Photographic Science-PPHS-600 or PPHS-601, 602, 603
Theory of the Photographic Process-PPHS-711, 712, 713
Mathematics and Statistics for Photographic Systems-PPHS-721, 722<2>
Instrumental and Photographic Optics-PPHS-731, 732, 733
Analysis and Evaluation of Imaging Systems-PPHS-741, 742, 743
Research and Thesis Guidance-PPHS-890³J

Quarter Credit Hours

Fall Winter Spring

Course	Fall	Winter	Spring
Principles of Photographic Science-PPHS-600 or PPHS-601, 602, 603	No Graduate Credit<sup>t>		
Theory of the Photographic Process-PPHS-711, 712, 713	3	3	3
Mathematics and Statistics for Photographic Systems-PPHS-721, 722<sup>2>	4	4	
Instrumental and Photographic Optics-PPHS-731, 732, 733	3	3	3
Analysis and Evaluation of Imaging Systems-PPHS-741, 742, 743	3	4	3
Research and Thesis Guidance-PPHS-890 ³ J	1	1	

(1) The three quarters cover photographic chemistry, radiometry, sensitometry, tone reproduction, and color. Courses PPHS-600, 601, 602, and 603 are intended for students who previously received acceptance into the MS program in photographic science. Other students are welcome if they have the necessary background in physics, mathematics, and chemistry. Consent of the Graduate Coordinator is necessary for registration. Each quarter of PPHS-601, 602, 603 carries 5 undergraduate quarter credits. PPHS-600 carries 15 quarter credits.

(2) Students in the part-time program may substitute College of Continuing Education courses CTAM-711, CTAM-712, and CTAM-801. PPHS-721, 722 is not offered during the evening hours.
(3) The remaining 7 credits are distributed as required by project work.

* All graduate courses applied toward the degree, including Research and Thesis, must be completed within seven years.

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 on 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 the program. Flexibility extends beyond what is to be learned to *where* it can be learned and *how* it can be learned and validated.

Photography is offered as a major with minor concentrations in printmaking, film making, printing, and museum practice. Successful completion of the program enables a student to pursue careers in education, museums, business and as self-employed professionals.

The broad goals of the program are to:

1. Provide students with the opportunity to use photography as a means to pursuing a career and earning a livelihood.

2. Provide students with the opportunity to use photography as a means of enriching their personal lives and the lives of society.

3. Provide an environment that encourages a sense of community, creativity, scholarship and purpose.

Electives and minors

No minor concentration is required, but a grouping of electives in a particular area of interest is available. Minors can be pursued in printmaking, film making, museum practice and printing. Minor concentration must be planned with and approved by the Coordinator. Elective courses are available in film making, television, animation, printmaking, painting, communications design, museum studies, crafts, bookbinding, typography, color photography, mixed media, studio photography, advertising photography,



perception, sensitometry, computer graphics, and materials and processes of photography. There are also opportunities for independent studies and experiential study.

Museum Studies

This is a two and one half year program that awards a master of fine arts degree and is designed to train individuals in the care, management and interpretation of photographic collections. Theoretical training, which takes place in seminars at Rochester Institute of Technology and the Visual Studies Workshop, is complemented by experiential learning at the Visual Studies Workshop and the International Museum of Photography at the George Eastman House.

The program is coordinated by Nathan Lyons, director, Visual Studies Workshop.

The faculty

The MFA photography program is supported by a staff of 50 faculty members within the School of Photographic Arts and Sciences and adjunct faculty members at the International Museum of Photography, George Eastman House and the Visual Studies Workshop.

Faculty and course work are also available from the School of Printing, College of Fine and Applied Arts and College of General Studies. Resource personnel from RIT's Technical and Educational Center for the Graphic Arts also support the program by providing students with technical advice and by serving as members of their thesis board.

Admission requirements

Students with a baccalaureate degree from an accredited college or university are eligible for admission provided they present a portfolio of work that demonstrates their photographic skills, visual sophistication and aesthetic awareness. (Museum studies applicants will present different documentation.) Acceptance is on the strength of their portfolios as judged by the graduate faculty, on their past academic performance, letters of recommendation and their personal statements of purpose. Applicants who are capable of good academic work as well as artistic visual expression and who demonstrate an interest in the exploration of new artistic ideas and

experiences will be favored. The graduate faculty will make recommendations to the coordinator of the program based on the above interlocking criteria.

Students who are judged to need more study in the general areas of art and photography will be advised to take such courses either prior to entrance or during their first year of study. Recommendations will be made by the coordinator with advice from the appropriate faculty member. Areas of art and photography include art history, photographic history, aesthetics, criticism, and general studio work (painting, sculpture, crafts, printmaking, photography, photographic printing, any form of image making).

Transfer credit

Course work taken prior to admission to the program should be submitted for approval upon entrance into the program. Up to 12 quarter credit hours of B or better (nine 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.

About 15 black-and-white and/or color photographs that represent a cohesive body of work should be sent. (The word *photograph* includes such photo-related media as printmaking, screen printing, electrophotography, color proofing, gum bichromate, cyanotype and albumen.) *Original* prints, slides or transparencies provide the best means of assessment. Slides should be sent in pocketed plastic sheets. Copy slides of original work are discouraged. Prints can be sent mounted or unmounted. Please put your name on each print or slide.

Museum Studies applicants need not send a portfolio of photographs. Instead, documentation supporting the ability to perform well in such a program. This would include such things as publications, papers presented, curated shows and other relevant experience.

The portfolio should be packaged in such a way as to facilitate handling (unpacking, viewing, repacking and shipping). A label with a return address would be helpful. Be sure to include a check or money order sufficient to cover return postage or shipping. The portfolio or Museum Studies documentation should reach the Chairman of the MFA photography program the first week in February. Applicants will be notified of their status in March.

Advisors

The MFA coordinator is the advisor for all candidates.

Degree requirements

The MFA degree in photography normally requires a minimum of two years of full-time resident graduate study. A minimum of 85 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 85 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

Designed to give depth of experience to photography 37

Electives

Designed to broaden the student's interests and experience in the arts and related areas and to provide an opportunity to pursue a specific area in depth

Humanities

Research and Thesis

Total 85

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 10 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.

Photo 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.

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.

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.

Richard D. Zakia, Chairman, MFA Program (475-2616)

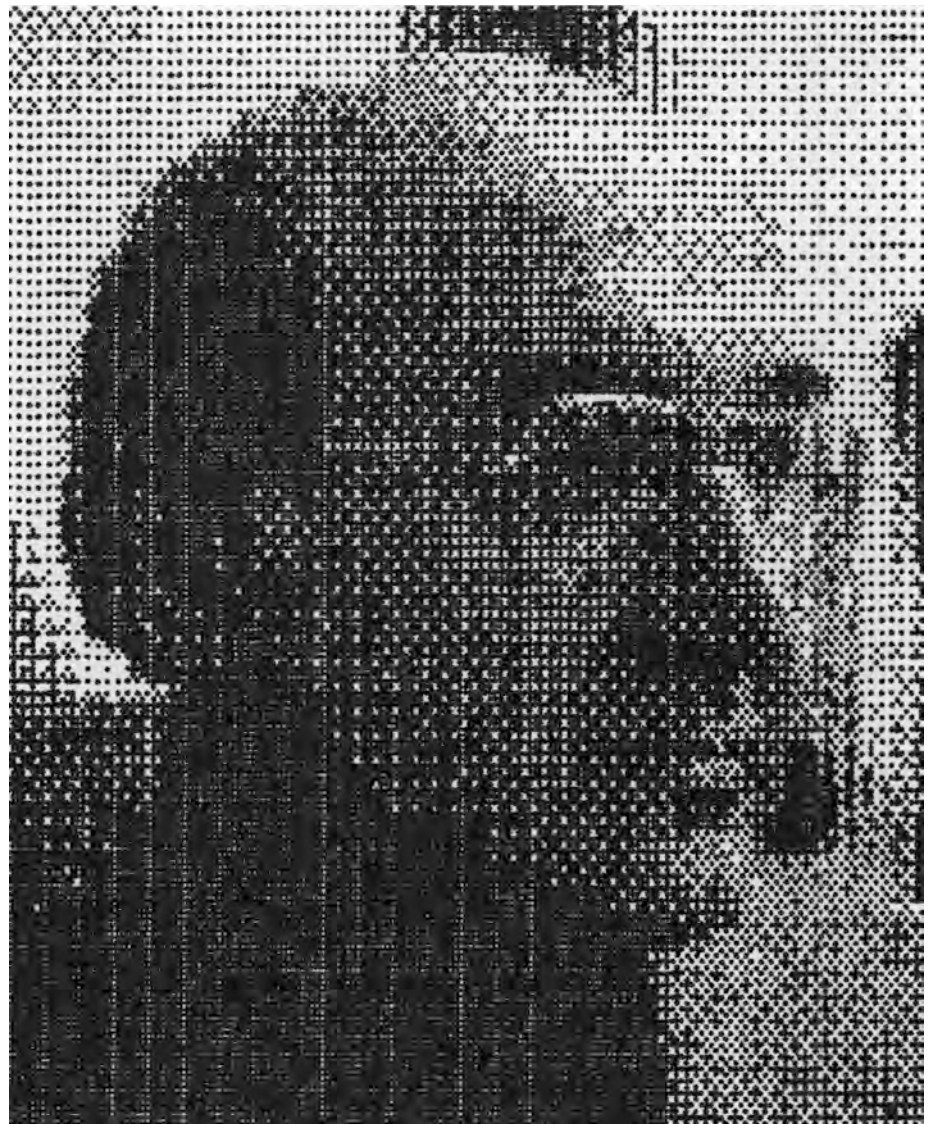
"Rochester is a unique place for anyone seriously interested in a broad pursuit of photographic studies. Photography touches upon many other disciplines, and the opportunities for study are limited only by the student's interest. The Rochester area is blessed with outstanding physical and human resources. 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.

"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.



Dr. Richard Zakia



Above, Chris Phillips (left center), a recent MFA graduate, discusses his book *Steichen at War* with students. At left, internationally famous Japanese photographer Eikoh Hosoe talks to MFA students during his RIT visit (photo by Alexander Syndikas).



Photography Courses

Master of Science in Photographic Science and Instrumentation*

PPHS-600

Registration #0907-600

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 the laboratory work. (Registration requires consent of the graduate coordinator.)

Credit 15 (Summer only)

(Not applicable to the 45 required graduate credits in the photographic science and instrumentation graduate program)

Principles of Photographic Science

PPHS-601, 602, 603

Registration #0907-601, -602, -603

Equivalent to PPHS-600, but offered in the evening and Saturdays during the regular fall, winter, and spring Quarters. (Preliminary admission to the MS program in Photographic Science or consent of graduate coordinator. Not offered every year. Consult coordinator of photographic science graduate program.)

Credit 5/Qtr.

(Not applicable to 45 required graduate credits)

Principles of Photographic Science

PPHS-711, 712, 713

Registration #0903-711, -712, -713

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.

Theory of the Photographic Process

PPHS-721, 722

Registration #0903-721, -722

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.

Mathematics and Statistics for Photographic Systems

PPHS-731, 732, 733

Registration #0907-731, -732, -733

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, basic instrument systems, electromagnetic waves, polarization, interference and function description of imaging performance.

Class 3, Credit 3/Qtr.

Instrumental and Photographic Optics

PPHS-741, 742, 743

Registration #0907-741, -742, -743

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)

Analysis and Evaluation of Imaging Systems

PPHS-751, 752, 753

Registration #0907-751, -752, -753

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 varies

Special Topics in Photographic Science

PPHG-890

Registration #0903-890

The thesis is designed and proposed by the candidate. It is considered his culminating experience in the program, involving research, a creative body of work, an exhibition or suitable presentation, and a written illustrated report.

Credit 1-12

Research and Thesis

Master of Fine Arts in Photography* Required Major Courses

PPHG-701, 702, 703

Registration #0903-701, -702, -703

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.

History and Aesthetics of Photography

PPHG-705, 706, 707

Registration #0903-705, -706, -707

An all-purpose weekly meeting to facilitate communication among members of the MFA community and to introduce them to the resources available on the campus and in the community.

Credit 1/Qtr

Student/Faculty Seminar

PPHG-720, 721, 722

Registration #0903-720, -721, -722

Each faculty member offers a different opportunity for students to explore the multiplicity of ways that photography can be used as a vehicle for expression and for communication. Visual research, group critiques, seminars, field trips, studio and laboratory practice are used.

Credit 4/Qtr.

Photographic Workshop

PPHG-725, 726, 727

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.

Credit 4/Qtr.

Photography Core

PPHG-730, 731, 732

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/Qtr.

Cinematography

PPHG-740, 741, 742

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/Qtr.

Photographic Museum Practice

PPHG-750, 751, 752

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 3-9/Qtr.

Special Topics Workshop

PPHG-755**Registration #0903-755**

This course presents relevant sensitometry and photographic theory, principles and practices in a manner sensitive to the background and needs of a fine art photographer.

Credit 4/Qtr.

Applied Sensitometry**PPHG-756****Registration #0903-756**

The application of selected sensitometric and perceptual principles to the understanding and practice of Zone System techniques for calibration and visualization.

Credit 4

Zone System Principles**PPHG-760****Registration #0903-760**

An advanced course which provides an applied psychological framework for the ways we select, code, organize, store, retrieve and interpret visual images and explores how photographs relate to art and perception.

Credit 4 (offered on sufficient demand)

Perception & Photography**PPHG-799****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 -10/Qtr.

Independent Project**PPHG-889****Registration #0903-889**

An introduction to research and thesis procedures and requirements with a review of existing thesis proposals and accepted thesis reports. Each student will be encouraged to develop his/her own thesis proposal during the course.

Credit 1 (Fall only)

Pre-Thesis Seminar**PPHG-890****Registration #0903-890**

The thesis is designed and proposed by the candidate. It is considered his culminating experience in the program, involving research, a creative body of work, an exhibition or suitable presentation, and a written illustrated report.

Credit 1-12

Research and Thesis

Graduate Faculty School of Photographic Arts and Sciences

Charles Arnold, Jr., MFA Rochester Institute of Technology—Professor, Photography

Burt H. Carroll, Ph.D., University of Wisconsin—Professor, Photographic Science and Instrumentation

Andrew Davidhazy, MFA, Rochester Institute of Technology, Associate Professor, Photography

Lothar K. Engelmann, Ph.D., J.W. Goethe University, Germany—Professor

Ronald Francis, Ph.D., Massachusetts Institute of Technology—Professor, Photographic Science and Instrumentation.

Nathan Lyons, Director, Visual Studies Workshop—Adjunct Lecturer, Photography

James E. McMillion, Jr., MFA Ohio University—Professor, Photographic Management

Beatrice Nettles, BFA, Florida; MFA Illinois—Associate Professor, Photography

John Pfahl, BFA, MA, Syracuse—Professor, Photography

Elliott Rubenstein, MFA, SUNY, Buffalo; MA, St. John's University—Assistant Professor, Photography

John R. Schott, Ph.D., Syracuse University—Assistant Professor, Photographic Science and Instrumentation

Leslie D. Stroebel, BS, Ed.D. University of Rochester—Professor, Photography

Richard D. Zakia, BS, Rochester Institute of Technology; Ed.D., University of Rochester—Professor, Photography

Associates of Graduate Faculty

Owen Butler, BFA, Rochester Institute of Technology—Assistant Professor, Photography

John F. Carson, MSEE, Massachusetts Institute of Technology—Associate Professor, Photographic Science and Instrumentation

David A. Engdahl, M.Ed., University of Rochester—Associate Director, School of Photographic Arts and Sciences, Professor

Andrew H. Eskind, MS, Illinois Institute of Technology—Interdepartmental Services, George Eastman House; Lecturer, Photography

Richard Floberg, MS, Boston University—Associate Professor, Photography

Edward Granger, Ph.D., University of Rochester, Lecturer—Photographic Science and Instrumentation

Bradley T. Hindson, BA, Rutgers; MFA, Ohio Univ.—Associate Professor

Weston Kemp, MFA, Rochester Institute of Technology—Associate Professor, Photography

Russell Kraus, Ed.D., Massachusetts—Director, School of Photographic Arts and Sciences, Associate Professor

Robert Mayer, Director, International Museum of Photography at the George Eastman House; BA, Fairleigh Dickinson University, MA, New York University

Frank Moser, MS, Minnesota—Lecturer, Photographic Science and Instrumentation

Martin Rennalls, MS, Boston University—Associate Professor, Photography

David J. Robertson, MS, Columbia—Professor, Photography

Hanoch Shalih, B.Sc., Polytechnic of Central London, Ph.D., University of London

William S. Shoemaker, MS, University of Miami—Professor, Photographic Science and Instrumentation

Robert A. Sobieszak, MA, Stanford—Director, Photographic Collections, International Museum of Photography, George Eastman House; Lecturer, Photography

Charles C. Werberig, BFA, MS, Syracuse—Associate Professor, Photography

Tom Muir Wilson, BFA, Cranbrook Academy of Art; MFA, Rochester Institute of Technology—Associate Professor

College of Science

Master of Science in Chemistry



John D. Paliouras, Dean, College of Science

Terence C. Morrill, Department Head, Chemistry (475-2497)

KayG. Henzel, Chairman of Chemistry Graduate Committee and Graduate Advisor (475-2077)

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. Typically, all requirements are met within two years.

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 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 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:

1. 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 from outside of the Department of Chemistry.

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. Demonstrated competence in a foreign or computer language.

4. Pass an oral thesis defense or comprehensive examination.

Additional information

More information may be obtained by phoning the chairman of the Graduate Committee (716) 475-2077, or the Department of Chemistry (716) 475-2497.

Master of Science in Clinical Chemistry

John D. Paliouras, Dean, College of Science

Clinical Sciences Department Head
(475-2978)

The clinical chemistry program is designed for either full-time or part-time graduate study. Required courses are offered during the late afternoon or evening on a regular basis in order to accommodate the work schedules of part-time students.

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.

Financial support

Teaching assistantship applications should be completed by March 15. Late applications may be considered under unusual circumstances. Information regarding other types of financial aid may be obtained from the RIT Student Aid office.

Program

Each student, together with the program director, will arrange a program that not only meets the minimum degree requirements but also considers educational and experience background and the career goals of the student. Because of the diversity of backgrounds of applicants to the program, interested individuals are encouraged to write or phone the Clinical Sciences Department (716-475-2978) regarding program planning, prerequisites, transfer credits and course sequencing.

A minimum of 50 quarter credits beyond the bachelor's degree are required. Required courses include Biochemistry, SCHB-702;

Biochemistry-Metabolism, SCHB-703; Advanced Clinical Chemistry, SHPC-820, 821, 822, 810, 811, 812; Clinical Laboratory Management I & II, SHPC-741, 742; Statistics and Quality Control in the Clinical Laboratory, SHPC-712; Survey of Physical Chemistry, SCHP-742; Introduction to Electricity and Electronics, SPSP-331; Clinical Laboratory Computer Applications, SHPC-722; Clinical Chemistry Research, SHPC-859 or 879; Advanced Physiology, SBIQ-705.

Two oral examinations must be passed during the program. The first includes a presentation, by the student, of a proposal for a clinical chemistry research project. The oral committee must evaluate not only the proposal but also the presentation and the overall academic progress of the student. The second oral examination deals with the presentation of the research project data.



Department of Chemistry

SCHA-711

Registration #1008-711

Instrumental Analysis

Theory, applications and limitations of instrumental methods in qualitative, quantitative, and structural analysis. Topics covered include fluorescence and phosphorescence, Raman, mass spectrometry, nuclear magnetic resonance, X-ray and radiochemistry, and electrochemistry. (SCHA-312)

Class 3, Credit 3 (offered every year) (F, W)

SCHA-720

Registration #1008-720

Instrumental Analysis Lab

Lab accompanying SCHA-711. Experiments include A.A., fluorimetry, coulometry, ^{13}C and ^1H NMR, polarography. Assignments depend on student background.

Lab. 6, Credit 2 (offered every year) (F, W)

SCHB-702

Registration #1009-702

Biochemistry

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 and SCHP-443 or -742)

Class 3, Credit 3 (offered every year) (F, W)

SCHB-703

Registration #1009-703

Biochemistry-Metabolism

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 (offered every year) (F, W)

SCHB-704

Registration #1009-704

Biochemistry-Nucleic Acids and 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 (offered every year) (S)

SCHC-772

Registration #1010-772

Special Topics

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 (offered every year)

SCHC-859

Registration #1010-859

External Research

Industrial internship research.

Credit 1-16 (offered every year)

SCHC-870

Registration #1010-870

Chemistry Seminar

Credit 1 (offered every year)

SCHC-879

Registration #1010-879

Research and Thesis Guidance

Hours and credits to be arranged. Chemical research in a field chosen by the candidate, subject to approval of the department head and advisor.

Credit variable (offered every year)

SCHC-899

Registration #1010-899

Independent Study-Chemistry

Credit variable (offered every year)

SCHI-762

Registration #1012-762

Inorganic Chemistry

The properties and structures of the elements and their compounds in relation to electronic and stereochemical configurations; acid-base theories; non-aqueous solvents. (SCHO-433 and SCHP-442)

Class 3, Credit 3 (offered every year) (S, SR)

SCHI-763

Registration #1012-763

Inorganic Chemistry

Transition metal coordination chemistry; lanthanides and actinides; organometallic compounds and special topics. (SCHO-433 and SCHP-442)

Class 3, Credit 3 (offered every year) (F, W)

SCHO-730

Registration #1013-730

Chemical Toxicology

Xenobiotic mechanism, chemical carcinogenesis, drug-induced toxicology, environmental and genetic toxicology, teratology and bioassay/biometrics. (SCHO-433)

Class 3, Credit 3 (offered upon sufficient request)

SCHO-736

Registration #1013-736

Spectrometric Chemical Identification of Organic Compounds

Theory and application of proton and carbon nuclear magnetic resonance, infrared, mass spectrometry, and ultraviolet spectra as applied to organic structure determination. (SCHO-433)

Class 3, Credit 3 (offered every year)

SCHO-737

Registration #1013-737

Advanced Organic Chemistry

Several of the following advanced topics in organic chemistry are covered: polyfunctional compounds, modern synthetic methods, stereochemistry, conformational analysis, free radical reactions, natural products, new synthetic reagents. (SCHO-433)

Class 3, Credit 3 (offered every year)

SCHO-739

Registration #1013-739

Advanced Organic Chemistry

Selected topics in physical organic chemistry including: techniques for elucidation of mechanism (kinetic, linear free energy relationships, isotope effects), molecular orbital theory, electrocyclic reactions, (SCHO-433 and SCHP-443.)

Class 3, Credit 3 (offered every year)

SCHO-832

Registration #1013-832

Stereochemistry

Advanced treatment of steric relationships and stereoisomerism in organic compounds. (SCHO-433, SCHP-443)

Class 3, Credit 3 (offered upon sufficient request)

SCHO-833

Registration #1013-833

Heterocyclic Chemistry

The preparation, properties, and reactions of heterocyclic systems, especially heteroaromatic rings. (SCHO-433)

Class 3, Credit 3 (offered upon sufficient request)

SCHO-835

Registration #1013-835

Organic Chemistry of Polymers

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 (offered in alternate years)

SCHP-741

Registration #1014-741

Chemical Thermodynamics

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 (offered every year)

SCHP-742

Registration #1014-742

Survey of Physical Chemistry

This course will present principles of physical chemistry to students who have an interest in the health related sciences. Molecular structures, thermodynamics and kinetics will be discussed with a view to their biological applications. (SCHG-217, SCHO-232)

Class 3, Credit 3 (offered upon sufficient request) Not acceptable for M.S. in Chemistry.

SCHP-743

Registration #1014-743

Chemical Kinetics

Methods of investigating the kinetics of chemical reactions and the theories used to interpret their results. Focus on homogeneous reactions in gas and liquid phases. Discussions of references from recent chemical literature. (SCHP-443)

Class 3, Credit 3 (offered alternate years)

SCHP-744 **Quantum Mechanics**
Registration #1014-744
 Matrix formulation of quantum mechanics; variation and perturbation methods; group theory; molecular orbital energies of complex molecules; calculation of vibrational frequencies and selection rules for complex molecules. Emphasis on use of spectroscopy and quantum chemistry to obtain chemical information. (SCHP-442)
 Class 3, Credit 3 (offered alternate years)

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 (offered upon sufficient request)

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 (offered upon sufficient request)

Department of Clinical Sciences

SCLC-820 **Advanced Clinical Chemistry I**
Registration #1023-820
 Toxicology, therapeutic drug monitoring, electrolytes acid-base, vitamins, oncology, hepatitis, coagulation, and various standard methods. (Permission of instructor)
 2 hr lecture, 2 hr seminar, Credit 3

On a rotating basis Ad. Clin. Chem. I, II, III will be offered two courses per year; one in the fall, another in the spring, and the third the following fall. They are independent courses that may be taken in any sequence.
 820 will be offered in F 1982; S 1984

SCLC-810 **Advanced Clinical Chemistry Laboratory I**
Registration #1023-810
 Comparison of current methods for analysis of toxicology samples-gas-liquid chromatography, radioimmunoassay, enzyme multiplied immunoassay. (Permission of instructor, class size limited to 12)
 Lab. 4, Credit 1 (offered concurrently with SHPC-820)

SCLC-811 **Advanced Clinical Chemistry Laboratory II**
Registration #1023-811
 Comparison of current methods for separation and determination of isoenzymes. (Permission of instructor, class size limited to 12)
 Lab. 4, Credit 1 (concurrent with SHPC-821)

SCLC-821 **Advanced Clinical Chemistry II**
Registration #1023-821
 Proteins, enzymes, hemoglobins, iron, renal functions, lipids, quality control, automation, and method selection. (Permission of instructor)
 2 hr lecture, 2 hr seminar, Credit 3 (S 1983; F 1984)

SCLC-822 **Advanced Clinical Chemistry III**
Registration #1023-822
 Radioimmunoassay, hormones, fetal-placement unit, integration of laboratory data. (Permission of instructor)
 2 hr lecture, 2 hr seminar, Credit 3 (F 1983; S 1985)

SCLC-812 **Advanced Clinical Chemistry Laboratory III**
Registration #1023-812
 Methods for the development, improvement, and trouble shooting of radioimmunoassay analyses. (Permission of instructor, class size limited to 12)
 Lab. 4, Credit 1 (concurrent with SHPC-822)

SCLC-859 **External Clinical Chemistry Research**
Registration #1023-859
 Credit Variable

SCLC-879 **Clinical Chemistry Research**
Registration #1023-879
 Credit 1-16

SCLC-899 **Independent Study**
Registration #1023-899
 Credit variable

SCLC-741, 742 **Clinical Laboratory Management I, II**
Registration #1023-741
 Organization of health care facilities, regulatory agencies, q.c., personnel relations, productivity analyses, equipment maintenance, education and safety programs, extra-laboratory interactions, cost-accounting of laboratory tests
 Class 4, Credit 4 (741-W 1982; 742-SR 1983)

SCLC-712 **Statistics and Quality Control**
Registration #1023-712
 Principles of statistics as they apply to biomedical sciences and to clinical laboratory analyses. Illustrative examples will involve clinical laboratory data. Probability, normal distributions, analysis of variance sampling, normal values, quality control, applications in patient care, hypothesis testing.
 Class 3, Credit 3 (S 1984)

SCLC-870 **Clinical Chemistry Seminar**
Registration #1023-870
 Credit 1

SCLC-772 **Special Topics in Clinical Science**
Registration #1023-772
 In response to student and/or faculty interest, special courses which are of current interest and/or logical continuations of regular courses will be presented. These courses will be structured as ordinary courses with specified prerequisites, contact hours and examination.
 Class variable, Credit variable

SCLC-722 **Clinical Laboratory Computer Applications**
Registration #1023-722
 Data processing overview and terminology, hospital computer utilizations, evaluation of the need for computers in the laboratory, design of laboratory and hospital systems, evaluation-selection-installation of computer systems, legal aspects of biomedical data processing, instrument interfacing.
 Class 3, Credit 3 (Winter of even-numbered years, e.g., 82-83)

Graduate Faculty College of Science

John D. Paliouras, Ph.D., University of Illinois—Professor and Dean

Department of Chemistry

Earl Krakower, Ph.D., University of British Columbia—Professor, physical chemistry; nuclear magnetic resonance, structure, and properties of molecules, chemical education

Jerry M. Adduci, Ph.D., University of Pennsylvania—Associate Professor, organic chemistry: organic mechanisms, polymer synthesis, and chemical technology.

Susannah M. Butler, Ph.D., SUNY/Stonybrook—Assistant Professor, physical chemistry: laser fusion targets and plasma chemistry, gas phase reaction kinetics and characterization of small molecules and atomic species.

B. Edward Cain, Ph.D., SUNY/Binghamton—Associate Professor, inorganic chemistry: chemical education, methodologies and adaptations for the handicapped student.

Robert E. Gilman, Ph.D., University of Michigan—Professor, organic chemistry: synthesis of novel hosts for cation complexation; cyclization via aryl-aryl coupling reactions.

Kay G. Henzel, Ph.D., Ohio State University—Chairman, Chemistry Graduate Committee; Graduate Advisor; Assistant Professor; synthetic organic chemistry: synthesis of natural products including fluorescent estradiol analogs; study of estrogen receptor mechanisms.

Terence C. Morrill, Ph.D., University of Colorado—Department Head, Professor, organic chemistry: stereochemistry and mechanism of organic reactions, and organic structure effects upon lanthanide-induced shifts in NMR spectrometry; computer assisted instruction.

John P. Neenan, Ph.D., University of California, Santa Barbara—Assistant Professor, Biochemistry: Design of active-site-directed irreversible enzyme inhibitors.

Christian G. Reinhardt, Ph.D., Lafayette College—Assistant Professor, biophysical chemistry: biological drug-receptor recognition, binding and stereochemistry, mechanisms of interferon induction, nucleic acid structure.

L. Paul Rosenberg, Ph.D., University of New Hampshire—Assistant Professor, analytical chemistry: quantitative determination of metal and anion binding by computer-assisted EPR, spectroscopy and fluorescence; computer interfacing.

Francis L. Scott, Ph.D., and D.Sc., Cork—Visiting Professor, bio-organic mechanisms: particularly of bio-organic reactions and exploration of mechanism whereby drugs and other xenobiotics, exert toxic effects.

Gerald A. Takacs, Ph.D., University of Wisconsin—Associate Professor, physical chemistry: chemical kinetics, atmospheric chemistry and photochemistry.

Vladimir Vukanovic, Ph.D., University of Belgrade—Visiting Professor, physical chemistry: plasma physical chemistry, atomic spectroscopy with arc plasma source.

Department of Clinical Sciences

James C. Aumer, MS, Michigan Technological University—Program Director, medical technology; Assistant Professor

William A. Burns, MS, Elmira—Associate Dean, medical technology; Professor

Jerome Wagner, Ph.D., University of Wisconsin—Assistant Professor and Program Director, nuclear medicine technology

Clinical Faculty

Richard M. Bayer, Ph.D., Rutgers University—Rochester General Hospital, Adjunct Clinical Assistant Professor

James Bertsch, MS, Rochester Institute of Technology—The Genesee Hospital, Adjunct Assistant Professor

Robert Kringle, MS, University of Wisconsin—Adjunct Assistant Professor

Norman P. Kubasik, Ph.D., Syracuse University—Upstate Medical Center—The Genesee Hospital, Adjunct Clinical Associate Professor

Royden N. Rand, Ph.D., University of Buffalo—Health, Safety and Human Factors Laboratory, Eastman Kodak, Adjunct Professor

Harrison E. Sine, Jr., Ph.D., SUNY at Buffalo—The Genesee Hospital, Adjunct Clinical Associate Professor

James D. Salvatore, MS, University of Rochester—Strong Memorial Hospital, Adjunct Clinical Assistant Professor

Materials Science and Engineering

Richard A. Kenyon, Dean, College of Engineering

John D. Paliouras, Dean, College of Science

Hrishikesh Banerjee, Director, Materials Science and Engineering Program

For information call 475-2536 (Dr. Banerjee)

The program, under the joint auspices of the colleges of Engineering and Science, offers graduate studies leading to the master of science degree in materials science and engineering with a variety of options designed to satisfy individual and industry needs in the rapidly growing field of materials.

The objectives of the program are threefold:

- With the advent of whole new classes of materials and instruments in recent times, the traditional practice of empiricism in the search for and selection of materials is rapidly becoming obsolete. The program will offer, therefore, a serious interdisciplinary learning experience in materials studies, crossing over the traditional boundaries of such classical disciplines as chemistry, physics, electrical and mechanical engineering.
- The program will provide extensive experimental courses in diverse areas of materials-related studies.
- The program will explore avenues for introducing greater harmony between industrial expansion and academic training.

Special Features of the Program

A special feature of the program is the offering of five required core courses. The core courses are specially designed a) to establish a common base of materials-oriented knowledge for students with baccalaureate degrees in chemistry, chemical engineering, electrical engineering, mechanical engineering, and physics; and consequently, b) to provide a new intellectual identity to those involved in the study of materials.

Second, there is an emphasis on experimental techniques in the program. It offers one required experimental course and makes available additional optional experimental courses. These are organized into appropriate units covering many aspects of analysis of materials. This aspect of the program should enhance student confidence when dealing with materials-related problems.

Finally, a large number of highly qualified scientists and engineers in the Rochester area are engaged in the research and development of materials. This reservoir of talent is utilized to ensure the breadth and quality of the program. The program offers an "industrial option" that allows participants to continue their studies in their work environment and thus enhance their job satisfaction.

The overall thrust of the program is to establish a positive relationship between academia and industry by building a sound academic base in the field of materials.

Governance of the Program

A Program Council will be established, consisting of 12 members, eight from the Institute and four from Rochester industries. The council will be responsible for decisions on all academic aspects of the program. The program director will serve as chairman of the council.

Admission

The program is open to individuals with a bachelor's degree in chemistry, physics, and chemical, electrical or mechanical engineering from an accredited college or university. Any student who wishes to study at the graduate level must first be admitted to the program. An applicant is permitted to take graduate courses as a non-matriculated student, however, if he or she meets the general requirements mentioned above.

A person not meeting the general requirements may petition for admission to the program. In such cases, the Program Council would decide on the necessary background courses to be taken at the undergraduate level. However, undergraduate credits that make up deficiencies may not be counted toward the master's degree.

To be considered for admission, it is necessary to file an application for admission to graduate study, accompanied by the appropriate

transcripts of previous study and two letters of recommendation.

Degree requirements

A minimum of 45 quarter credit hours is required for the completion of the program.

A course unit will normally carry four quarter credit hours, with the exception of the seminar which will carry one quarter credit hour.

The five core courses and the seminar course are required for the completion of the program. Together, they carry a total of 21 quarter credit hours.

The remaining 24 quarter credit hours may be taken in a combination of advanced courses including "special topics," electives in courses currently available in other master's programs in the Institute, and the "research thesis" option, subject to prior approval. Also, the Program Council may award transfer credits based on academic background above and beyond the baccalaureate degree or credit by examination based on experience.

Part-Time Study

Because practicing scientists and engineers are encouraged to pursue the program on a part-time basis, most of the courses are scheduled in the late afternoon. (This may not apply to courses offered off campus at several industrial locations.)

Students employed full-time in industry are normally limited to a maximum of two courses, or eight credit hours, each quarter. A student who wishes to register for more than eight credit hours while employed full-time must obtain the permission of the Program Council.

Thesis Option and the Industrial Internship Option

The inclusion of a research thesis as a formal part of the master of science degree program in materials science and engineering is optional. The research thesis option would carry a minimum of eight and a maximum of 16 quarter credit hours, subject to review and approval of the project.

It is also recognized that in-plant work experience in the materials-related areas may include independent study and creative research. This industrial internship option may be applied, for a minimum of four and a maximum of 16 quarter credit hours, toward the completion of the master of science degree.

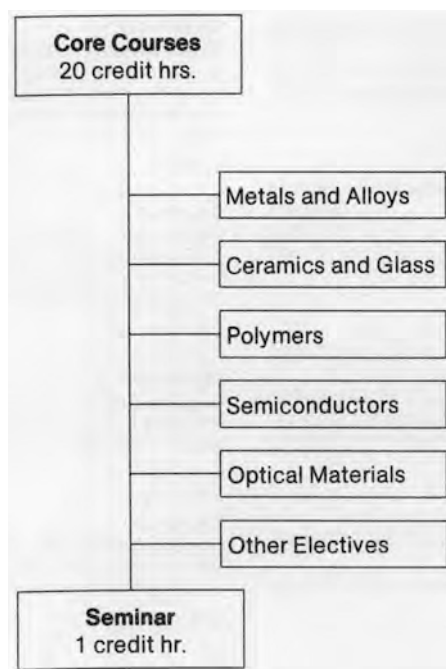
Curriculum

The core courses will be offered on the basis of a one-year cycle and the advanced courses will be scheduled on the basis of a two-year cycle. The final format will be announced after the Program Council is established.

Course Number and Title

Core Courses:

SESM-701 Introduction to Materials Science
 SESM-702 Introduction to Polymer Science
 SESM-703 Introduction to Solid State Science
 SESM-704 Introductory Theoretical Methods
 SESM-705 Introductory Experimental Techniques



Materials Science and Engineering

SESM-701 Introduction to Materials Science

Registration #1028-701

Crystal structure and defects, strength of materials, metals, alloy principles, ferrous alloys.

Credit 4 (offered every year)

SESM-702 Introduction to Polymer Science

Registration #1028-702

Introduction to the physical chemistry and organic chemistry of polymers, structure, preparation and properties of polymers.

Credit 4 (offered every year)

SESM-703 Solid State Science

Registration #1028-703

Crystal structure and x-ray diffraction; lattice vibrations and thermal properties; electron band theory of insulators, metals, and semiconductors, junction diodes and transistors.

Credit 4 (offered every year)

SESM-704 Introductory Theoretical Methods

Registration #1028-704

Treatment of waves and fields; selected topics of interest in electrodynamics and fluid mechanics; statistical mechanics, Maxwell-Boltzmann, Bose Einstein, and Fermi-Dirac distributions and their applications.

Credit 4 (offered every year)

SESM-705 Introductory Experimental Techniques

Registration #1028-705

The list of laboratory projects includes the areas of:

- Microanalysis of materials; x-ray diffraction, scanning electron microscopy metallography, microelectronics, fluorescence, phosphorescence, etc.;
- Thermal systems: thermomechanical and thermogravimetric systems and differential scanning calorimetry;
- Thin films; thermal evaporation system, sputter coating system, phase contact microscopy, chemical vapor deposition system;
- sonics and ultrasonics

Credit 4 (offered every year)

Elective Courses

SESM-706, 707, 708

Registration #1028-706, -707, -708

Experimental Techniques

The study of more topics listed in Introductory Experimental Techniques.

Credit 4 (offered every year)

SESM-710, 711

Registration #1028-710, -711

Material Properties and Selection I and II

Mechanical properties of metallic polymeric materials; application and selection of such materials based on strength, fatigue, impact, creep, processing, and economy.

Credit 4 per quarter

SESM-714

Registration #1028-714

Ceramics and Glass

Nature of ceramics, nature of glass, processing of ceramics and glass materials, properties and application of ceramics and glass.

Credit 4

SESM-717

Registration #1028-717

Materials Degradation Corrosion

Electrochemical nature of corrosion, high-temperature corrosion, anticorrosion techniques, materials selection for corrosion services.

Credit 4

SESM-720

Registration #1028-720

Organic Polymers

This course is designed to meet the needs of students in the area of organic chemistry related to synthesis, polymerization mechanism, structures, stereochemistry and reactions of organic polymers and their industrial usage.

Credit 4

SESM-721

Registration #1028-721

Physical Chemistry of Polymers

This course is designed to meet the needs of students of materials science in the area of theoretical and experimental physical chemistry macromolecules.

Credit 4

SESM-722

Registration #1028-722

Polymer Processing

A study of the basic principles and methods involved in the technology of polymeric materials, including treatment of heat transfer, mass flow, mixing, shaping and moulding of polymeric materials.

Credit 4

SESM-730**Optical Properties of Materials****Registration #1028-730**

Fundamentals of geometrical and physical optics; interaction of radiation with atoms, molecules, and matter; dielectrics; phenomenological considerations of electro-optics, acousto-optics, and lasers.

Credit 4

SESM-733**Electrical and Magnetic Properties of Materials****Registration #1028-733**

Band structures of pure and doped solids and solid compounds, transport phenomena, semiconduction, optical properties, galvanomagnetic and magneto-optic effects.

Credit 4

SESM-734**Advanced Optics****Registration #1028-734**

Lasers: theory, types and construction; optical properties of various metals and alloys; thin films: multilayer dielectric coating; principles and applications of electro-optical and acousto-optical materials; shutters and modulators.

Credit 4

SESM-736**Amorphous and Semicrystalline Materials****Registration #1028-736**

Electrical, thermal, and optical properties of amorphous materials; models of conduction.

Credit 4

SESM-740**Nuclear Science and Engineering****Registration #1028-740**

Systematics of the atom nuclei; radioactivity; neutron induced reactions; fission; nuclear reactor principles, designs and materials.

Credit 4

SESM-800**Special Topics****Registration #1028-800**

In addition to in-depth study of any of the courses listed under Elective Courses, special topics may be selected from such areas as elastomers, organometallics, radiation damage, processing of materials, superconductivity, etc.

Credit 4

SESM-879**Research and Thesis Guidance****Registration #1028-879**

A project involving research on a topic in materials science and engineering carried out either on campus or off campus under the industrial internship option. An oral examination and written thesis are required.

Credit variable

SESM-890**Seminar****Registration #1028-890**

This course is required for completion of the program and will involve a one-hour presentation on some topic in materials science and engineering.

Credit 1

SESM-899**Independent Study****Registration #1028-899**

This course number should be used by students wishing to study a topic on an independent study basis. Permission to register required.

Credit variable

Graduate Faculty

Materials Science and Engineering

College of Engineering and College of Science

Richard A. Kenyon, Ph.D., P.E., Syracuse University—Dean, College of Engineering, Professor: Mechanical Engineering, Thermodynamics and Fluid Mechanics

John D. Paliouras, Ph.D., University of Illinois—Dean, College of Science, Professor: Mathematics, Analysis

Hrishikesh Banerjee, Ph.D., University of Calcutta—Director of Materials Science and Engineering, Professor: Physics, Nuclear Physics, Solid State and Semiconductor Physics

Swaminathan Madhu, Ph.D., University of Washington—Director of Graduate Programs in Engineering, Professor: Electrical Engineering, Communications Theory, Logic Design

Bhalchandra V. Karlekar, Ph.D., P.E., University of Illinois—Professor and Department Head, Mechanical Engineering: Heat Transfer, Applied Mathematics

Arthur Z. Kovacs, Ph.D., Duke University—Professor and Department Head: Physics, High Energy Physics, Systems Engineering and Management Science

Earl Krakower, Ph.D., University of British Columbia—Professor and Department Head: Chemistry, Physical Chemistry, Nuclear Magnetic Resonance

Harvey E. Rhody, Ph.D., Syracuse University—Professor and Department Head: Electrical Engineering, Communication Theory

Jerry M. Adduci, Ph.D., University of Pennsylvania, Associate Professor: Chemistry, Organic Mechanisms, Polymer Synthesis and Characterization

Frank J. Bogacki, MS, University of Pennsylvania, Assistant Professor: Electrical Engineering, Solid State Devices

John F. Carson, MS, Massachusetts Institute of Technology—Associate Professor: Electrical Engineering, Applied Optics

Robert A. Clark, Ph.D., University of Maryland—Dean, College of Continuing Education, Professor: Physical and Organic Chemistry, Polymers

Lynn Fuller, Ph.D., University of Buffalo, Assistant Professor: Electrical Engineering, Solid State Devices and Microelectronics

Anand Garikepati, M.Sc., Osmania University—Visiting Assistant Professor: Physics, Transport Properties of Semiconductors, Ultrasonics

Surendra K. Gupta, MS, University of Notre Dame—Lecturer: Mechanical Engineering, X-ray Diffraction, Powder Metallurgy

Roger E. Heintz, Ph.D., Syracuse University, Associate Professor: Electrical Engineering, Solid State Devices

Ronald E. Jodoin, Ph.D., University of Rochester—Associate Professor: Physics, Optics, Lasers and Digital Image Processing

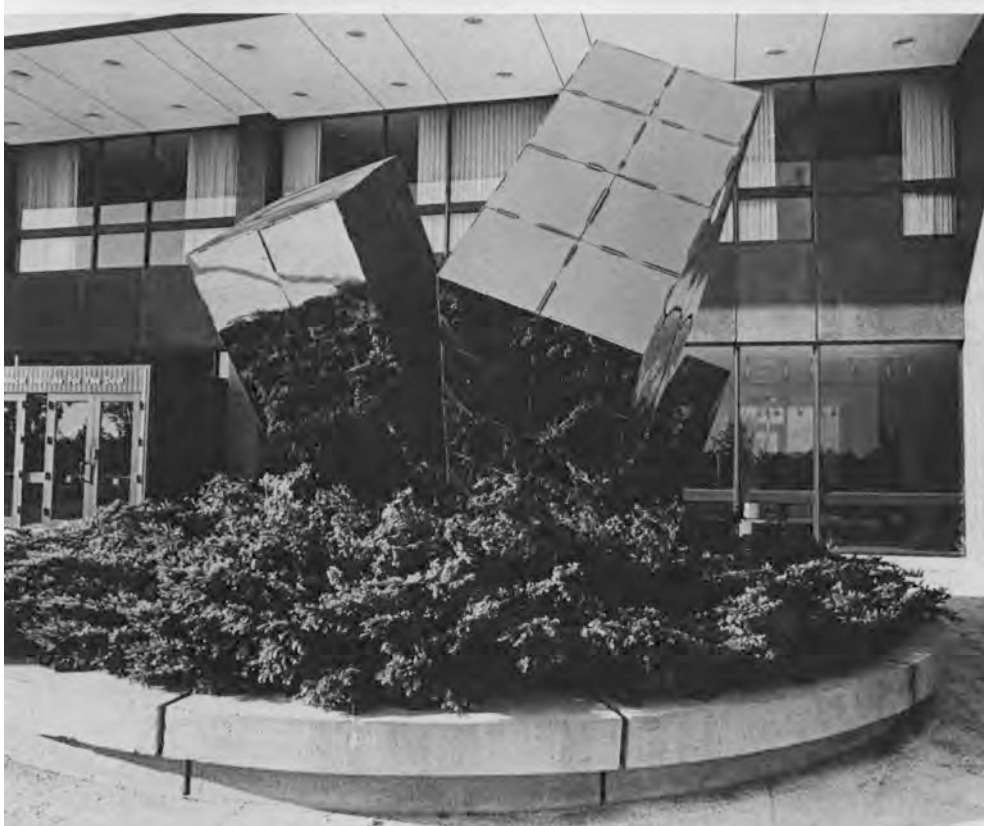
Chris Nilsen, Ph.D., P.E., Michigan State, Associate Professor: Mechanical Engineering, Metallurgy and Materials Science

Robert L. Snyder, Ph.D., P.E., Iowa State, Professor: Mechanical Engineering, Materials Science, Chemistry

Gerald A. Takacs, Ph.D., University of Wisconsin, Associate Professor: Chemistry, Chemical Kinetics, Atmospheric and Photochemistry

Vladimir Vukanovic, Ph.D., University of Belgrade, Visiting Professor: Plasma Physical Chemistry, Atomic Spectroscopy with Arc Plasma Source.

The National Technical Institute for the Deaf



William E. Castle, Director

The National Technical Institute for the Deaf (NTID) was created to provide deaf students with technical and professional 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 (RIT) 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. NTID at RIT will have completed its first 14 years in 1982 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 10 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 at RIT through 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 the graduate programs of RIT 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 Admissions or the NTID Office for Career Opportunities, One Lomb Memorial Drive, P.O. Box 9887, Rochester, New York 14623.

Joint Program to Prepare Educational Specialists for the Deaf at the Secondary Level

Joint program to prepare educational specialists for the deaf at the secondary level

Co-Sponsors: University of Rochester through the Graduate School of Education and Human Development

Walter I. Garms, Dean and

Rochester Institute of Technology through the National Technical Institute for the Deaf

William E. Castle, Director

A new type of professional

The University of Rochester's Graduate School of Education and Human Development and Rochester Institute of Technology through the National Technical Institute for the Deaf have jointly developed a graduate program designed to improve the quality of education and services for deaf people.

Graduates of the program will receive master's degrees and be qualified to work as professionals with deaf people at the secondary level in:

- teaching deaf and normally hearing secondary students in such areas as English, mathematics, science, and social studies;
- managing special educational support service systems such as tutoring, notetaking, and interpreting;
- serving as resources on deafness to schools involved in mainstreaming deaf students into regular school systems.

Graduates will work in secondary schools serving deaf students, or function as instructional leaders, working with colleagues to enrich and upgrade the quality of education for deaf people nationally.

Certification

Graduates of this program will be eligible for:

- provisional certification from New York State as an academic teacher of the normally hearing, for grades 7-12, in one or more of

these areas: English, social studies, mathematics, biology, chemistry, physics, earth science or general science.

- provisional certification from New York State as a teacher of the deaf and hearing-impaired, nursery through grade 12.
- a master of science in education degree from the University of Rochester co-sponsored by Rochester Institute of Technology through the National Technical Institute for the Deaf.

To be certified to teach one or more of the broad fields listed below at the secondary level in New York State, applicants must satisfy the following minimum course work (undergraduate or graduate level) requirements in *one* of these areas:

English - 36 semester hours including work in linguistics, literature, and writing;

Mathematics - 36 semester hours including a calculus sequence;

Science - 44 semester hours in the natural sciences including a calculus sequence;

Social Studies - 36 semester hours in history, geography and the social sciences, with American studies and at least one course in the methods of inquiry in history, geography or one of the social sciences.

The University of Rochester and National Technical Institute for the Deaf: uniquely qualified to jointly prepare educational specialists

The University of Rochester, one of the smallest of the nation's distinguished universities, enrolls about 8,000 students, upwards of 3,000 of them at the graduate level. One of its eight colleges and schools, the Graduate School of Education and Human Development, offers doctor's and master's degrees in a variety of educational specialties. The school maintains long-established programs of teacher preparation for students in the university's outstanding departments of English, mathematics, social sciences, and natural sciences in the College of Arts and Science. Individuals and groups from the school's faculty have engaged in a number of joint activities with NTID personnel over the past 10 years: members of the university's School of Medicine and Dentistry and Center for Visual Science have joined in similar collaboration.

NTID, an integral part of Rochester Institute of Technology, is the world's largest technical college

for the deaf. It has led the way, both nationally and internationally, in efforts to integrate higher education for deaf students into college life on a campus planned primarily for hearing students. Today nearly 1,000 hearing-impaired students from 49 states, Puerto Rico, and the District of Columbia study and reside on the RIT campus with 8,500 hearing students.

RIT's students are enrolled in the Colleges of Applied Science and Technology, Business, Continuing Education, Engineering, Fine and Applied Arts, General Studies, Graphic Arts and Photography, Science, Eisenhower College and, of course, NTID.

RIT offers a wide range of programs, including more than 200 individual career study areas offering master's, bachelor's and associate's degrees.

About the program

This full-time master's degree program normally will require three to five semesters to complete depending upon the applicant's entry-level qualifications. The program is designed for people who seek academic certification to teach both hearing and deaf students. It also will serve those who are already certified to teach academic subjects to hearing students at the secondary level and who seek additional certification to teach deaf students.

Applicants must have at least an undergraduate major in an academic area normally taught at the secondary school level, such as English, literature, mathematics, chemistry, or history. Some successful applicants also may need more advanced work in their area of academic expertise, or may need to develop a broader perspective in several academic areas. For example, persons with an undergraduate degree in mathematics may need additional mathematics preparation to meet the University of Rochester's program requirements, or to attain an appropriate breadth of knowledge in mathematics.

Sign language

Participants will be required to demonstrate basic skills in expressive and receptive sign language before their student teaching begins. Those without sign language skills will be encouraged to participate in sign language courses at NTID in the summer that precedes their first semester of graduate study.

Admission requirements:

To gain admittance to this new graduate program, applicants must:

- Complete the equivalent of an undergraduate major in at least one academic area directly related to subjects normally taught at the secondary level.
- Demonstrate an interest in serving the needs of deaf people.
- Satisfy the University of Rochester admission requirements: solid undergraduate background in an academic area, good recommendations, and a successful on-campus interview.
- Applicants are encouraged to take the aptitude section of the Graduate Record Examination (GRE) prior to admission. Those who have not done so before admission will be required to take the GRE subsequent to admission.

The participants will determine their individual programs of study with the assistance of a faculty advisor. Among the major areas of study available to participants will be specialized courses which relate deafness to the communication sciences and disorders, instructional theories and techniques, educational goals and processes, and psycho-social-cultural development. Student teaching will provide exposure to the full range of educational environments available to deaf adolescents in the region.

How to apply

Admission is open without discrimination to hearing-impaired or hearing applicants. Enrollment will be limited to 15. Some financial aid may be available. For an application, please write to:

Associate Dean for Graduate Studies
Graduate School of Education and Human Development
304 Lattimore Hall
University of Rochester
Rochester, NY 14627

For additional information, please contact:

Dr. Kenneth R. Nash
Director, Joint Program to Prepare Educational Specialist for the Deaf at the Secondary Level
422 Lattimore Hall
University of Rochester
Rochester, NY 14627
Phone (716) 275-4009 (voice or TTY)

Note: Course descriptions can be found in the University of Rochester Graduate Bulletin.

NTID/RIT Graduate Internships

The purpose of the NTID Internship program is to provide opportunities for students at the master's or doctoral level to gain practical experience in the application of their discipline. These interns are usually graduate students or professionals who wish to gain advanced in-service training in their career areas and in education and services for the deaf. The duration of the internship depends on individual needs and the calendar of the sponsoring institution. NTID offers graduate internships in:

Audiology
Speech Pathology
Career and Personal Counseling
Education Administration
Teaching
Theatre
Curriculum Planning and Evaluation
Media Development
Educational Research

In 1981, 57 interns from 16 states and four foreign countries worked with NTID mentors in their career areas.

For more information contact
Jane Bolduc
Coordinator of Internships
Office of Professional Development
National Technical Institute for the Deaf
Rochester, New York 14623

Graduate Faculty

William E. Castle, Ph.D., Stanford University—Professor, Director and Vice President, NTID/RIT

Jack R. Clarcq, Ed.D., Syracuse University—Associate Professor, Associate Vice President, Technical Assistance Programs, NTID/RIT

Kenneth R. Nash, Ed.D., Columbia University—Associate Professor, Director Joint Educational Specialist Program, Adjunct Associate Professor, Graduate School of Education and Human Development, University of Rochester

Frank C. Caccamise, Ph.D., University of Washington—Associate Professor

Kathleen E. Crandall, Ph.D., Northwestern University—Associate Professor

Greg Emerton, Ph.D., Western Michigan University—Associate Professor

Susan D. Fischer, Ph.D., Massachusetts Institute of Technology—Associate Professor

T. Alan Hurwitz, Ed.D., University of Rochester—Associate Professor

Donald D. Johnson, Ph.D., University of Illinois—Professor

Harry Lang, Ed.D., University of Rochester—Associate Professor

Charles A. Layne, Ph.D., Ohio State University—Associate Professor

Bonnie Meath-Lang, Ed.D., University of Rochester—Assistant Professor

Robert F. Panara, MS, New York University—Professor

Dale L. Rockwell, MA, Wesleyan University—Associate Professor

Donald G. Sims, Ph.D., University of Pittsburgh—Associate Professor

Joan B. Stone, Ed.D., University of Rochester—Assistant Professor

Ross E. Stuckless, Ph.D., University of Pittsburgh—Professor

Joanne D. Subtelny, Ph.D., Northwestern University—Professor

Gerald B. Walter, Ed.D., University of Pittsburgh—Associate Professor

Officers

M. Richard Rose, BS, MS, Ph.D.,
President

Robert G. Quinn, BS, MS, Ph.D., Vice
President, Academic Affairs

Robert Frisina, BA, MA, Ph.D.,
Senior Vice President,
Institutional Advancement

Donald Scott, BA, BS,
Vice President, Finance and
Administration

Fred W. Smith, BA, MA, Ph.D.,
Vice President, Student Affairs

William E. Castle, BS, MS, Ph.D.,
Vice President and Director,
National Technical Institute for the
Deaf

Alfred L. Davis, AB, MA,
Vice President

Deans

Paul Bernstein, BS, MS, Ph.D.,
Graduate Studies

Robert A. Clark, BS, Ph.D.,
College of Continuing Education

Mark F. Guldin, BS, MS, Ph.D.,
College of Graphic Arts and
Photography

Robert H. Johnston, BS, MA, Ph.D.
College of Fine and Applied Arts

Richard A. Kenyon, BME, MS, Ph.D.
College of Engineering

Walter F. McCanna, Ph.D.
College of Business

Dennis C. Nystrom, BS, Ed.D.,
College of Applied Science and
Technology

John D. Paliouras, BA, MA, Ph.D.
College of Science

Peter J. Pere, BBA, MA, Ed.D.,
National Technical Institute for the
Deaf

Thomas R. Plough, BA, MA, Ph.D.
Eisenhower College
(Executive Dean)

Mary Sullivan, BA, MA, Ph.D.
College of General Studies

Trustees

Maurice I. Abrams, M.D. *
Honorary Director
American School for the Deaf, Inc.

James R. Alsdorf*
Former Vice President
& General Counsel
GarlockInc.

Theodore J. Altier
Chairman and Treasurer
Altier and Sons Shoes Inc.

Robert B. Anderson*
Partner
Robert B. Anderson & Co.

Mrs. Marcus N. Barbour*

Bruce B. Bates
Vice Chairman
Board of Trustees
Rochester Institute of Technology
Vice President
E.F. Hutton & Company Inc.

George S. Beinetti*
Former Chairman of the Board
Rochester Telephone Corporation

John L. Blake
Director
City of Rochester and Monroe County
Private Industry Council

H. Frank Blount
Chairman
National Advisory Group, NTID
Southeastern Regional
Vice President for Business Services
AT & T

Theodore C. Briggs*
Retired Chairman of the Board
Lawyers Co-operative Publishing Co.

Mrs. David L. Brooke

William A. Buckingham
President and Chief Executive Officer
of Manufacturers Hanover Trust, N.A.

Howard F. Carver*
Former Chairman of the Board
The Gleason Works

Colby H. Chandler
Vice President, Board of Trustees and
Chairman of the Executive
Committee
Rochester Institute of Technology
President
Eastman Kodak Company

Albert K. Chapman*

Brackett H. Clark*
Honorary Vice Chairman
Board of Trustees
Rochester Institute of Technology
Chairman of the Board and Treasurer
Rapidac Machine Corporation

Hugh E. Cumming
Retired President and Director
Curtice-Burns Inc.

E. Kent Damon
Vice Chairman
Board of Trustees
Rochester Institute of Technology
Vice President and Secretary
Xerox Corporation

Robert H. Downie
Senior Vice President—Development
Moore Corporation, Limited

Francis E. Drake, Jr.
Retired Chairman of the Board
Rochester Gas & Electric Corporation

Mrs. James C. Duff us
President
Women's Council
Rochester Institute of Technology

Richard H. Eisenhart
Chairman Emeritus
Board of Trustees
Rochester Institute of Technology
Chairman
R.H. Eisenhart Inc.

Walter A. Fallon
Chairman of the Board and
Chief Executive Officer
Eastman Kodak Company

Mrs. Julian M. Fitch
Former President
Women's Council
Rochester Institute of Technology

Maurice R. Forman*
Retired Chairman
B. Forman Company

Karl F. Fuchs*
President
Alliance Tool Corporation

Daniel E. Gill
President and Chief Executive Officer
Bausch & Lomb Inc.

James S. Gleason
President and Chief Executive Officer
The Gleason Works

Lawrence C. Gleason*

Former Chairman of the Board
The Gleason Works

Fred H. Gordon, Jr.*

Chairman, Executive Committee
Mixing Equipment Co. Inc.
(a unit of General Signal Corporation)

Lucius R. Gordon*

Chairman of the Board
Mixing Equipment Co. Inc.
(a unit of General Signal Corporation)

Thomas H. Gosnell

Treasurer
Board of Trustees
Rochester Institute of Technology
President
Lawyers Co-operative Publishing Co.

Ezra A. Hale*

Honorary Chairman
Board of Trustees
Rochester Institute of Technology
Honorary Chairman of the Board
Central Trust Company

Alfred M. Hallenbeck

Counsel
Board of Trustees
Rochester Institute of Technology
Vice President and General Counsel
Sybron Corporation

Alexander D. Hargrave

Chairman of the Board and Chief
Executive Officer
Lincoln First Banks Inc.

James C. Henderson

President
Rochester Telephone Corporation

John E. Heselden

President
Gannett Newspaper Division
Gannett Co. Inc.

John D. Hostutler

President
Industrial Management Council

Thomas E. Hustead

Retired General Manager
Rochester Products Division
General Motors Corporation

Frank M. Hutchins

Chairman
Board of Trustees
Rochester Institute of Technology
Chairman of the Board
Hutchins/Young & Rubicam Inc.

Stanley R. Jacobs*

Former Member
New York Stock Exchange

Herbert W. Jarvis

President and Chief Operating Officer
Sybron Corporation

Paul C. Jenks, M.D.

Retired Physician

Byron Johnson

Senior Partner
Johnson, Mullan, Brundage &
Keigher, P.C.

John Wiley Jones*

Chairman of the Board
Jones Chemicals Inc.

Thomas F. Judson, Sr.

Chairman of the Board
John B. Pike & Son Inc.

Arthur M Lowenthal*

Susan Eisenhower Mahon
Free-Lance Writer

William J. Maxion

Chairman of the Board
Case-Hoyt Corporation

Russell C. McCarthy*

Retired Manager
Industrial Management Council

J. Warren McClure*

President
McClure Media Marketing
Motivation Co.

C. Peter McColough*

Chairman of the Board and
Chief Executive Officer
Xerox Corporation

Paul Miller*

Former Chairman of the Board
Gannett Co. Inc.

Mrs. Edward T. Mulligan

Alfred J. Murrer
Chairman of the Board
The Gleason Works

Raymond E. Olson*

Retired Vice Chairman of the Board
Sybron Corporation

Frederick G. Ray

Chairman of the Board
President and Chief Executive Officer
Rochester Savings Bank

Ernest I. Reveal

Retired Chairman of the Board
R.T. French Company

Jorge A. G. Rivas

President
Offset Multicolor, S.A.

M. Richard Rose

President
Rochester Institute of Technology

Harris H. Rusitzky

Secretary
Rochester Institute of Technology
President
Serv-Rite Food Service & Consulting
Corporation

John E. Schubert

Former Chairman of the Board
The Community Savings Bank

F. Ritter Shumway*

Honorary Member of the Board
Sybron Corporation

Mrs. F. Ritter Shumway*

Former President
Board of Health, County of Monroe

Ellis D. Slater*

Retired Corporate Executive

Arthur L. Stern*

Chairman Emeritus
Board of Trustees
Rochester Institute of Technology
Stern, Lane & Stern

Robert J. Strassenburgh II

Former Chairman and President
Strassenburgh Laboratories

Robert L. Tarnow

Chairman of the Board
Goulds Pumps Inc.

Gaylord C. Whitaker*

Consultant
Singer Education Systems

Ronald A. White

President
Graphic Systems Division
Rockwell International Corporation

Wallace E. Wilson*

Group Vice President (Retired)
General Motors Corporation

Kenneth W. Woodward, M.D.

Manager
Clinical Services
Xerox Corporation

Index

A -----	
"About RIT"	4
Accountancy, Graduate Programs in	34
Accountancy, Master of Science in	34
Accountancy Seminar	39
Accounting and Theory, Advanced	39
Accounting, Basic Taxation	39
Accounting, Financial	39
Accounting, Seminar in	39
Accounting Theory I, II	39
Accreditation	6
Administration in the Social Work Setting	43
Admission Requirements (General)	8
Advanced Accounting and Theory	39
Advanced Clinical Chemistry I, II, III	96
Advanced Clinical Chemistry Laboratory I, II, III	96
Advanced Computer Utilization Techniques	28
Advanced Electromagnetic Engineering	61
Advanced Marketing Management	41
Advanced Macroeconomic Theory	41
Advanced Microeconomic Theory	41
Advanced Microprocessor Systems Design	59
Advanced Optics	100
Advanced Organic Chemistry	95
Advanced Taxation Accounting	39
Aesthetics, Theories of	76
Algorithms and Data Structures	28
American Architecture	76
American Business, Economic Environment of	41
American Craftsmen, School for	74
American Educational Thought & Practice, History of	77
Amorphous and Semicrystalline Materials	100
Analysis and Evaluation of Imaging Systems	90
Analysis for Engineers	62
Analytical Mechanics	64
Applications of Behavioral Psychology to Training and Adult Learning	29
Application of Computers to Graphic Arts	81
Applied and Mathematical Statistics, Master of Science in	46
Applied Regression Analysis	42
Applied Mechanics Systems Analysis	62
Applied Science and Technology, College of	18
Applied Sensitometry	91
Applied Statistics, Special Topics in	50
Architecture, American	76
Architecture, Computer	26
Architecture, Software	26
Art and Design, School of	72
Art Education	72
Art Education, Master of Science for Teachers	66, 70, 72
Art Education, Methods and Materials in	72
Art Education, Seminar in	72
Art, Practice Teaching in	72
Art, Twentieth Century American	76
Art: Vision and Concept	77
Arts and Crafts in Tribal Societies	76
Auditing	39
Auditing Theory	39
Automatic Control Systems	64
Automobile Registration	15

B -----	
Basic Taxation Accounting	39
Bayesian Statistics	50
Bevier Gallery	69
Biochemistry	95
Biochemistry—Metabolism	95
Biochemistry—Nucleic Acids and Molecular Genetics	95

Biotechnology and Human Factors I, II, III, IV	62
Bureaucracy in Modern Society	43
Business Administration Courses	39
Business Administration, Master of	33, 37
Business, American, Economic Environment of	41
Business and Society	39
Business, College of	32
Business Forecasting Methods	43
Business Research Methods	40
C -----	
Calendar	Inside front cover
Campus Map	Inside back cover
Career and Human Resource Development	25, 26
Career Concepts: Commerce	25
Career Concepts: Production	25
Career Concepts: Services	25
Career Counseling Skills	26
Career Decision Making Concepts	25
Career Development Project	26
Career Education in Colleges and Special Settings	25
Career Education Seminar— Handicapped	26
Career Education Seminar—Women	26
Career and Human Resource Development, Master of Science in	18, 25
Career Internship	26
Cary Library	80
Ceramics	74
Ceramics and Ceramic Sculpture	74
Ceramics and Ceramic Sculpture, MFA Degree	67, 69, 74
Ceramics and Ceramic Sculpture, MST Degree	67, 69, 74
Ceramics and Glass	99
Chemical Kinetics	95
Chemical Thermodynamics	95
Chemistry, Department of	95
Chemistry, Heterocyclic	95
Chemistry, Inorganic	95
Chemistry (Master of Science)	92, 94
Chemistry Seminar	95
Chemistry, Special Topics	95
Cinematography	90
City Center	70
Clinical Chemistry, Advanced	96
Clinical Chemistry Laboratories, Advanced	96
Clinical Chemistry (Master of Science)	94
Clinical Chemistry Research	96
Clinical Chemistry Research, External	96
Clinical Chemistry Seminar	96
Clinical Laboratory Computer Applications	96
Clinical Laboratory Management	96
Clinical Science—Special Topics	96
Clinical Sciences, Department of	96
Coding Theory	27
College of Applied Science and Technology	18
College of Business	32
College of Continuing Education	46
College of Engineering	52
College of Fine and Applied Arts	66
College of General Studies	76
College of Graphic Arts and Photography	78
College of Science	92
Communication Design	see Graphic Design
Comparative Organizations	40
Compiler Construction	27
Computability	27
Computational Complexity	27
Computer Architecture	26
Computer Assisted Instruction	28
Computer Communications Networks	27
Computer Engineering Department	57
Computer Graphics	27
Computer Science, Master of Science in	19, 21
Computer Science, Seminar in	28
Computer Science and Technology, School of	21, 26
Computer Systems Management, Master of Science in	18, 21, 22, 28
Computer Systems Management, Seminar in	28

Computers to the Graphic Arts, Application of	81
Computing Theory, Foundations of	26
Consumer Behavior	41
Contemporary Issues in Art	76
Continuing Education, College of	46
Continuum Mechanics, Introduction to	64
Control, Optimal	60
Control Systems Design, Optimal	64
Cooperation and Conflict	43
Cost and Managerial Accounting	39
Costs (Tuition, etc.)	10
Counseling Center	15
Course Numbering	17
Criterion Referenced Instruction and Technical Training I, II	29
Cubism to the Present	76
p -----	
Data Base Systems	27
Data Base System Implementation	27
Data Processing and Administration	28
Data Structures, Algorithms and	28
Deans	104
Decision Analysis	42
Decision Sciences, Seminar in	42
Deferred Payment Plan	10
Degrees Offered (Graduate Study)	7
Department of Career and Human Resource Development	19
Department of Chemistry	95
Department of Clinical Sciences	96
Department of Computer Engineering	57
Department of Electrical Engineering	57, 59
Department of Industrial Engineering	57, 61
Department of Instructional Technology	23
Department of Mechanical Engineering	57, 62
Department of Statistics	46
Design of Experiments	82
Design of Experiments I, II	49
Developing Instructional Modules	29
Developmental Psychology	77
Deviance, Conformity, and Criminal Behavior	43
Digital Control Systems Design	60
Digital Image Processing	60
E -----	
Economic Environment of American Business	41
Economic Environment of Human Services	42
Economics, Seminar in	41
Education/Business/Industry Interrelationships	25
Educational Psychology	77
Educational Sociology	77
Elasticity, Theory of	64
Electrical and Magnetic Properties of Materials	100
Electrical Engineering Courses	59
Electrical Engineering Department	57
Electrical Engineering, Master of Science in	57
Electrical Engineering, Special Topics in	60
Electromagnetic Engineering, Advanced	61
Electromagnetic Theory, Special Topics in	61
Electro-optics	60
Emergencies	16
Energy Methods in Mechanics	64
Engineering, College of	52
Engineering Courses	59
Engineering Department, Computer	57
Engineering Department, Electrical	57
Engineering Department, Industrial	57
Engineering Department, Mechanical	57
Engineering Economy	61
Engineering Internship	61
Engineering, Master of	52
Engineering Materials	64
Engineering, Optical (I, II)	60
Engineering Research and Thesis Guidance	61, 64
Environmental Design	see Industrial and Interior Design
Evaluation of Training and Instruction	29
Experimental Stress Analysis	63

Experimental Techniques	99
External Clinical Chemistry Research	96
External Research.....	95

p -----

Facilities Planning	62
Faculty	See Graduate Faculty
Fiber Optics	60
Film History and Criticism	76
Film and Society.....	76
Finance and Research, Theory of	41
Finance, Seminar in	41
Financial Accounting	39
Financial Accounting Theory	39
Financial Aid	10
Financial Management I, II.....	40
Financial Management, Problems in	41
Fine and Applied Arts	66
Fine and Applied Arts, College of	66
Finite Elements	63
Fluid Dynamics	64
Foundation Courses	81
Foundations of Computing Theory.....	26
Fundamentals of Statistics I, II.....	49

G-----

Gas Dynamics.....	64
General Studies, College of	76
General Studies Courses	76
Glass	74
Glass, Master of Fine Arts in	66-70, 74
Glass, Master of Science for Teachers.....	66-70, 74
Glass, Stained.....	74
Goudy-Coggeshal Memorial Workshop ...	80
Graduate Degrees Offered	7
Graduate Education at RIT	4
Graduate Education at RIT, Philosophy of	8
Graduate Faculty:	
College of Applied Science and Technology	31
College of Business	44
College of Continuing Education	51
College of Engineering	65
College of Fine & Applied Arts	75
College of General Studies	77
College of Graphic Arts and Photography	83, 91
College of Science	97, 100
NTID	103
School of Printing	83
School of Photographic Arts and Sciences	91
Graduate Paper (Electrical Engineering).....	61
Graduate Programs for Deaf Students ..	102
Graduate Programs of Study	7
Graduation Requirements	12
Graphic Arts and Photography, College of	78
Graphic Arts and Photography Courses	81, 90
Graphic Arts, Application of Computers to the	81
Graphic Arts, Research Methods in	81
Graphic Design	72
Graphic Design (MFA)	66-70, 72
Graphic Design (MST)	66-70, 72
Graphic Reproduction Theory	81
Group Development and Organizational Change	29
Group Dynamics for Career Development.....	26

H-----

Heat Exchanger Design	63
Heat Transfer.....	63
Heterocyclic Chemistry	95
Higher Education General Information Survey Code	7
History and Aesthetics of Photography ...	90
History of American Education Thought and Practice.....	77
Housing	15
Human Resources Topics.....	26
Human Services Group.....	42, 43

I-----

Identification Cards	15
Imaging Systems, Analysis and Evaluation of	90
Imposition and Finishing	81
Independent Project	91

Independent Study (Chemistry)	95, 96
Independent Study (Computers)	27, 28
Independent Study (Computer Systems Management)	28
Independent Study (Engineering)	60
Independent Study (Instructional Technology)	30
Independent Study (Materials Science)	100
Individual Learning Style Analysis	29
Industrial and Interior Design	66-70, 72
Industrial and Interior Design (MFA)	66-70, 72
Industrial and Interior Design (MST)	66-70, 72
Industrial Engineering Courses	61
Industrial Engineering Department.....	57
Industrial Engineering, Special Topics in	62
Information Media and Design	28
Information Retrieval Systems in Career Planning	25
Information Science Courses	28
Information Science, Master of Science in	19, 23, 24
Information Storage and Retrieval	27
Information Systems	40
Ink, Color and Substrates	82
Inorganic Chemistry	95
Instructional Development I, II, III	29
Instructional Facility Design	29
Instructional Techniques	25
Instructional Technology.....	23, 28
Instructional Technology, Department of	23
Instructional Technology, Independent Study	30
Instructional Technology, Internship.....	30
Instructional Technology, Master of Science in	19
Instructional Technology, Research in	28
Instructional Technology, Selected Topics in	30
Instructional Technology, Sources of Information in	28
Instructional Television.....	28
Instrumental Analysis	95
Instrumental Analysis Laboratory	95
Instrumental and Photographic Optics	90
Instrumentation and Experimental Analysis	64
Integrated Business Analysis.....	40
Interior Design	see Industrial and Interior Design
International Management.....	41
Internship, Engineering.....	61
Internship (Instructional Technology)	30
Interpersonal Communications	29
Interpersonal Skills	43
Intervention in the Community	43
Introduction to Continuum Mechanics	64
Introduction to Decision Processes	49
Introduction to Instructional Technology I, II	28
Introduction to Material Science	99
Introduction to Polymer Science	99
Introduction to Systems Analysis	82
Introductory Experimental Techniques	99
Introductory Theoretical Methods.....	99
Inventory Design	62

J-----

Jewelry, Metalcrafts and	74
--------------------------------	----

L-----

Labor/Management Problems	40
Law and the Administrative Process	43
Learning Development Center.....	15
Learning, Management of	25
Legal Environment of Business.....	40
Libraries.....	14, 80
Library Automation and Management	28
Lithographic Press	81
Logistics, Marketing.....	41
Lubrication	64

M-----

Macroeconomic Theory, Advanced	41
Magnetic Resonance, Principles of	96
Management and Budgeting in Instructional Technology	29
Management and Organization	39
Management, Computers in	82
Management Development.....	40
Management, Financial.....	40

Management, International	41
Management of Learning	25
Management, Seminar in	40
Managerial Decision Making	50
Managerial Economics	41
Manpower Forecasting Fundamentals	25
Marketing Communications	42
Marketing Concepts	41
Marketing Logistics	41
Marketing Management, Advanced	41
Marketing, Seminar in	42
Master of Business Administration	33, 37
Master of Engineering	52, 56
Master of Fine Arts In:	
Ceramics and Ceramic Sculpture	67, 69, 74
Glass	67, 70, 74
Graphic Design	66-70, 72
Industrial and Interior Design	66-70, 72
Medical Illustration.....	66, 70, 73
Metalcrafts & Jewelry	67, 70, 74
Painting	67, 70, 72
Photography	86, 90
Printmaking.....	67, 70, 73
Weaving and Textile Design	67, 70, 74
Woodworking & Furniture Design	67, 70, 74
Master of Science in:	
Accountancy	34
Applied and Mathematical Statistics	46
Career and Human Resource Development	18, 19, 25
Chemistry.....	92, 95
Clinical Chemistry.....	94, 96
Computer Science	19, 21
Computer Systems Management	18, 22, 28
Education	102
Electrical Engineering	52
Human Services Management	34, 38, 42
Information Science	19, 28
Instructional Technology	19, 23, 28
Materials Science and Engineering	98
Mechanical Engineering	52, 58, 63
Photographic Science & Instrumentation	84, 90
Printing	78, 80, 81
Master of Science for Teachers in:	
Art Education	66, 70, 72
Ceramics and Ceramic Sculpture	67, 69, 74
Glass	67, 70, 74
Graphic Design	66-70, 72
Industrial and Interior Design	66-70, 72
Metalcrafts and Jewelry	67, 70, 74
Painting	67, 70, 72
Printmaking.....	67, 70, 73
Weaving and Textile Design	67, 70, 74
Woodworking & Furniture Design	67, 70, 74
Master's Thesis	61
Materials Degradation: Corrosion	99
Materials Properties and Selection I and II	99
Mathematical Programming	42, 62
Mathematics and Statistics for Photographic Systems	90
Mathematics for Engineers	63
Mechanical Engineering Courses	62
Mechanical Engineering Department.....	57
Mechanical Engineering, Master of Science in	52, 57, 62
Mechanics	63
Mechanics, Analytical	64
Mechanics, Energy Methods in	64
Medical Illustration Photography	73
Medical Illustration Exhibits and Design	73
Medical Illustration Graphics.....	73
Medical Illustration Surgical I, II	73
Medical Illustration Topics	73
Medical Service (Student Health)	16
Melbert B. Cary, Jr. Graphic Arts Collection.....	80
Metalcrafts and Jewelry.....	74
Metalcrafts and Jewelry (MFA) ...	67, 70, 74

Metalcrafts and Jewelry (MST) ...	67, 70, 74
Methods and Materials in Art Education ..	72
MFA Gallery	88
Microcomputers in Control and Instrumentation.....	59
Microcomputers, Microprocessors and ..	26
Microeconomic Theory, Advanced	41
Microprocessor Systems Design, Advanced	59
Microprocessors and Microcomputers ..	26
Modeling and Simulation I, II	27
Models of Operating Systems	27
Modern Control Theory	60
Multivariate Analysis I, II	49
Multivariate Methods in Business	42
Music Literature	77

N

National Technical Institute for the Deaf	101
Nature of Work, the	25
Network Theory.....	59
Nonparametric Statistics.....	50
NTID.....	101
Nuclear Science and Engineering.....	100
Numerical Methods	64

O

Occupational/Industrial Environments	25
Officers.....	104
On-Line Information Systems Design.....	27
Operations Management.....	39
Optical Engineering, I, II	60
Optical Properties of Materials	100
Optics, Advanced	100
Optimal Control.....	60
Optimal Control Systems Design.....	64
Organic Chemistry, Advanced	95
Organic Chemistry of Polymers	95
Organic Polymers	99
Organizational Behavior.....	39
Organization and Management	39
Organization and Management in Criminal Justice	43
Oriental Art	76

P

Painting	72
Painting (MFA)	67, 70, 72
Painting (MST)	67, 70, 72
Parsing, Theory of.....	27
Perception and Photography	91
Personnel Systems.....	40
Philosophy of Graduate Education at RIT	8
Photographic Museum Practice	90
Photographic Process, Theory of the	90
Photographic Science and Instrumentation, Master of Science in	84, 90
Photographic Science, Principles of.....	90
Photographic Science, Special Topics in	90
Photographic Workshop	90
Photography Core.....	90
Photography, History and Aesthetics of ..	90
Photography, Master of Fine Arts	86, 90
Physical Chemistry of Polymers	96, 99
Physical Chemistry, Survey of	95
Picasso	77
Placement Services	16
Plates and Shells, Theory of	62
Polymer Processing	99
Portfolio Guidelines for Graduate Applicants	72
Practical R & D Management	60
Practice Teaching in Art.....	72
Pre-Thesis Seminar.....	91
Principles of Magnetic Resonance	96
Principles of Operations Research I	61
Principles of Photographic Science	90
Printing	78, 80, 81
Printing, Master of Science in.....	78, 80, 81
Printing Plates	81
Printing Technology	81
Printing Technology, Trends in	81
Printmaking	73
Printmaking (MFA).....	67, 70, 73
Printmaking (MST)	67, 70, 73
Problems in Financial Management	41
Production Control	62

Programmed Instruction	28
Programming, Review of	28
Psychology, Developmental.....	77
Psychology, Educational	77
Psychology of Learning and Teaching	29

Q

Quality Control: Acceptance Sampling ...	49
Quality Control: Control Charts	49
Quantitative Analysis	42
Quantum Mechanics.....	96

R

Refund Policy	10
Regression Analysis I, II	49, 50
Reliability	49
Rembrandt	77
Reproduction Photography.....	81
Research and Thesis.....	91
Research and Thesis Guidance	61, 64, 73, 74, 90, 95, 100
Research, Clinical Chemistry.....	96
Research Corporation	8
Research, External	95
Research in Instructional Technology	28
Research Methods, Business.....	40
Research Methods in Graphic Arts	81
Research Option	40
Research Projects	29, 82
Review of Programming.....	28
Rochester, University of.....	102

S

Sales Management.....	41
Sample Size Determination.....	50
Sampling Theory and Applications.....	50
School for American Craftsmen	74
School of Art and Design	72
School of Computer Science and Technology	21, 26
School of Photographic Arts and Sciences	84-91
School of Printing	78
Science, College of	92
Science Courses	95
Sculpture.....	73
Securities and Investment Analysis.....	41
Selected Topics in Instructional Technology	30
Seminar in Accounting	39
Seminar in Aesthetics	77
Seminar in Career and Human Resource Development	25
Seminar in Chemistry	95
Seminar in Computer Science	27
Seminar in Computer Systems Management	28
Seminar in Decision Science.....	42
Seminar in Economics.....	41
Seminar in Finance	41
Seminar in Management	40
Seminar in Marketing	42
Seminar in Materials Science	100
Seminar, Pre-Thesis.....	91
Seminar, Statistics	50
Seminar, Student/Faculty	90
Simulation	43
Small Business Administration	40
Sociology, Educational	77
Software Architecture	26
Solid State Science	99
Solid Wastes Engineering	63
Sources of Information in Instructional Technology	28
Special Populations.....	43
Special Projects—Career and Human Resource Development	26
Special Topics—Chemistry	95
Special Topics (Clinical Science).....	96
Special Topics in Applied Mechanics.....	63
Special Topics in Applied Statistics.....	50
Special Topics in Computer Architecture	59
Special Topics in Electrical Engineering ..	60
Special Topics in Electromagnetic Theory	61
Special Topics in Industrial Engineering ..	62
Special Topics in Materials Science	100
Special Topics in Photographic Science ..	90
Special Topics in Systems Analysis	63
Special Topics in Thermo Fluid Systems	63

Special Topics Workshop	90
Spectrometric Chemical Identification of Organic Compounds	95
Stained Glass	74
Statistical Analysis I, II	42
Statistical Analysis for Engineers I, II	61
Statistical Inference.....	81
Statistical Thermodynamics	64
Statistics and Quality Control.....	96
Statistics, Fundamentals of.....	49
Statistics Seminar	50
Statistics, Theory of.....	49
Stereochemistry.....	95
Stochastic Estimation and Control.....	60
Student/Faculty Seminar	90
Student Health Services	16
Student Services	14
Survey Design and Sampling.....	42
Survey of Operations Research	62
Survey of Physical Chemistry	95
Systems Administration	40
Systems Analysis, Introduction to.....	82
Systems Analysis, Special Topics in	63
Systems Development	28
Systems Programming.....	27
Systems Programming Laboratory	27
Systems Safety Engineering	62
Systems Simulation	62

T

Taxation Accounting, Advanced	39
Taxation Accounting, Basic	39
Teaching, Learning, Content and Environment.....	25
Technical & Education Center Library	80
Techniques of Work Analysis.....	29
Technological Forecasting	62
The Nature of Work	25
The Two Year Colleges	25
Theories of Aesthetics and Art Criticism ..	76
Theory of Elasticity	64
Theory of Finance and Research.....	41
Theory of Parsing.....	27
Theory of Plates and Shells	62
Theory of Statistics I, II.....	49
Theory of the Photographic Process	90
Thermal Stresses	64
Thermo Fluid System Analysis	62
Thermodynamics	64
Thesis Guidance, Research and	61, 64, 73, 74, 90, 95, 100
Thesis, Master's.....	61
Thesis (Statistics).....	50
Thyristor Power Control and Conversion	60
Tone and Color Analysis	82
Trends in Printing Technology.....	81
Tribal Societies, Arts and Crafts in	76
Trustees	104, 105
Tuition and Costs.....	10
Turbomachinery.....	63
Twentieth Century American Art.....	76
Two-Year Colleges, The	25
Typography Procedures, Photo	82

U

University of Rochester, Joint Program for Educational Specialists	102
--	-----

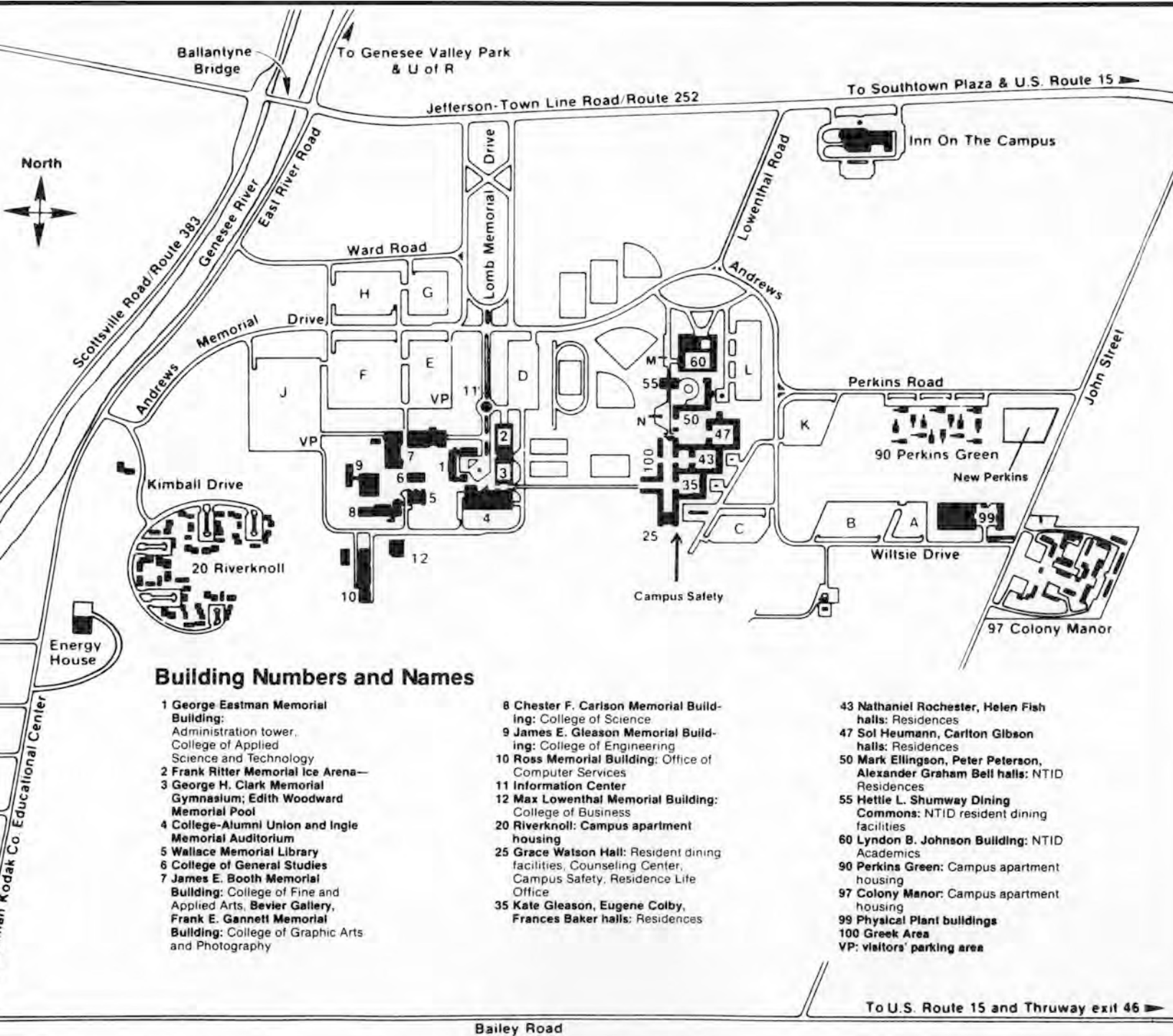
V

Value Analysis.....	61
Veterans' Benefits.....	16
Vibration Theory and Applications	63

W

Wallace Memorial Library.....	14
Weaving and Textile Design	74
Weaving and Textile Design (MFA)	67, 70, 74
Weaving and Textile Design (MST)	67, 70, 74
Woodworking and Furniture Design	74
Woodworking and Furniture Design (MFA)	67, 70, 74
Woodworking and Furniture Design (MST)	67, 70, 74
Work Analysis, Techniques of	29
Work, The Nature of	25

Z





Rochester Institute of Technology
Office of Admissions
One Lomb Memorial Drive
P.O. Box 9887
Rochester, NY 14623