January 1987

1987-1988 College of Continuing Education

Rochester Institute of Technology

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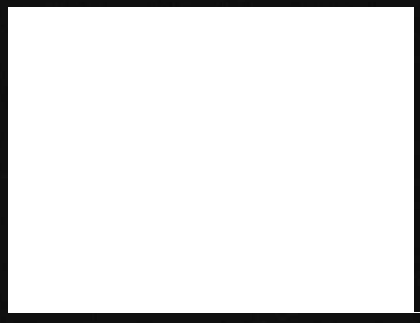

Program and Course
Description Guide

College of Continuing Education

Who to Call About What in the College of Continuing Education

Administrative Officers and Staff

Dr. Donald D. Baker, Dean 475-5070
Dr. Lawrence W. Belle, Associate Dean 475-5872
Dr. Mark L. Blazey, Associate Dean 475-6116

Academic Division

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Joyce Clayton, Admissions Counselor 475-5511
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Bette Anne Winston, Academic Advising Coordinator 475-2218

Business & The Arts Division

Dr. Lynda Rummel, Director 475-4999
Eric Bellman, Chairperson, Fine & Applied Arts & Crafts 475-4977
Betty Conley, Chairperson, Communications 475-4936
Dr. Ronald Hilton, Chairperson, Liberal Arts 475-4986

Science & Technology Division

Henry Cooke, Director 475-5021
Alfred Haacke, Chairperson, Physics and Computer Systems . . 475-4934

School of Applied Industrial Studies

James D. Forman, Director 475-5000
Orville Adler, Chairperson, Machine Tool Technology 475-5006
Robert Klafehn, Chairperson, Automated Equipment Technology and Packaging Machinery Mechanics 475-5053
Elizabeth Paciorek, Chairperson, Drafting Technology 475-4994
Ronald Perry, Chairperson, Computer Service Technology . . . 475-5001

Center for Quality and Applied Statistics

Dr. John D. Hromi, Director 475-2002
Dr. Edward Schilling, Chairperson, Graduate Statistics 475-6129

Department of Career and Human Resource Development

Dr. Dorothy Paynter, Director 475-5069

Information Services

Alice McCrave, Coordinator 475-2531

RIT Training and Professional Development

Dr. Mark L. Blazey, Associate Dean and Director 475-6116
Carole Rose, Associate Director, Program Management 475-4982
Kathleen Sherek-Martynec, Associate Director, Program Development 475-5084

College of Continuing Education

A traditional college education is not always the answer. For the adult student-juggling work, family and social obligations—alternative ways to reach educational goals are a necessity.

The courses and programs offered by the College of Continuing Education (CCE) are unique because they are tailored to the adult student who has been working for several years and is reaching for the next rung on the career ladder, or is contemplating a career switch, or is re-entering the work force after some years away. Students can earn certificates, diplomas, and degrees.

The courses and programs offered by CCE also are unique because they are offered during the day, at night, on Saturdays, through Weekend College, and even via TeleCourses that students can take at home.

The CCE **Academic Division** offers numerous options in areas such as management, photography, technologies, and machine tool, as well as fine and applied arts, technical communication, business administration, computer science and general education. CCE offers 19 certificate programs and diplomas, 23 associate degrees, and six bachelor of science degrees, as well as the new flexible **Applied Arts and Science Degrees** at the diploma, associate and baccalaureate levels.

The **School of Applied Industrial Studies** (SAIS) offers full-time, one-year diploma programs in drafting, computer services, automated equipment and machine tool technology & packaging machinery mechanics. Also offered is a part-time evening certificate program in Computer-Aided Drafting.

The **Center for Quality and Applied Statistics** (CQAS) offers a master of science degree in applied and math^gaatical statistics for part-time or full-time students. Summer study and co-op programs also are available. The center presents short courses and seminars through its "Quality and Productivity Series" for individuals, business and industry. Call 475-6129 for additional information.

The **Career and Human Resource Development Department** (CHRD) provides graduate study leading to a master of science degree in career planning and human resource development. The behavioral science-based program emphasizes the areas of organizational development, career development, human resource development and statistical analysis. The program is open to both full- and part-time students and prepares professionals for employment in education, business, industry, and social services agencies. Call 475-6677 for additional information.

RIT Training and Professional Development offers several hundred short courses, seminars and workshops each year, presented by RIT faculty, and nationally renowned speakers. These programs won't provide participants with credit, but will provide them with up-to-date knowledge and skills in a wide range of fields—business, communications, engineering, allied health, human resource development, small business skills—the list goes on.

RIT Training and Professional Development offers custom-tailored programs for business, industry and organizations. Staff experts will help with a firm's in-house training needs, analyze, and design training programs that meet those needs exactly. Call 475-6600 for additional information.

The **CCE Open Enrollment Policy** allows a student to take any course or pursue any degree for which he or she has sufficient background. Academic advisors are available throughout the year to answer questions regarding course or program choices.

To officially choose a program, students must **matriculate** —that is, complete an admissions application and be accepted. At the time of matriculation degree requirements are defined and documented, transfer credits are evaluated to meet degree requirements, and eligibility for applying for student loans and state and federal aid is established.

Specially trained **financial aid** counselors can provide students with information about some of the grants and loans available for part-time students. In addition to federal, state and private programs, RIT has special financial aid funds for part-time students that can cut tuition costs by as much as 50 percent. Many companies have employee education benefits that will pay for some or all tuition costs; active U.S. Army Reserve and National Cuard members are eligible for benefits that pay up to 90 percent of tuition.

For students who want to try a new field, brush up on some old skills, or are looking for personal satisfaction rather than credit, RIT's new **Audit Policy** may be the answer. Students can audit many of the CCE credit courses on a non-credit basis, and the tuition is half price.

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

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

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

Who teaches our courses?
Most courses in the College of Continuing Education are conducted by instructors who teach what they do professionally. Our faculty are selected for their professional competence, academic background and teaching ability. Our faculty teach because of their enthusiasm for their subject, their interest in seeing others develop personally and professionally, and their own need for a creative outlet.

When are courses taught?
In addition to our weekly evening and trick work schedules, we also offer courses on television and through audio conferences, and Weekend College.

Weekend College courses meet on Saturdays (leaving the rest of your weekend free) usually every other weekend, and a full course

may be completed in four or five weekends. Weekend College students enjoy the schedule and the seminar-like environment. Through Weekend College, you can earn credits toward a degree or complete a certificate or diploma program.

Telecourses offer quality programming which students can take at home. Courses combine videotape lectures aired on cable and public broadcast television with textbook readings, audio and computer conferencing, assignments, exams, and a limited number of class meetings. Students have access to instructors by mail, computer, telephone, or individual appointment. These electronic delivery systems allow students to learn at times and places convenient to them.

Applied Arts and Science Degrees

Adult students returning to college on a part-time basis need high-quality degree programs in a variety of fields that are both flexible and recognize an adult's prior college level-learning. The College of Continuing Education now offers you the opportunity to tailor an **individualized program of technical and professional study** through its new Applied Arts and Science program. There are three levels:

Diploma
36 credits; 1 area of concentration

Associate of Applied Science (AAS) degree: 52 core credits plus 38 credits in 1-2 areas of concentration plus general education courses

Bachelor of Science (BS) degree: 90 core credits plus 90 credits in 2-4 areas of concentration plus general education courses

Individualized Concentrations

The associate and bachelor's degrees allow you to study several different professional and technical areas, selected specifically to meet your unique career and personal goals. The diploma focuses on one concentration. Foi your professional concentrations, you can draw on a wealth of educational resources from across RIT colleges and departments, including: **engineering technologies, sciences, computing, photography and printing, business and management, liberal arts, physical and social sciences, mathematics, fine arts, and applied communication.**

No two Applied Arts and Science programs will be exactly alike because each takes into account the student's previous learning and brings together a special combination of courses that are right for the individual student's career and professional development. For example, one individualized program might lead to a bachelor's degree with concentrations in computing, graphic arts, and management, while another could lead to a bachelor's degree that combines fields of communication and management.

And as your career plans evolve and the demands of your technical and professional fields change, you will meet regularly with your advisor to review and update your plan of study.

Common Features

Every Applied Arts and Science degree has certain features in common:

1. An approved program of study developed with an individual advisor and advisory committee
2. General education courses in mathematics, computer science, science, and liberal arts (52 credits for the AAS; 90 credits for the BS)
3. One or more professional concentrations which provide each student with the opportunity to develop an interdisciplinary program tailored to specific career and personal objectives:

Recognition for Prior College-Level Learning

Your program will begin by taking account of what you already know and have accomplished. For example, college credits earned at RIT or other institutions will be reviewed to see how they might be applied to your Applied Arts and Science program of study; your professional certifications and experiences will be evaluated for the possibility of receiving credit in your new program; and you may earn credits (by examination, portfolio reviews, or other documentation) for college-level learning that you have gained on-the-job or through other educational experiences. For advising, contact Bette Anne Winston at 475-2218.

Course requirements, CIDA-AAS & CIDB-BS degrees

	Math/ Computer/Science	Qtr. Cr.	Liberal Arts	Qtr. Cr.	Concentration(s)* 1 or 2	Qtr. Cr.
Phase 1 + 2 CIDA-AAS	Tech Math CTAM-201,202 or College Math for Business CBCH-201,202 or Math Thought/ Process AND CTAM-205 Modern Math Methods CTAM-206 Intro to Computers/ Prog. CTDS-200 or Intro to Computer Science CTDS-202 or Data Processing CBCC-321 College Physics/ Lab CTCP-221, 222,223,206 207,208 or Contemporary Science (3 of 4 courses) CTCS-221,222, 223,224 or Engineering Chemistry/ Lab CTCC-241, 242,243,246 247,248	8 8 4 4 4 4 12 12 12	Communications + + CHGL-220 Literature CHGH-260 Communications Elective Humanities Electives Behavioral Science Electives	4 4 4 8	To be developed by student with advisor	38
Phase3 + 4 CIDB-BS	**Math/Science** Math OR Science Electives"*	8	**Liberal Arts** Humanities Elective" Liberal Arts Concentration"" Liberal Arts Electives"" Senior Seminar	4 12 16 2	**Concentration(s)* 2 or 3** To be developed by student with advisor	52

+ + Communications courses required pretest, call 4 75-2234 for information. Students completing BS or 6. *Tech degrees must also pass a communications competency test.*
**A concentration = 20 QH (or more) in one subject area (i.e., Computers, Communications, Business).*
***Must choose one course each from three different areas of Humanities (i.e., Fine Arts, History, Philosophy, or Science/Technology and Values).*
****Cannot be in the same area as professional concentration.*
*****Students choosing a Liberal Arts area for a professional concentration must choose their "Liberal Arts Concentration" and "Liberal Arts Electives" in* ***other*** *disciplinary or interdisciplinary areas in the College of Liberal Arts.*

Business and the Arts

Lynda Rummel, Director

The Business and the Arts Division of CCE provides a wide variety of technical and professional programs of study at several distinct levels of achievement. In addition, many general education courses, which are a required part of every degree program in CCE, are offered by this division.

Each program of study is carefully designed to meet your interests and the interests of Rochester's expanding business, artistic and industrial complex. Advisory committees composed of representatives from local businesses, industries and professional groups contribute to an ongoing assessment of courses and programs of study to assure you of a high-quality education. Business and the Arts includes the following:

- (Half-a) Weekend College
- Small Business Management Sequence
- Management Certificate
- Certificates in Basic and Advanced Technical Communication
- Business Communication Concentration
- Certificates in Public Relations Communications - Programs in Professional Writing and Graphic Communication
- Management Diploma (7 options)
- AAS in accounting, business administration, marketing, personnel administration, production management, and traffic and transportation.
- AA in general education (with career options)
- Deaf studies concentration
- Diplomas in fine and applied arts and crafts
- Diplomas in printing and photography
- AAS in professional photography
- AAS/BS in graphic arts (with 3 options)
- AAS/BS in photographic science

Business and Management Studies

Lynda Rummel, Chairperson

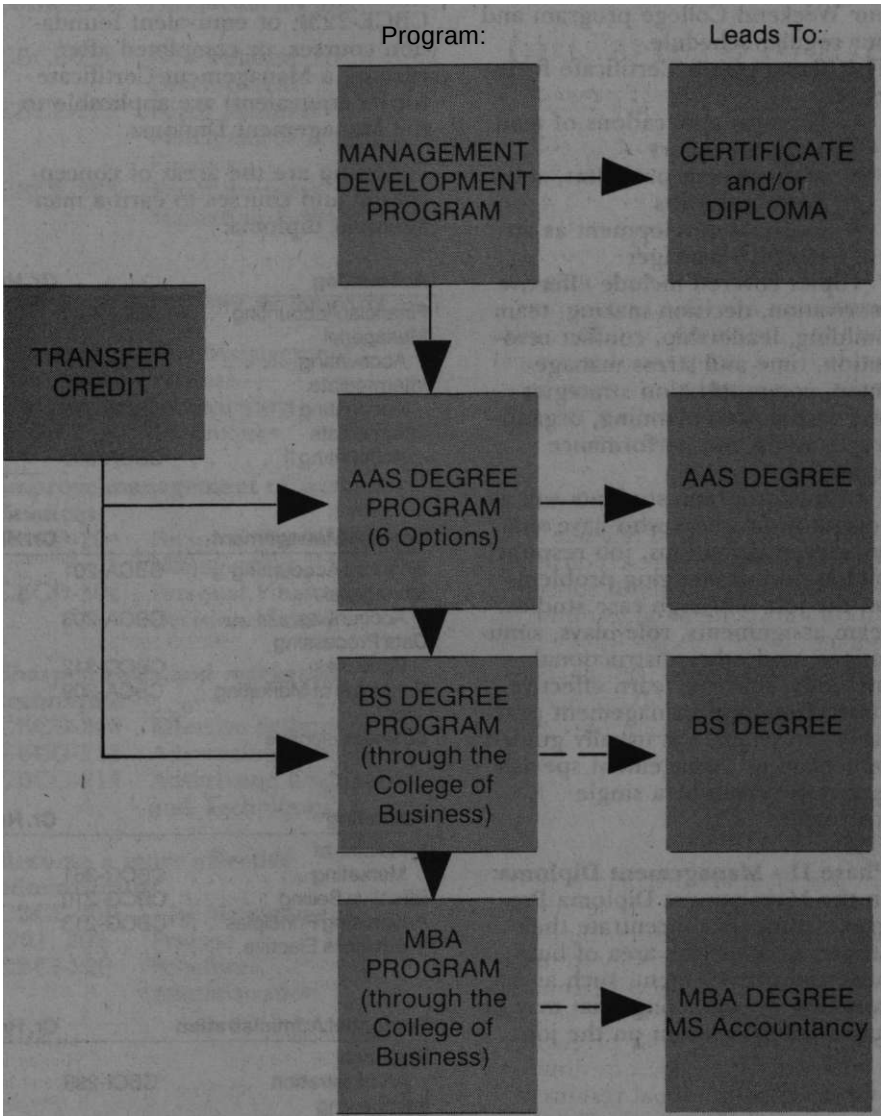
Approximately 50 credit-bearing courses in business and management subjects are available through the College of Continuing Education.

Courses leading to an AAS degree and transferable to appropriate baccalaureate degree programs in RIT's College of Business are available in business administration, accounting, marketing, personnel administration, production management, and traffic and transportation. If you are interested in a short-term concentration in one of these business or management fields, CCE also offers a Management Development Program leading to a Management Certificate and Management Diploma.

General requirements for an AAS degree, diploma, or certificate in business management are:

- Completing the necessary quarter credits (12 for a certificate and 16 for a diploma; 92 for an AAS)
- Following the program outline when selecting courses
- Achieving a program GPA of at least 2.0 in order to be certified

Business/Management Program Paths



The Management Development Program

This program has two components: a 12-credit course (The Management Process) in practical supervision, management, and communication skills, leading to a Management Certificate, and further study totaling 16 quarter credits in one of seven concentrations for a Management Diploma. Credits earned in this program can be applied to appropriate AAS degree programs in CCE. In addition, credits are also transferable to appropriate baccalaureate degree programs in RIT's College of Business.

Phase I - Management Certificate: The Management Process course is taken for three consecutive quarters. It is offered as part of our Weekend College program and our regular schedule.
The Management Certificate focuses on:

- Practical applications of management theory
- Management problems, solutions and ideas
- Personal development as an effective manager

Topics covered include effective motivation, decision making, team building, leadership, conflict resolution, time and stress management, communication strategies and techniques, planning, organizing, staffing and performance appraisal.

In this program, students will associate with others who have similar career aspirations, job responsibilities and challenging problems on the job. Through case studies, team assignments, role-plays, simulations, and other instructional methods, students learn effective supervisory and management practices. Instruction is usually guided by a team of management specialists, rather than by a single instructor.

Phase II - Management Diploma: In the Management Diploma Program, students concentrate their studies in a specific area of business and management, such as accounting or marketing, that may be immediately relevant on the job.

A Management Diploma may be earned by completing a total of 16 quarter credits upon earning a Management Certificate or completing three foundation courses as specified below:

Foundation Courses		**Cr. Hrs.**
Dyn. Comm.	CGHL-204 or 205	
or		
Communications	CHGL-220	4
Organization and Management	CBCE-203	4
1 -additional business course		4

Credits earned while taking The Management Process (CBCE-200, -201, -202), the small business management sequence (New Ventures Development, CBCE-221; Small Business Management and Finance, CBCE-222; and Small Business Marketing and Planning, CBCE-223), or equivalent foundation courses, or completed after earning a Management Certificate (or its equivalent) are applicable to the Management Diploma.

Following are the areas of concentration and courses to earn a management diploma:

Accounting		**Cr. Hrs**
Financial Accounting	CBCA-201	
Managerial Accounting	CBCA-203	
Intermediate Accounting I	CBCA-308	4
Intermediate Accounting II	CBCA-309	4
		16

General Management		**Cr. Hrs.**
Financial Accounting	CBCA-201	4
Managerial Accounting	CBCA-203	4
Data Processing Principles	CBCC-312	4
Principles of Marketing	CBCA-309	4
or		
Business elective		
		16

Marketing		**Cr. Hrs.**
Principles of Marketing	CBCG-361	4
Effective Selling	CBCG-210	4
Advertising Principles	CBCG-213	4
1-Business Elective		4
		16

Personnel Administration		**Cr. Hrs.**
Personnel Administration	CBCI-229	4
Interviewing Techniques	CBCI-224	4
Business Law I	CBCB-301	4
1 -Business Elective		4
		16

Industrial Management		**Cr. Hrs.**
Production Management	CBCJ-209	4
Fundamentals of Industrial Engineering	CBCJ-305	4
Industrial Engineering Economy	CBCJ-306	4
Data Processing Principles	CBCC-321	4
		16

Traffic & Transportation		**Cr. Hrs.**
Traffic & Transportation Principles and Practices	CBCL-234	4
Traffic & Transportation Rates and Classifications I	CBCL-239	4
1 -Traffic & Transportation Elective		4
Principles of Marketing	CBCA-361	4
		16

Real Estate Management		**Cr. Hrs.**
Basic Real Estate Principles	CBCM-201	4
Advanced Real Estate Principles	CBCM-202	4
Real Estate Investment and Finance	CBCM-203	4
Real Estate Evaluation		4
		16

Credit hours earned in the diploma programs can be applied to appropriate AAS degree programs in CCE and are transferable to appropriate baccalaureate degree programs in RIT's College of Business.

Business and Management AAS degree programs

Programs leading to an AAS degree in business administration are available in accounting and business administration and are fully transferable to baccalaureate degree programs in RIT's College of Business. AAS degree programs in management are offered in marketing, personnel administration, production management, and traffic and transportation. The management programs are designed to give specialized skills in these areas, with the course work being transferable to a BS degree program in the College of Business. All business and management degree programs include a core group of business courses in organization and management, accounting, data processing and business law. Approximately half of the credits in degree programs are earned through these professional courses. In addition, all degree programs include a broad spectrum of courses in communications, behavioral sciences, humanities, and science.

The core requirements and professional programs are outlined on the next page.

Courses and sequences of special interest

Students may want to consider taking one or more business and management courses that will help them advance in their careers, enable them to enter a new career, or just add to their understanding of an area they find interesting. Here are several courses that are particularly popular with those who want to:

Own, Manage or Invest in a Small Business

A **certificate** of completion in small business management may be earned by completing three, four-credit courses dealing with managing, financing, and marketing small businesses. These courses are:

CBCE-221	New Venture Development
CBCE-222	Small Business Management & Finance
CBCE-223	Small Business Marketing & Planning

Become a supervisor or improve supervisory skills

CBCE-200 201, 202	The Management Process
CBCI-224	Interviewing Techniques

Improve management of personal finances

CBCD-204	Personal Financial Management
CBCD-304	Personal Financial Decision Making

Sharpen sales and marketing techniques

CBCG-210	Effective Selling
CBCG-213	Advertising Principles
CBCG-214	Advertising Evaluation and Techniques

Become a more effective administrator

CBCE-200, 201, 202	The Management Process
CBCI-229	Personnel Administration

Prepare for New York State license exams in real estate and insurance

CBCM-201	Basic Real Estate Principles
CBCM-202	Advanced Real Estate Principles
CBCN-271 ,	Principles of Insurance
CBCN-272	Principles of Insurance II

The two courses in real estate and the two courses in principles of insurance are approved by the New York State Division of Licenses as preparation for the sales person and broker's license examination in real estate and insurance. These courses provide an excellent foundation for a career in these fields.

Core Requirements, All Business and Management AAS Programs

Below are the core requirements for all business and management degree programs to which professional program requirements are added.

	Professional Courses	Qtr. Cr.	General Education	Qtr. Cr.	Math, Statistics & Science	Qtr. Cr.
Required Courses 92 Credits	Financial Accounting . CBCA-201	4	Communications (3) ... CHGL-220	8		8
	Managerial Accounting CBCA-203	4	Literature ... CHGH-260		Math for Business. CBCH-201,202	8
	Organization &Mgmt(1) . CBCE-203	4	or	or	Statistics. CBCH-351,352	8
	Data Proc. Principles . CBCC-321	4	Dyn. Comm. I (3) ... CHGL-204	8		
	Principles of Marketing . CBCG-361	4	Dyn. Comm II ... CHGL-205			
	Management Science . CBCE-353	4				
	Professional Concentration Courses (see below)	20	Economics CHGS-221,222	8		
			Psychology ... CHGS-211	4		
			Sociology ... CHGS-231	4		
	Total	44	Total	24	Total	24

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

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

	Qtr. Cr.
Dynamic Communications I (CHGL-204).	*4*
Organization & Management (CBCE-203).	*4*
1-Business elective	*4*

(2) Science electives may include any of the following:
Comtemporary Science/Biology CTCS-221
Contemporary Science/Chemistry CTCS-222
Contemporary Science/Physics CTCS-223
Contemporary Science/Oceanus CTCS-224
Engineering Chemistry CTCC-24 J, 242,243 or
College Physics CTCP-201,202,203

(3) *Communications courses require pretest, call 475-2234 for information.* Students who take CHGL-204 should also take CHGL-205. Students who take CHGL-220 should also take CHGH-260.

Science Ele

Business and Management AAS Programs (Professional Program Requirements)

Accounting (CBCA)		**Cr. Hrs.**
Intermediate Accounting I* . . .	CBCA-308	4
Intermediate Accounting II*	CBCA-309	4
Business Law I.	CBCB-301	4
Business Law II	CBCB-302	4
History or Fine Arts Elective		4
		20

Business Administration (CBCE)		**Cr. Hrs.**
History or Fine Arts Elective		4
Legal Environment of Business	CBCB-310	4
3-Business Electives†		12
		20

Marketing (CBCG)		**Cr. Hrs.**
Effective Selling†	CBCG-210	4
Advertising Principles†	CBCG-213	4
Business Law I.	CBCB-301	4
2-Business Electives†		8
		20

Personnel Administration (CBCI)		**Cr. Hrs.**
Personnel Administration†	CBCI-229	4
Interviewing Techniques†	CBCI-224	4
Business Law I.	CBCB-301	4
2-Business Electives†		8
		20

Production Management (CBCJ)		**Cr. Hrs.**
Production Management†	CBCJ-209	4
Fundamentals of Industrial Engineering† . . .	CBCJ-305	4
Industrial Engineering Economy†	CBCJ-306	4
Business Law I Elective†	CBCB-301	4
		4
		20

Traffic & Transportation (CBCM)		**Cr. Hrs.**
Traffic & Transportation Principles and Practices†	CBCL-234	4
Traffic & Transportation Rates and Classifications†.	CBCL-239	4
1 -Traffic & Transportation Elective†		4
Business Law I Elective†	CBCB-301	4
		4
		20

**To transfer these courses to RIT's College of Business you will be required to complete subsequent courses in the same subject area.*

†Acceptable as free elective transfer credit into baccalaureate degree programs in RIT's College of Business.

The Arts/General Education

The arts side of Business and the Arts includes courses and programs in liberal arts and humanities, behavioral and social science and communication. These are often referred to as general education courses. In the Arts we also offer programs providing credentials which take advantage of RIT's strengths within the arts and humanities. Diploma options are offered in the fine and applied arts (CHAA) and crafts (CHAC), as well as the associate in arts degree in general education (CHGE). Certificates in technical communication and a concentration in deaf studies also are available.

General Education
General education courses serve a pivotal function within all programs of the College of Continuing Education. These courses provide the foundation upon which professional knowledge is built. The faculty introduces the basic concepts and skills of the arts, humanities, communication, and the behavioral and social sciences.

Each professional and technical program within CCE selects from general education courses essential to developing professional and personal competence. Students are then given a range of free electives to fill out personal interests.

Writing Program and Exit Test
To insure that graduates of all CCE associate degree programs will be prepared to meet the writing demands of their careers, CCE instituted the following writing program in September 1984.

1. **Diagnostic Test.** All students planning to register for Dynamic Communications 1(0236-204), or Communications 220(0236-220) must take a 40-minute diagnostic placement test prior to registration. (Students may register for 205 without pretesting if they have credit for 204.) Results of the tests will allow us to place students in the most appropriate course for developing their written and other communication skills. Students may take the diagnostic test at their convenience in the CCE office (M-R, 8:30 a.m.-7:30 p.m. and F, 8:30 a.m.-3 p.m.) or during Open Registration (see quarterly schedule for testing times).
2. **Exit Test.** An exit test given prior to the last week of classes in 205 and 220 is part of the communications requirements for all associate degrees. Students who do not pass the test may work out a program with their instructors for mastering needed skills and may re-take the exit test at a later time. When the test has been passed, students will receive the grade they earned in the course.

General Education AA degree program

Ronald Hilton, Chairperson

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

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

- Accounting
- Advertising Design
- Technical Communication
- Communication
- Public Relations Communication
- Fine Arts
- Personnel Management
- General Management & Supervision
- Industrial Management
- Small Business Management
- Real Estate
- Marketing
- Deaf Studies

For more information on the career skills option contact the Division of Business and the Arts at 475-5027.

Course requirements, General Education (CHGE), AA Degree

		Qtr. Cr.		Qtr. Cr.
Required Courses 92 Credits	Humanities . . CHGH-201, 202, 203	12	Economics CHGS-221	4
	Introduction to Literature . CHGH-260	4	Psychology CHGS-211	4
	Introduction to Art Appreciation CHGH-210	4	Philosophy CHGH-270	4
	Introduction to Music . . CHGH-230	4	Electives	20
	History CHGH-220	4	Career Skills Area	20
	Political Science CHGS-261	4		
	Contemporary Science Elective . .	4		
	Science, Technology & Humanity Elective	4		

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

Public Relations Communications Certificates*

Ronald Hilton, Chairperson

Public relations communications is vital to virtually every human endeavor. Almost every organization employs individuals, either in house or by contract through public relations agencies, who can prepare press releases, brochures, newsletters, annual reports, point of purchase promotions, and other persuasive, informative materials in a variety of media. The demand for people trained in the special skills of public relations communications will continue to grow well into the 1990s.

Underlying successful public relations communications are skills in two key areas: writing and graphic communication. CCE now offers a certificate program in each of these specialities. Both programs share a common core of courses that provide an introduction to public relations and teach widely used principles and techniques of advertising, project management, and persuasion. The professional writing program provides specialized instruction in writing marketing materials,

* New York Department of Education approval pending

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

These programs are intended for individuals who wish to enter the field of public relations or take on PR responsibilities; or who have been working in a particular aspect of public relations and who wish to upgrade or broaden their skills; and/or who have been performing PR tasks for which they have had no formal preparation. Courses in these programs were developed with the assistance of Rochester-area public relations communicators and are taught by experienced professionals.

Courses are scheduled so that the core and one or both of the certificate options may be completed in four quarters of part-time study. Students may earn one or both certificates, and students not wishing to take an entire certificate program may take specific individual courses. Courses may be applied toward appropriate diploma, AAS, and BS degree programs. Students must achieve a program GPA of at least 2.0 in order to be certified. For advising and further information about these courses, transfer credit, credit for college-level learning, and financial assistance, call Ronald Hilton, 475-4986.

Core Courses, Certificates in Public Relations Communications

		Qtr. Cr.
Introduction to Public Relations	(CHGL-360)	2
Psychology of Persuasion	(CHGS-320)	2
Advertising Evaluation & Techniques	(CBCG-214)	4
Managing the Project	(CHGL-332)	2
	Core Total	10

Certificate in Public Relations Communications - Professional Writing

		Qtr. Cr.
Core Courses		10
Writing for the Organization	(CHGL-365)	2
Writing for the Organization II	(CHGL-366)	2
Promotional Writing	(CHGL-331)	2
Scripting and Speechwriting	(CHGL-367)	4
	Certificate Total	20

Certificate in Public Relations Communications—Graphic Communication

		Qtr. Cr.
Core Courses		10
Graphic Communication for the Non-Artist I	(CHAD-270)	
Graphic Communication for the Non-Artist II	(CHAD-271)	3
Art for Reproduction,	(CHAD-220)	3
	Certificate Total	19

Technical Communication Certificates

Elizabeth Conley, Chairperson

In this age of information, all kinds of organizations, large and small, have increasing needs for individuals skilled in documenting, packaging, presenting, and managing technical and scientific information. Whether done within the company or by contract, companies involved in manufacturing, materials handling, computer products, marketing, and medical and scientific products all need professionally prepared documents, brochures, manuals, and other materials for product users, service technicians, purchasing managers, trainers, and other employees and customers.

The following sequence of courses, designed to be completed in two consecutive quarters of study, is intended to provide a strong, practical foundation in technical communication.

Certificate in Basic Technical Communication

		Qtr.cr.
Phase I:		
Technical Writing & Editing	CHGL-323	4
Research Techniques	CHGL-324	2
Phase II:		
Instructional Design Principles	CHGL-325	2
Document Design Principles	CHGL-326	2
Practicum: Designing Manuals	CHGL-327	2
Total Credits		12

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

For those interested in further professional development and instruction in more specialized topics, the following sequence of courses, designed to be completed in two quarters of study, is available.

Certificate in Advanced Technical Communication

		Qtr. Cr.
Phase I:		
Writing in the Sciences	CHGL-328	2
Oral Communication Skills for Technical Communicators	CHGL-329	2
Communicating Online	CHGL-330	2
Phase II:		
Promotional Writing	CHGL-331	2
Managing the Project	CHGL-332	2
Audiovisual Presentations	CHGL-333	2
Total Credits		12

Up to four credits may be awarded by examination or for courses taken at another college. Prerequisite for the Advanced sequence is completion of the Basic sequence or the equivalent. Students must achieve a program GPA of at least 2.0 in order to be certified.

Courses in these sequences were developed with the assistance of working technical communicators and are taught by experienced professionals. For advising and further information about these courses, transfer credit and financial assistance, call Betty Conley, 475-4936.

Business communication concentration

Business leaders say that a key to success is the ability to communicate successfully. A **certificate of completion** in business communication may be earned by completing the following three, four-credit courses:

CHGL-301	Professional Presentations
CHGL-302	Discussion Skills and Leadership
CHGL-307	Communicating in Business

Courses may be taken separately and may be used as elective or professional concentration courses in appropriate CCE degree programs. For information, call Betty Conley, 475-4936.

Deaf studies concentration

Ronald Hilton, Chairperson

Many individuals have deaf family members, co-workers, clients or friends. The courses in the Deaf Studies Program are designed to enable hearing persons to communicate with deaf people and to develop some understanding of the experience of being deaf through courses related to the linguistic, psychological, social, and physical aspects of deafness.

Rochester has the second highest population per capita of hearing-impaired individuals in the United States, resulting in extensive community and educational resources. Rochester is a center for habilitation, rehabilitation, social services and educational services for deaf people in New York State and across the country.

Deaf studies courses include:

CHGD-211, 212, 213	Sign Language & Manual Communication Systems I, II *8c* III
CHGD-311, 312	American Sign Language I & II
CHGD-241, 242	Aspects & Issues of Deafness I & II

Fine and Applied Arts and Crafts Diploma Programs

Eric Bellmann, Chairperson

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

Options begin with introductory courses to provide students with a basic exploration of the creative process and to help them develop visual organization skills. After taking these courses, the student will be able to earn a fine and applied arts diploma by completing the requirements in any of five areas. Students may want to include printing and photography electives in their programs after receiving an advisor's approval. Some electives are offered only in alternate years.

Students enrolled in the fine and applied arts diploma program prior to Fall 1980 may elect to follow either the previous program requirements or the new program as listed.

For more information call Eric Bellmann at 475-4977.

Fine and Applied Arts and Crafts Diploma Programs (CHAA and CHAC)

Core Requirements:		**Qtr. Cr**
Basic Drawing and Media	CHAF-201,202,203	6
Basic Design	CHGH-20,202,203	6
Introduction to Art Appreciation	CHGH-210	4
		16

Program Requirements:

Craft (CHAC). In addition to the core requirements each student must become familiar with three of four areas.

		Qtr. Cr
Core Requirements*		16
Major craft courses		18
Minor craft courses		6
Third craft choice		2
Electives with advisor's approval		6
		48

Fine Arts (CHAA)		**Qtr. Cr.**
Core requirements*		16
Drawing (3 quarters)	CHAF-306	6
Basic Figure Drawing	CHAF-207	2
Figure Drawing (2 quarter credit)	CHAF-317	4
Electives with advisor's approval		20
		48

Advertising Design (CHAA)		**Qtr. Cr.**
Core requirements*		16
Display Design	CHAD-211,212,213	6
Lettering and Layout	CHAD-261,262,263	6
Graphic Design	CHAD-311,312,313	6
Advertising Design	CHAD-315,316,317	6
Basic Figure Drawing	CHAF-207	2
Electives with advisor's approval		6
		48

Fashion Illustration (CHAA)		**Qtr. Cr.**
Core requirements*		16
Basic Figure Drawing	CHAF-207	2
Figure Drawing (5 qtr.)	CHAF-307	10
Fashion Illustration	CHAD-331,332,333	6
Marketing'	CBCG-361	4
Lettering and Layout	CHAD-261,262,263	6
Electives with advisor's approval		4
		48

Interior Design (CHAA)		**Qtr. Cr.**
Core Requirements*		16
Display Design	CHAD-211,212,213	6
Marketing	CBCG-361	4
Interior Design	CHAD-224,225	4
History of Interior Design	CHAD-222	2
Environmental Design	CHAD-251,252,253	6
Electives with advisor's approval		10
		48

'Core requirements are prerequisite for all diploma programs: CHAA and CHAC.

Graphic Arts and Photography

The arts side of Business and the Arts also offers graphic arts programs that are structured to provide students with a broad understanding of the graphic arts field, and, at the same time, allow them to select a major in design, printing, and photography. In addition, programs leading to an AAS in professional photography and an AAS/BS in photographic science are available.

Diploma Programs in Printing and Photography

Printing

Linda Tolan, Adjunct Chairperson

This program utilizes the laboratories of the School of Printing Management and Sciences, which are completely equipped with the most modern printing machinery for all processes of producing the printed word, including flexography screen printing, lithography and gravure. The printing program leads to a diploma indicating competency in specialized areas of printing as well as a practical understanding of the entire printing operation. All printing courses shown are open to students not enrolled as diploma candidates. Courses in the printing diploma (at the 200 level or higher) may be applied towards Graphic Arts degrees.

Printing (CHGV) diploma program requirements

CHGT-201 202, 203	Introduction to Printing
CHGT-227	Copy Preparation
CHGT-101 102, 103	Process Camerawork
CHGT-111 112, 113	Color Separation Camerawork
CHGT-121 122, 123	Offset Layout and Stripping
CHGT-141 142, 143	Offset Presswork
CBCE-101 102, 103	Human Relations
CHGT	Printing Electives (4 cr.)

Photography

Andrew Davidhazy, Adjunct Chairperson

This sequence of photographic courses is designed to prepare students for the highly competitive field of professional photography. The requirements combine a thorough technical education in photography with an introduction to human relations. Because of the specific nature of the diploma, all six required courses must be completed before a diploma can be earned. Students may apply photography courses completed for the diploma towards the associate in applied science degree in professional photography. Students completing the AAS in professional photography may continue their studies in the Graphic Arts bachelor degree program.

Photography (CHGN) diploma program requirements:

CHGP-201 202, 203	Basic Professional Photography
CHGP-211 212, 213	Color Photography
CHGP-241 242, 243	Commercial Photography
CHGP-231 232,233	Portrait Photography
CHGP-331 332, 333	Portrait Retouching
or	
CHGP-321 322, 323	Commercial Retouching
CBCE-101 102, 103	Human Relations
or	
CHGS-211	Psychology: Introduction

AAS and BS Degree Programs in Photographic Science (CHGR), Professional Photography (CHGP) and Graphic Arts (CHGT)

AAS and BS Program in Photographic Science (CHGR)

Andrew Davidhazy, Adjunct Chairperson

Today, the complexity of the photographic process and its manufacturing technology is easily matched by its multitude of uses. From its very beginnings, photography attracted the interest of many famous scientists. Photographic materials, for example, triggered the discovery of x-rays and enabled the discovery of distant galaxies in space and elementary particles on earth.

As a result, photography's impact on society has been tremendous and continues to increase. The graphic arts industry is now almost completely dependent on photographic processes. New light-sensitive processes have found numerous applications, particularly in the duplicating field, and hold much promise for other future non-silver imaging processes. Photosensitive resins are essential to the manufacture of microcircuits in the electronics industry. Electronic image retrieval, analysis and management systems are a powerful new force in the field.

It is evident that a field of such variety and growth potential should provide interest, challenge and reward to a substantial number of technicians, scientists and engineers for years to come.

The degree program in photographic science provides students with a thorough understanding of the photographic process, from fundamental laws and principles in sensitometry, photographic chemistry and radiometry, to state of the art research and practice in emulsion chemistry, color theory, non-silver processes, image evaluation and photographic optics.

These topics combined with a solid background in mathematics, chemistry, physics and statistics prepare students for a promising career as an engineering technician at the completion of the associate degree or as a photographic technologist at the bachelor's level.

Beyond the requirements in the photographic science area students are encouraged to examine other fields of interest through elective courses in electronics, chemistry, physics, or other appropriate subjects.

The program prepares students for an interdisciplinary relationship with chemists, physicists, electrical and mechanical engineers developing new photosensitive systems, improving existing products, or finding new applications for a variety of imaging systems in science, medicine or industry.

Most courses are designed to also meet the needs of local engineers and scientists who wish to refresh their background in the photographic process, or who want to explore a new or specialized subject.

Technical electives for photographic science (CHGR)
The following is a partial list of courses that fulfill the technical elective requirements for the photographic science program:

CHGR-421	Mathematical Methods in Photographic Science
CHGR-520	Electrostatic Imaging Methods
CHGP-351	Industrial Photography Instrumentation
CQAS-711 712	Fundamentals of Statistics
CQAS-721	Control Charts
CTDS-202	Introduction to Computer Science
CTDP-304 305, 306	Assembly Language Programming COBOL
CTIL-201 202, 203	Elements of Electricity and Electronics
CTEM-301	Applied Mechanics and Strength of Materials

Other courses not listed above are acceptable. These include advanced topics in chemistry, physics, statistics, electronics, and mechanics. Up to six quarter credits may be scheduled in management. You should schedule all electives with your advisor's approval.

Course requirements, Photographic Science (CHGR), AAS and BS degrees

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
102 Quarter Credits	Phase I	Algebra & Trigonometry . . . CTAM-210	4	Communications'. . . . .CHGL-220 and Literature. . . . . .CHGH-260 or Dynamic Comm. I*. . . . .CHGL-204 and Dynamic Comm. I. CHGL-205	8	Fundamentals of Photographic Science CHGR-207,208,209	12
		Engineering Chemistry . CTCC-241,242,243 (lec.) -246,247.248 (lab.)	12			Black and White Sensitometry . . CHGR-227,228,229	12
	Phase II	Calculus. CTAM-251,252,253	12	Communications Elective	4		
		College Physics CTCP-201,202,203 (lec.) -206,207,208 (lab.)	12	Psychology. CHGS-211	4	Radiometry. CHGR-237,238	6
				Economics. CHGS-221	4	Photographic Chemistry . CHGR-217,218,219(lec.) 224,225,226 (lab.)	12
92 Quarter Credits	Phase III	Calculus. CTAM-305	4	Electives	8	Optics. CHGR-407,408,409	9
		Differential Equations CTAM-306	4			Image Evaluation . CHGR-417,418,419 or Quality Control of Photo-Solutions CHGR-307,308,309	9
						Color Sensitometry . CHGR-414,415,416	10
	Phase IV	Elective (Statistics)	8	Electives	8	Theory of Photo Process . . CHGR-527	4
		Electives (Computer Programming)	4			Theory of Color Process . . CHGR-528	4
						Non-silver Imaging Systems . CHGR-529	4
						Technical Electives	16

In order to meet program objects and prerequisites of later courses, transfer students who have an associate degree may be required to take courses with Phase III and IV for appropriate work completed by the time of transfer.
The AAS degree is awarded upon the student's satisfactory completion of all courses in Phase I and II. In the case of transfer students seeking a degree, 45 credits must be completed at RIT.
**Communications courses require pretest, call 475-2234 for information.*
Students who take CHGL-204 shoudlalso take CHGL-205; students who take CHGL-220should also take CHGH-260. AIIBS students must also satisfactorily pass a communications competency test.

AAS Program in Professional Photography (CHGP)

Andrew Davidhazy, Adjunct Chairperson

The role of photography has become increasingly influential in the development of modern technology. In its multitude of applications it plays a vital role in communication, business, medicine and education, as well as being the primary means of recording moments of the present for future enjoyment.

Although at this time competition in the fields of commercial, advertising and free lance photography is very great, there is a need for qualified technicians and specialists particularly in the fields of marketing, training, medicine, graphic arts, photofinishing, law enforcement, and others.

The degree program in professional photography provides students with a balanced education comprised of courses in science, general education and applied photography. Specific educational goals can be met through careful selection from a comprehensive list of professional electives.

Course requirements
The AAS degree is awarded after completion of all courses in Phases I and II. Transfer students seeking a degree must complete 45 credits at RIT.

The primary aim of the program is to prepare students with a broad background in photography so that they may modify general knowledge to fit their particular job specialty.

Although courses are designed to serve the needs of students with a well-defined career objective, most are also suitable for improving photographic background or providing photographic training that would help further develop job skills. After receiving the AAS degree, graduates may pursue a further degree in the BS program in graphic arts with a major in photography with complete transfer of credit. Consult with chairperson for details.

Professional electives for professional photography (CHGP) degree

CHGP-404, 405, 406	Architectural Photography
CHGP-241, 242, 243	Commercial Photography
CHGP-401, 402, 403	Fashion Photography
CHGP-221, 222, 223	Illustrative Photography
CHGP-351	Industrial Photography—Instrumentation
CHGP-352	Industrial Photography—A.V. Techniques
CHGP-353	Industrial Photography—Special Topics
CHGP-301, 302	Motion Picture Photography
CHGP-431, 432, 433	Photographic Communication
CHGP-411	Photography of the Natural World
CHGP-231, 232, 233	Portrait Photography
CHGP-321, 322, 323	Retouching, Commercial
CHGP-331, 332, 333	Retouching, Portrait
CHGP-366	Dye Transfer Printing

Other courses not listed above are also acceptable. This includes topics in printing design and audio visual areas. Up to six quarter credits may be scheduled in management, quality control, electronics or other technical areas. At least 15 quarter credits must be scheduled from the professional photography area. All electives should be scheduled with the chairperson's approval.

Course requirements, Professional Photography (PCHGP), AAS degree

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
95 Quarter Credits	Phase 1	Technical Mathematics . CTAM-201,202 or Mathematical Thought and Processes . . . . . CTAM-205 And Modem Mathematical Methods CTAM-206	8	Communications'. . . . . CHGL-220 and Literature. . . . . CHGH-260 or Dynamic Comm. I'. . . . . CHGL-204 and Dynamic Comm. II. . . . . CHGL-205 Communications Elective Psychology. CHGS-211	8 8 4 4-	Basic Professional Photography . . CHGP-201,202,203 Professional Electives	12 12
	Phase II	Electives	12	Economics. . . . . CHGS-CHGS-211 Electives	4 4	Color Photography . CHGP-211,212,213 Professional Electives	12 15

Suggested photographic electives are listed below. All electives for degree seeking students are to be selected with advisor's approval. At least 15 quarter credits must be from the photography area.

•Communications courses require a pretest, call 4 75-2234 for Information. Students who take CHGL-204 should also take CHGL-205; students who take CHGL-220 should also take CHGH-260. All BS students must also satisfactorily pass a communications competency test.

The Graphic Arts Degree Program (CHGT)

Eric Bellman
Andrew Davidhazy
Linda Tolan, Chairpersons

This program is structured to provide students with an opportunity to receive a broad understanding in the graphic arts field, and, at the same time, to select a major in design, photography or printing.

The professional courses in this program are presented in a manner which provides a broad practical background in printing, photography, design, and related fields as well as a concentration of study in the student's major. Classroom instruction is supplemented by related work in studios and laboratories where actual experience is gained.

Students need not take courses in the order listed, as long as all courses are completed in one phase before proceeding to the next. After successfully completing all courses in Phases **I** and **II,** students will receive an AAS degree. **If** students are transferring from another institution, students must complete 45 credits within CCE.

Course requirements, Graphic Arts (CHGT), AAS and BS degrees with options in design, printing or photography

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
94 Quarter Credits	Phase 1	Technical Mathematics . CTAM-201,202 or Mathematical Thought and Processes. . . . . .CTAM-20E And Modem Mathematical Methods. CTAM-206	8	Communications". . . . . .CHGL-220 and Literature. . . . . .CHGH-260 or Dynamic Comm. I". . . . . .CHGL-204 and Dynamic Comm. II. . . . . .CHGL-205 Communications Elective Psychology. CHGS-211	8 8 4 4	Intro to Printing . . CHGT-201,202,203 Basic Professional Photography . . CHGP-201,202,203 Basic Design . . . . CHAD 201,202,203	6 12 6
	Phase II	Contemporary Science. . . . .CTCS-221,222,223 or Engineering Chemistry . CTCP-201,202,203(lec) -246,247,258 (lab) or Physics . . . . CTCP-201,202,203 (lec) -206,207,208 (lab)	12	Economics. . . . . .CHGS-221 Electives (Humanities)	4 6	Paper and Printing . . . CHGT-251,252 Copy Preparation. . . . . .CHGT-227 Technology of Typesetting . . CHGT-237 Graphic Design . . CHAD-311,312,333 Professional Electives	4 3 2 6 9
94 Quarter Credits	Phase III	Science, Technology and Society Electives	8	Electives	20	Reproduction Camerwork . . CHGT-301,302,303 Printing Plates. . . . .CHGT-231,232 Printing Process. . . . . .CHGT-341 Advertising. CHAD-301,302	6 4 2 8
	Phase IV			Electives	16	Estimating. . . . . .CHGT-219 Imposition and Finishing . . . CHGT-421 Professional Electives	4 2 24

in order to meet program objectives and prerequisites of later courses, transfer students who have an associate's degree may be required to take courses within Phase I and II. In many instances, such transfer students will be granted credit within Phase III and IV for appropriate work completed by the time of transfer.

•Communications courses require pretest. Call 475-2234 for information. Students who take CHGL-204 should also take CHGL-205; students who take CHGL-220 should also take CHGL-260. All BS students must also satsifactorilypass a communications competency test.

Science and Technology

Henry Cooke, Director
Barbara Warth, Academic Program Assistant

This division in CCE offers a variety of technical and scientific programs of study. Included are:

- AS in engineering science
- AAS in applied science in building technology, electrical technology, electromechanical technology, manufacturing technology, and mechanical technology
- BS in applied science in chemistry, mechanical, electrical and mechanical-industrial
- B.Tech. in computer systems

Each program is carefully designed to meet the student's needs as well as the particular needs of local industry for technical personnel trained to meet the requirements of Rochester's expanding industrial community.

Courses for people on rotating work schedules
If rotating work schedules make it impossible for an individual to attend regular evening classes, enrollment in certain courses is offered on both a day and evening schedule. They are taught by the same instructor, and may be attended day sessions or evening sessions.

Courses in this program include basic technical and general education courses which can be applied to a diploma or AAS degree program. It is necessary to begin these course sequences in September. There are no beginning entry points in December or March for rotating work schedules.

Mathematics diagnostic examination
In order to take any of the beginning mathematics courses, a student must take a diagnostic examination to determine the level at which he or she should start the mathematics courses. An advisor should be consulted to determine where to start the mathematics sequence. Call 475-2218 to arrange an appointment to take the math exam. There is no charge for this exam.

Breakage deposit cards
For some courses, students need to purchase a Breakage Deposit Card for $5 from the cashier. A refund can be received for unused amounts at the end of the school year.

Degree Programs
BS in Applied Science

The BS in applied science programs is designed for the individual with better than average preparation in high school mathematics and science. Students having the ability to pursue the BS program but having a deficient mathematics background may complete CTAM-101, 102, 103 before entering this program.

An intensive core of courses in mathematics, physics, chemistry, ana the basic engineering sciences is required in these programs while allowing the student to develop some depth in the interest area of choice.

After completing approximately half the courses in the BS program, students receive an AAS degree. If the student already holds an AAS degree, he or she may be able to enter a BS program with minimal loss of credit. Consult an advisor for transcript evaluation before entering these programs.

Applied Science—Chemistry Program (CTCC)

Alfred Haacke, Chairperson

The chemistry curricula leading to the AAS and BS degrees are designed to provide students with a sound background in the fundamental principles in a broad spectrum of chemistry disciplines. Strong emphasis is on mathematical and physical aspects of the science of chemistry, and the more practical aspects of the science are presented in various laboratory courses. In the BS degree program professional elective courses provide students with the opportunity for specialization in the area of their choice.

Courses need not be taken within any phase in the sequence listed as long as all courses in one phase are completed before proceeding to the next phase. The AAS degree is awarded upon satisfactory completion of all courses in Phases I and II. Transfer students must complete 45 credits of this program at RIT before receiving a degree.

Course requirements, (CTCC), AAS and BS degrees

	Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
Phase 1	College Algebra and Trigonometry. CTAM-210	8	Dynamic Comm. I" Comm. (4)		General Chemistry . CTCC-211,212,213	9
	Calculus. CTAM-251,252	8	CHGL-204 (4) CHGL-220		Qualitative Inorganic Analysis . CTCC-216	4
	Computer Techniques . . . CTDP-201	2	and or and		Quantitative Analysis . . CTCC-217,218	4
			DynamicComm.il Literature (4)			
			CHGL-205 (4) CHGH-260		Organic Chemistry . CTCC-231,232,233 (lec.) 237,238 (lab.)	13
Phase II	Calculus. CTAM-253	4	Psychology. CHGS-211	4	Analytical Chemistry - Instrumental Analysis . CTCC-311 (lec.) 316 (lab.)	5
	Physics . . . . CTCP-301,302,303 (lec.) CTCP-306,307,308 (lab.)	12 3	Economics. CHGS-221	4	Analytical Chemistry Separations. . . . . CTCC-213 (lec.) 317 (lab.)	5
			"Electives	4'	Introduction to Physical Chemistry. . . . . CTCC-313 (lec.)	
Phase III	Calculus. CTAM-305	5	History of Political Science Elective	5	Chemical Literature and Technical Writing. CTCC-417	2
	Engineering Statistics CTAM-341	4	Literature Elective. . >	4	Qualitative Organic Analysis. . . . . CTCC-525 (lec.) 535 (lab.)	3
	Mathematics Elective	'4			Physical Chemistry . CTCC-401,402,403 (lec.) 405,406,407 (lab.)	15
Phase IV	Modem Physics. CTCP-457,458	8	"Electives	16	Instrumental Analysis . . CTCC-511,412	8
					Inorganic Chemistry. CTCC-551	4
					+ Professional Electives	21

**Communications courses require pretest, call 4 75-2234 for information. Students who take CHGH-204 should also take CHGL-205; students who take CHQH-220should also take CHGH-260. All BS students must also satisfactorily pass a communications competency test.*

***These electives must be selected from the areas of humanities, communications or behavioral sciences offered in the Humanities Studies area; subject to the advisor's approval.*

+ At least one of these professional elective courses must be taken in the area of organic chemistry. The selection of all professional elective courses is subject to advisor's approval.

In order to meet program objectives and prerequisites of later courses, transfer students who have an associate degree may be required to take courses within Phases I and II. In many instances, such transfer students will be granted credit within Phases III and IV for appropriate work completed by the time of transfer.

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

Applied Science-Electrical Program (CTBE)

Henry Cooke, Chairperson

This intensive program in the electrical field includes a sound basis in mathematics, science and general engineering. This broad fundamental curriculum will provide a solid technical foundation for later specialization in the numerous branches of the electrical industry. The remainder of the curriculum is devoted primarily to developing methods of analysis and applying them to the solution of problems in the electrical field.

Courses need not be taken within any phase in the sequence listed, as long as courses in one phase are completed before proceeding to the next phase. The AAS degree is awarded upon satisfactory completion of all courses in Phases I and II. If you are a transfer student seeking a degree, you must complete 45 credits of this program at RIT and meet with an advisor before registering, to obtain a preliminary evaluation of your previous course work.

For an advising appointment call 475-2218.

Course requirements, (CTBE), AAS and BS degrees

	Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
Phase I	College Algebra and Trigonometry. CTAM-210	4	Dynamic Comm. I* Comm. (4)		Engineering Graphics . . CTID-211,212	4
	Calculus. CTAM-251,252	8	CHGL-204 (4) CHGL-220			
	Computer Techniques . . . CTDP-201	2	and or and			
	Engineering		Dynamic Comm. II Literature (4)			
	Chemistry . . . CTCC-241,242 (lec.)	6	CHGL-205 (4) CHGH-260			
	246,247 (lab.)	2				
Phase II	Calculus. CTAM-253	4	Economics. CHGS-221	4	Engineering Mech. . . . CTBM-341,342	8
	Calculus. CTAM-305	4	Psychology. CHGS-211	4	Circuit	
	Physics . . . . CTCP-301,302,303 (lec.)	12			Analysis . . CTBE-401,402,403 (lec.)	12
	306,307,308 (lab.)	3			406,407,408 (lab.)	
	Engineering Math. CTAM-328	4			Materials Technology I CTEF-314	3
					Engineering Materials II. . . . CTEF-315	3
Phase III	Differential Equations CTAM-306	4	History of Political Science Elective	4	Electric and Magnetic	
	Modern Physics. CTCP-457,458	8			Fields. CTBE-411,412,413	12
	Nuclear Physics. CTCP-459	4			Electronics. CTBE-421,422,423	12
					Thermodynamics. CTBM-401	4
Phase IV	Complex Variables. CTAM-420	4	"Electives	12	Electromechanical Energy	
			Literature Elective	4	Conversion. CTBE-501	4
					Control Systems CTBE-511,512	8
					Electives	14

** Communications courses require pretest, call475-2234 for information. Students completing BS or B. Tech degrees must also pass a communications competency test.*
***These electives must be selected from the areas of humanities, social sciences and language arts subject to advisor's approval.*
In sequentially numbered courses, the lower numbered course is prerequisite.

Mechanical-Industrial Program (CTBI)

Henry Cooke, Chairperson

The mechanical-industrial curriculum integrates management courses with courses in engineering, science and general education in order to satisfy industry's need for qualified personnel in the manufacturing management field. Graduates of this program have a combined background in management and engineering. Students need not take courses in the order listed, as long as all courses are completed in one phase before proceeding to the next phase. After successfully completing all courses in Phases I and II, students receive an AAS degree. In the case of transfer students seeking a CCE degree, 45 credits of this program must be completed at RIT.

Course requirements, (CTBI), AAS and BS degrees

	Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
Phase I	College Algebra and Trigonometry. CTAM-210	4	Dynamic Comm. I* Comm. (4)		Machine Shop . CTIS-201,202,203 (lec.)	6
	Calculus. CTAM-251,252	8	CHGL-204 (4) CHGL-220		206,207,208 (lab.)	
	Computer Techniques . . . CTDP-201	2	and or and		Engineering Graphics CTID-211,212,213	6
	Physics . . . . CTCP-301,302,303 (lec.)	12	Dynamic Comm II. Literatures (4)		Accounting for Engineers CBCA-207,208	8
	306,307,308 (lab.)	3	CHGL-205 (4) CHGH-260			
Phase II	Calculus. CTAM-253	4	Economics. CHGS-221	4	Organization and	
	Calculus. CTAM-305	4	Psychology. CHGS-211	4	Management. CBCE-203	4
					Engineering Mechanics . CTBM-341,342	8
					Manufacturing	
					Analysis. CTEF-201,202,203	9
					Strength of Materials . . CTBM-344 (lec.)	3
					354 (lab.)	
Phase III	Engineering		Psychology - Behavior in	4	Data Processing. CBCC-321	4
	Chemistry . CTCC-241,242,243 (lec.)	12	Industry. CHGS-316		Electrical Engineering	
	246,247,248 (lab.)				Principles CTBE-461,462,463	12
	Engineering Statistics . . CTAM-341,342	8				
Phase IV	Mathematics Elective	4	Sociology. CHGS-231	4	Fundamentals of Industrial	
			Effective Speaking. CHGL-301	4	Engineering. CBCJ-305,306	8
			**Electives	12	Electives	24

In sequentially numbered courses, the lower *numbered course is prerequisite.*
**Communications courses require pretest, call4 75-2234 for information. Students completing BS and B. Tech. degrees must also pass a communications competency test.*
***These electives must be selected from the areas of humanities, social sciences and language arts, subject to advisor's approval.*

Mechanical program (CTBM)

Henry Cooke, Chairperson

This curriculum is designed to provide the student with a sound basis in mathematics, science and general engineering. Courses in theory are supplemented by laboratory work to increase the understanding of industrial methods and techniques. The knowledge and skills acquired in this program apply to a wide variety of industrial assignments in mechanical design and manufacturing.

Courses need not be taken in the order listed, as long as all courses in one phase are completed before proceeding to the next phase. The AAS degree is awarded upon satisfactory completion of all courses in Phases I and II. In the case of transfer students seeking a degree, 45 credits of this program must be completed at RIT.

Course requirements, (CTBM), AAS and BS degrees

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
	Phase I	College Algebra and Trigonometry. CTAM-210	4	Dynamic Comm. I* Comm. (4) CHGL-204 (4) CHGL-220 and or and Dynamic Comm. II Literature (4) CHGL-205 (4) CHGH-260		Machine Shop . CTIS-201,202,203(lec.) 206,207,208 (lab.)	6
		Calculus. CTAM-251,252	8			EngineenngGraphics CTID-211,212,213	6
		Computer Techniques . . . CTDP-201	2				
		Engineering Chemistry . . . CTCC-241,242 (lec.)	6				
		246,247 (lab.)	2				
	Phase II	Calculus. CTAM-253	4	Economics. CHGS-221	4	Engineering Mechanics . CTBM-341,342	8
		Calculus. CTAM-305	4			Manufacturing Analysis. . . . CTEF-201,202,203	9
		Physics . . . . CTCP-301,302,303 (lec.)	12			Strength of Materials . . CTBM-344 (lec.)	3
		306,307,308 (lab.)	3			357 (lab.)	1
		Math Elective	4				
	Phase III	Differential Equations CTAM-306	4	History or Political Science	4	Strength of Materials CTBM-345	4
		Boundary Value Problems . CTAM-318	4	Electives		Materials Technology I CTEF-314	3
		Modem Physics. CTCP-457,458	8			Materials Technology II CTEF-315	3
		Nuclear Physics. CTCP-459	4			Thermodynamics CTBM-401,402	8
						Electrical Engineenng Principles CTBE-461,462,463	12
	Phase IV			"Electives	12	Machine Design . CTBM-551,552,553	9
				Literature Elective	4	Fluid Mechanics CTBM-411,412	8
						Electives	6

' Communications courses require pretest, call475-2234 for information. Students completing BS and B. Tech. degrees must also pass a communications competency test.
" These electives must be selected from the areas of humanities, social sciences and language arts, subject to advisor's approval.
In sequentially numbered courses, the lower numbered course is prerequisite.

Engineering Science (CTSE)

Alfred Haacke, Chairperson

This AS program in engineering science is designed to prepare the student to pursue a BS in engineering. The program permits orderly transfer into RIT's College of Engineering to continue pursuit of the baccalaureate degree in engineering through completion of upper-level courses made available during the evening hours by the College of Engineering. These degree programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Students with a strong high school mathematics and science background can earn the engineering bachelors degree in two stages at RIT.

After earning the AS degree in engineering science students are eligible to apply to the College of Engineering for admission in the baccalaureate program in engineering. Students accepted in this program can complete an engineering degree through continued part-time study.

Course requirements, Engineering Science (CTSE), AS Degree

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
48 Quarter Credits	Phase I	Calculus. CTAM-251,252,253	12	Dynam. Comm. I* Comm. (4) CHGL-204 (4) CHGL-220 and or and Dynamic Comm II CHGL-205 (4)		Engineering Graphics CTID-211	2
		Physics . . . . CTCP-301,302,303 (lec.)	12			Engineering Mechanics . CTBM-341,342	8
		306,307,308 (lab.)	3			Computer Programming for Engineers. CTDP-320	4
48 Quarter Credits	Phase II	Calculus. CTAM-305	4	Psychology. CHGS-211		Circuit Analysis. . . . CTBE-401 (lec.)	
		Differential Equations CTAM-306	4	Economics. CHGS-221		406 (lab.)	4
		Engineering Math. CTAM-328	4	Sociology. CHGS-231		Digital Systems. CTEE-321	3
		Engineering . . . . CTCC-241,242 (lec.)	6	Literature. CHGH-260			
		Chemistry. . . . . 246,247 (lab.)	2				
		Modern Physics. . . . CTCP-457,458	8				

** Communications courses require pretest, call475-2234 for information.*

Computer Programs AAS and B.Tech. Degrees

Alfred Haacke, Chairperson

Computer systems (CTDC)
The goal of this program is to provide students with the skills and technology fundamental to a career in business applications computing. Graduates from this program must master the principles and skills which underlie the disciplines of business data processing and data management. These include hardware organization and assembly language, data structures, file management, business programming system specification and design, business applications programming, data communication, and data base design and implementation.

Positions in business data processing and data management not only require a strong computing background, but also a sound foundation in analytical and business skills. For this reason, students are required to take a basic sequence of courses from business and other technical studies majors. The student may continue to pursue a professional electives concentration in business or may choose another curriculum at RIT.

After completing approximately one half of the program, students are eligible for the AAS degree.

The computer systems curriculum is designed to facilitate transfer for graduates of two-year degree programs in data processing or business.

Prospective students are urged to see an advisor before enrolling in classes. For an advising appointment call 475-2218.

Computer Systems (CTDC), B. Tech Degree

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
	Phase 1	Business Statistics CBCH-351	4	Dynamic Comm. I Comm. (4)	4	Intro to Computer Science . . CTDS-202	4
		Calculus for Technologists I . CTEM-420†	4	CHGL-204 (4) CHGL-220		Intro to Programming. CTDP-208	**4**
		Calculus for Technologists II . CTEM-421†	4	and or and		Program Design and Validation. CTDP-210	4
				DynamicComm.il Literature (4)	4		
				CHGL-205 (4) CHGH-260		Assembly Language Programming. CTDP-305	**4**
				Social Science Electives	8		
	Phase 11 +			Literature Elective	4	Digital Computer Organization CTDS-315	4
				Humanities Elective	8	Data Structure Analysis CTDS-320	**4**
				Elective (Lower Division)	**4**	Data Organization and Management. CTDS-325	**4**
						Business Applications Programming. CTDP-307	**4**
						Systems Specification, Design and Implementation CTDS-335	4
						Organization and Management. CBCE-203	4
						Financial Accounting. . . . CBCA-201	**4**
						Computer Science Elective††	**4**
						Professional Elective	**4**
	Phase III & IV			Electives (Upper Division)	12	Data Comm. Systems CTDS-420	4
						Data Base Concepts. . . . CTDS-485	4
						Computer Sciences Electives††	32
						Restricted Computer Science Electives†††	8
						Programming Systems Workshop. CTDP-488	**4**
						Management Science CBCE-353	**4**
						Professional Electives	28

† Orequivalent—see advisor before enrolling,

†† Must be selected from Computer Science courses—notice exceptions listed under course descriptions.

††† Restricted Computer Science Electives—students must take one course from Group A and one course from Group B.

Group A: Software Emphasis
1)CTDS-440 Operating Systems
2) CTDS-S30 Discrete Simulations
3) CTDS-525 Assemblies, Interpreters and Compilers

Group B: Hardware Emphasis:
1)CTDS-565 Computer Systems Selected
2) CTDS-545 Processor Design Concepts
3) CTDS-520 Computer Architecture

+ Upon successful completion of Phase I and Phase II, students are eligible for AAS degree.
**Communications courses require pretest, call475-2234 for information.*

Associate in Applied Science Programs (AAS)

Industrial technology

Henry Cooke, Chairperson

Associate degree programs in building technology, electrical technology, electromechanical technology, and mechanical technology are designed to allow an employed individual to develop the technical skills needed to function at the technician level and to earn the AAS degree usually required for the job title "technician." Course work is applied and practical, emphasizing laboratory experiences.

Each program contains a core of technical mathematics and physics to prepare the student for the technical courses to follow.

Candidates for this program should have completed at least two years of high school mathematics including algebra and trigonometry. Students having a deficiency in this area may qualify by completing mathematics CTAM-101, 102, 103.

Several of these beginning courses are offered on a shift schedule to accommodate those working a rotating shift. A core of general education courses is required and structured to develop the student's skills in communications and interpersonal relations essential to the technician.

Courses need not be taken within any phase in the order listed, so long as all courses in one phase are completed before proceeding to the next phase. After successfully completing all courses in Phases I and II, the student will receive an AAS degree (about 5 years of two courses per term). A student transferring from another institution must complete 45 credits of this program at RIT.

Many graduates of these programs continue on to the B. Tech. degree in engineering technology.

Electrical Technology (CTIE)

This program is designed to prepare the student for a career at the technician level in the field of electricity and electronics.

Phase I is devoted to providing the student with the mathematics and science background necessary to master the technical courses which follow. These technical courses provide the broad practical background of electricity and electronics required of the technician in industry. Instruction is supplemented by related work in the laboratories, where the student will gain actual work experience in handling and operating electrical equipment.

Course requirements, (CTIE), AAS degree

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
95 Quarter Credits	Phase 1	Technical Mathematics . CTAM-201,202 Technical Calculus. . . . .CTAM-203 College Physics CTCP-201,202,203 (lec.) 206,207,208 (lab.)	8 4 12	Communications-It..... CHGL-220 and Literature. . . . . .CHGH-260 or Dynamic Comm. 1†† . . . . CHGL-204 and DynamicComm.il. CHGL-205	8 or 8	Engineering Graphics_____CTID-211,212 Elements of Electricity and Electronics.. CT1L-201,202,203(lec.) 206,207,206 (lab.)	4 12
	Phase II			Psychology. . . . . .CHGS-211 Economics. CHGS-221	4 4	Applied Electronics . CTEE-361,362,363 366,367,368 Machines and Power Systems. . . . . CT1L-301,302 .306,307 Computer Techniques . . . . CTDP-201 Digital Systems. . . . . .CTEE-321 Digital Systems (lab). . . . .CTEE-326 Programmable Controllers . . CTEE-331 Microprocessors. . . . . .CTIL-353 Microprocessors (lab) . . . . CTIL-356 Electives	12 8 2 3 3 3 1 4

† All electives must be selected with advisor's approval.
**Communications courses require pretest, call 4 75-2234 for information.*

Electromechanical Technology (CTIL)

The manufacture of new and sophisticated equipment and complicated devices in which a number of electrical, electronic and mechanical principles are involved in one function or one piece of equipment, has led to the demand by industry for a new technology recognized by the composite word "electromechanical." A graduate of this dual-discipline program will be qualified to assist in design and development of new devices and to install, operate, service and maintain complex electromechanical assemblies. A graduate could also qualify for employment in automation and numerical control systems. The curriculum has a mathematics and science base with applications in electricity, electronics and mechanics. The emphasis is on the interrelationship of electronic and mechanical principles in systems and devices in which these principles are interdependent.

Course requirements, (CTIL), AAS degree

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
95 Quarter Credits	Phase 1	Technical Mathematics . CTAM-201,202 College Physics CTCP-201,202,203 (lec.) 206,207,208 (lab.)	8 12	Communications*. . . . . CHGL-220 and Literature. . . . . CHGH-260 or Dynamic Comm. I*. . . . . CHGL-204 and Dynamic Comm. II. CHGL-205	8 or 8	Engineering Drawing . CTID-201,202,203 Elements of Electricity and Electronics . . CTIL-201,202,203(lec.) 206,207,206 (lab.) Mechanical Components and Mechanisms. CTIL-221,222	6 12 8
	Phase II			Psychology. CHGS-211	4 4	Machine and Power Systems. . . . CTIL-301,302 (lec.) 306,307 (lab.) Pneumatic and Hydraulic Systems. . . . . CTIL-303(lec.) 308 (lab.) Digital Systems. . . . . CTEE-321 Computer Systems. . . . . CTEE-323 Electromechanical Devices and Systems. . . . CTIL-351,352,353 Microprocessors (lec.) . . . . CTIL-353 Microprocessors (lab.) . . . . CTIL-366 Elective	8 4 3 3 12 3 1 3

' Communications courses require pretest, call 475-2234 for information.

Building Technology (CTIJ)

David Onesti, Adjunct Chairperson

This program is structured to provide the student with a broad understanding of the building industry, while majoring in architectural technology or construction technology.

The architectural technology major provides in-depth training in all aspects of architectural drawing to qualify a graduate for employment as an architectural technician. The professional courses in this major are designed to meet individual requirements.

Course requirements, CTIJ-AAS degree

Students by choice of electives may develop a concentration in either architecture or construction.

The construction technology major provides a more general background in building construction and qualifies the student for career opportunities in the building industry.

In addition to purely technical courses relating to the building industry, the program includes courses in college mathematics and physics as well as a selection of courses in general education.

Course requirements, (CTIJ), AAS degree

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
95 Quarter Credits	Phase 1	Technical Mathematics . CTAM-201,202 College Physics CTCP-201,202,203 (lab.) 206,207,208 (lab.)	8 12	Communications*. . . . . CHGL-220 and Literature. . . . . CHGH-260 or Dynamic Comm. I". . . . . CHGL-204 and Dynamic Comm. II. CHGL-205	8 or 8	Architectural Drawing CTIB-201,202,203,204,205,206	12
	Phase II			Economics. . . . . CHGS-211 Elective	4 4	Architectural Drawing" . . . . CTIB-207,208,209 Applied Mechanics and Strength of Materials. . . . . CTEM-301,303 Building Materials. . . . . CTIB-241 Building Construction . . CTID-242,243 Construction Contracting . . CTIB-251 Building Estimating (Residential)"*. . . . . CTIB-252 Building Estimating (Commercial)*". . . . . CTIB-253 Structural Theory. . . . . CTIB-301 Structural Design. . . . . CTIB-302 Surveying. . . . . CTIB-231 Electives	6 8 4 6 3 3 3 4 4 4 8

All electives must be *selected with advisor's approval.*

** Communications courses require pretest, call 4 75-2234 for information.*

*** Required for Architectural Technology.*

**** Required for Constmction Technology*

Mechanical Technology (CTIM)

This program is designed to prepare a student for a career at the technician level in the mechanical field. Phase I provides the mathematics and science background necessary to master the technical courses which follow. These technical courses in mechanics, materials, design, and manufacturing procedures cover the broad principles of mechanical engineering. The program is designed to meet the needs of industry for training in design, development, test engineering, manufacturing and other branches of this broad field.

Course requirements, (CTIM), AAS degree

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
95 Quarter Credits	Phase I	Technical Mathematics . CTAM-201,202 Technical Calculus. . . . .CTAM-203 College Physics CTCP-201,202,203 (lec.) 206,207,208 (lab.)	8 4 12	Dynamic Comm. I* Comm. (4) CHGL-204 (4) CHGL-220 and or and Dynamic Comm. II Literature (4) CHGL-205 (4) CHGH-260		Engineering Drawing . CTID-201,202,203 Machine Shop . . . CTIS-201,202,203 206,207,208 (lab.)	6 6
	Phase II			Economics. . . . . .CHGS-221 Psychology. CHGS-211	4 4	Manufacturing Analysis .. CTEF-201,202 Applied Mechanics and Strength of Materials. . . CTEM-301,302,303 Materials Technology I . . . . CTEF-314 Materials Technology 11 . . . . CTEF-315 Production Control. . . . . .CTEF-391 Principals of Mechanical Design. . . . .CTEM-315,316,317 Elective	6 12 3 3 3 6 6

** Communications courses require pretest, call 475-2234 for information.*

Manufacturing Technology (CTED)

This program is designed to prepare a student for a career at the technician level in the field of manufacturing. Emphasis is on the practical aspects of process and materials courses, work measurement and design, as well as the concepts of computer numerical control. Graduates of industrial training programs may find this program offers additional growth opportunity from the vocational to the professional levels.

Lower Division Technical Electives

Mechanical/Manufacturing Electives

CTEF-203 Manufacturing Analysis
CTEF-210 Industrial Plastics
CTEF-211 Metallurgy
CTEF-328 Report Writing
CTEF-360 Introduction to Numerical Control

Course requirements, (CTED), AAS degree

		Mathematics and Science	Qtr. Cr.	General Education	Qtr. Cr.	Professional	Qtr. Cr.
95 Quarter Credits	Phase I	Technical Mathematics . CTAM-201,202 Technical Calculus. . . . . .CTAM-203 Introduction to Computer and Programming CTDS-200	8 4 4	Dynamic Comm. I" Comm. (4) CHGL-204 (4) CHGL-220 and or and Dynamic Comm. II Literature (4) CHGL-205 (4) CHGH-260	4 4	Machine Shop . . . CTIS-201.202,203 206,207,208 (lab.) Engineering Drawing . CTID-201,202,203 Materials Technology I . . . . CTEF-314 Materials Technology II CTEF-315	6 6 3 3
	Phase II	College Physics CTCP-201,202,203 (lec.) 206,207,208 (lab.)	12	Economics. . . . . .CHGS-221 Psychology. CHGS-211	4 4	Manufacturing Analysis .. CTEF-201,202 Intro to Numerical Control . . CTEF-360 Applied Mechanics . . . CTEM-301,303 Report Writing. . . . . .CTEF-328 Time Study. . . . . .CTEF-380 Tool Design. . . . . .CTEF-370 Technical Electives	6 4 8 2 3 4 6

**Communications courses require pretest, call 475-2234 for information.*

Diploma Programs

A diploma of the Institute can be earned by completing one of eight tethnical diploma programs. These programs are carefully planned to include the basic courses in their respective specialized fields, so that maximum benefit will accrue for a minimum expenditure of time. Enrollment in or completion of a diploma program does not preclude the possibility of later pursuing a degree program; in fact some courses are applicable to degree programs if the student should decide to pursue a degree at a later time.

Students not interested in pursuing a diploma program may register for individual courses of their choice as long as they meet any prerequisites.

Diplomas of the Institute are granted in the following programs: automatic screw machine operation and set-up; instrument making and experimental work; machine shop; tool and die making; turret lathe and chucker operation and set-up, photography, printing and an interdisciplinary diploma.

Machine Tool Programs

Orville Adler, Chairperson

Apprenticeship programs
In cooperation with local industry, CCE offers a wide selection of courses applicable to apprenticeship programs. Applicants seeking to complete courses required in apprenticeship programs should consult with their company training director to determine courses required.

Machine shop
For tool room work, there are a number of precision machines to perform the required machining operations such as: Bridgeport vertical mills, Pratt & Whitney jig bore, cylindrical grinders, surface, grinders, electrical discharge machines (EDM), engine lathes, pantograph machine and punch presses for trying out of dies. Other active facilities in the machine shop are numerical control, computer-aided manufacturing, and heat treating labs.

When registering for the following programs, a student must register in the proper sequence. For example, when Shop Mathematics (CTIS-151) has been completed, the next course to complete would be CTIS-152, etc.

Specialized industrial training
Specialized intensive training programs may be developed on a one-time basis or as on-going programs to meet the specific needs of a given company or organization.

If seeking advanced standing in subjects in the machine shop area, a student must submit transcripts of courses taken at other schools and/or take an examination in those courses for which the student seeks credit. The examination fee is $50 per course. An admission card must be received before being admitted to the test. The test may be scheduled at City Center. For further information call Orville Adler, at 475-5006.

Course Requirements

	Tool and Die Making (CTML)		Instrument Making and Exp. Work (CTMI)
Phase 1	Mechanical Blueprint Reading . . . . . CTID-101 Machine Shop Lecture . . . . . CTIS-201,202,203 Machine Shop Lab . . . . . CTIS-206,207,208 Shop Mathematics CTIS-151,152,153	Phase 1	Mechanical Blueprint Reading . . . . . CTID-101 Machine Shop Lecture . . . . . CTIS-201,202,203 Machine Shop Lab . . . . . CTIS-206,207,208 Shop Mathematics CTIS-151,152,153
2	Advanced Machine Shop I . . . . . CTIS-104,105,106 Shop Trigonometry CTIS-154,155,156	2	Instrument Making I . . . . . CTIS-111,112,113 Shop Trigonometry CTIS-154,155,156
3	Tool & Die Making I . . . . . CTIS-121,122,123 Heat Treatment CTIS-161,152	3	Instrument Making II . . . . . CTIS-114,115,116 Heat Treatment CTIS-161,162
4	Tool & Die Making II . . . . . CTIS-124,125,126 Human Relations CBCE-101,102,103	4	Instrument Making . . . . . CTIS-117,118,119 Human Relations CBCE-101,102,103
5	Tool & Die Making II . . . . . CTIS-127,128,129 Electives (any 3 quarters)	5	Electives (any 3 quarters)

	Machine Shop (CTMS)		Automatic Screwmachine, Set-Up and Operate (CTMR)
Phase I -	Mechanical Blueprint Reading . . . . . CTID-101 Machine Shop Lecture . . . . . CTIS-201,202,203 Machine Shop Lab . . . . . CTIS-206,207,208 Shop Mathematics CTIS-151,152,153	Phase 1	Hand Screw Machine . . . . . CTIS-131,132,133 Mechanical Blueprint Reading . . . . . CTID-101 Shop Mathematics CTIS-151,152
2	Advanced Machine Shop I . . . . . CTIS-104,105,106 Heat Treatment CTIS-161,162	2	Automatic Screw Machine I . . . . . CTIS-134,135,136 Human Relations CBCE-101
3	Advanced Machine Shop II Human Relations CBCE-101,102,103	3	Automatic Screw Machine II . . . . . CTIS-137,138,139 Electives (any three quarters)

Electives (any 3 quarters of the following):

Precision Measurement CTIS-101,102,103
Engineering Drawing CTID-201,202,203
Industrial Plastics CTEF-210
Numerical Control (CNC) CTIS-281,282
Computer Programming for N/C (CAM) CTIS-283
Mechanical Blueprint Reading II CTID-102

Starting Classes for Mid Year

Winter	Spring	Summer
Mach. Lec. CTIS-201 Mach. Lab. CTIS-206 Math CTIS-157 B/P CTID-101	B/P CTID-101	Mach. Lec. CTIS-204 Mach. Lab. CTIS-209

Starting Classes for B Shift or Tricker

Fall	Winter	Spring
Mach. Shop Lec. CTIS-201 Mach. Shop Lab CTIS-206 (May come either AM or PM)	Math CTIS-157	B/P CTID-101

School of Applied Industrial Studies

The School of Applied Industrial Studies (SAIS) was initiated in the late 1970s to help meet the need for skilled workers in Rochester industry. The School of Applied Industrial Studies is a reaffirmation of some of the original concepts of RIT.

RIT's roots go back to the Rochester Athenaeum, which was established in 1829 "for the purpose of cultivating and promoting literature, science, and the arts." In 1885, the growing industries of Rochester declared their future independence of European trained machine designers, toolmakers, and draftsmen by setting up a Mechanics Institute to provide technical training for men and women. In 1891 the Athenaeum and Mechanics Institute of Technology merged with the stated goal of preparing students for "the making of a living and the living of a life."

SAIS has been established at RIT's City Center where extensive modern equipment and facilities are available to carry out this historic mission of RIT.

Admission requirements
The School of Applied Industrial Studies offers admission to high school graduates (or equivalent) who have successfully completed one year of algebra and have an aptitude for the specific technical field. Applicants are accepted on a continuous basis throughout the year by admission in any one of the three entry dates: Fall (September), Winter (December), Spring (March).

Persons wishing to enroll in specific courses or who wish to pursue the program on a part-time basis must meet the general program requirements and (if appropriate) any course prerequisites.

Admission information and applications should be obtained directly from the

Admissions Office
College of Continuing Education
33 N. Fitzhugh St.
Rochester, N.Y. 14614
(716) 475-5003

Transfer credit
SAIS accepts credits from any accredited college or university for those courses which the transfer credit directly applies. To obtain credit, formal application should be made at time of admission. A grade of "C" or better is required in the original course to be considered for transfer.

Programs
The School of Applied Industrial Studies offers one-year (12-month) programs leading to a diploma of the Institute in the following fields:

1. Automated Equipment
2. Computer Service Technology
3. Drafting Technology
4. Machine Tool Technology

The SAIS programs are designed especially to prepare persons for entry level positions in a wide range of industrial organizations.

Financial aid
Students applying to the School of Applied Industrial Studies should contact the RIT Office of Financial Aid as well as the SAIS Admissions Office regarding assistance. Beyond the financial aid generally available to all college students, SAIS offers scholarships both at admission and during the program for qualifying applicants or students.

Graduation requirements
The minimum requirements for the diploma of the Institute from the School of Applied Industrial Studies are:

1. successful completion of the prescribed program including the mathematics and communication sequences required for the specific curriculum
2. the minimum credit hours specified for each curriculum
3. minimum cumulative quality point average of 2.0

SAIS holds three graduations each year: at the conclusion of the Fall (November), Winter (February), and Summer (August) quarters.

Job placement
The School of Applied Industrial Studies retains a full-time staff to assist with the total activity of job placement. The school has contacts with hundreds of businesses and industries who commonly hire the graduates and every effort is made to provide the graduating SAIS student with as many opportunities as may be available.

A continuous effort is made to develop new and wide ranging job opportunities for SAIS graduates in all of the program fields.

Automated Equipment Technology

Robert Klafehn, Program Chairman

This program is designed to prepare persons for a technician's position in the field of automated equipment maintenance. This field is one of the most rapidly expanding fields and anticipates a very large need for qualified personnel in the next few years.

Students enrolling in this program will study electricity, electronics, mechanisms, hydraulics and pneumatics. Foundation courses in physical principles will be provided and a good proficiency in math will be required.

SAIS facilities provide the extensive lab and hands-on equipment needed to provide our students with experience in handling automated industrial machines, robots, copying machines and a host of other automated and computerized devices.

Graduates will find job opportunities across the country in a wide variety of industries and job classifications related to automated equipment and machinery. Opportunities are excellent for future education and growth for those who enter this profession.

Program graduation requirements
Beyond those listed as the general graduation requirements, the following also apply:

a. A minimum mathematics sequence to include at least
   CAIG 207 Algebra & Trigonometry II
   CAIG 208 Algebra & Trigonometry III
b. 11 quarter credits in a communication sequence through
   CAIG 206 Technical Communications
c. a minimum of 64 quarter credit hours earned

Automated Equipment Technology _

Course Requirements		Qtr.Cr.
Unit 1(1 st quarter)		
Machine Shop	CAIM123	2
Electricity/Electronics	CAIE 203	3
Hydraulic/Pneumatic Syst	CAIE 202	4
Communication Skills	CAIG 104	2
Algebra & Trigonometry I	CAIG 107	3
Special Studies (Intro, to AET)	CAIE 298	2
		16
Unit II (2nd quarter)		
Physical Principles I	CAIE 101	3
Machine Devices/Systems	CAIE 201	3
Electricity/Electronics II	CAIE 205	3
Communicating on the Job	CAIG 105	3
Algebra & Trigonometry II	CAIG 207	4
		16

Course Requirements		Qtr.Cr.
Unit III (3rd quarter)		
Rotating Elect. Equipment	CAIE 211	3
Electricity/Electronics III	CAIE 221	4
Physical Principles II	CAIE 102	3
Composition-Written and Oral	CAIG 220	4
Statistical Process Control	CAIG 108	4
		18
Unit IV (4th quarter)		
Transducers & Control. Syst	CAIE 212	4
Auto. Equip. Troubleshooting	CAIE 231	3
Electrical Control Systems	CAIE 215	3
Technical Communications	CAIG 206	4
Special Studies	CAIE 298	1-4
		14-18

Computer Service Technology

Ronald Perry, Chairman

Computers play an increasingly important role in our everyday lives. The advent of the personal computer, the use of computer controlled machines in industry and the increased use of computers in large and small businesses, have created a need for technicians to service this hardware. This exciting field will continue to grow, and the demand for individuals trained in the repair of computers and computer controlled devices will expand as new uses for computers develop.

Students in the SAIS Computer Service Technology Program study electricity and electronics, computer-related courses dealing with hardware, microprocessors and CPU operation, as well as programming languages presently used on computers.

SAIS facilities provide opportunities for extensive experience on a variety of equipment used in the repair of computers and exposure to a sampling of the computer hardware used today.

Graduates will find employment opportunities in numerous areas in computer related fields. Opportunities for future education and growth are excellent for those who enter this challenging field.

Entering students should be high school graduates or equivalent, and have taken high school algebra.

Program graduation requirements
Beyond those listed as general graduation requirements, the following also apply:

a. a minimum mathematics sequence to include at least
   CAIG-207 Algebra & Trigonometry II
   CAIG-208 Algebra & Trigonometry III
b. 11 quarter credits in a communications sequence through
   CAIG-206 Technical Communications
c. a minimum of 66 quarter credit hours earned.

Computer Service Technology

Course Requirements		Qtr.Cr.
Unit I (first quarter)		
Electricity/Electronics	CAIE 0272-203	3
Fundamentals of Computers	CAIC 0275-201	4
Introductory Programming I (BASIC) . . .	CAIC 0275-205	2
Electricity/Electronics Schematic Interpretation	CAIG 0275-212	2
Algebra & Trigonometry I	CAIG 0274-107	3
Communication Skills I	CAIG 0274-104	2
		16
Unit 2 (second quarter)		
Electricity/Electronics II	CAIE 0272-205	3
Computers I	CAIC 0275-202	4
Introductory Programming II (PASCAL)	CAID 0275-207	2
Special Tool & Equipment Use	CAIC 0275-215	1
Algebra and Trigonometry II	CAIG 0274-207	4
Communicating on the Job	CIAG 0274-105	3
		17

Course Requirements		Qtr.Cr.
Unit 3 (third quarter)		
Digital Circuits	CAIC 0275-216	4
Computers II	CAIC 0275-203	3
Introductory Programming III (FORTRAN)	CAIC 0275-209	2
Algebra and Trigonometry III	CAIG 0274-208	4
Composition-Written and Oral	CAIG 0274-220	4
Interpersonal Communications	CAIG 0274-210	1
		18
Unit 4 (fourth quarter)		
Linear Circuits	CAIC 0275-218	2
Computers III	CAIC 0275-204	4
Introductory Programming IV (COBOL)	CAID 0275-211	2
Computer Systems Troubleshooting . . .	CAIC 0275-220	5
Technical Communications	CAIG 0274-206	4
		17

Drafting Technology

Elizabeth Paciorek,
Program Chairperson

The drafting field has undergone many significant changes in recent years. Today not only does the drafter require a sound knowledge of drafting fundamentals but also must be able to quickly specialize in a particular area of drafting. The advent of computer-assisted drafting has added another exciting dimension to this important technical field.

Students in the SAIS drafting program receive a strong foundation of basic drafting skills plus experience on the latest drafting tools and techniques of computer-assisted drafting. Formal course work in computing and extensive activity utilizing the School's (CAD/CAM Computer Assisted Design/Computer Assisted Manufacturing) facilities is required of all students enrolled in either the mechanical or printed circuit board program options.

Graduates enter such positions as mechanical and electronic drafter and CAD operator, with a wide range of companies, both large and small. Opportunities are excellent for future education and growth for those who enter these job fields.

Program graduation requirements
Successful completion of:

a. a minimum mathematics sequence of
   - CAIG 106 Industrial Math
   - CAIG 207 Algebra & Trigonometry II
   - CAIG 208 Algebra & Trigonometry III

b. 11 quarter credits in a communications sequence through
   - CAIG 206 Technical Communications

c. a minimum of 67 quarter credit hours earned
d. other general requirements of School

Drafting Technology: Mechanical Option

Course Requirements		Qtr.Cr.
Unit 1(1st quarter)		
Basic Machine Shop	CAIM 121	2
Manufacturing Processes	CAID-210	5
Technical Drawing I	CAID-238	5
Communication Skills	CAIG-104	2
Industrial Mathematics	CAIG-106	3
		17
Unit II (2nd quarter)		
Basic Machine Shop II	CAIM-122	2
Drafting Mechanics I	CAID-215	4
Drafting Mechanical Lab	CAID-225	1
Technical Drawing II	CAID-239	5
Communicating on the Job	CAIG-105	3
Algebra & Trigonometry I	CAIG-107	3
		18
Unit III (3rd quarter)		
Materials Selection	CAID-211	2
Drafting Mechanics II	CAID-217	3
Technical Drawing III	CAID-240	3
Introduction to Computer Aided Drafting	CAID-245	4
Composition-Written and Oral	CAIG-220	4
Algebra & Trigonometry II	CAIG-207	4
		18
Unit IV (4th quarter)		
Introduction to Computers	CAID-208	3
Drafting Mechanics III	CAID-219	2
"Technical Drawing IV	CAID-241	2
Computer Aided Drafting	CAID-247	3
Technical Communications	CAIG-206	4
Algebra & Trigonometry III	CAIG-208	4
		18

Drafting Technology: Printed Circuit Board Option
Course requirements similar to those listed under "Mechanical Option" but must receive department approval prior to registration.

The following substitutions are recommended:

Course Requirements		Qtr. Cr.
Unit I: Intro, to Computers	CAID-208	3
Unit II: Drafting Mechanics III	CAID-219	3
Unit III: Fundamentals of Designing PCB's	CAID-249	4
Unit IV: CAD/CAM PCB Layout	CAID-251	6
Technical Elective	CAIG-206	1-4
• Special Studies: CAM	CAID-298	*A*
• Statistical Process Control	CAIG-108	3

Computer-Aided Drafting Certificate

Part-time Evening
Computer-Aided Drafting is changing the role of drafters, designers, and engineering professionals. This has resulted in a need for advanced skills and knowledge in order to remain on the cutting edge of technology. The School of Applied Industrial Studies is prepared to assist you in developing these skills with two CAD Certificate Program Options in Mechanical CAD and CAD/CAM for Printed Circuit Board Design. The course requirements will vary depending upon your prior academic and employment experience. Each course is designed to teach CAD concepts as well as the specific system commands without prior computer or CAD experience. Upon the successful completion of the option requirements, students will receive a Certificate of Completion from the School of Applied Industrial Studies.

Certificate requirements

Option "A"

CAD
PRINTED CIRCUIT BOARD DESIGN

Course requirements

CAIC-212	Schematic Interpretation
CAID-249	Fundamentals of Designing Printed Circuits
CAID-251	CAD/CAM-PCB Layout

OR

Option "B"

CAD
MECHANICAL

Course requirements

CAID-245	Introduction to CAD
CAID-247	Computed-Aided Drafting
CAID-298	Special Study CAD/CAM

Machine Tool Technology

Orville Adler,
Program Chairperson

Machine tool technology is the "flagship" program of the School of Applied Industrial Studies. Historic records indicate a perennial need for skilled personnel in the machine trades in both the Rochester area and across the nation. The need for persons with machining skills will no doubt remain paramount in the traditional industrial organizations. Beyond the need for the generalist who has the background and education to function in a variety of roles in this field, the need for persons with special attributes to enter apprenticeships in tool and die making, mold making, and instrument making will continue unabated.

As the technology advances in the mass production field, graduates are called upon in areas requiring computer-assisted manufacturing (CAM) and other state-of-the-art manufacturing techniques including electric discharge machining (EDM), numerical control (N/C) and laser machining. Students enrolled in the Machine Tool Technology Program will be exposed to all of these facets of modern manufacturing with opportunities for specialization in any one of the aforementioned techniques.

SAIS boasts one of the most modern and extensive facilities for preparation in the machine tool field. An intensive program of instruction provides graduates with a variety of opportunities for employment growth in one of the most traditional and stable areas of employment in U.S. industry.

Graduation requirements
Beyond those listed as general graduation requirements, the following also apply:

a. a minimum mathematics sequence to include at least
   - CAIG 106 Industrial Math
   - CAIG 207 Algebra & Trigonometry II
   - CAIG 108 Statistics Process Control

b. 11 quarter credits in a communications sequence through
   - CAIG 206 Technical Communications

c. a minimum of 65 quarter credits earned.

Machine Tool Technology

Course Requirements		Qtr. Cr.
Unit I (1st quarter)		
Industrial Machine Shop I	CAIM-120	4
Materials & Methods	CAIM-210	3
Principles of Blueprint Reading	CAID-110	3
Communication Skills	CAIG-104	3
		15
Unit II (2nd quarter)		
Production Automated Machining . . .	CAIM-212	3
Industrial Machine Shop II	CAIM-231	4
Engineering Drawing for Machinists . . .	CAID-216	3
Communicating on the Job	CAIG-105	3
Algebra & Trigonometry I	CAIG-107	3
		16

Course Requirements		Qtr. Cr.
Unit III (3rd quarter)		
Numerical Control Programming & Machining	CAIM-214	3
Tool & Gauge Making	CAIM-218	3
Intermediate Machine Tool Technology	CAIM-232	4
Composition-Written and Oral	CAIG-220	4
Algebra & Trigonometry II	CAIG-207	4
		18
Unit IV (4th quarter)		
Die Making	CAIM-220	3
Metallurgy & Heat Transfer	CAIM-222	3
Advanced Machine Tool Technology . .	CAIM-233	4
Technical Communications	CAIG-206	4
Algebra & Trigonometry III	CAIG-208	4
		18

Packaging Machinery Mechanics

Robert Klafehn, Chairman

The packaging industry involves a wide ranging field including foods, pharmaceuticals, general consumer goods, and a vast array of products which many people take for granted.

Packaging is not only important for the health and safety of consumers but also provides for maximum convenience and/or availability to the general public.

Modern packaging techniques and processes count heavily toward our standard of living and in the case of the manufacturer may mean the difference between success and failure.

The key individual in the packaging process has been shown, over and over again, to be the person or persons who maintain and insure the proper packaging of a manufacturer's product.

The high speeds, computerized packaging line found today in successful industries rely heavily upon specially trained and skilled personnel to maintain production schedules and insurance of product quality.

The SAIS program provides instruction in electrical and electronic circuitry, hydraulics, pneumatics, computers and specialized packaging machinery, equipment and techniques which are in high demand.

Graduates of this program will find job opportunities across the nation in a wide variety of industries. Positions in packaging machinery mechanics demand excellent salaries commensurate with the serious obligations and responsibilities of the job.

Program graduation requirements
Beyond those listed as the general graduation requirements, the following also apply:

a. a minimum mathematics sequence to include at least
   CAIG 207 Algebra & Trigonometry II
   CAIG 208 Algebra & Trigonometry III
b. 11 quarter credits in a communications sequence through
   CAIG 206 Technical Communications
c. a minimum of 67 quarter credit hours earned

Packaging Machinery Mechanics

Course Requirements		Qtr.Cr.
UnitI		
Machine Shop	CAIM123	2
Hydraulic/Pneumatic Systems	CAIE-202	4
Electricity/Electronics 1	CAIE-203	3
Introduction to Packaging	CAIP-104	3
Communication Skills	CAIG-104	2
Algebra & Trigonometry 1	CAIG-107	3
		17
Unit II		
Physical Principles 1	CAIE-101	3
Machine Devices & Syst	CAIE-201	3
Electricity/Electronics II	CAIE-205	3
Packaging Mach. Sys. 1	CAIP-206	2
Communications on the Job	CAIG-105	3
Algebra & Trigonometry II	CAIG-297	4
		18

Course Requirements		Qtr. Cr.
Unit III		
Physical Principles II	CAIE-102	3
Rotating Electrical Mach	CAIE-211	3
Electricity/Electronics III	CAIE-221	4
Composition-Written and Oral	CAIG-220	4
Algebra & Trigonometry II	CAIG-208	4
		18
Unit IV		
Practical Fabrication	CAIM-235	2
Electrical Control Systems	CAIE-215	3
Pkg. Machinery Systems II	CAIP-207	4
Packaging Machinery Troubleshooting and Repair	CAIP-215	4
Technical Communications	CAIG-206	4
		17

Course Descriptions

Business and The Arts

Accounting

CBCA-201 **Financial Accounting**
Registration #0201-201
Emphasis is placed on analyzing and recording business transactions, and understanding the results of these transactions. Preparations of basic financial statements required by any business are included.

Credit 4

CBCA-203 **Managerial Accounting**
Registration #0201-203
The functions and uses of accounting information are presented. Emphasis is placed on the preparation and operation of dynamic budget and the use of accounting data for control and profit planning. (CBCA-201)

Credit 4

CBCA-207, 208 **Accounting for Engineers**
Registration #0201-207, 208
A survey of basic accounting principles for those interested in a general understanding of accounting terminology, its functions within an organization and the application of accounting data in decision making.

Credit 4/Qtr.

CBCA-308, 309 **Intermediate Accounting I, II**
Registration 0201-308, 309
Designed to broaden understanding of accounting practices and improve skills in gathering, analyzing, reporting, and evaluating accounting theory and concepts as they relate to business problems. (CBCA-203)

Credit 4/Qtr.

Business Law

CBCB-301 **Business Law I**
Registration #0202-301
Introductory course in business law including basic legal principles and procedures, criminal law, torts, contracts, sales, and real property.

Credit 4

CBCB-302 **Business Law II**
Registration #0202-302
Continuation of CBCB-301 includes law agency, partnerships, corporations, insurance and bankruptcy. Also presents survey of commercial paper, secured transactions, and bank deposits.

Credit 4

CBCB-310 **Legal Environment of**
Registration #0202-310 **Business**
Foundation course which introduces: the function of law in society; the fundamentals of the federal and state court systems; contract formation (offer, acceptance, consideration, and capacity) and related ethical issues; and the emergence of the federal regulatory agencies and the practical impact of these agencies on the American business community.

Credit 4

Data Processing and Systems Analysis

CBCC-321 **Data Processing Principles**
Registration #0203-321
Introduction to computer technology including an examination of the concepts function and techniques associated with modern data processing. While this course does not include any programming, the interrelated areas of operation, programming, and systems analysis are discussed.

Credit 4

CBCC-322 **Data Processing Systems**
Registration #0203-322
Covers the spectrum of management considerations pertaining to the use of computers in business systems. Provides a methodology for effective planning, development, installation, and management of computer-based business information systems. (CBCC-321 or equivalent)

Credit 4

CBCC-351 **BASIC Programming for**
Registration #0203-351 **Business**
An introduction to computers and computer programming for business students. After a brief survey of computer systems and terminology, students will learn to utilize a timeshared computer system. The introduction to BASIC programming covers all major functions; problems and examples will be drawn from business applications. NOTE: Not for computer science majors.

Credit 2

Finance

CBCD-204 **Personal Financial**
Registration #0204-204 **Management**
The main objectives of this course is to enable you to manage your personal finances more effectively. The course deals with personal budgeting, protection of personal assets, consumer credit, investments, and estate planning.

Credit 4

CBCD-304 **Personal Financial Decision**
Registration #0204-304 **Making**
The course will focus on the financial decision-making process from an individual planning perspective to include basic tax planning concepts, accumulation, and retirement planning models. This course will expand on the topics presented in Personal Financial Management (CBCD-204), with particular emphasis on planning for decisions related to insurance, investments, and estate transfers. Throughout the course basic mathematical concepts (compounding, discounting, etc.) and the effects of taxation will be applied to each area.

Credit 4

General Management

CBCE-101, 102, 103 **Human Relations**
Registration #0205-101,102,103
Designed to acquaint both employees and supervisors with basic principles of human behavior: motivation, morale, leadership, communication, emotional understanding and organizational behavior. Managerial aspects common to all supervisory positions emphasized. An identical daytime class also available for shift workers.

Credit 2/Qtr.

CBCE-200, 201, 202 The Management Process
Registration #0205-200,201,202
A comprehensive 3-quarter course in effective supervision and management for supervisors and potential supervisors. Approximately 50 topics of current importance to supervisors are presented, as well as essential management principles, business communications, and practical supervision techniques. Specific supervisory problems of course participants are discussed in informal sessions and through projects conducted outside the classroom. Instruction is usually guided by a team of management specialists. Lecture-discussion, panel presentations, audiovisual presentation, simulation exercises and case studies. (Program extends over three consecutive quarters and courses should be taken in sequence.) A management certificate is awarded for successful completion of the course.

Credit 12

CBCE-203 Organization Management
Registration #0205-203
A general introduction to the major management functions and the organization of business. Topics include business and personal planning, organizing, staffing, implementing, directing, control, time management, appraisal, compensation, organization theories, decision-making, problem solving, influences on managerial decision making, communication, management styles and motivation. Extensive use is made of learning groups in which students work together in small groups to discuss and apply concepts. Some out of class time is required to prepare for a learning group presentation.

Credit 4

CBCE-353 Management Science
Registration #0205-353
Foundation course which introduces mathematical model-building and the use of management science in the decision-making process. Mathematical techniques will include: linear programming; the assignment model; the transportation model; inventory control models; critical-path models (PERT/CPM); and computer simulation. Homework assignments will include running "canned" computer application programs. (CBCH-201, 202, 351, 352 and CBCC-321)

Credit 4

Small Business Management

CBCE-221 New Venture Development
Registration #0205-221
Course presents factors to be considered by those interested in the ownership and management of small business enterprises. Includes who should be an entrepreneur, guidelines for starting a new business, basic legal consideration, and approaches for obtaining capital and credit.

Credit 4

CBCE-222 Small Business Management
Registration #0205-222 and Finances
The functions required to successfully manage and finance a small business are presented. A variety of topics include staffing a small business, purchasing and supplier relations, comsumer credit policies, and the financial and administrative controls necessary to minimize business risk.

Credit 4

CBCE-223 Small Business Marketing and
Registration #0205-223 Planning
The planning and execution of successful small business marketing approaches include market determination, distribution and pricing are presented. The regulatory environment facing small business is included along with techniques for planning growth.

Credit 4

Marketing

CBCG-210 Effective Selling
Registration #0207-210
Investigates the importance of the sales function within the overall marketing organization and the necessary general characteristics of a successful salesperson. The various steps of the sales process and the practical applications of effective sales presentation are discussed.

Credit 4

CBCG-213 Advertising Principles
Registration #0207-213
Social, economic and mass communication aspects of advertising with special emphasis on the role of advertising in the marketing mix. Special topics include agency/client relationship, radio and TV ratings, history of advertising, the creative process and psychographics. Guest lectures discuss corporate campaigns.

Credit 4

CBCG-214 Advertising Evaluation and
Registration #0207-214 Techniques
Course presents basic approaches used in planning, preparation and evaluation of advertising and sales promotional materials. Course incorporates a number of projects involving writing/layout/production for print, broadcast and specialized media advertising.

Credit 4

CBCG-361 Marketing
Registration #0207-361
An introductory course in marketing designed to provide a better awareness of the function of marketing and how marketing relates to other areas of business. Topics include the marketing concept, developing a product strategy, behavioral aspects of consumer marketing, the marketing mix, segmentation and current marketing issues.

Credit 4

Mathematics and Statistics for Business

CBCH-201, 202* Mathematics for Business
Registration #0208-201, 202
An introduction to mathematical concepts and quantitative methods required in business management, included are: sets and real number system, linear, non-linear and exponential functions, and system of equations and inequalities. Differential and integrated calculus is Introduced plus some special topics in quantitative analysis such as linear programming and simulation.

Credit 4/Qtr.

* Entering students who want to register for CBCH-201 are required to take a diagnostic examination to determine the level at which they may start the sequence. Students who have had previous college level mathematics courses should consult with an advisor.

CBCH-351, 352 Business Statistics
Registration #0208-351, 352
An introduction to the basic tools of statistical analysis used in business including charts, frequency distribution, averages, dispersion, probability theory, sampling. Logical procedures for making business decisions under conditions of uncertainty are emphasized. Hypothesis testing including, one, two, and k-sample test means, proportions, regression and correlation analysis are also included. (CBCH-202)

Credit 4/Qtr.

Personnel Administration

CBCI-224 Interviewing Techniques
Registration #0209-224
A practical approach to interviewing techniques with emphasis on role plays and case studies. Coverage includes employment, disciplinary, counseling, and performance appraisal interviews.

Credit 4

CBCI-229 **Personnel Administration**
Registration #0209-229
An introduction to personnel administration including an overview and discussion of employment, equal employment opportunity, job evaluation, training, performance appraisal, compensation, benefits, personnel planning, labor relations, and other related topics.

Credit 4

Production Management and Industrial Engineering

CBCJ-209 **Production Management**
Registration #0210-209
The organization of production functions with emphasis on management responsibilities. All levels of factory operation are discussed and relationship between various aspects of production are presented.

Credit 4

CBCJ-305 **Fundamentals of Industrial**
Registration #0210-305 **Engineering**
An overview of industrial engineering problems and techniques is presented including facilities selection and layout, methods analysis, work measurements, operations planning and control materials handling and an introduction to operations research.

Credit 4

CBCJ-306 **Industrial Engineering**
Registration #0210-306 **Economy**
The economic factors required for rational decisions are presented. Emphasis is placed on analytical tools used in manufacturing environment including evaluation of capital spending alternatives, depreciation methods, decision-making under risk conditions, and value analysis methods. (CBCJ-305)

Credit 4

Transportation, Traffic and Distribution Management

CBCL-234 **Traffic and Transportation**
Registration #0212-234 **Management (Principles and Practices)**
A study of traffic management and its relationship to other corporate functions. Includes a review of the elements of sound shipping practices with emphasis on securing the most economical mode of transportation.

Credit 4

CBCL-239 **Traffic and Transportation**
Registration #0212-239 **Management (Rates and Classifications)**
Discussion and practice in the use of freight rates and classifications, the interpretation and determination of freight rates and charges, and analysis of best as well as most economical means of moving materials; extensive use of tariff materials as applied to actual case situations. (CBCL-234 or equivalent)

Credit 4

Real Estate

CBCM-201 **Basic Real Estate Principles**
Registration #0213-201 **Salesperson's Course**
Comprehensive study of real estate principles including: law of agency, human rights and fair housing, real estate instruments, financing, valuation and listings, contracts, license law and ethics, closings, land use regulations, and real estate math. Completion of this course satisfies the NYS educational requirement for a real estate salesperson's license. For licensure, participants must attend all classes and pass the final exam. Individuals interested in licensure only should call 262-2608.

Credit 4

CBCM-202 **Advanced Real Estate**
Registration #0213-202 **Principles Broker's Course**
A study of topics related to real estate including: operation of a broker's office, construction, general business law, subdivision and development, leases, taxes, assessments, investment property, alienation, property management, condominiums and cooperatives, rent regulations, appraisals, and advertising. Completion of this course and Basic Real Estate Principles satisfies the educational requirement for a real estate broker's license. For licensure, participants must attend all classes and pass the final exam. Individuals interested in licensure only should call 262-2608.

Credit 4

CBCM-203 **Real Estate Investment and**
Registration #0213-203 **Finances**
An introduction to real estate investment with emphasis on the purchase and sale of real estate, the acquisition of financing, the selection of appropriate ownership forms, and the use of statistical data in making real estate decisions.

Credit 4

CBCM-204 **Real Estate Evaluation**
Registration #0213-204
The evaluation of real estate through appraisal and analysis, basic consideration in real estate management, and the advantages of various types of real estate investments are discussed.

Credit 4

Insurance

CBCN-271, 272 **Principles of Insurance**
Registration #0214-271, 272
This two quarter sequence course leads to qualification for taking the New York State agents and brokers examination for Casualty and Property insurance licenses. All casualty and property insurance are covered in the class. Emphasis placed on providing students with practical working knowledge of insurance policies and coverages. The course offers practical insight for both insurance professionals and insurance buyers.

Credit 4/Qtr.

Ceramics

CHAC-201 **Introduction to Ceramics**
Registration #0222-201
An extensive survey of on and off the wheel forming techniques using stoneware and porcelain clays. Students will be introduced to a variety of decorative methods as well as the basics of glazing and firing finished work. Class projects will emphasize the development of competent skills and good design.

Credit 2

CHAC-211 **Intermediate Ceramic Wheel**
Registration #0222-211 **Throwing**
An exploration of Japanese wheel throwing techniques. Students will work with raku stoneware and porcelain, using methods and tools common to Japanese potters. Class projects will concentrate on production techniques with special emphasis being given to glazing and firing procedures. (CHAC-201 or equivalent)

Credit 2

CHAC-301 **Advanced Ceramics**
Registration #0222-301
An introduction to the world of the professional potter. Work will center on advanced forming and decorative techniques ranging from sectional throwing to photo-sensitive emulsion glazing. Special emphasis will be on independent projects which require the potter to master clay and glazing formulation, design, production and firing techniques. Kiln design and construction as well as marketing techniques for finished work will be discussed. (CHAC-211 or equivalent)

Credit 2

CHAC-295 **Independent Study: Ceramics**
Registration #0222-295
Independent study may be developed at upper division level. Projects must be developed with instructor, subject to the approval of the program director. Credit may vary from one to five quarter-credits. For information on independent study contact the Division of Business and the Arts.

Credit Variable

CHAC-298 **Special Topics: Ceramics**
Registration #0222-298
Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter.

Credit Variable

Design

CHAD-201, 202, 203 **Basic Design**
Registration # 0223-201, 202,203
Study of basic elements of design: line, shape, texture, color, space and their incorporation in design principles as applied to two and three-dimensional design problems including the graphic arts.

Credit 2/Qtr.

CHAD-211, 212, 213 **Display Design**
Registration #0223-211,212,213
First quarter examines the fundamentals of three-dimensional design. The second and third quarters apply these principles to develop mechanical, graphic and model making manipulative skills and problem solving approaches used by designers in space planning. (CHAF-201, 202, 203 and CHAD-201, 202, 203 or equivalent experience)

Credit 2/Qtr.

CHAD-215, 216, 217 **Rendering Techniques**
Registration #0223-215,216,217
This course will introduce students to the materials and techniques used by designers in rendering interiors, layouts, products, etc. Marker sketching, perspective, shadowing, media selection, and presentation techniques will be covered. Suggested for all design students. (CHAF-201, 202, 203; CHAD-201, 202, 203 or equivalent)

Credit 2/Qtr.

CHAD-220 **Art for Reproduction**
Registration #0223-220
This course prepares students to enter the field of graphic design by providing orientation and the studio experience in the presentation of imagery for reproduction. Presentations will include board techniques, materials, tools, mechanical art procedures, printing and bindery processes, etc. (CHAD-201, 202, 203 or 271, or equivalent)

Credit 3

CHAD-224, 225 **Interior Design**
Registration #0223-224, 225
Career orientation. Emphasis on practical aspects of the profession. Details of purchasing all furnishings used in a home. Client centered planning and design. (CHAF-201, 202, 203; CHAD-201, 202, 203 or equivalents)

Credit 2/Qtr.

CHAD-226 **History of Interior Design**
Registration #0223-226
Historical survey of period decoration and furniture styles from antiquity to the present.

Credit 2

CHAD-227 **Business Aspects of**
Registration #0223-227 **Environmental Design**
This course will introduce students to the various occupations available to the environmental and interior designer, and instruct them in the use of their artistic and technical skills to obtain employment and establish themselves in the design community. Dealing with clients, vendors, and contractors will also be covered. Assignments will be structured to meet the personal business needs of each student.

Credit 2

CHAD-231 **Color Theory in Art**
Registration #0223-231
An opportunity to develop an awareness of and sensitivity to the world of color through slide lectures, class discussion and instructor's evaluation. Emphasis on the visual impact of color. (CHAD-201, 202, 203 or equivalent experience)

Credit 2

CHAD-235 **Commercial Interior Design**
Registration #0223-235
Students will learn to develop a good commercial interior plan given clear specifications and boundaries. Presentation techniques, client relations and fee philosophy will also be discussed with frequent field trips and guest speakers. (CHAD-224, 225 or equivalent)

Credit 2

CHAD-241, 242, 243 **Model Design**
Registration #0223-241, 242, 243
Study of the materials and techniques of model building. Working in scale, drawing, and construction. (CHAD-211, 212, 213)

Credit 2/Qtr.

CHAD-251, 252, 253 **Environmental Design**
Registration #0223-251, 252, 253
The study of enclosed space, using material and the elements of design, line, form, texture, and color to develop living space. (CHAF-201, 202, 203 and CHAD-201, 202, 203 or equivalent experience)

Credit 2/Qtr.

CHAD-261, 262, 263 **Lettering and Layout**
Registration #0223-261, 262, 263
Study of commercial layout procedures from rough layouts to comprehensives, type selection, copy fitting, pictorial indication and production procedures as related to contemporary practices.
Course emphasizes the design, structure, historical development and techniques of lettering. Procedes from rough letter indication to development of finished lettering, and application in commercial advertising problems. Typography and photo lettering methods will be studied in relationship to their use in commercial design. (CHAF-201, 202, 203 and CHAD-201, 202, 203)

Credit 2/Qtr.

CHAD-270 **Graphic Communication for**
Registration #0223-270 **the Non-Artist I**
Introduces basic skills in communication graphics, including: elements of design (line, shape, texture, color, space) and their application to two-dimensional projects; typography and commercial layout procedures (from rough layouts to comprehensives); and rendering techniques (marker sketching, shadowing, and perspective). Course is designed for people with little or no previous art training. Lecture/demonstration and studio format; student projects followed by critiques.

Credit 3

CHAD-271 **Graphic Communication for**
Registration #0223-271 **the Non-Artist II**
An exploration of current approaches to solving graphic design problems in the communications professions applying basic skills in design, lettering and layout, and rendering, with emphasis on the use and selection of art materials, photographs, and photographic/ electronic image-producing equipment; and an exploration of design in the advertising process, involving planning, creating, producing, and evaluating media. (Prerequisite: CHAD-270)

Credit 3

CHAD-301, 302 **Advertising**
Registration #0223-301, 302
Advertising is planned, created and placed by bright, inquisitive, hard working people in a fast paced, time-conscious business. They work within limits of budgets, marketing objectives, research, media, competitor's actions and a growing list of government regulations. This course examines the world of advertising and what is required to create advertising campaigns by tracing a campaign development step by step.

Credit 4/Qtr.

CHAD-331, 332, 333 **Fashion Graphics**
Registration #0223-331,332, 333
Drawing the fashion figure from live models and photographs, students will study proportions, anatomy, body movement, line variations, fashion details and accessory drawing. Work on preliminary editorial and store layouts for retail advertising. (CHAF-201, 202, 203; CHAD-201, 202, 203; CHAF-207 or equivalents)

Credit 2/Qtr.

CHAD-360 **Portfolio Workshop**
Registration #0223-360
A workshop designed to help students take what they have learned in art classes (or work situations) and prepare and present a saleable portfolio. Projects will be tailored to the needs of individual students allowing them to compile an accurate representation of their skills in most concise, positive and beneficial manner possible. Visits from prominent people in the field showing their work and sharing their experiences.

Credit 2

CHAD-411, 412, 413 **Art and Technology**
Registration #0223-411,412,413
An inter-media course in researching and comprising the possibilities of applying and coordinating technology to the arts involving transformation of an idea into visible form. (CHAF-201, 202, 203; CHAD-201, 202, 203)

Credit 2/Qtr.

CHAD-295 **Independent Study: Design**
Registration #0223-295
Independent studies may develop at the upper division level. Projects must be developed with instructor, subject to approval of the program chairperson or the Division of Business and the Arts. Credit may vary from one to five quarter-credits. For information on independent study contact the Division of Business and the Arts.

Credit Variable

Drawing

CHAF-201, 202, 203 **Basic Drawing and Media**
Registration #0224-201, 202, 203
An intensive study of the fundamentals of drawing and application of media, designed to develop a flexible, creative mind capable of interpreting ideas. Specific emphasis is placed on problems confronting the student who has had little or no drawing experience.

Credit 4, Lecture 3, Lab 1

Painting

CHAF-211 **Introduction to Painting**
Registration #0224-211
Study of the materials and techniques of painting through use of still-life and nature forms. Basic training and foundation for advanced work. (CHAF-201, 202, 203; CHAD-201, 202, 203 or equivalents)

Credit 2

CHAF-301 **Painting**
Registration #0224-301
Painting with opportunities for gifted and advanced students to explore media, seek new skills, develop a new style of expression. The instructor, an accomplished artist, works individually with the student. Models are available on a limited basis. Still-life and sketches will be used for inspiration. May be elected more than once for credit. (CHAF-211 or equivalent)

Credit 2

CHAF-227 **Figure Painting**
Registration #0224-227
Painting from costumed and nude models. The emphasis is placed on action, structure, gesture, composition, experimental attitudes and techniques. The student is provided with an opportunity to achieve clear understanding of various media in his or her individual search for expression. May be elected more than once for credit. (CHAF-317 or equivalent)

Credit 2

CHAF-337 **Portrait Painting**
Registration #0224-337
Particular attention is given to the development of anatomical understanding. Several media will be explained. Emphasis will be placed on understanding various aesthetic and craft traditions. Individual attention is supplemented by demonstrations and discussions with the instructor who is an active portrait artist in the community. May be elected more than once for credit. (CHAF-207 and CHAF-211 or equivalents)

Credit 2

CHAF-341 **Watercolor Painting**
Registration #0224-341
Basic study of watercolor media, methods, and techniques. Students receive individual, as well as group instruction with emphasis on composition, color, and personal expression. Media: watercolor, tempera, and casein. May be elected more than once for credit. (CHAF-201, 202, 203 or equivalents)

Credit 2

CHAF-207 **Basic Figure Drawing**
Registration #0224-207
Drawing from the costumed and nude model. The student makes a visual analysis of action, and gesture through quick sketches. Short poses gradually extend to longer studies so that the student can develop techniques, skills and the control of media. (CHAF-201,202, 203 or equivalent)

Credit 2

Sculpture

CHAF-247 **Sculpture**
Registration #0224-247
Study of basic theories of form and space utilizing sculptural processes and techniques. Solutions to problems, traditional and modern, are achieved through exercises using various materials such as clay, wood, plaster, plastic. Through discussion and practice, the student is introduced to the proper use of the sculptor's tool and methods. (CHAF-201, 202, 203; and CHAD-201, 202, 203 or equivalents)

Credit 2

CHAF-357 **Sculpture Workshop**
Registration #0224-357
An in-depth study of sculptural methods, techniques and materials (clay, wood, plaster, stone and welded metal). Students may concentrate in one material. May be elected more than once for credit. (CHAF-247)

Credit 2

Illustration

CHAF-361 **Illustration**
Registration #0224-361
Fundamentals of visualization and pictorial organization in terms of advertising and editorial illustration. Emphasis on contemporary graphics procedures. May be elected more than once for credit. (CHAF-207 or equivalent)

Credit 2

CHAF-362 **Airbrush Techniques**
Registration #0224-362
This course is designed to provide an opportunity for beginners to develop the basic skills and techniques of painting with an airbrush and allow experienced users to enhance their skills. Graphic artists, fine artist, illustrators, and photographers can benefit from this exposure to airbrush techniques and applications through demonstration and experiential learning. Class will be limited to 10 students. (0223-201, 202, 203, and 0224-201, 202, 203 or equivalent)

Credit 3

CHAF-263 **Calligraphy**
Registration #0224-263
Students will explore the history of the alphabet through slides, lectures, and projects. Italic handwriting with related variations and techniques will be taught.

Credit 2

CHAF-363 **Calligraphy Workshop**
Registration #0224-363
Further study in the methods and techniques of calligraphy. Students will be able to pursue study in a variety of styles and letter forms in a concentrated manner. May be elected more than once for credit. (CHAF-263 or equivalent)

Credit 2

Printmaking

CHAF-296 **Introduction to Printmaking**
Registration #0224-296
An introduction to the methods, materials, tools, and techniques of printmaking. Areas covered may include woodcut, etching, engraving, stencil, collographs, and lithography. Students are required to pull an edition of print in one area. Additional fee required for supplies. (CHAF-201,202,203, and CHAD-201,202,203 or equivalents)

Credit 2

CHAF-397 **Printmaking Workshop**
Registration #0224-397
Further study of methods and techniques of etching, lithography and relief printing. Students may concentrate in one print medium. May be elected more than once for credit. Additional fee required for supplies. (CHAF-296)

Credit 2

CHAF-293 **Creative Papermaking**
Registration #0224-293
Students will explore and trace the history of papermaking through ancient devices to modern techniques and trends. Lectures and readings will supplement and expand upon the lab work.

Credit 2

CHAF-295 **Independent Study: Fine Arts**
Registration #0224-295
Independent studies may be developed at the upper level. Projects must be developed with an instructor, subject to the approval of the program chairperson or Division of Business and the Arts. Credit may vary from one to five quarter-credits. For information on independent study contact the Division of Business and the Arts.

Credit Variable

CHAF-298 **Special Topics: Fine Arts**
Registration #0224-298
Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter.

Credit Variable

Metalcrafts and Jewelry

CHAM-201 **Introduction to Metalcrafts**
Registration #0225-201 **and Jewelry**
Emphasis will be placed on basic jewelry making techniques involving sawing, filing, soldering, hand and machine finishing techniques, simple stone setting and more. Design will be stressed throughout the course. May be elected more than once for credit.

Credit 2

CHAM-211 **Intermediate Metalcrafts and**
Registration #0225-211 **Jewelry**
Work of a more complex nature will be introduced. Some techniques included will be surface treatment of metal, more sophisticated stone setting, basic hollowware, casting and more.

Independent and creative statements will be emphasized in keeping with the student's technical and aesthetic development. May be elected more than once for credit. (6 credits CHAM-201 or presentation of portfolio)

Credit 2

CHAM-301 **Advanced Metalcrafts and**
Registration #0225-301 **Jewelry**
For advanced students in the arts or crafts interested in and capable of exploring a particular area. Content and method decided by conference between student and instructor and directed toward development of student's own creative ability. Advanced level academic credit is variable in proportion to class and outside assignments scheduled. May be elected more than once for credit. (Presentation of portfolio)

Credit 2

CHAM-295 **Independent Study:**
Registration #0225-295 **Metalcrafts/Jewelry**
Independent studies may be developed at the upper division level. Project must be developed with instructor, subject to approval of the program chairperson or the Division of Business and the Arts. Credit may vary from one to five quarter-credits. For information on independent studies contact the Division of Business and the Arts.

Credit Variable

CHAM-298 **Special Topics: Metalcrafts**
Registration #0225-298 **and Jewelry**
Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter.

Credit Variable

Weaving/Textiles

CHAT-201 **Introduction to Weaving**
Registration #0226-201
An introduction to the materials, processes and techniques of weaving. Emphasis on basic skills includes fiber analysis, yarn calculations, warping loom dressing, 4 harness loom techniques, finishing, designing, drafting and color effects. May be elected more than once for credit.

Credit 2

CHAT-211 **Intermediate Weaving**
Registration #0226-211
A continuation in the development of weaving techniques and design skills through advanced study of color effects, drafting, 4 harness and tapestry techniques. The course will include samples of a particular technique plus home assignments and a final project to satisfy individual needs. May be elected more than once for credit. (6 credits CHAT-201 or presentation of portfolio)

Credit 2

CHAT-301 **Advanced Weaving**
Registration #0226-301
For advanced students in the arts or crafts interested in and capable of exploring a particular area. Content and method decided before registration by conference between student and instructor and directed toward development of student's own creative ability. Advanced level academic credit is variable in proportion to the class and outside assignments schedules. May be elected more than once for credit. (Presentation of portfolio)

Credit 2

CHAT-295 **Independent Study:**
Registration #0226-295 **Weaving/Textiles**
Independent studies may be developed at the upper division level. Projects must be developed with the instructor, subject to the approval of the program chairperson. Credit may vary from one to five quarter-credits. For information on independent study contact the Division of Business and the Arts office.

Credit Variable

CHAT-298 **Special Topics:**
Registration #0226-298 **Weaving/Textiles**
Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter.

Credit Variable

Woodworking

CHAW-201 **Introduction to Woodworking**
Registration #0227-201
Elementary problems in choice of woods, joinery, finishing, use and care of hand tools, and basic procedures in machine woodworking. Suggested introductory project: Construct a dovetailed box from a hardwood with hand cut dovetails. May be elected more than once for credit.

Credit 2

CHAW-211 **Intermediate Woodworking**
Registration #0227-211
Students who have acquired the ability to use hand and powered tools will advance at their own pace on an individually challenging technique and project. The development of design skills and technical ability will be emphasized. May be elected more than once for credit.

Credit 4/Qtr.

CHAW-301 **Advanced Woodworking**
Registration #0227-301
For advanced students in the arts or crafts interested in and capable of exploring a particular area. Content and methods decided before registration by conference between student and instructor and directed toward development of student's own creative ability. Advanced level academic credit is variable in proportion to class and outside assignments scheduled. May be elected more than once for credit. (Presentation of portfolio)

Credit 2

CHAW-295 **Independent Study:**
Registration #0227-295 **Woodworking**
Independent studies may be developed at the upper division level. Projects must be developed with an instructor, subject to the approval of the program director. Credit may vary from one to five quarter-credits. For information on independent study contact the Division of Business and the Arts.

Credit Variable

CHAW-298 **Special Topics: Woodworking**
Registration #0227-298
Special topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter.

Credit Variable

International Studies

CHGI-211 **Chinese Language and**
Registration #0233-211 **Culture: China and the Chinese People**
This course will introduce basic Chinese culture as well as 100 daily conversational sentences. The emphasis in this quarter will be on Chinese culture characteristics, traditional philosophies and religions, beliefs, family structure, political life, economic system and trade practices, especially when these impact on contemporary practices.

Credit 4

CHGI-212 **Chinese Language and**
Registration #0233-212 **Culture: Chinese Communism: Ideology and Practice**
This course will introduce basic Chinese culture as well as 100 daily conversational sentences. This quarter's emphasis is on the special features of Chinese communism, their trade ideologies and practices, their general relationships with foreign countries, internal developments and conflicts.

Credit 4

CHGi-213 **Chinese Language and**
Registration #0233-213 **Culture: Contemporary Issues**
This course introduces Chinese culture as well as 100 daily conversational sentences. This quarter's emphasis is on the contemporary issues, their relations with the United States, their business practices. During the third quarter more time will be spent on language practice and students' independent work. It is more beneficial if students have had at least one of the two previous courses.

Credit 4

CHGI-221 **Japan: The Changing**
Registration #0233-221 **Tradition**
What are foundations of Japan's economic and technological success? This course considers the economy, government, and society of modern Japan and traces its emergence from the first contacts with the West in the 1500s to its present position as a leading economic power. To help Westerners understand the Japanese, Dr. Edwin O. Reischauer, scholar and former Ambassador to Japan, authored the text and aided in developing and producing this course. This course may serve as a behavior science elective.

Credit 4

Deaf Studies

CHGD-211 Sign Language & Manual
Registration #0234-211 Communications System I
This course is designed to develop fluency at a basic level. This course includes introduction and practice of approximately 300 basic signs, theoretical consideration and practice of grammatical features of sign language, fingerspelling and sociolinguistic information regarding the appropriate application of manual communication skills in communicating with deaf persons.

Credit 2

CHGD-212 Sign Language & Manual
Registration #0234-212 Communications System II
This course is a continuation of conversational signing skill development. The course includes 300 additional basic signs, continued practice with the grammatical features of sign language, fingerspelling practice, and further sociolinguistic information regarding the appropriate use of manual communication skills between deaf and hearing persons. (CHGD-211 (minimum grade of B) or equivalent sign skill)

Credit 2

CHGD-213 Sign Language & Manual
Registration #0234-213 Communications System III
The third in a series of basic conversational sign language courses. This course introduces the student to approximately 300 additional signs, continues the practice of the grammatical features of sign language, refines fingerspelling skills, and further develops students' sensitivity to the use of manual communication by deaf and hearing persons. (CHGD-212 (minimum grade of B) or equivalent sign skill)

Credit 2

CHGD-311 American Sign Language I
Registration #0234-311
This course is designed to continue sign language skill development as the language is used among deaf community members. Students are exposed to many new signed expressions; grammar, syntax and lexical items of A. S. L. Videotapes, dialogues, language games, lecture and readings are used in presentation of this content. (CHGD-213 (minimum grade of B) or equivalent sign skill)

Credit 2

CHGD-312 American Sign Language II
Registration #0234-312
The second in a series of American Sign Language courses. This course continues the study of grammar, syntax and lexical items of A. S. L. Culture aspects of the deaf community are considered as they relate to the language of deaf people. (CHGD-311 (minimum grade of B) or equivalent sign skill)

Credit 2

CHGD-241 Aspects & Issues of Deafness
Registration #0234-241 I
This course will develop knowledge and understanding of the effects of hearing impairment, particularly with regard to the audiological, psychological, educational and vocational implications. Class activities include a simulated deafness experience, films, lectures and discussions.

Credit 3

CHGD-242 Aspects & Issues of Deafness
Registration #0234-242 II
This course examines deafness from a cultural perspective, focusing on: what constitutes culture, what characterizes deaf culture, dynamics of interaction between the deaf and the larger community, and historical perspectives on deaf heritage. Films, individual case studies, cultural simulation, discussions and lecture will be implemented. (Recommended: CHGD-241)

Credit 3

Humanities

CHGH-201, 202, 203 Humanities
Registration #0235-201, 202, 203
These are three interdisciplinary courses in which literature, art, music, and philosophy are related to the historical, economic, and scientific forces that have shaped western civilization. 201 studies the culture of modern world; 202 deals with ancient Greece, Rome, and the Middle Ages; and 203 traces the development of the Humanities from the Renaissance through the Romantic age.

Credit 4/Qtr.

CHGH-210 Introduction to Art
Registration #0235-210 Appreciation
A study of the elements involved in the creation of the visual arts (painting, sculpture, architecture) and of the factors which affect an audience's response to them.

Credit 4

CHGH-220 Introduction to History
Registration #0235-220
This course will broadly survey the major periods of world history and will attempt to define what is unique and distinctive about the historian's approach to reality.

Credit 4

CHGH-230 Introduction to Music
Registration #0235-230 Appreciation
A study of the elements of music (such as rhythm, melody, harmony), of different musical styles, and of music in the context of history. Emphasized topics include major musical periods (Rococo, Baroque, Classical, Romantic and Modern). Major composers: Bach, Vivaldi, Handel, Mozart, Haydn, Beethoven, Brahms, Chopin, Tchaikovsky, Liszt, Dvorak, Stravinsky and Copeland.

Credit 4

CHGH-260 Introduction to Literature
Registration #0235-260
An introduction to the elements and distinctive qualities of five varieties of literary experience: Poetry, short fiction, film, the novel, and briefly, expository prose. Emphasized topics include form, theme, style, versification, and characterization. Although this course is not historically oriented, students will become familiar with materials from many periods in history.

Credit 4

CHGH-270 Introduction to Philosophy
Registration #0235-270
By introducing major philosophers and the issues that they have traditionally concerned themselves with, this course aims to acquaint students with the methods of philosophical questioning and argumentation.

Credit 4

CHGH-298 Special Topics: Humanities
Registration #0235-298
•Experimental lower-division courses will be offered under this number; titles will appear in each quarter's course listing.

Credit Variable

CHGH-323 Modern Europe
Registration #0235-323
An examination of the development of Europe from the Seventeenth Century to the present time, with emphasis on theories and concepts of civilization, culture, government, and international relations. Also emphasized: the Industrial Revolution, 19th Century Democracies, World Wars I and II, governmental experiments of the Twentieth Century, and the Post (WWII) War Period.

Credit 4

CHGH-325 **Modern America**
Registration #0235-326-01
Modern American History with particular attention given to the nation's emergence as a world power and to problems created at home by continued industrialization and urbanization. Also included: emergence of cities, civil rights, and emergence of women and other minorities in national politics.

Credit 4

Communications

Students who apply for Dynamic Communications I, CHGL-204, or Communications, CHGL-220 must take a pre-test to determine the course most appropriate for their communication needs. Only students who have credit for CHGL-204, or equivalent, may register for Dynamic Communications II, CHGL-205.

CHGL-120 **Basic Communication**
Registration #0236-120
This course provides an opportunity for students to improve their reading, writing, listening skills. For college-prep students or adults who want to upgrade their communication skills.

Credit 3 (Diploma)

CHGL-204 **Dynamic Communications I**
Registration #0236-204
The first of a two-course sequence, Dynamic Communications I focuses on writing skills. The achievement of clarity, logic, coherence, development of ideas, and effective use of language is emphasized. Basic research techniques and critical reading skills are also included. (Requires pre-test)

Credit 4

CHGL-205 **Dynamic Communications II**
Registration #0236-205
This course builds on the skills acquired in Dynamic Communications I. Emphasis will be on organizing and supporting ideas in papers of several paragraphs. The major exercise is the writing of an 8-10 page researched position paper and an oral defense of the paper's thesis. A study of critical reading techniques will teach students to evaluate the substance, logic, organization, and clarity of their own writing. (CHGL-204 or equivalent)

Credit 4

CHGL-206 **Vocabulary**
Registration #0236-206
This course will help you improve your vocabulary and its usage. Some aspects of language study which directly apply to vocabulary building will be examined: origins of words, historical development of their forms and meanings, their current usages, and use of dictionary and context to distinguish meanings.

Credit 1

CHGL-220 **Communications**
Registration #0236-220
This course consolidates the objectives and content of Dynamic Communications I, CHGL-204, and Dynamic Communications II, CHGL-205. (Requires pre-test)

Credit 4

CHGL-298 **Special Topics:**
Registration #0236-298 **Communications**
Special Topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter.

Credit Variable

CHGL-301 **Professional Presentations**
Registration #0236-301
This course focuses on the principles of preparing and delivering oral presentations. Students will deliver a variety of speech types representative of those commonly occurring in business, industrial, community, and social settings. Self, peer, and instructor critiquing will be used for evaluation of in-class, tape-recorded, and TV-monitored speeches.

Credit 3 Credit 5, Lec. 3, Lec./Lab 2

CHGL-302 **Discussion Skills and**
Registration #0236-302 **Leadership**
Students will study the theory of leadership in small groups and the dynamics of group behavior. The major exercises of the course are leading and participating as members in conferences which simulate those of civic, business, and industrial settings. Peer critiquing and TV tapings allow students to apply theory as they learn to recognize the elements of successful conferences.

Credit 4

CHGL-307 **Communicating in Business**
Registration #0236-307
This course focuses on the development of those communication skills essential to functioning effectively in the business world. Students will learn the process of analyzing communication situations and responding to them appropriately. Topics include reports, memos, letters, oral presentations, and interpersonal skills. (CHGL-204 and 205 or equivalent)

Credit 4

CHGL-308 **Technical Report Writing**
Registration #0236-308
Students learn to prepare reports of the sort required by practicing engineers and managers in industry and business. They will develop the ability to analyze audiences and purposes, state problems, design reports, and write and edit them. Assigned reports will be discussed and critiqued by peers and instructor. (CHGL-204, 205 or equivalent)

Credit 4

CHGL-323 **Technical Writing and Editing**
Registration #0236-323
This course focuses on the writing skills required for preparing technical documents. Adapting material and language for audience and purpose, and conventions of technical writing style are emphasized. Strategies for evaluating technical discourse are studied and applied. Prior to enrolling in this course, students must demonstrate command of standard written English prose.

Credit 4

CHGL-324 **Research Techniques**
Registration #0236-324
This course focuses on techniques for information generation. Interviewing skills, review and use of literature, and blueprint reading are included.

Credit 2

CHGL-325 **Instructional Design**
Registration #0236-325 **Principles**
An introduction to the process of designing instructional packages from need and task analysis through identifying goals and objectives, media selection, program development, and validation testing.

Credit 2

CHGL-326 **Document Design**
Registration #0236-326
An overview of the principles and techniques involved in document design. Includes basic principles of graphic design and visual communication, use of computer graphics, and introduction to typography and reproduction methods.

Credit 2

CHGL-327 **Practicum: Designing Manuals**
Registration #0236-327
With supervision, students will apply general principles of technical communication to the process of planning, researching, writing, editing, formatting, and producing a finished manual.

Credit 2

CHGL-327 **Practicum: Designing Manuals**
Registration #0236-327
With supervision, students will apply general principles of technical communication to the process of planning, researching, writing, editing, formatting, and producing a finished manual.

Credit 2

CHGL-328 **Writing in the Sciences**
Registration #0236-328
This course reviews current conventions used in presenting the results of scientific investigation in reports and journal articles. The elements of a scientific manuscript embodying technical content, organization, style, validity, and significance will be discussed and put into practice.

Credit 2

CHGL-329 **Oral Communication Skills**
Registration #0236-329
This course focuses on effective techniques for oral presentation of technical material, and participation, both as leader and member, in formal and informal meetings.

Credit 2

CHGL-330 **Communicating Online**
Registration #0236-330
Reviews recent research in online communication, presents principles for online writing and screen design, and examines systems for storage and retrieval of online information.

Credit 2

CHGL-331 **Promotional Writing**
Registration #0236-331
This course focuses on practical guidelines for preparing marketing materials including brochures, data sheets, trade press articles, press kits, and newsletters.

Credit 2

CHGL-332 **Managing the Project**
Registration #0236-332
Principles of project management are studied and applied in cases and examples taken from the fields of technical and marketing communication. Major topics include planning, organizing, scheduling, budgeting, controlling, monitoring, and reporting. Conflict resolution, team building, and motivation are also covered.

Credit 2

CHGL-333 **Audiovisual Presentations**
Registration #0236-333
This course introduces a variety of ways to visualize information for presentation to audiences. Students will learn how to match the media to the message and the audience, how to prepare simple materials quickly, and how to work with production units for more sophisticated visuals. From flip charts to video, visualizing information will be studied and practiced.

Credit 2

CHGL-298, 398 **Special Topics:**
Registration #0236-298 **Communications**
Special Topics are experimental courses announced quarterly. Watch for titles in the course listing each quarter.

Credit Variable

CHGL-360 **Introduction to Public**
Registration #0236-360 **Relations**
An overview of the public relations function, covering tasks, responsibilities and roles of the PR practitioner in organizations (as researcher, image-developer, designer, editor, coordinator, marketer and advertiser; as advisor to management) and (as spokesperson, media manager, and services purchaser and provider) with various publics and clients. Course may be counted as either a business or communication elective (consult advisor).

Credit 2

CHGL-365 **Writing for the Organization I**
Registration #0236-365
This course is designed for non-professional writers whose positions frequently require preparation of correspondence as well as copy for inbound and outbound company publications. Emphasis will be on developing clarity, precise use of language, and style in writing letters, reporting information, and creating feature articles. (Prerequisite: Comm 220 or equivalent)

Credit 2

CHGL-366 **Writing for the Organization II**
Registration #0236-366
Introduction to writing at the corporate level, including planning the annual report, handling crisis communication, covering meetings, adapting interviews for print, and preparing company statements for various media. Techniques for creating interest, presenting financial information, and quoting. Emphasis will be on producing clear, correct copy that is appropriate for purpose and audience. (Prerequisite: Comm 220 or equivalent; CHGL-365)

Credit 2

CHGL-367 **Scripting and Speechwriting**
Registration #0236-367
Introduces principles for two specialized forms of writing: speechwriting and scripting. Speechwriting covers techniques for preparing speech in the "voice" of another: adapting message, wording, and tone to speaker. Scripting covers story boarding, using basic script formats, and enhancing the message, where appropriate, with dimensions of characterization, sound, and color. (Prerequisite: Comm 220 or equivalent)

Credit 4

Behavioral Studies

CHGS-201 **Anthropology-Introduction**
Registration #0237-201
Anthropology studies the similarities and differences between cultures. This course will explore the influences of environment, technology, work, authority, kin and non-kin groups, enculturation, religion, folklore and art in different societies. It will stress the value of cross-cultural comparisons in understanding American culture and society.

Credit 4

CHGS-211 **Psychology-Introduction**
Registration #0237-211
Psychologists study a broad range of topics to discover more about how people think, feel, and interact with others. In this survey course students learn how scientific methodology has been used to discover some of the causes and factors involved in sensation, perception, motivation, emotion, stress, learning, development, personality, psychological disorders, and social behavior. Students are encouraged to apply this information to their daily lives.

Credit 4

CHGS-221 **Principles of Economics I**
Registration #0237-221
This course covers the basic principles of macro-economics. It traces the development of economics from an historical perspective, the functioning of the American economic system, and covers such topics as money and banking, economic growth and problems of inflation, unemployment, scarcity of resources, business cycles, international trade, and supply and demand.

Credit 4

CHGS-222 **Principles of Economics II**
Registration #0237-222
This course covers micro-economic problems such as distribution of income, allocation of resources, price determination under competition, monopolies, supply and demand, and their applications to business firms and labor unions. It also deals with the structure of American industry and the roles played by government, business, and individuals viewed in the light of current economic trends.

Credit 4, Lecture 3, Lab 1

CHGS-231 Sociology: Introduction
Registration #0237-231
Sociology deals, in a scientific way, with human beings and their relationships with one another. Consideration is given to the role of the individual in society, social interaction, social institutions and social change. Objectives are to examine the human condition in the context of social relationships, dispel myths and prejudices, and ascertain practical applications of concepts in sociology.

Credit 4

CHGS-261 Political Science: Introduction
Registration #0237-261
This course introduces the discipline of political science. It is designed to acquaint students with the complexities of political issues, political thought and behavior, government structures and processes, public policy, and international affairs.

Credit 4

CHGS-316 Psychology: Behavior in
Registration #0237-316 Industry
Industry presents one environment for understanding human behavior. This course applies psychological and social concepts to the industrial setting. Topics to be covered are motivation, performance, assessment, quality of work life, group behavior, leadership, organizational structure, communication and decision making. (CHGS-211)

Credit 4

CHGS-317 Psychology of Stress &
Registration #0237-317 Adjustment
Physiological, psychological, and social stress can have serious consequences on one's daily life. This course is designed to familiarize students with the basic concepts of stress, the positive and negative ramifications of stress, and examine strategies for managing stress. (CHGS-211 or equivalent)

Credit 4

CHGS-320 Psychology of Persuasion
Registration #0237-320
This course examines important research on persuasive communication, covering: What causes people to respond to persuasive communication in different ways? How can the communicator predict group responses to a given persuasive message? Projects will require students to use theory in designing effective strategies for various purposes and audiences.

Credit 2

Photography

Students enrolled in photographic courses have the studios and laboratories available to them only for the scheduled class times. On a space available basis additional time may be secured, but not to exceed the equivalent of one regularly scheduled lab or studio period per week. Work done in the studios or laboratories must be for the specific purpose of meeting course objectives.

CHGP-021 Introduction to Photography
Registration #0231-021
For the novice photographer who would like to learn how to produce aesthetically and technically acceptable photographs. Topics include cameras, lenses, films, developing, printing, enlarging, filters, flash photography and print finishing. The emphasis is on successful solution of practical photographic problems.

Credit none

CHGP-101 Photography Workshop
Registration #0231-101
A flexible course in the application of photography to create expression. Emphasis is on self-criticism and the development of the individual's ability to create meaningful and purposeful photographs. Class time devoted to developing and enlarging, as well as group and individual critique sessions. All shooting assignments are completed outside of class.

Credit 2

CHGP-102 Photography Workshop
Registration #0231-102
Continuation of CHGP-101. Students are encouraged to develop in areas of specific interest to them. Excellence in the creative as well as the technical aspects of photography, printing and presentation is stressed. Students should bring examples of past work to first class. This course may be elected more than once for credit.

Credit 2

CHGP-104 Color Photography Workshop
Registration #0231-104
The course will acquaint students with skills in color materials handling, from exposure to color printing. Aesthetic and communicative aspects of color photography will be stressed. Small format equipment with color negative and reversal materials will be used. Students should bring examples of the past work to first class. May be elected more than once for credit. (CHGP-102 or equivalent)

Credit 2

CHGP-201, 202, 203 Basic Professional
Registration #0231-201,202,203 Photography
An introductory course to photographic principles and practice designed primarily for the inexperienced who aspire to enter photography as a profession, who would find such knowledge' useful in a related field or who wish to improve personal knowledge. Both theory and practice are provided in a wide range of picture taking and darkroom techniques. Some background in photography is desirable but not absolutely necessary. This course is a prerequisite to all other courses in the professional photography program.

Credit 4/Qtr.

CHGP-211, 212, 213 Color Photography
Registration #0231-211,212, 213
Color theory and applied problems in color photography, processing and printing. Negative and reversal processing, color balance and correction, internegatives, duplication techniques, elements of masking and optimum reproduction methods. (CHGP-201, 202, 203 or equivalent)

Credit 4/Qtr.

CHGP-221, 222, 223 Illustrative Photography
Registration #0231-221, 222, 223
The application of various specialized photographic techniques to creative image making. Special emphasis on single source studio lighting techniques to achieve desired visual effects. Novel and innovative camera methods and photographic design concepts are stressed. Particular emphasis on advertising photography applications and on the essence of the subject. Topics will include still life, food and consumable products, fashion assignments and some location photography. The principle camera format used will be 4x5. Equipment is available at the studios for use during class hours. Some small format photography will also be required. (CHGP-201, 202, 203 or equivalent)

Credit 3/Qtr.

CHGP-231, 232, 233 Portrait Photography
Registration #0231-231, 232,233
A foundation course in portraiture, including concepts and psychology of portraiture and the use of professional cameras and studio equipment through lectures, demonstrations, and assigned projects. Stress is placed on understanding facial types and on the appropriate use of light. It is recommended that students who enroll in this course also schedule Portrait Retouching CHGP-331, 332, 333. (CHGP-201, 202, 203 or equivalent)

Credit 3/Qtr.

CHGP-241, 242, 243 Commercial Photography
Registration #0231-241, 242, 243
Materials, equipment and techniques with emphasis on the solution of problems in commercial photography. It is recommended that students who enroll in this course also schedule Commerical Retouching, CHGP-321, 323. (CHGP-201, 202, 203 or equivalent)

Credit 4, Lecture 3, Lab 1

CHGP-366 **Dye Transfer Printing**
Registration #0231-366
The dye transfer color printing process is covered in its theory and through practical laboratory assignments. Mordant, dye acidity and contrast, color balance controls, dyeing, image transfer and registration. (CHGP-211, 212, 213 or equivalent)

Credit 3

CHGP-401, 402, 403 **Fashion Photography**
Registration #0231-401,402,403
A course designed to expand the photographer's vision and awareness to the problems of fashion photography. Emphasis on sensitivity to light, the beauty of the model, and most important, on the development of the student's personal taste in expressing the inherent qualities of the garment. Students should bring to first class examples of past work, whether it be fashion photography or not. (CHGP-201, 202, 203 or equivalent)

Credit 3/Qtr.

CHGP-404, 405, 406 **Architectural Photography**
Registration #0231-404,405,406
Photographic interpretation and effective visual presentation of buildings, both as structures for habitation as well as art forms in themselves. Use and application of view camera included. Effective use of small format equipment. Assignments to be completed outside of class time include exteriors, interiors, landscapes, details and individual as well as group buildings. Students must make arrangements for printing outside of class.

Credit 3/Qtr.

CHGP-411 **Photography of the Natural**
Registration #0231-411 **World**
Through lectures, field trips, class discussion, and critiques, the student is offered an opportunity to develop an awareness and sensitivity to the beauty of the natural world. There are a number of field trips scheduled to areas such as Letchworth Park, Bergen Swamp, Sapsucker Woods and other appropriate locations. Transparency materials are exclusively in the 35mm format. The student is expected to have his or her own camera, light meter and some type of close-up accessory. May be elected twice for credit. (CHGP-201, 202, 203 or equivalent)

Credit 4

CHGP-431, 432, 433 **Photographic Communication**
Registration #0231-431, 432,433
Photography for people in action situations. The decisive moment and "candid" pictures. Picture stories and sequences. Effective use of available light. Historical perspectives. Use of writing and captions in conjunction with photographic images. Shooting and printing portion of the assignments to be completed outside of class time.

Credit 2/Qtr.

CHGP-295, 298 **Photographic Vision I and II**
Registration #0231-295, 298
The Photographic Vision is a video-based two course sequence all about photography, presented in a medium that enhances the power of the photograph. The course covers the basic mechanical skills of camera handling, the nomenclature of the tools and materials, the history of photography, and the technical, artistic and commercial dimensions of this craft. Photography is approached as an art form and as unique means of human communication as well as a technical skill. Students desiring darkroom experience should also register for a Photography Workshop: CHGP-101 or 102. Completion of CHGP-295 and 298, CHGP-101,102 along with four credits of Photography electives, will satisfy the requirements of Basic Professional Photography: CHGP-201, 202 and 203.

Credit 3/Qtr.

Photographic Science

CHGR-207, 208, 209 **Fundamentals of**
Registration #0238-207, 208, 209 **Photographic Science**
Principles of sensitometry, photographic chemistry and applied photography. Subject areas include densitometers, sensitometers, logarithms, characteristic curves and photographic response relationships. General emulsion and photographic processing chemistry formulations, time-temperature relationship, chemical balance and process control. The view camera and its use, perspective, depth of field, lighting and proper metering techniques, filters, flash and photography as a pictorial and a scientific instrument. (A background in algebra and trigonometry is suggested)

Credit 4/Qtr.

CHGR-217, 218, 219 (Lec.) **Photographic Chemistry**
CHGR-224, 225, 226 (Lab)
Registration #0238-217, 218, 219, 224, 225, 226
This course will provide the student with an understanding of the chemical basis of photography necessary to the continued study of photographic science, and to provide a systematic study of the manufacture and properties of silver halide photographic emulsions and processing solutions.

Specific topics will be: formation and growth of silver halide crystals; chemical and spectral sensitization; addenda and coating; latent image theory and application of conventional and diffusion transfer processing; comparisons and silver halide and non-silver photographic systems.

The course will assume only an introductory knowledge of chemistry. Yet science or engineering graduates entering photographic research or involved in other areas of photographic technology will find in the course a basis for their work and for further study. The lecture may be taken by itself. (CHGR-201, 202 and 203 and CHGR-207, 208 or equivalent)

Credit 4/Qtr., Lec. 3, Lab 1

CHGR-227, 228, 229 **Black and White Sensitometry**
Registration #0238-227, 228, 229
The relation of photographic density to exposure in a light-sensitive silver halide emulsion, including radiation source, exposure measuring devices, sensitometers, chemical development and processing, D-Log curves, densitometers, tone reproduction, and the necessary latent image theory. (CHGP-207, 208, 209 and CTAM-210 or equivalent)

Credit 4/Qtr.

CHGR-237, 238 **Radlometry**
Registration #0238-237, 238
You will become acquainted with the human visual process, light sources, attenuators, receivers and the physical parameters involved in the generation, propagation, composition and measurement of radiant energy particularly as it relates to photographic materials and fundamental optical systems.

A background in algebra and trigonometry is recommended. (CHGP-207 and CTAM-210 or equivalent)

Credit 3/Qtr.

CHGR-307 **Quality Control of**
Registration #0238-307 **Photographic Solutions**
Principles of photographic processing solutions, their chemical and sensitometric analysis, the application of statistics and the design of photographic processing machines for precision photographic processing. Identification of processing errors, processing for permanence, modification and restoration of photographic images.

Content purpose and criticality of control of the chemical components in Black and White and Color processing solutions. Current procedures and instrumentation for the analysis and control of processing solutions. Testing for the identification of processing errors. Design of replenishment formulas. Principles of machine design construction materials and processing solution compatibility. Specific examples of use in present day machines. (CHGR-217,218,219 or equivalent)

Credit 3 Credit 5, Lec. 3, Lec./Lab 2

CHGR-407, 408, 409 Optics
Registration #0238-407,408, 409
Introduction to geometrical and physical opticals applied to photographic systems and optical instruments. (CTAM-251, 252 or equivalents)

Credit 3/Qtr.

CHGR-414, 415, 416 Color Sensitometry
Registration #0238-414,415,416
Photometric measurements, color specification, spectrophotometry, visual and printing densities, integral and analytical color densitometry, color reproduction, dye deficiencies and masking. (CHGR-227, 228, 229 and CTAM-251, 252, 253 or equivalents. Computer programming background also required)

Credit 3 (CHGR-414, 415), Credit 4 (CHGR-416)

CHGR-417, 418, 419 Image Evaluation
Registration #0238-417,418, 419
The course objective is to develop fundamental and rigorous understanding of the problems of evaluating photo-opticals systems. Both the subjective and the objective methods of analysis are discussed in considerable detail.

The main topics are: point-and-line-spread function of photo-optical systems; derivation of the line-spread function of photographic emulsions; one-dimension image formation and convolution integrals; Fourier analysis and Fourier transforms; auto-correlation and its applications; modulation transfer function of photo-optical systems (MTF). (CHGR-407, 408, 409 and CTAM-305, 328 or equivalent. Computer programming background also required)

Credit 3/Qtr.

CHGR-421 Mathematical Methods in
Registration #0238-421 Photographic Science
A survey of various mathematical techniques useful in devising or modeling photographic systems. Each method is applied to numerous problems and examples from photographic science after development of the pertinent mathematics. Topics selected from: linear spaces, transformations, dimensional analysis, information theory, system analysis, distributory theory, stochastic processes. (CTAM-251, 252, 253 or equivalents)

Credit 4

CHGR-520 Xerography and
Registration #0238-520 Electrographics
The objectives of this course, which is directed towards working engineers, scientists and experienced technicians, are to provide a comprehensive program devoted to the scientific background and practical applications of electro-photography, to emphasize the relationship of silver photography to electrostatic imaging, and to provide practical experience in xerographic image formation and reproduction.

Topics which will be covered in lectures, demonstrations, and laboratories include: electrical imaging and electrostatic principles; photoconductivity; the electrical latent image; dry and wet development; image transfer and fusing; and novel technical approaches.

The prerequisites assume a background in general physics (especially electricity) and college mathematics or equivalent experience.

Fundamental principles of selected subjects will be received.

Credit 3

CHGR-527 Theory of the Photographic
Registration #0238-527 Process
An advanced course in photographic theory covering the underlying principles and mechanisms of the photographic process. Latent image formation, photographic sensitivity, emulsions, and development processes will be discussed in terms of the basic principles of solid state physics. The concepts of band structure, trapping levels, lattice defects, surface space charge layers, and interface electrochemistry will be described and employed. (CHGR-217, 218, 219 and 224, 225, 226 or equivalent)

Credit 4

CHGR-528 Theory of the Color Process
Registration #0238-528
The measurements of color photography, colorimetry, tone and color reproduction, spectrophotometry, and masking theory are treated in a common mathematical notation. (CHGR-217, 218, 219 and 224, 225, 226 and CHGR-414, 415, 416 or equivalent)

Credit 4

CHGR-529 Non-Silver Imaging Systems
Registration #0238-529
The purpose of the course is to examine the more promising non-silver and unconventional silver halide systems in view of the future requirements in cost, sensitivity, image quality, color rendition, ecology (to compare them to present silver imaging systems), and to consider the reasons for the commercial failure and future prospects of other systems.

The course will emphasize the principles and methods of physics and chemistry which have been developed into non-silver photographic systems, rather than the extensive empiricism which has been characteristic of this field. The student will gain an understanding of the principle non-silver systems and today's research and product trends. Topics include: latent-image theoiy; exposure effects: mechanism of development and spectral sensitization; sensitometry; and image evaluation. (CHGR-527 or equivalent)

Credit 4

CHGR-557, 558, 559 Independent Research
Registration #0238-557,558, 559
Individual project involving research in an applied professional or scientific photographic subject carried out under the guidance of a professor. (Permission of chairperson, photography)

Credit 3/Qtr.

Printing

CHGT-101,102, 103 Process Camerawork
Registration #0239-101,102,103
Fundamentals of photography and photomechanical principles and techniques for black and white reproduction. Emphasis on line and halftone photography. Designed for the individual who wants to do process camerawork or who wants to become more proficient in this area.

Credit 2/Qtr.

CHGT-111, 112, 113 Color Separation
Registration #0239-111,112,113 Camerawork
Fundamentals of light and color as applied to masking and color separation in offset lithography. Densitometric control of the photographic operations is emphasized; various masking methods are surveyed. Laboratory projects supplement lecture material. (CHGT-101, 102, 103 or equivalent)

Credit 2/Qtr.

CHGT-121, 122, 123 Offset Layout and Stripping
Registration #0239-121,122,123
Examination and treatment of negative and positive films to remove defects; study and application of various methods of assembling film negatives or positives into flats in preparation for platemaking; study of proofing systems and types of impositions.

Credit 2/Qtr.

CHGT-131, 132 Offset Platemaking
Registration #0239-131, 132
A comprehensive course covering all aspects of offset platemaking. Includes all imaging methods for lithographic plates, such as the various forms of presensitized, wipe-on, photopolymer, deep-tech, bi- and tri-metal plates, as well as transfer and direct camera plate systems; basic step and repeat layout and procedures on two machines also are studied.

Credit 4/Qtr.

CHGT-141, 142, 143 Offset Presswork
Registration #0239-141,142,143
A study of the fundamentals of lithographic presswork. Emphasis is placed on principles, procedures, equipment and the relationship of materials.

Credit 2/Qtr.

CHGT-151, 152, 153 Color Stripping
Registration #0239-151,152,153
An advanced study of image assembly to include 4 color process stripping; pin register systems; proofing systems; contacting procedures. Students should have taken prerequisite course of offset layout and stripping. (CHGT-121,122,123 or equivalent experience)

Credit 2/Qtr.

CHGT-201, 202, 203 Introduction to Printing
Registration #0239-201,202,203
Survey of the various phases of production employed in major printing processes, encompassing the major steps from design to finished printed product.

Credit 2/Qtr.

CHGT-207 Printing Design and Layout
Registration #0239-207
Fundamentals of layout and design as applied to commercial printing and advertising, including how to design with type, specify type and illustrations, and produce layouts from thumbnail sketches to a completed comprehensive design. Emphasis on technical and printing problems.

Credit 3

CHGT-211 Phototypesetting Procedures
Registration #0239-211
Study and analysis of phototypesetting procedures, emphasizing techniques of phototypography through the medium of contemporary laboratory facilities. One field trip.

Credit 2

CHGT-215 Bookbinding
Registration #0239-215
This course is intended to give the student an introduction to the skills of hand bookbinding. The purpose is to experience bookbinding as an art form. Content will cover history, materials, methods of bookbinding and restoration. Students should bring two books of their own for rebinding.

Credit 2

CHGT-219 Estimating
Registration #0239-219
A basic course in planning production, cost of materials, hour costs, hour rates, estimating time and time standards.

Credit 4

CHGT-227 Copy Preparation
Registration #0239-227
Copy preparation for reproduction; working from layouts; arrangement and handlings for paste-up, separation mechanicals, and photographic copy; requirements of reproduction proofs; writing complete specifications for stripping and camera.

Credit 3

CHGT-231, 232 Printing Plates
Registration #0239-231, 232
Theory and practice of platemaking for lithographic, letter press and flexographic printing plus theory of gravure cylinder making.

Credit 2/Qtr.

CHGT-237 Technology of Typesetting
Registration #0239-237
An introduction to machine typesetting including hot metal, tape and phototypesetting.

Credit 2

CHGT-241 Typography
Registration #0239-241
The typographical factors important to all phases of printing design from simple commercial work to books. Special attention is given to the logical selection of types, and their fitness for a variety of jobs.

Credit 2

CHGT-251, 252 Paper and Printing
Registration #0239-251, 252
A survey of kinds of paper and papermaking emphasizing the graphic arts processes and their relation to varieties of paper; instruction in utilizing paper characteristic for printing advantage. Attention given to the economics of paper buying, the problems of the pressroom, and the paper revolution.

Credit 2

CHGT-301, 302, 303 Reproduction Camerawork
Registration #0239-301,302, 303
The photographic process as it relates to the printing of black and white and color reproductions. Emphasis on basic photography; line and half-tone photography; tone reproduction; and color separation photography. The theoretical approach is stressed; however, students will be involved in various photographic activities.

Credit 2/Qtr.

CHGT-314 Flexography
Registration #0239-314
A study of the theory and practice of flexographic printing, uses and development of flexography, plate and ink requirements, press principles and operation, experiments in printing on a wide variety of surfaces.

Credit 2

CHGT-317, 318 Computer Applications in
Registration #0239-317, 318 Printing
A basic course covering computers and how they are used in graphic arts applications. Characteristics and types of computers used are discussed as well as introduction to programming concepts.

Credit 2/Qtr.

CHGT-341 Printing Processes
Registration #0239-341 Introduction to Offset Press
A basic introduction to offset presses. Covering: lithographic theory, the applications of lithography, capabilities and limitations of process and basic press design and function. The material will be presented in the form of lectures and demonstrations. (CHGT-203)

Credit 2

CHGT-407 Ink and Color
Registration #0239-407
This course is designed to meet the needs of both management and production printing students. A two-hour lecture course on all facets of ink manufacturing and color matching; lab project participation by the student is strictly voluntary. Emphasis on technical and printing problems with offset (wet/dry) and letterpress inks.

Credit 2

CHGT-421 Imposition and Finishing
Registration #0239-421
Course is designed to understand imposition planning as related to and governed by folding and other finishing operations. Content deals with the concepts of pre-press planning, binding and finishing. Included are topics on preparing layouts, forms and folded paper material for binding. Laboratory experiments include operation of modern bindery equipment and the binding of a hardcover book.

Credit 2

CHGT-301, 302, 303 Reproduction Camerawork
Registration #0239-301, 302,303
The photographic process as it relates to the printing of black and white and color reproductions. Emphasis on basic photography; line and half-tone photography; tone reproduction; and color separation photography. The theoretical approach is stressed; however, students will be involved in various photographic activities.

Credit 2/Qtr.

CHGT-314 **Flexography**
Registration #0239-314
A study of the theory and practice of flexographic printing, uses and development of flexography, plate and ink requirements, press principles and operation, experiments in printing on a wide variety of surfaces.

Credit 2

CHGT-317, 318 **Computer Applications in**
Registration #0239-317, 318 **Printing**
A basic course covering computers and how they are used in graphic arts applications. Characteristics and types of computers used are discussed as well as introduction to programming concepts.

Credit 2/Qtr.

CHGT-341 **Printing Processes**
Registration #0239-341 **Introduction to Offset Press**
A basic introduction to offset presses. Covering: lithographic theory, the applications of lithography, capabilities and limitations of process and basic press design and function. The material will be presented in the form of lectures and demonstrations. (CHGT-203)

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Credit 2

Science and Technology

Mathematics

Entering students who apply for any of the beginning mathematics courses. CTAM-201, 210 or 251, are required to take a diagnostic examination to determine the level at which they may start the mathematics sequence. Students who have had previous college level mathematics courses should consult with an advisor.

CTAM-101, 102, 103 **Mathematics**
Registration #0240-101,102,103
A three-quarter sequence for students whose high-school mathematics background is insufficient to allow them to enroll in degree-level mathematics course. This is an accelerated intermediate high school algebra course with an introduction to trigonometry.

Credit 3/Qtr.

CTAM-201, 202 **Technical Mathematics**
Registration #0240-201, 202
A two-quarter sequence to meet the needs of students enrolled in AAS degree programs. This is an introduction to college algebra and trigonometry covering basic algebraic concepts and operations, algebraic and transcendental (trigonometric, logarithmic, and exponential) functions. (CTAM-103 or equivalent)

Credit 4/Qtr.

CTAM-203 **Technical Calculus**
Registration #0240-203
An elementary applied calculus course for students in the AAS program. This course covers the basic differential and integral calculus of algebraic and transcendental function with applications. (CTAM-202 or equivalent)

Credit 4

CTAM-205 **Mathematical Thought &**
Registration #0240-205 **Processes**
An examination of mathematical thought and processes through a study of elementary mathematical concepts. This course is designed to acquaint the student with the "mathematical way of thinking," the development of mathematical formulas, the applications of mathematics in today's society on an elementary level.

Credit 4

CTAM-206 **Modern Mathematical**
Registration #0240-206 **Methods**
An examination of selected modern mathematical methods used in today's society. This examination includes a study of the nature of these methods, a study of how these methods are used, and a study of the usefulness of these methods in today's society.

Credit 4

CTAM-210 **College Algebra and**
Registration #0240-210 **Trigonometry**
A precalculus course covering a study of algebraic and transcendental (trigonometric, logarithmic, and exponential) functions including graphs and equations. (Three years of high school mathematics or equivalent including intermediate algebra)

Credit 4

Calculus for Technologists (See CTEM-420, 421.)

CTAM-251, 252, 253 **Calculus**
Registration #0240-251,252, 253
A three quarter sequence covering the differential and integral calculus of single variables.

CTAM-251
Topics include limits, derivatives of algebraic and trigonometric functions; continuity; differentials; related rates; curve sketching; maxima and minima problems; indeterminate forms. (CTAM-210 or equivalent)

Credit 4/Qtr.

CTAM-252
Topics include the indefinite integral; the definite integral; applications; differentiation and integration of transcendental functions. (CTAM-251 or equivalent)

Credit 4

CTAM-253
Topics include methods of integration; plane analytic geometry; polar coordinates; vector algebra with emphasis on applications; sequences and series. (CTAM-252 or equivalent)

Credit 4

CTAM-265 **Discrete Mathematics I**
Registration #0240-265
An introduction to discrete mathematics with applications in computer science and mathematics, with an emphasis on proof techniques. It covers the basics of combinatorics, sets, functions, the natural numbers, and the integers modulon.

Credit 4

CTAM-266 **Discrete Mathematics II**
Registration #0240-266
A continuation of discrete mathematics with applications in computer science and operations research. It covers finite state machines, relations, graphs, trees, optimization and matching. (CTAM-265)

Credit 4

ADDENDUM
Page A3 (courses following CTAM-266)

CTAM-305 **Calculus**
Registration 10240-305
Partial differentiation; multiple integrals; solid analytic geometry; vector calculus with emphasis on applications to science and engineering.
(CTAM-253 or equivalent)

Credit 4

CTAM-306 **Differential Equations**
Registration >0240-306
Ordinary differential equations through nth order with emphasis on first and second order linear. Applications, LaPlace Transforms.
(CTAM-305 or equivalent)

Credit 4

CTAM-318 **Boundary Value Problems**
Registration 10240-318
A continuation of CTAM-306, Differential Equations. Topics covered are Fourier Series, and introduction to partial differential equations; series solutions of differential equations; applications of the material covered.
(CTAM-306 or equivalent)

Credit 4

CTAM-328 **Engineering Mathematics**
Registration #0240-328
An introduction to matrix algebra and vector analysis. Topics covered are matrix operations with application; vector algebra, vector calculus, gradient, divergence and curl; linear and surface integrals; independence of path and the divergence theorem; applications.
(CTAM-305 or equivalent)

Credit 4

CTAM-341-342 **Engineering Statistics**
Registration >0240-341,342
Designed to provide the student with a working understanding of the basic statistical strategies useful in the analysis and interpretation of data generated by problems of variation in the physical and applied sciences, and as such is a study of the concepts and techniques of mathematical probability and statistics and its role as the central core of all statistical strategies.
(CTAM-305 or equivalent)

Credit 4/Qtr.

CTAM-407 **Linear Algebra**
Registration >0240-407
Topics covered in this course are: vector spaces; systems of linear equations; linear transformations and matrices; determinants; characteristic roots and vectors; similarity of matrices and quadratic forms; applications of the above.
(CTAM-252 or equivalent)

Credit 4

CTAM-417 **Numerical Analysis**
Registration #0240-417
This course covers linear difference equations; numerical methods for solving equations; interpolation, iteration, and approximating procedures; error analysis or related methods; empirical formulas; and problems involving computer applications. Where applicable, the computer will be used in solving problems. (FORTRAN or BASIC Programming and CTAM-306 or equivalents)

Credit 4

CTAM-420 **Complex Variables**
Registration #0240-420
A study of the calculus of complex functions. Cauchy Theory leading to residue theory and conformal mapping. (CTAM-305 or equivalent)

Credit 4

Electrical (Applied Science)

CTBE-401, 402, 403 (Lec.) **Circuit Analysis**
CTBE-406, 407, 408 (Lab)
Registration #0241-401, 402, 403, 406, 407, 408
Circuit parameters, Ohm's Law, Kirchhoff's Laws, combination of elements, voltage and current division, mesh and nodal analysis, linearity and superposition. Thevenin's and Norton's theorems, dependent sources, transient analysis, sinusoidal steady-state analysis, polyphrase circuits, complex frequency, pole-zero diagrams, resonance, magnetically coupled circuits, two-port theory. Fourier series analysis of circuits. LaPlace transform techniques of circuit solution. (CTCP-303 and CTAM-305 or concurrent with CTAM-306)

Credit 4, Lec. 3, Lab 1

CTBE-411, 412, 413 **Electric and Magnetic Fields**
Registration #0241-411,412,413
Electric and magnetic field application in dielectrics and magnetic core component. Wave propagation and the formulation of dynamic field equations and their specific application to radiation problems, waveguides, antennas, shielding, and transmission lines. (CTAM-328 and CTBM-342 or equivalent)

Credit 4/Qtr.

CTBE-421, 422, 423 **Electronics**
Registration #0241-421,422,423
An integrated treatment of basic electronic devices and their circuits with emphasis on active circuits and their analysis; biasing, stability, and frequency response consideration, feedback amplifiers and nonlinear circuits. (CTBE-403 and 408 or equivalent)

Credit 4/Qtr.

CTBE-431, 432 **Electronics (Advanced)**
Registration #0241-431, 432
An in depth study of stability, feedback, temperature and noise effects as applied to operational amplifiers. Application of integrated circuit operational amplifiers as RC filters and in linear and nonlinear modes. (CTBE-423 or equivalent)

Credit 4/Qtr.

CTBE-433 **Electronics**
Registration #0241-433 **(Communications)**
Introduction to systems for transmitting information at high frequencies: AM, FM, PM. Digital and sampled data systems including basic information theory and noise. Emphasis is on basic understanding utilizing analysis as a tool to demonstrate application and to further understanding. Topics to include propagation, RF amplification, modulation and detection, basic antenna and transmission line principles, D-A and A-D conversion, signal-to-noise ratio, band-width, sampling theory, and noise sources with their effects on information transmission. (CTBE-412 and CTBE-423 or equivalent)

Credit 4

CTBE-434 **Digital Logic Design**
Registration #0241-434
Concepts of Boolean algebra and related switching circuit theory, analysis and synthesis of AND/OR, NAND/NOR logic. Use of Darnaugh map techniques for combinational logic. Simplification, analysis, and synthesis of sequential circuits, using transition and state tables, number systems and codes. TTL, ECL, HTL, digital MOS device characteristics. (CTBE-423 or equivalent)

Credit 4

CTBE-461, 462, 463 **Electrical Engineering**
Registration #0241-461,462,463 **Principles**
A course for non-electrical majors. Electric and magnetic circuits, electrical measurements, electronic devices, transformers, power systems, machines, and control circuits. (CTAM-305 and CTCP-303 or equivalent)

Credit 4/Qtr.

CTBE-S01 **Electromagnetic Energy**
Registration #0241-501 **Conversion**
Theoretical development of magnetic circuit principles as applied to electromechanical energy conversion with emphasis on electromagnetic field and mechanical energies. Electromagnetic devices are discussed with emphasis on the magnetic circuit point of view under steady-state operation conditions. (CTAM-306 and CTBE-412 or equivalent)

Credit 4

CTBE-511, 512 **Control Systems**
Registration #0241-511, 512
Control systems are analyzed with emphasis on open and closed loop operation. System parameters are discussed including block diagrams, transfer functions, and stability. Nyquist criteria and Bode plots are presented to predict and analyze the operation and design of control systems. (CTBE-501 and CTBE-403 and 408, CTBE-511, or equivalent)

Credit 4/Qtr.

Mechanical (Applied Science)

CTBM-341, 342 **Engineering Mechanics**
Registration #0242-341, 342
Vector methods in statics and dynamics, force systems, friction, moments, centers of mass and centroids, moments and products of inertia, work, velocity, acceleration, kinetic energy, momentum, rigid body motion, rotation, work, potential energy, conservative forces and impulse. (CTCP-302 and CTAM-305)

Credit 4

CTBM-344 (Lec.); 354 (Lab) **Strength of Materials I**
Registration #0242-344, 354
Stress, strain, Hooke's Law, shear, torsion, shear and bending in beams, moment diagrams and deflection of statically determinate beams. (CTBM-341 or equivalent)

Credit 4, Lec. 3, Lab 1

CTBM-345 **Strength of Materials II**
Registration #0242-345
A continuation of the study of the way engineering materials behave. Slope and deflection of statically indeterminate beams, analysis of special beams, reinforced concrete beams, shear center, bending or torsion stresses combined with direct stresses, combined stresses for general types of loading. Mohr's circle, column analysis, energy of strain and impact, Castigliano's Theorem. (CTBM-344 and 354)

Credit 4

CTBM-347 (Lec.); 357 (Lab) **Engineering Materials**
Registration #0242-347, 357
Properties of engineering materials from the standpoint of atomic, and crystalline structure, imperfections, and phase changes. (CTBM-341)

Credit 4, Lec. 3, Lab 1

CTBM-401 **Thermodynamics I**
Registration #0242-401
Fundamental properties of thermodynamic systems: perfect gases, state and energy equations, laws of thermodynamics, and properties of pure substances. (CTCP-302 and CTAM-306 or equivalents)

Credit 4

CTBM-402 **Thermodynamics II**
Registration #0242-402
Thermodynamic properties of steam and refrigerants: fluids, heat transfer, mixtures of gases and vapors, internal combustion cycles and vapor power cycles. (CTBM-401 or equivalent)

Credit 4

CTBM-403 **Thermodynamics III**
Registration #0242-403
Additional material on vapor power cycles and internal combustion engines, reactive systems, and fundamentals of heat transfer. (CTBM-402 or equivalent)

Credit 4

CTBM-411 **Fluid Mechanics I**
Registration #0242-411
The basic properties of fluids are described. The principles of fluid behavior are investigated and applied to practical problems. Forces developed by fluids in motion are also examined. Major topics include incompressible viscous flow and boundary-layer theory. Films showing flow phenomena are used to supplement the lecture material. (CTBM-401 or equivalent)

Credit 4

CTBM-412 **Fluid Mechanics II**
Registration #0242-412
Introduction to special flow systems. Major topics include potential flow, compressible flow, and the behavior of fluids in open channels, dimensional analysis and its relation to model flow-testing. Lectures are supplemented with films. (CTBM-411)

Credit 4

CTBM-551 **Machine Design I**
Registration #0242-551
Statics of linkage mechanisms, kinematics and dynamics of linkages, analytical methods of solution based on vector analysis, graphical methods, and additional vector methods of solution. (CTBM-345 or equivalent)

Credit 3

CTBM-552 **Machine Design II**
Registration #0242-552
Kinematics of cam mechanisms, dynamic analysis of cams and some vibrational analysis, cam synthesis, stress analysis of machine design, including the selection of materials. (CTBM-551)

Credit 3

CTBM-553 **Machine Design III**
Registration #0242-553
Design of machine elements (shafts, springs, gears, bearings, clutches and brakes), vibration analysis, material selection, additional analytical and graphical solutions. (CTBM-552)

Credit 3

CTBM-554 **Linkage Mechanism**
Registration #0242-554 **Synthesis**
The combining of linkage mechanisms to perform machine functions. Coordinating of output motion with input motion for four and six-link mechanisms. Combinations and inversions of four-bar and slider-crank linkages. Analyzing coupler-curves. Coupler-cognate mechanism synthesis. Solving problems by graphical and analytic methods with typical applications to machine design. (CTBM-551 or permission of advisor)

Credit 3

Chemistry

CTCC-211, 212, 213 **General Chemistry**
Registration #0244-211,212,213
For chemistry majors and others who desire an in-depth study of general chemistry; atomic structure, chemical bond, properties of elements and compounds, states of matter, solutions, acids and bases, oxidation-reduction reactions, chemicals calculations, qualitative and quantitative analysis. (3 years of high school math or equivalent, including intermediate algebra)

Credit 3/Qtr.

CTCC-216 **Qualitative Inorganic Analysis**
Registration #0244-216
A lecture-laboratory course designed to present and illustrate the principles of the methodology of qualitative inorganic cation and anion analyses. (Concurrent with CTCC-213 or equivalent)

Credit 2

CTCC-217, 218 **Quantitative Analysis**
Registration #0244-217, 218
A lecture-laboratory course designed to illustrate the techniques and skills required for volumetric and gravimetric quantitative analysis. (Concurrent with CTCC-211, 212 or equivalent)

Credit 2/Qtr.

CTCC-231 **Organic Chemistry**
Registration #0244-231
A lecture course serving as an introduction to the science of organic chemistry. A survey of the nomenclature of organic molecules and a discussion of the structure and properties of the various classes of organic compounds is presented. (CTCC-213 or equivalent)

Credit 3

CTCC-232, 233 (Lec.) CTCC-237, 238 (Lab) **Organic Chemistry**
Registration #0244-232, 233, 237, 238
Fundamental principles of organic reactions are examined for the various types of organic chemicals. Nomenclature, stereo-chemistry, physical characterization techniques, and reaction types are stressed. Laboratory; preparation of various types of organic chemicals. Emphasis is on the techniques of separation and identification. (CTCC-231 or equivalent)

Credit 5, Lec. 3, Lab 2

CTCC-241, 242, 243 (Lec.) CTCC-246, 247, 248 (Lab) **Engineering Chemistry**
Registration #0244-241, 242, 243, 246, 247, 248
A general chemistry course for engineering science and applied science students. The fundamental concepts relating to the physical states of matter, the atomic theory, chemical reactions, thermodynamics, kinetics, electrochemistry, solutions, acid-base theory, oxidation-reduction reactions, nuclear chemistry and a brief introduction to organic chemistry, biochemistry and polymer chemistry as these topics relate to technological problems are presented. The emphasis is placed on the techniques available for the solution of real problems. The laboratory includes applications of the principles discussed in lecture to the solution of specific or project oriented laboratory problems. (CTAM-202 or equivalent)

Credit **4,** Lec. 3, Lab 1

CTCC-311 (Lec.) CTCC-316 (Lab) **Analytical Chemistry**
Registration #0244-311,316 **Instrumental Analysis**
Elementary treatment of instrumental theory and techniques; properties of light; refractive index, ultraviolet, visible and infrared spectrophotometry; emission spectroscopy; flame photometry; electrochemistry; Nernst Law; pH meters and electrodes. A knowledge of organic chemistry is desirable. (CTCC-213, CTCC-218 or equivalents; CTAM-210 required or to be taken concurrently)

Credit 5, Lec. 3, Lec./Lab 2

CTCC-313 (Lec.) CTCC-317 (Lab) Analytical
Registration #0244-312, 317 Chemistry-Separations
Inorganic and organic separations; Raoult and Henry Laws; phase rules; distillation; extraction; absorption and surface effects; electrophoresis; chromatography including gas, liquid, column, paper, thin layer, and ion exchange. (CTCC-213, CTCC-218 or equivalents; CTAM-210 or equivalent)

Credit 5, Lec. 3, Lec./Lab 2

CTCC-313 (Lec.) Introduction to Physical
Registration #0244-313 Chemistry
Properties of gases, kinetic-molecular theory; Boltzman Distribution functions; non-ideal behavior; first law of thermodynamics; heat capacities; Euler's theorem and homogeneous functions; thermochemistry; and introduction to the second law. (CTCC-231, CTCC-233 or equivalents; CTAM-253)

Credit 3

CTCC-401, 402 (Lec.); CTCC-405, Physical Chemistry
406 (Lab)
Registration #0244-401, 402,
405, 406
Kinetic-molecular theory of gases, states of matter, atomic and molecular structure, thermodynamics, quantum theory, chemical kinetics, photochemistry, spectroscopy (x-ray, optical, magnetic), chemical kinetics, electrochemistry, absorption and heterogeneous catalysis, and macromolecular structure analysis. (CTCC-313; CTAM-305 or take concurrently)

Credit 5, Lec. 3, Lec./Lab 2

CTCC-403 (Lec.) CTCC-407 (Lab) Physical Chemistry
Registration #0244-403, 407
A lecture course presenting some of the more mathematical aspects of physical chemistry. Selected topics from the areas of chemical statistics, quantum theory, chemical bonding molecular states and spectra, and the gas, liquid and solid states are discussed. (CTCC-402 and 406 or equivalent)

Credit 5, Lec. 3, Lec./Lab 2

CTCC-417 Chemical Literature and
Registration #0244-417 Technical Writing
Organization of technical libraries, classification of scientific literature into original and secondary sources and techniques for making literature searches; use of card catalog, index, abstracts, monographs, handbooks, critical tables, journals, bibliographies, technical catalogs, and patents; preparation of literature research reports. (CTCC-233 and 238, CTCC-313 or equivalent)

Credit 2

CTCC-511, 512 Instrumental Analysis
Registration #0244-511, 512
Instrumental techniques of analysis including spectrophotometry, conductance, potentiometry, and refractive index measurement, gas chromatography, mass spectroscopy, NMR, and electron spin resonance. Emphasis is placed on the uses of instrumental methods for structure determination, measurement of reaction, kinetics and mechanisms. (CTCC-313, CTAM-253 or equivalents)

Credit 4

CTCC-521 Synthetic Organic Chemistry
Registration #0244-521
An extensive discussion of the methodology and strategy of the synthesis of complex organic molecules including a discussion of the stereochemistry and mechanism of the synthetic processes. (CTCC-233 and 238 or equivalent)

Credit 3

CTCC-522 Physical Organic Chemistry
Registration #0244-522
Topics include activation parameters, kinetic treatment of mechanism elucidation, linear-free energy concepts, quantitative analysis of conformational and electronic effects, simple Huckel Molecular Orbital Theory, electrocyclic reactions, acidity functions and primary and secondary isotop effects. (CTCC-403 or equivalent)

Credit 2

CTCC-523 Advanced Topics in Organic
Registration #0244-523 Chemistry
Several of the following advanced topics in organic chemistry are covered: polyfunctional compounds, modern synthetic methods, stereochemistry, conformational analysis, free radical reactions, natural and synthetic polymers. (CTCC-233 and 238 or equivalent)

Credit 3

CTCC-525 (Lec.) CTCC-535 (Lab) Qualitative Organic Analysis
Registration #0244-525, 535
A combination of chemistry and spectroscopic techniques is used to identify the structure of "unknown" organic compounds. (CTCC-233 and 238)

Credit 3, Lec. **1,** Lec./Lab 2

CTCC-528 Organic Chemistry of
Registration #0244-528 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. (CTCC-233 and 238 or equivalent)

Credit 3

CTCC-551 Inorganic Chemistry
Registration #0244-551
The properties and structures of the elements and their compounds in relation to electronic and stereochemical principles. Some emphasis on the reactions and spectroscopic identification of inorganic compounds. (CTCC-403 and 407 or equivalents)

Credit 4

CTCC-555 Biochemistry
Registration #0244-555
Introduction to modern biological chemistry, physiological and physical-chemical aspects of energy metabolism, intermediary metabolism, biosynthesis of biopolymers, and metabolic regulations; structure and function of proteins and nucleic acids as an introduction to enzymology, molecular biology, and molecular genetics. (CTCC-233 and 238 or equivalent)

Credit 3

CTCC-561 Surface and Colloid
Registration #0244-561 Chemistry
Surface energy of liquids and solids, adsorption, catalysis, preparation and properties of classical colloids, electrical and optical properties of colloids, formation and properties of macromolecules. (CTCC-403 or equivalent)

Credit 3

CTCC-562 Photochemistry
Registration #0244-562
Properties of visible and ultraviolet radiation, adsorption of radiation, spectra, mechanisms in gases, liquids, and solids; experimental techniques. (CTCC-403 or equivalent)

Credit 3

CTCC-563 Chemical Thermodynamics
Registration #0244-563
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. (CTCC-403 or equivalent)

Credit 3

CTCC-564 Quantum Chemistry
Registration #0244-564
The application of quantum mechanics to the covalent bond, diatomic molecules, resonance and complex molecules; molecular spectroscopy; elements of quantum statistical mechanics. (CTCC-403 or equivalent)

Credit 4, Lecture 3, Lab 1

CTCC-565 **Chemical Kinetics**
Registration #0244-565
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. (CTCC-403 or equivalent)

Credit 3

CTCC-598 **Topics in Chemistry;**
Registration #0244-598 **Spectrometric Identification of Organic Compounds**
A practical approach to the elucidation of the structure of organic compounds through detailed analysis of their infrared, ultraviolet-visible, nuclear magnetic resonance and mass spectrometric properties. The emphasis is on the solution of real problems. (CTCC-233 or equivalent)

Credit 3

CTCC-599 **Independent Study:**
Registration #0244-599 **Chemistry**
Faculty-directed study of chemical topics on a tutorial basis. (Consent of instructor)

Credit 1-3

Physics

CTCP-201, 202, 203 (Lec.) **College Physics**
CTCP-206, 207, 208 (Lab)
Registration #0245-201, 202, 203, 206, 207, 208
A basic course in physics using algebra and trigonometry; topics covered: statics, dynamics, harmonic motion, sound, heat, fluid-flow, wave motion, optics, electricity and magnetism. Emphasis on understanding of basic principles and problem solving. (CTAM-202. Students who have not taken CTAM-202 must take the math qualifying exam.)

Credit 4, Lec. 3, Lab 1

CTCP-301, 302, 303 (Lec.) **Physics**
CTCP-306, 307, 308 (Lab)
Registration #0245-301, 302, 303, 306, 307, 308
Physics for engineering and science students. The following topics are covered: statics, dynamics, harmonic motion, wave motion, sound, thermodynamics, fluid-flow, optics, electricity and magnetism. Calculus is used freely. (CTAM-253 or equivalent)

Credit 5, Lec. 4, Lab 1

CTCP-457 **Modern Physics**
Registration #0245-457
An introductory course of 20th century physics. Review of some classical concepts, special relativity, quantum effects, duality of waves and particles, the hydrogen atom. (CTCP-303, CTAM-306)

Credit 4

CTCP-458 **Modern Physics**
Registration #0245-458
A continuation of CTCP-457. Many electron atoms, molecular physics, solid state physics and devices. (CTCP-457 or equivalent)

Credit 4

CTCP-459 **Nuclear Physics**
Registration #0245-459
Elementary particles, nuclear structure, nuclear reactions, fission, fusion. Nuclear power, accelerating machines. (CTCP-458 or equivalent)

Credit 4

Contemporary Science

CTCS-221 **Contemporary**
Registration #0246-221 **Science-Biology**
An introduction to the fundamental principles of biology for nonscience majors and the application of these concepts to areas of interest in our contemporary technological society. Topics to be discussed include the cell as a biological unit. The biogenesis-abiogenesis controversy, genetic coding and introduction to plant and animal biology. The course is presented in a lecture-demonstration format. (CTAM-201 or CTAM-205 or CBCH-201 or equivalent)

Credit 4

CTCS-222 **Contemporary**
Registration #0246-222 **Science-Chemistry**
An introduction to the fundamental principles of chemistry for nonscience majors and the application of those concepts to areas of interest and concern in our contemporary technological society. Topics to be discussed include the atomic theory, chemical periodicity, nuclear reactions and energy, physical states of matter, chemical compounds, chemical reactions, organic chemistry, biological chemistry and macromolecular chemistry. The course is presented in lecture-demonstration format. (CTAM-201 or CTAM-205 or CBCH-201 or equivalent)

Credit 4

CTCS-223 **Contemporary**
Registration #0246-223 **Science-Physics**
An introduction to the fundamental principles of physics for nonscience majors, and the application of these concepts to areas of interest and concern in our contemporary technological society. The conceptual basis for the phenomena of heat, light, sound, mechanics, electricity and magnetism are discussed and are related to such topics as astronomy, space exploration, lasers and environmental concerns. The course is presented in a lecture-demonstration format. (CTAM-201 or CTAM-205 or CBCH-201 or equivalent)

Credit 4

CTCS-224 **Contemporary**
Registration #0246-224 **Science-Oceanus**
An introduction to the fundamental principles of oceanography for nonscience majors, and the application of those concepts to areas of interest and concern in our contemporary technological society. The marine environment will be investigated in terms of basic scientific concepts, and topics to be discussed will include plate tectonics and earthquake prediction, the impact of ocean pollutants, climate fluctuations, cetacean intelligence and resources from the sea.

Credit **4**

Computer Programming

CTDP-200 **Introduction to**
Registration #0249-200 **Microcomputers**
This technical course will help you become familiar with small computers, more comfortable with terminology and technology involved and more aware of the computers' significance and potential. You will also learn beginning BASIC. Not for computer system majors.

Credit **4**

CTDP-201 **Computer Techniques**
Registration #0249-201
Programming in BASIC on RIT's VAX computers. After an introduction to time-sharing and editing procedures the course deals with the computer as a tool for solving applied problems. Not for computer systems majors. (CTAM-202)

Credit 2

CTDP-208 **Introduction to Programming**
Registration #0249-208
Fundamentals of programming using the structured programming language PASCAL. Topics include basic problem-solving methods, algorithm development, elementary data types, expression evaluation, use of basic control structures and subprograms. Programming projects will be required. (CTDS-202 or permission of a computer systems advisor)

Credit 4

CTDP-210 **Program Design and**
Registration #0249-210 **Validation**
Program design, including specification, structured development, advanced data types, procedures and functions, program validation and verification. Programming paradigms, including basic internal sorting and searching algorithms. Programming projects are required. (CTDP-208)

Credit 4

CTDP-215 **FORTRAN Programming**
Registration #0249-215
A study of FORTRAN programming techniques and applications. Topics include FORTRAN constants, variables, expressions, functions, logical operations, storage allocations, statements. I/O manipulation and subprograms. Debugging and diagnostic methods. Programming projects will be required. (CTDS-202 or permission of advisor)

Credit 4

CTDP-241 **Programming I-Algorithmic**
Registraton 0249-241 **Structures**
An introduction to programming emphasizing the development and documentation of modular computer-based algorithms. A structured procedural programming language (e.g. Pascal) is used to demonstrate modern programming principles. Topics include variables, expressions and assignment, control structures (sequencing, selection and repetition), modularity via procedures and functions, parameter mechanisms, and identifier scope in block structured languages. Programming assignments are an integral part of this course.

Credit: 4

CTDP-242 **Programming II-Data**
Registration 0249-242 **Structures**
An introduction to the basic data structures used in computer applications. Both abstract concepts and implementation details will be discussed, including comparisons of alternative implementations. Topics include arrays, records, pointers, dynamic storage allocation, linked lists, stacks, queues, trees. Programming projects are required. (CTDP-241)

Credit: 4

CTDP-243 **Programming Ill-Design and**
Registration 0249-243 **Implementation**
A first course on the design and implementation of moderately large single-programmer systems. Modern principles of design and testing will be presented in class and reinforced by programming assignments. The, importance of both internal and external program documentation will be stressed. Topics include top-down design, stepwise refinement, test data selection, modularity measures (cohesion and coupling), common programming paradigms, and advanced file I/O. Programming projects are required. (CTDP-242)

Credit: 4

CTDP-301 **COBOL Programming**
Registration #0249-301
COBOL programming techniques and applications. Topics include introduction to the concepts of modular and structured programming, COBOL coding methods, data processing, sequential file manipulation, table look-up SORT and SEARCH verbs. COBOL debugging and editing facilities. Documentation standards. Programming projects will be required. Not for computer systems majors. (CTDS-202 or similar course)

Credit 4

CTDP-304 **Advanced COBOL**
Registration #0249-304 **Programming**
Advanced COBOL programming techniques and applications with topics including magnetic tape and disk file processing techniques, subroutines, over-lay and segmentation, report writer, core dump analysis and coding optimization techniques. Programming projects will be required. Not for computer systems majors. (CTDP-301)

Credits 4

CTDP-305 **Assembly Language**
Registration #0249-305 **Programming**
A study of assembly language programming methods with topics including computer organization, assembly process, assembly coding, addressing, binary arithmetic, repeatability, storage allocation, subroutine linkage, looping and address modification, character manipulation, bit manipulation, floating-point arithmetic, decimal instruction set, some system I/O, macros and debugging techniques. Programming projects will be required. (CTDS-202)

Credit 4

CTDP-306 **Advanced Assembly**
Registration #0249-306 **Techniques**
A study of advanced techniques in assembly language programming. Topics include macro definition and invocation, conditional assembly, system macros and supervisor calls, program linkage, reentrant and recursive programs and I/O programming at the interrupt level. Programming projects will be required. (CTDS-3T5, CTDS-325)

Credit 4

CTDP-307 **Business Applications**
Registration #0249-307 **Programming**
The mastery of the techniques and concepts of programming within a business programming environment. Emphasis on algorithmic solutions to business problems, including report generation, sorting and table processing and generation, complex I/O processing. Students will also program against a data base in a host-embedded programming language. Programming projects are required. (CTDS-325)

Credit 4

CTDP-318 **APL Programming**
Registration #0249-318 **Techniques and Applications**
Topics include APL programming and style, function definition and recursive programming, APL report formatting features, file I/O subsystem, graphic I/O and business systems applications. Programming projects will be required. (A high level programming language)

Credit 4

CTDP-320 **Computer Programming for**
Registration #0249-320 **Engineers**
Computer programming in FORTRAN. Application emphasis is on numerical methods. Programming projects are required. Not for computer systems majors. (CTAM-305)

Credit 4

CDTP-330 **PL/1 Programming**
Registration #0249-330
Topics include elementary data types and control structures, data structuring capabilities (arrays and records), run-time error handling, standard built-in functions, text processing, user written functions and subroutines. Emphasis on developing well-structured and modular programs. Programming projects are required. (A high level programming language)

Credit 4

CTDP-488 **Programming Systems**
Registration #0249-488 **Workshop**
A workshop for the mastery of the techniques and concepts of programming systems, design and implementation. Students will work with data modeling, both with and without a data-base management system product. Student will gain experience with system specification and design charting techniques, project scheduling and management and programming team experience. Programming projects will be required. (CTDP-307, CTDS-335, CTDS-485)

Credit 4

Computer Systems

CTDS-200 **Introduction to Computers & Programming**
Registration #0250-200
Basic concepts and overview of computer science. The topics include historical development, algorithms, flowcharting and programming in BASIC. Exposure to assembler language, hardware concepts, software concepts, binary and hex numbers and logic. Application of the computer to various disciplines. Not for computer science majors. (High School intermediate algebra)

Credit 4

CTDS-202 **Introduction to Computer Science**
Registration #0250-202
An introduction to the computer: information representation, instruction execution and the software interface to the user. Topics include integer and floating point arithmetic, logical operations, introduction to machine and assembly language, input/output operations, operating systems. (Three years high school mathematics, permission of advisor)

Credit 4

CTDS-230 **Discrete Structure**
Registration #0250-230
Foundations of discrete mathematics. Topics include: propositional logic, functions and relations, algebra of sets, Boolean algebra and Boolean functions, permutations and combinations, vectors and matrices, graphs, digraphs, trees and strings. (CTAM-202 or equivalent)

Credit 4

CTDS-315 **Digital Computer Organization**
Registration #0250-315
Introduction to the logical design of a computer. Topics include a review of arithmetic and Boolean algebra, combinational and sequential circuit design, flip-flops and adders, storage organization, instruction fetch decode and execution in a simple CPU, input/output subsystem, interrupts. (CTDS-202)

Credit 4

CTDS-320 **Data Structure Analysis**
Registration #0250-320
Information structures: sequential lists, stacks, queues, sequential allocation; linked lists, doubly linked lists, linked allocation; trees, tree traversal; lists, orthogonal lists, multilinked structures; dynamic storage allocation and garbage collection. Programming projects are required. (CTDP-210)

Credit 4

CTDS-325 **Data Organization and Management**
Registration #0250-325
A course dealing with the methodology associated with the external storage of data. Topics include file organization (sequential, Indexed and direct access physical organization); space optimization and directory organization; an introduction to external sorting and searching and the basis of data modeling, data base organization and management. Programming projects are required. (CTDS-320)

Credit 4

CTDS-335 **System Specification, Design and Implementation**
Registration #0250-335
Students are introduced to basic concepts of system specification and design, systems implementation and project management. Tools used include PERT/CPM (scheduling tools), structured English, structured flowcharts and decision trees (description tools), dataflow diagramming (description and design tool) and hierarchical design of programming systems (design tool). Students are also introduced to HIPO charts, NS charts, etc. and to the structured design methods of Yourdon. (CTDS-325)

Credit 4

CTDS-340 **Finite State Machines and Automata**
Registration #0250-340
Topics include finite state models, machine capabilities, descriptive methods, decomposition methods, regular expressions, bilateral analysis and synthesis, sequential iterative systems and space-time transformations. (CTDS-315)

Credit 4

CTDS-400 **Logical Design**
Registration #0250-400
An introduction to switching theory, sequential circuit analysis and synthesis, error detection, error correction networks, speed-up techniques, serial and parallel approaches, interfacing techniques. (CTDS-315)

Credit 4

CTDS-420 **Data Communication Systems**
Registration #0250-420
Data communication and telecommunication systems. Including communication techniques and interfaces, common carrier implications and tariffs, multiplexors; buffering response time and human factors; network design analysis and cost, software considerations. (CBCH-351, CTDS-315)

Credit 4

CTDS-430 **Numerical Methods**
Registration #0250-430
Topics included are: error analysis, roots of an equation, solution of systems of equations, interpolation, power series calculation of functions, numerical integration and first order differential equations. Programming projects are required. (CTEM-421 or equivalent and FORTRAN or BASIC)

Credit 4

CTDS-440 **Operating Systems**
Registration #0250-440
A general survey of operating system concepts. Topics include process synchronization, interprocess communication, deadlocks, resource management, memory management, overlays, static and dynamic relocation, virtual memory, file systems, logical and physical I/O, device allocation, process and resource protection. (CTDS-315 and CTDS-320)

Credit 4

CTDS-480 **Formal Languages**
Registration #0250-480
Formal language theory and principles. Topics include context free, context sensitive grammars, regular expressions; Turing machines; introduction to computability. (CTDS-340)

Credit 4

CTDS-485 **Data Base Concepts**
Registration #0250-485
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. (CTDS-325)

Credit 4

CTDS-520 **Computer Architecture**
Registration #0250-520
A study of computer architecture and design. Topics include review of basic theories, hardware technology, parallel and distributive logic, synchronous and asynchronous machines and analysis of commercial machines. Alternatives to classical machine structure. (CTDS-315)

Credit 4

CTDS-525 **Assemblers, Interpreters, and Compilers**
Registration #0250-525
A survey of three basic programming language processors; assemblers, interpreters, and compilers. The topics include design and construction of language processors, formal syntactic definition methods, parsing techniques and code generation techniques. (CTDS-320)

Credit 4

CTDS-530 **Discrete Simulation**
Registration #0250-530
Computer simulation techniques. Abstract properties of simulation modeling, analysis of a simulation run and statistics. The simulation language GPSS will be taught. Programming projects are required. (CBCH-351 or equivalent and programming experience)

Credit 4

CTDS-545 **Processor Design Concepts**
Registration #0250-545
A survey of bit-slice processor design and implementation techniques. Topics include microprogramming and emulation, comparison of microcode and hardwired logic, I/O processors and subsystems. (CTDS-315)

Credit 4

CTDS-550 **Review of Computer Science**
Registration #0250-550
Review of significant advances in computer science which have occurred in the last few years. Designed to give graduating students an overview of recent technological and theoretical advances. Reports on outside readings. (Senior year standing)

Credit 4

CTDS-565 **Computer Systems Selection**
Registration #0250-565
A study of computer systems design, evaluation and selection methodology. The design aspect deals with the problem of specifying physical systems on the basis of logical design specifications and performance analysis of existing and proposed computer systems. The selection aspect covers vendor proposal requests, evaluation and validation of proposals and procurement methods. (CTDS-315 and CTDS-320)

Credit 4 '

Lower Division Electrical Technology

CTEE-101, 102, 103 **Basic Mathematics for Electronics**
Registration #0253-101,102,103
Course will begin with a brief review of fundamental arithmetic and algebraic concepts for those whose skills have lessened due to time lapse. The slide rule, powers of ten and units and dimensions applicable to the field of electronics will be emphasized. Ratios, simultaneous equations, exponents, radicals, quadratic equations, and logarithms with specific applications; solution of Ohm's and Kirchhoff's Laws, trigonometric functions, right triangles and vector algebra. (One year of high school mathematics or equivalent)

Credit 3

CTEE-105, 106, 107 **Electrical Schematics**
Registration #0253-105,106,107
Electrical symbols, schematics, color codes, specifications and ratings, logic diagrams, block diagrams, wiring and control diagrams. (Concurrent enrollment in CTEE-101)

Credit 1

CTEE-321 (Lec.) CTEE-326 (Lab) **Digital Systems**
Registration #0253-321, 326
Introduction to binary and octal number systems, logic components and their functions; truth tables; gates, switches, counters, flipflops, integrators, differentiators and adders; application to mechanical, relay, fluidic, pneumatic and electronic digital logic systems. (CTIL-203 or equivalent)

Credit 4, Lecture 3, Lab 1

CTEE-322 **Analog Systems**
Registration #0253-322
Introduction to all types of transducers; study of operational amplifiers and their uses with transducers in analog control of electromechanical systems; study of all types of differential transducers and their role in analog control systems. (CTIL-203 or equivalent)

Credit 3

CTEE-323 **Computer Systems**
Registration #0253-323
Flow diagrams of a computing system; computer input-output systems, card, tape, photoelectric, voice; computing portion of the computer, storage, memory, comparing systems, information flow; similarities and differences between analog and digital computers; advantages, disadvantages and limitations of the analog and digital computers; auxiliary computer systems, sorters, plotters, keypunch, printers, related computer systems, numerical control; interfacing systems between computer and computer controlled systems; processing typical problems on the computer including flow diagrams; discussion of types of problems which lend themselves to computer systems. (CTIL-203)

Credit 3

CTEE-361, 362, 363 (Lec.) **Applied Electronics**
CTEE-366, 367, 368 (Lab)
Registration #0253-361, 362, 363, 366, 367, 368
Applications of electronic components and circuits which have become electronic building blocks; applications of oscillators, tuned circuits, amplifiers, power amplifiers, multi-vibrators, switching, waveshaping and other circuits; applications of integrated circuits including special purpose amplifier, operational amplifier, timers, regulators, zero voltage switches and other integrated circuits both linear and digital. The laboratory includes testing, troubleshooting and analysis of electronic circuits. (CTIL-203)

Credit 4, Lec. 3, Lab 1

Lower Division Mechanical Technology

CTEM-301 **Statics**
Registration #0254-301
Basic principles of statics, systems of forces, free-body diagrams, equilibrium conditions, friction, centroids, moments of inertia. (CTCP-201 or equivalent)

Credit 4

CTEM-302 **Dynamics**
Registration #0254-302
Principles of dynamics; kinematics and kinetics of rectilinear, rotational and plane motion; velocity, acceleration; inertia; work, energy, power, impact. (CTEM-301 or equivalent)

Credit **4**

CTEM-303 **Applied Mechanics (Strength of Materials)**
Registration #0254-303
Strength of materials, principles of stress and strain, properties of materials, shear and thermal stresses, stress and deflection of beams, column analysis, connections, combined stresses. (CTEM-301 or equivalent)

Credit 4

CTEM-315 **Principles of Mechanical Design I**
Registration #0254-315
Additional material, with emphasis on applications, on area moments, centers of gravity, beam deflection, end loading, columns, stress and strain, plastic deformation, stress concentrations, torsion. (CTEM-303)

Credit 2

CTEM-316 **Principles of Mechanical Design II**
Registration #0254-316
Thin-walled tubes, non-circular shafts, springs, screw threads, belts, stress in cylindrical shells. (CTEM-315)

Credit 2

CTEM-317 **Principles of Mechanical Design III**
Registration #0254-317
Ball and roller bearings, gears, stresses in thick-walled cylinders, shrink and press fits, flywheel design, elastic impact, curved beams, cams, loading of flat plates. (CTEM-316 and CTID-203)

Credit 2

CTEM-420 **Calculus for Technologists I**
Registration #0254-420
An elementary applied calculus course covering the differential and integral calculus of algebraic functions with emphasis on applications. (CTAM-202 or equivalent)

Credit 4

CTEM-421 **Calculus for Technologists II**
Registration #0254-421
A continuation of CTEM-420. Topics covered in this course are: application of the integral calculus; differential and integral calculus of the transcendental function; and basic techniques of integration with emphasis on applications to engineering technology problems. (CTEM-420 or equivalent)

Credit 4

CTEM-422 **Solutions of Engineering Problems**
Registration #0254-422
A continuation of CTEM-421, this course covers selected applied mathematics topics including; differential equations through 2nd order linear, LaPlace Transforms, Taylor's series, and other appropriate topics. Emphasis is on the application of these topics to engineering problems. (CTEM-421 or equivalent)

Credit 4

Lower Division Manufacturing Technology

CTEF-201, 202, 203 **Manufacturing Analysis**
Registration #0255-201, 202, 203
Introduction to current manufacturing processes, casting, forming, stamping, welding and chipless machining, to produce parts on a production basis. Selected pieces will be analyzed with respect to production sequencing and cost, including costs of material handling, manufacture, inspection, and assembly. Projects involving solution to production problems will be assigned. (CTIS-203 or equivalent)

Credit 3

CTEF-210 **Industrial Plastics**
Registration #0255-210
An introductory course in industrial plastics with emphasis on the practical aspects such as properties, identification, processing methods, design and suitability for given applications. Classwork will be supplemented with demonstrations, discussions of samples, and several field trips.

Credit 4

CTEF-211,212 **Metallurgy**
Registration #0255-211, 212
Review of chemical and metallurgical terms; manufacturing process; theory of constitutional diagrams; space-lattices, theory of hardening, heat treatment and general properties of ferrous and non-ferrous metals and alloys; effects of composition and mechanical working upon such properties as grain size, hardenability, machinability and weldability of metals. Some knowledge of chemistry and physics is desirable.

Credit 3

CTEF-314, 315 **Materials Technology I, II**
Registration #0255-314, 315
A two quarter course involving a study of materials, their structure and characteristics. Topics covered include atomic and crystal structure, phases and phase diagrams, physical properties, corrosion and oxidation, diffusion in metals, recovery, recrystallization and grain growth, age hardening and heat treatment of metals. The effect of processes such as welding on the metallurgy of the part will be examined. Organic and ceramic materials will also be studied. (CTEF-314)

Credit 3/Qtr.

CTEF-328 **Report Writing**
Registration #0255-328
Principles of organizing data and information into clear and concise engineering reports; technique of library research; oral reports; minutes of meetings; business letters; short and formal reports.

Credit 2

CTEF-360 **Intro to Numerical Control**
Registration #0255-360
The philosophy of the use of numerical control in manufacturing. The course will review manual programming, examine different applications of numerical control, and introduce computer-assisted programming techniques. N/C machine tools will be demonstrated.

Credit 4

CTEF-370 **Tool Design**
Registration #0255-370
The design of special tooling, jigs, and fixtures for economic production. The principles of positioning, locating and clamping are studied along with the analysis of cutting forces. Also covered are tools for inspection and gauging. (CTEF-202)

Credit 4

CTEF-380 **Time Study**
Registration #0255-380
The principles and applications of the basic techniques for improvement of the man-job-time relationship, job standards and recording, and work-space design for the efficient use of manpower. (CTEF-202)

Credit 3

CTEF-391 **Production Control**
Registration #0255-391
This course prepares the student to deal with production planning algorithms and inventory control models. Subjects such as forecasting, inventory control techniques, production planning and scheduling and material requirements planning will be presented. (CTEF-202)

Credit 4, Lec. 3, Lab 2

Building Technology (Industrial Technology)

CTIB-101, 102 **Architectural & Structural Blueprint Reading (Residential, Commercial)**
Registration #0261-101, 102
Reading and interpretation of architectural and structural drawings; use of scales, symbols for materials, drafting conventions, schedules and specifications; freehand sketching, elementary mathematics, and some quantity take-off.

Credit 3/Qtr.

CTIB-201 **Architectural Drawing**
Registration #0261-201
Introduction to architecture, the role of architectural drawings in the construction process, and basic drafting techniques used in architectural drawing including pencil techniques, freehand sketching and lettering. Introduction to drawings required in the traditional construction drawing set.

Credit 2

CTIB-202 **Architectural Drawing**
Registration #0261-202
Introduction to the techniques of the architectural design process including preliminary presentation drawings and isometrics. Preparation of drawings required in the design and construction process of different building types. (CTIB-201)

Credit 2

CTIB-203 **Architectural Drawing**
Registration #0261-203
Advanced study in the complete architectural process required in developing more complex building types. Preparation of design and schematic drawings of different building types. (CTIB-202)

Credit 2

CTIB-204, 205, 206 **Architectural Drawing**
Registration #0261-204,205,206
Design development, presentation and working drawing preparation including: plans, elevation, sections, and details of different building types. Site planning, cost analysis, perspective presentation and related design skills. (CTIB-203)

Credit 2/Qtr.

CTIB-207, 208, 209 **Architectural Drawing**
Registration #0261-207,208, 209
Advanced design development, presentation and working drawing preparation including; plans, elevation, sections, and details of different building types. Site planning, cost analysis, perspective presentation and related design skills. (CTIB-206)

Credit 2/Qtr.

CTIB-231 **Surveying**
Registration #0261-231
Introduction to surveying including measurement of horizontal distances, leveling, theory of error, bearings and azimuths, measurement of angles, tachymetry, traverse surveys and computations. Several field trips provide familiarization with instrument use. (High school algebra and trigonometry or equivalent)

Credit 4

CTIB-241 **Building Construction**
Registration #0261-241 **(Materials)**
Study of basic construction materials including concrete, masonry, metal, wood, bitumens, plastics, coatings, glass and glazing. Basic physical properties of materials are defined and emphasis is placed on practical applications. Design of concrete mixtures and basic stress-strain relationships are covered.

Credit 3

CTIB-242, 243 **Building Construction**
Registration #0261-242, 243 **(Methods and Procedures)**
Elements and details of building construction. Study of fundamental design concepts, building codes, foundations, wood, steel and concrete construction, specifications and construction management. (CTIB-241 or equivalent)

Credit 3/Qtr.

CTIB-251 **Construction Contracting**
Registration #0261-251
Construction activities from the contractors' viewpoint. Bidding procedures from bid advertisement to bid opening; bonds, insurance, contracts, subcontracts and bidding documents; construction safety, project planning, scheduling and control. Governmental controls including zoning and building codes.

Credit 3

CTIB-252, 253 **Building Estimating**
Registration #0261-252, 253 **(Residential, Commercial)**
Basic cost estimating of residential and commercial construction projects including types of estimates, quantity taken off, unit price, material and labor costs, overhead, profit and contingencies. Job cost data sources and cost indices are reviewed. (CTIB-101 or CTIB-203 or equivalent)

Credit 3/Qtr.

CTIB-301 **Structural Theory**
Registration #0261-301
Analysis of loads, determination of reactions, horizontal and vertical shear, shear diagrams, bending moments, axial and combined stress, truss analysis, deflections and introduction to computer analysis. (CTEM-301 and CTEM-303 or equivalents)

Credit 4

CTIB-302 **Structural Design**
Registration #0261-302
Fundamentals of structural design including the basic design concepts of structural steel, reinforced concrete, and timber: design of beams, columns, and trusses including connections. (CTIB-301 or equivalent)

Credit 4

CTIB-311, 312, 313 **Architectural Projects**
Registration #0261-311, 312, 313
Advanced work in architectural drafting to develop specialized skills in design development, contract documents, frame construction, shop drawings, site planning or other related areas. Program to be planned individually to match the individual requirements of each student. (CTIB-206 or equivalent)

Credit 2/Qtr.

Engineering Drawing

CTID-101 **Mechanical Blueprint Reading**
Registration #0262-101 **I**
The major thrust of this course is to enable the student to visualize machine parts represented on the blueprint as actually needed in practice. This is accomplished by covering such topics as lines, freehand sketching, orthographic projection, auxiliary and sectional views as well as callouts for machine processes. A brief introduction to Geometric Dimensioning and Tolerancing is also included.

Credit 1

CTID-102 **Mechanical Blueprint Reading**
Registration #0262-102 **II**
This course is a continuation of CTID-101 dealing with further study of machine detail and assembly drawings, however, the major emphasis of the course will be the application of modern geometric dimensioning and tolerancing as used on all types of drawings as derived from the ANSI Y14.5 government standards.

Credit 1

CTID-141, 142, 143 **Tool Design**
Registration #0262-141,142,143
Drafting and design of shop tools. Student makes design drawings under instructor's supervision. Design of various machine cutting tools, gauge design, design of drilling jigs and milling fixtures. Principles and practice of punch and die design. Fundamentals of plastic molding and extruding with emphasis on production of practical designs. Consideration given to importance of tooling costs, redesign for economical production and production processes as they affect the designer. Course designed for tool and die makers, manufacturing managers, quality control managers and engineers. Drafting board and instruments required. (CTID-203 and CTIS-203, CTAM-103 or equivalents)

Credit 2/Qtr.

CTID-151, 152, 153 **Machine Design**
Registration #0262-151,152,153
These courses cover analytically the major topics of machine design. They include properties and behavior of materials, basic principles of statics and dynamics, design of basic machine elements, spring and linkage design, methods of fastening, gear and bearing selection. (CTAM-103, CTID-203, CTIS-203 or equivalent)

Credit 3/Qtr.

CTID-201 **Engineering Drawing**
Registration #0262-201
This is an introductory course in mechanical drawing. Spatial objects are first drawn by free hand sketching before drawing instruments are used. Topics covered include lettering, orthographic and isometric drawing, auxiliary and section views, and principles of dimensioning and tolerances.

Credit 2

CTID-202 **Engineering Drawing**
Registration #0262-202
This course is a continuation of CTID-201 which covers in more detail the topics included in CTID-201. In addition, drawings involving flat pattern developments and intersections, threads, fasteners and springs are also taught. (CTID-201 or equivalent)

Credit 4/Qtr.

CTID-203 Engineering Drawing
Registration #0262-203
This course continues the teaching of the fundamentals of drafting as done in CTID-201-2 and includes topics on geometric tolerancing and dimensioning and welding, electrical, and piping drawings. The last half of the course requires the student to prepare a complete set of drawings, including detail, assembly, parts and materials list, as needed to manufacture a complete machine component. (CTID-202 or equivalent)

Credit 2

CTID-211 Engineering Graphics
Registration #0262-211
This is an introductory course in drafting addressed to prospective engineering students. Its content is essentially the same as CTID-201 and 202 with emphasis on graphic communication rather than skills development.

Credit 2

CTID-212 Engineering Graphics
Registration #0262-212
This course covers the fundamental principles of descriptive geometry as used to find graphical solutions of spatial engineering problems. Students are taught methods of drawing an object in any view desired and also problems of ordinary point-line-plane are solvable by the same methods. (CTID-211 or CTID-202 or equivalent)

Credit 2

CTID-213 Engineering Graphics
Registration #0262-213
The subject of graphical kinematics is introduced by first covering the principles of basic motion; namely velocity and acceleration. These concepts are then applied to the design and analysis of mechanisms such as linkages, cams, gears, pulleys, belts, etc. The graphical approach is emphasized where applicable throughout the course. (CTID-212 or equivalent)

Credit 2

Electromechanical (Industrial Technology)

CTIL-201 (Lec.) CTIL-206 (Lab) Elements of Electricity and
Registration #0264-201, 206 Electronics
This course and its mandatory associated laboratory provide an introduction to Basic Electricity and its application to direct current circuitry. Included are principles relating to current, voltage, resistance, OHMS law, problems related to various circuit configurations are presented. (CTAM-103 or equivalent)

Credit 4, Lec. 3, Lab 1

CTIL-202 (Lec.) CTIL-207 (Lab) Elements of Electricity and
Registration #0264-202, 207 Electronics
This course and its mandatory associated laboratory provide an introduction to Basic Electricity and its application to alternating current circuitry. Included are principles relating to current, voltage, inductance, capacitance, inductive reactance, capacitive reactance, impedance, phase angle, power factor, sinusoids, power, etc. Applicable principles necessary to solve problems related to various circuit configurations are presented. (CTAM-103 or equivalent)

Credit 4, Lec. 3, Lab 1

CTIL-203 (Lec.) CTIL-208 (Lab) Elements of Electricity and
Registration #0264-203, 208 Electronics
This course and its mandatory associated laboratory provide an introduction to Basic Transistor Theory. The theory and application of PN Junction diodes and PNP and NPN Transistors are fully developed. A thorough analysis of the common-base, common-emitter and common-collector configurations is provided. (CTAM-103 or equivalent)

Credit 3 Credit 5, Lec. 3, Lec./Lab 2

CTIL-221, 222 Mechanical Components and
Registration #0264-221, 222 Mechanisms
Introduction to mechanical elements of electromechanical systems; Study of individual components and mechanisms in terms of functions and operating charactersitics. Topics covered are: Torque, inertia, work, power, efficiency, gears, (spur, bevel, helical, worm), gear trains, differentials and integrators, belt drives, chain drives, pins, couplings, cams, linkages, switches. Independent approach to practical problem solving is stressed. (CTCP-201, 202 and CTID-201, 202, 203 or equivalents)

Credit 4

CTIL-301, 302 (Lec.) CTIL-306, 307 (Lab) Machines and Power Systems
Registration #0264-301, 302, 306, 307
Basic concepts and characteristics of D.C., synchronous and induction machines including transformer action, turns ratio, losses, power factor, waveforms and impedance matching; single phase and three phase operation; study of the machine in an electromechanical system including types of control (torque, speed, voltage, current) and associated devices (clutches, brakes, coupling, bearings, mounting); electrical and mechanical power transmission; specialized machines such as metadynes, amplidynes, selsyns, sychro control transformers and their systems applications. Lab sessions develop a qualitative feel for characteristics and applications of power systems, machines and their control. (CTIL-201, 202, 203 and CTAM-201, 202 or equivalents)

Credit 4, Lec. 3, Lab 1

CTIL-303 (Lec.) CTIL-308 (Lab) Pneumatic and Hydraulic
Registration #0264-303, 308 Systems
Introduction to pneumatic and hydraulic components; pneumatic and hydraulic power systems; compressors, pumps, efficiency and applications; integrated electromechanical power systems; Lab sessions develop a qualitative feel for characteristics and applications of power systems, machines and their control. (CTCP-201, 202)

Credit 4, Lec. 3, Lab 1

CTIL-351, 352, 353 Electromechanical Devices
Registration #0264-351,352, 353 and Systems
Concepts and principles of electromechanical system components and systems; temperature, displacement, force, electropneumatic, electrohydraulic transducers, encoders, amplifiers and control elements and their applications to systems. Thermistor, thermocouple, pneumatic temperature transducer. LVDT, proximity sensors, strain gauges, pressure, flow, level transducers, control values, motors, mechanisms and control devices; open loop, closed loop, digital analog, sequential systems. Analysis of systems representative of types found in industrial use today. The laboratory includes analysis and troubleshooting of operational electromechanical systems. (Successful completion of all other technical courses in CTIL curriculum.)

Credit 4/Qtr.

Machine Shop

All courses must be taken in the proper sequence in each program. For additional information call department, 262-2741.

CTIS-101, 102, 103 Precision Measurement
Registration #0266-101,102,103
The care and use of all common inspection and gauging equipment. Techniques of inspecting various types of parts, quality control procedures and discussion and application on the use of tolerancing; blueprints and true positioning. Sine bar, contour projector, casting layout, surface finishes, thread gauging, common types of production gauging and the use of optical flats are used in the second and third quarters.

Credit 1/Qtr.

CTIS-104 to CTIS-109 **Advanced Machine Shop I, II**
Registration #0266-104, 105, 106, 107, 108, 109

Advanced work on lathes, milling machines and grinders; explanations and demonstrations on more difficult problems; assemblies and temporary tooling. Some work done entirely in metrics. Must accurately handle tool room layout, machining, and measuring equipment. Special emphasis on skill, neatness and accuracy. (CTIS-203)

Credit 1/Qtr.

CTIS-111 to CTIS-119 **Instrument Making &**
Registration #0266-111,112, 113, 114, 115, 116, 117, 118, 119 **Experimental Work I, II, III**

Students must operate ail tool room equipment. Skillful manipulation of hand tools; make small temporary tooling required to form or bend the finished parts; blank development and precision layout; make small punches, dies, cutters and assemblies to simulate actual industrial model work. (CTIS-203)

Credit 1/Qtr.

CTIS-121 to CTIS-129 **Tool and Die Making I, II, III**
Registration #0266-121, 122, 123, 124, 125, 126, 127, 128, 129

Planning and making accurate complete tool and die assemblies. Emphasis is on accuracy of the individual parts and in the fitting of the assembled tool or die. Samples from the forming and blanking dies are inspected for quality. (CTIS-106)

Credit 1/Qtr.

Machine Tool

CAIM-112 **Principles of Blueprint**
Registration #0270-112 **Reading II**

This course is a continuation of unit I, dealing with further study of machine detail and assembly drawings. However, the major emphasis of the course will be the application of modern geometric dimensioning and tolerancing as used on ail types of drawings as derived from the ANSI Y^.S government standards.
Class 3, Credit 3

CAIM-120 **Industrial Machine Shop I**
Registration #0270-120

A beginning industrial machine shop course introducing students to the basic machines in industry today, and the techniques used in operating them. The care and skillful use of precision measuring and gauging equipment. Introduction to metal cutting machines such as lathes, horizontal and vertical mills, bandsaws, and drill presses. Also covered are the basic skills in layout and bench work.

Credit 4, Lab 15

CAIM-121 **Basic Machine Shop I (DT)**
Registration #0270-121

This course is intended to introduce the student with hands on experience performing such tasks as: tool grinding, thread cutting, drilling layout and bench work. The techniques of precision measurement is covered to a great extent. Safety and neatness of projects is covered throughout the quarter.

Credit 2, Lab 5 hours per week

CAIM-122 **Basic Machine Shop II (DT)**
Registration #0270-122

In this course the student will be introduced to more advanced type of machining, such as, horizontal mills, precision grinding, layout, drilling and tapping, and additional bench work projects. Safety and neatness of work are stressed throughout the quarter. (0270-121 or equivalent)

Credit 2, Lab 5 hours per week

CAIM-123 **Machine Shop (AET)**
Registration #0270-123

This course is designed to introduce the student to hands on experience. Explanation and techniques are demonstrated to the student in precision measurement, tool grinding, engine lathe, drill press, layout and sawing. Safety and neatness of work is stressed throughout the quarter.

Credit 2, Lab 5 hours per week

CAIM-210 **Materials and Methods**
Registration #0270-210

Machine shop theory and techniques involving the basic machine tools, the practical application of cutting material, tool geometry, measuring and inspection, turning and milling, threads and threading, drilling and grinding work. Introduction of plastic and powder metal, its properties and processing method.

Class 3, Credit 3

CAIM-214 **Numerical Control**
Registration #0270-214 **Programming and Machining**

An introduction to the field of numerical control and N/C programming. Techniques for both manual and computer assist programming of cutter paths are practiced. Programs include: turning and milling in point to point, linear and circular interpolation modes, use of loops, macros, canned cycles and cutter compensation. Operation of state-of-the-art CAM computer, printer, plotter, bit pad, DNC and CNC controls included. (CAIM-120 or equivalent, CAIG-107 or equivalent)

Class 3, Credit 3

CAIM-218 **Tool and Gage Making**
Registration #0270-218

This course offers the student a basic knowledge of jigs and fixtures. Studies of the basic principles and construction of work holding devices: clamps, locators, supports and tool assemblies. Design consideration: economics, comparative cost analysis and practical application of jigs and fixtures. The actual development of a workable jig and fixture design. (CAIM-110, CAIM-120)

Class 3, Credit 3

CAIM-220 **Diemaking**
Registration #0270-220

Introduction to the manufacturing process of diemaking and related to the production process of stamping sheet and plate materials primarily but not necessarily metals.

Empirical (experience) and technical data is used to develop the details, techniques, and theories of cutting and forming processes of pressworking (stamping) dies.

Guidelines for the manufacture of die components, selection of proper die sets, and economical materials use is maximized. (CAIM-110, CAIM-231.)

Class 3, Credit 3

CAIM-222 **Metallurgy and Heat Treating**
Registration #0270-222

An introductory course in physical and mechanical characteristics of metals and alloys, crystal structure. Heat treating of steels and the use of the iron-carbide equilibrium diagram, transpiration diagram, hardenability of tool steels and alloy steels.

Class 3, Lab 3, Credit 3

CAIM-231 **Industrial Machine Shop II**
Registration #0270-231

Extensive use and refinement of machine tools, such as engine lathes, turret lathes, vertical mills, and surface grinders. Explanation and demonstrations on more difficult problems, assemblies and temporary tooling. Emphasis on neatness, time, quality and accuracy are stressed. (CAIM-120, CAIM-106 or equivalent)

Credit **4,** Lab 15

CAIM-232 **Intermediate Machine Tool**
Registration #0270-232 **Technology**

Complex part and assembly machining involving more advanced techniques on turning and milling centers and surface and cylindrical grinders. Principles of cutting theory and basic cutter grinding are discussed and demonstrated. Advanced manufacturing processes involving electro discharge machining (EDM) and numerical control (N/C) are introduced and applied. (CAIM-231)

Credit **4,** Lab 15

CAIM-233 **Advanced Machine Tool**
Registration #0270-233 **Technology**

This course teaches the manufacturing and assembly processes involved in building a die, jig or fixture needed to produce a piece part to print specifications.

Students manufacture a die, jig or fixture by utilizing standard machining techniques, and also special machines and equipment such as: electrical discharge machine (EDM), cylindrical grinder, jig bore, internal grinder, honer, radius dresser, and heat treating of 0-1 tool steel. Components and piece parts are inspected for conformance to the prints to insure print specifications and tolerances are correct.

Credit 4, Lab 15

Drafting Technology

CAID-110 **Principles of Blueprint Reading**
Registration #0271-110
To aid the student in reading, visualizing and interpreting basic blueprints in the industrial environment.

Class 3, Credit 3 [1]

CAID-147 **Blueprint Reading (EMT/PKG)**
Registration #0271-147
An introductory course which develops the concept of how and why engineering drawings exist. Drawings are sketched and interpreted. Mechanical, electrical, and hydraulics are studied including working with tolerances and geometric tolerancing.

Class 1, Lab 2, Credit 2

CAID-208 **Introduction to Computers**
Registration #0271-208
Presents computers terminology, functions and commands. Programs will be developed.

Class 5, Lab 5, Credit 3

CAID-210 **Manufacturing Processes**
Registration #0271-210
Manufacturing Processes will acquaint students with methods of fabricating which are used to convert ideas into usable products and/or machines.

Class 5, Credit 5

CAID-211 **Materials Selection**
Registration #0271-211
Investigates the use and conditions of materials in a product life cycle. The atomic, chemical and mechanical composition of materials, including the testing of materials will be studied.

Class 3, Credit 2

CAID-225 **Drafting Mechanics Lab**
Registration #0271-225
A hands-on experience with demonstrations of the laws of physics and the collection of data as a result of these experiments.

Lab 3, Credit 1

CAID-238 **Descriptive Geometry**
Registration #0271-238
Technical Descriptive Geometry is a survey of the theories and methods used to graphically represent the solutions to spatial relationship problems dealing with points, lines, and planes. Projections and multiview projection theories, visualization of points, lines, and planes, and solids, size and shape description, auxiliary views, developments, and intersections will be covered. Problems will be solved through sketching and instrument drawings. (This course satisfies the requirements of CTID-211 and 212.)

Credit **4**

CAID-239 **Technical Drawing II**
Registration #0271-239
Technical Drawing II will present technical information to analyze and prepare accurate mechanical production drawings from verbal instructions and engineers' sketches. Accuracy and neatness is stressed. Proficiency is developed in both coordinate and geometric dimensioning and tolerancing. Four significant working drawing projects will be accomplished, with consideration given to manufacturing processes and operations. (CAID-238)

Class 2, Lab 8, Credit 5

CAID-240 **Technical Drawing III**
Registration #0271-240
Will enable the student to interpret an engineer's design layout. The student individually and in a team setting will draw a complete set of working detail drawings, including a listing of manufacturing methods, materials, specifications, heat treatment and parts listed. (CAID-239)

Class 1, Lab 6, Credit 3

CAID-241 **Technical Drawing IV**
Registration #0271-241
This course applies the study of electronic components and graphic symbology to the practice of drawing schematic, block, and logic diagrams and printed circuit board layouts. A portfolio of drawings will be developed by the completion of the course.

Class 2, Lab 3, Credit 2

CAID-251 **CAD/CAM Printed Circuit**
Registration #0271-251 **Board Uyout**
This course is designed to cover all aspects necessary to produce the libraries, artwork, and documentation requirements of a CAD generated printed circuit board layout. To maximize CAD hands-on time, class size will be limited. (CAID-249 or equivalent)

Class 3, Lab 3, Credit 3

Automated Equipment Technology

CAIE-101 **Applied Physical Principles I**
Registration #0271-101
A course designed to give the students tools to measure and qualify the world around them in terms of physical laws. Areas of study to be linear motion, Newton's laws, friction, forces and equilibrium, and rotational motion. Both mathematical and graphical solutions to vector problems will be undertaken.

Class 3, Lab 2.5, Credit 3

CAIE-102 **Applied Physical Principles II**
Registration #0271-102
An extension of CAIE-101 this course proceeds to examine the properties of solids, liquids, and gaseous states of matter; heat and temperature; and harmonic motion as it applies to sound, light, and other electromagnetic radiations. (CAIE-101)

Class 3, Lab 2.5, Credit 3

CAIE-201 **Machine Devices/Systems**
Registration #0272-201
The student will learn, through hands on experience and study, the following areas: gears, chain drives, belt drives, pulleys, linkages, universals, differentials, bearings, cams, lubrication and friction, speed changes and braking.

Class 3, Lab 3.5, Credit 3

CAIE-202 **Hydraulic/Pneumatic**
Registration #0272-202 **Systems**
Basics of fluid mechanics are studied. Primary areas of study are pressure flow, viscosity, turbulence, work, energy and power. Hydraulic and pneumatic components such as pumps, motors, cylinders, flow and pressure control valves are studied along with fluid conditioning. Pneumatic logic and its application is studied.

Class 3.5, Lab 4, Credit 4

CAIE-203 **Electricity/Electronics I**
Registration #0272-203
To introduce the electrical circuit, basic principles of circuit action, and experience with circuit components and devices. Proper use of instruments needed to power and measure electrical circuit values will be taught. Analysis of series, parallel, and complex DC circuits will be conducted. Comparisons and contrast between electrical circuits are conducted. Comparisons and contrast between electrical circuits and other types of circuits encountered by the electromechanical technician, e.g., magnetic, hydraulic, mechanical will be pointed out.

Class 3, Lab 2.5, Credit 3

CAIE-205 **Electricity/Electronics II**
Registration #0272-205
Introduce the concept of alternating current. Study the generation of AC, analyze the action of AC resistive and reactive circuits, use appropriate equipment and instruments to analyze and diagnose AC circuits. Values peculiar to AC circuits will be studied (i.e., reactance, inpedance, phase angle, etc.). Both lab and mathematical techniques requisite to the analysis of AC will be taught. (CAIE-203)

Class 3, Lab 2.5, Credit 3

CAIE-211 **Rotating Electrical Machinery**
Registration #0272-211
Study will be made of AC and DC generators; of DC and AC motors, and of single and polyphase transformers. Basic generators and motors actions will be studied. Regulations, efficiency and power factor will be addressed. (CAIE-205)

Class 1.5, Lec./Dem. 1.5, Lab 3, Credit 3

CAIE-212 **Transducers & Control**
Registration #0272-212 **Systems**
Operation of input and output transducers (mechanical, fluid-mechanical, acoustic, thermal, optical, magnetic, chemical) and the interface and feedback systems they function within. She/he will be able to identify normal and abnormal operation of open and closed loop systems utilizing these transducers. (CAIE-211)

Class/Dem. 3, Lab 4, Credit 4

CAIE-215 **Electrical Control Systems**
Registration #0272-215
Students will examine basic methods of Electrical control circuits. Both Electro-mechanical and programmable controller devices will be examined. Safety features in control will be stressed, forward and reverse control, jogging, plugging, sequential control will be some of the features. (CAIE-205)

Class 1.5, Lec./Dem. 1.5, Lab 3, Credit 3

CAIE-221 **Electricity/Electronics III**
Registration #0272-221
Operation of basic electronic circuits (recifiers, amplifiers, oscillators, switching, wave shaping, timing) utilizing semi-conductors. Students will add, subtract, divide and multiply binary numbers and be able to construct logic circuits to perform logical operations. (CAIE-205)

Class/Dem. 4.5, Lab 4, Credit 4

CAIE-231 **Automated Equipment**
Registration #0272-231 **Systems Troubleshooting**
Experiences in diagnosing and correcting faults introduced into electromechanical systems. Emphasis will be placed upon the development of a systematic approach to troubleshooting. Students will be exposed to such items as logs, machine history, flow charts, and other reports generated by maintenance systems. (Units I, II, III)

Class 1.5, Lab 4, Credit 3

CAIE-298 **Special Studies**
Registration #0272-298
A flexible course designed to permit the Automated Equipment Technology student to pursue, in depth, some aspect of the technical fields. To be conducted in either the class or independent study mode. The credit will be based on the nature and extent of the study undertaken.

Credit 1-4

Packaging Mechanics

CAIP-201 **Introduction to Packaging**
Registration #0273-201
Role of the packaging person conduct, responsibilities, safety, packaging materials. Blueprint Reading.

Class 4, Credit 3

CAIP-206 **Packaging Machinery**
Registration #0273-206 **Systems I**
Product Filling: Types and methods of container filling. Bottle closing; capping, sealing, can closing; double seaming. (CAIP-201, 202)

Class **3,** Lab 2, Credit 2

CAIP-207 **Packaging Machinery**
Registration #0273-207 **Systems II**
Package labeling, coding, marking, imprinting, case packing, cartoning, wrapping, bundling, form fill sealing.

Class 5, Lab 2, Credit 4

CAIP-210 **Packaging Machines and**
Registration #0272-210 **Related Equipment**
Packaging line operations, handling of perishable products, refrigeration, pasteurization, support equipment.

Class 5, Lab 2, Credit 4

CAIP-215 **Package Machinery**
Registration #0273-215 **Troubleshooting and Repair**
Problems associated with packaging machinery, cause and correction. (CAIP-206, 207)

Class 4, Lab 2, Credit 4

CAIP-230 **Packaging Machinery Set-up**
Registration #0273-230 **and Operation**
Changeover procedures, adjustment, start-up, fine tuning.

Lab 6, Credit 2

Communication

CAIG-104 **Communication Skills**
Registration #0274-104
A review of basic skills in reading, writing, listening, speaking, study skills and time management.

Class 2, Recitation I, Lab 1, Credit 2

CAIG-105 **Communicating on the Job**
Registration #0274-105
An application of communication skills to entry-level jobs. Includes writing business letters and memos, giving and following directions, filing out forms, practicing interpersonal communications in simulated job scenes. (CAIG-104)

Class 3, Recitation 1.5, Credit 3

CAIG-220 **Composition: Written and**
Registration #0274-220 **Oral**
An emphasis on developing the college essay and on adapting the writing process to oral presentations. Topics include reasoning and persuasion, planning and organizing, developing and revising the expository essay. Documented library research paper is required.

Class 4.5, Credit 4

CAIG-206 **Technical Communication**
Registration #0274-206
An introduction to the principles of technical writing for the technician. Assignments typically relate to projects in the student's major field of study and include a proposal, short informal reports, instructions, and a formal technical report. An extensive Job Search Module prepares students to explore career options, then search, apply and interview for employment. (CAIG-105, 204)

Class 4.5, Credit 4

CAIG-210 **Interpersonal**
Registration #0274-210 **Communications**
An opportunity to explore and practice the communication skills that service technicians will use on the job. Emphasis will be focused on ways to work with customers and clients as a representative of the service organization. (0274-105)

Class 2, Credit 1

Mathematics

CAIG-106 **Industrial Mathematics**
Registration #0240-420
Topics include fractions and decimals; measurement; introduction to algebra; ratio and proportion; speeds and feeds, tapers, pulleys and gears; introduction to geometry and trigonometry with applications to machine tool and drafting.

Required of all first quarter students in Machine Tool Technology and Drafting Technology programs.

Credit 3, Recitation 4.5, Credit 3

Computer Service

CAIC-201 **Fundamentals of Computers**
Registration #0275-201
An introduction to electronic data processing. A study of basic computer theory, file storage media, input-output devices, binary and hexadecimal number systems and programming techniques.

Class 3, Recitation 3, Credit 4

CAIC-205 **Introductory Programming I**
Registration #0275-205
An interactive programming course utilizing the BASIC language. Emphasis is placed on development of skills necessary for the technician to communicate with a computer using the BASIC language.

Class 1, Lab 2, Credit 2

CAIC-212 **Electrical/Electronic**
Registration #0275-212 **Schematic Interpretation**
The student will learn to read and interpret various diagrams related to the servicing of computers. Drawings studied will be electrical wiring diagrams, schematics, logic and block diagrams and others found in service manuals.

Class 2, Credit 2

CAIC-202 **Computers I**
Registration #0275-202
The study of the organization and operation of microcomputers and microprocessors, with emphasis on CPU operation during machine and assembly program execution. Microprocessor instruction sets in regards to data transfer, arithmetic and logic instructions, and control over I/O devices will be studied. (CAIC-201, CAIC-212)

Class 3, Lab 4, Credit 4

CAIC-207 **Introductory Programming II**
Registration #0275-207
An interactive programming course utilizing the PASCAL language. Emphasis is placed on the development of skills necessary for the technician to communicate with a computer using the PASCAL language.

Class 1, Lab 2, Credit 2

CAIC-215 **Special Tool/Equipment Use**
Registration #0275-215
The care and use of special tools and testing equipment used to repair computers will be studied. The student will demonstrate proficiency in a lab situation. (CAIE-203, CAIC-212)

Lab/Dem. 2, Credit 1

CAIC-216 **Digital Circuits**
Registration #0275-216
A study of the logic concepts and circuits used in digital systems including measuring instruments, communications; and computers. Integrated circuits are used to demonstrate the digital techniques of gating, counting, storing, shifting, and converting. (CAIE-205)

Class 3, Lab 4, Credit 4

CAIC-203 **Computers II**
Registration #0275-203
The analysis of microcomputers with emphasis on system logic, timing and interfacing to I/O devices. Functional and in depth operation of these components will be studied, with use of diagnostic programs and digital test equipment. (CAIC-202, CAIE-205, CAIC-215)

Class 2, Lab 4, Credit 3

CAIC-209 **Introductory Programming III**
Registration #0275-209
An interactive programming course utilizing the FORTRAN language. Emphasis is placed on the development of skills necessary for the technician to communicate with a computer using the FORTRAN language.

Class 1, Lab 2, Credit 2

CAIC-218 **Linear Circuits**
Registration #0275-218
The properties of linear integrated circuits and their applications in power supplies, regulators, amplifiers, oscillators, and multivibrators will be studied. (CAIC-216)

Class 1.5, Lab 3, Credit 2

CAIC-204 **Computers III**
Registration #0275-204
The study of micro and mini-computer operating systems used in industry today. The student will learn file management, copy, backup, directory, and formating routines along with various methods of file protection. These commands will be used to communicate with the computer system during systems troubleshooting and preventative maintenance techniques. (CAIC-201)

Class 3, Lab 4, Credit 4

CAIC-211 **Introductory Programming IV**
Registration #0275-211
An interactive programming course utilizing the COBOL language. Emphasis is placed on the development of skills necessary for the technician to communicate with a computer using the COBOL language.

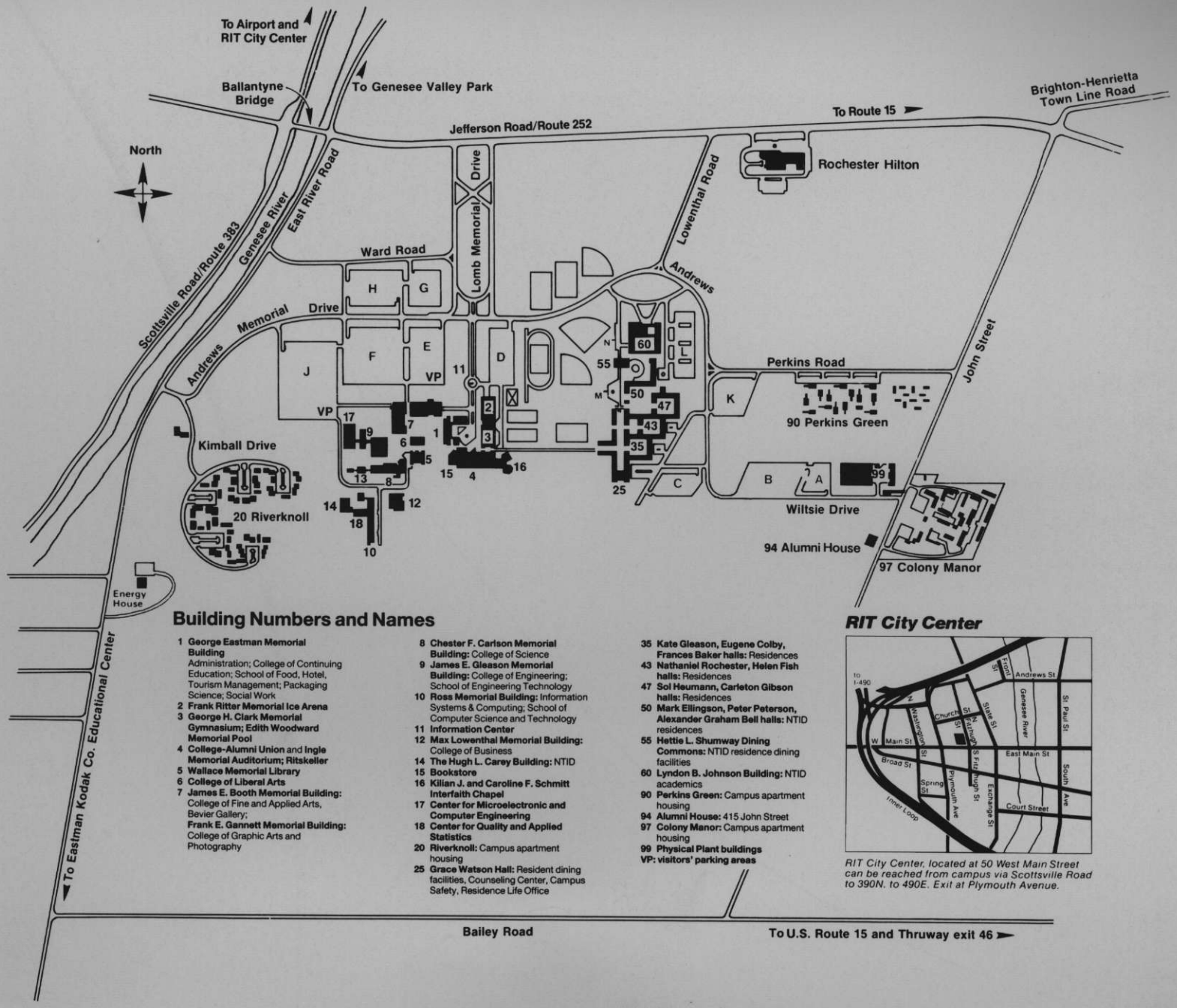
Class 1, Lab 2, Credit 2

CAIC-220 **Computer Systems**
Registration #0275-220 **Troubleshooting**
Hands on experience will be given in diagnosing and repairing faults in computers using documentation and tests equipment. A specific fault analysis approach will be taught that emphasizes a systematic approach to troubleshooting. (CAIC-203, CAIC-216)

Lab 15, Credit 5

CAIC-295 **Independent Research**
Registration #0275-295 **Project**
To allow the student to use the knowledge that he/she has learned in the Computer Service Program. Students will demonstrate this knowledge by doing a research project concerning computers and/or computer maintenance. Emphasis will be placed on not only the accomplishment of the experiment/project, but skills in writing a report documenting progress throughout the experiment/project. The student and faculty member(s) involved will submit, no later than ten class days, a project proposal with goals, tasks, and objectives for review and approval of the department chair and the director. The student will be expected to complete the assignment with minimal faculty supervision. The amount of credit awarded is dependent on the lab time and the amount of outside work required.

Credit 1-4, Lab 3



Building Numbers and Names

1 **George Eastman Memorial Building**
Administration; College of Continuing Education; School of Food, Hotel, Tourism Management; Packaging Science; Social Work

2 **Frank Ritter Memorial Ice Arena**

3 **George H. Clark Memorial Gymnasium; Edith Woodward Memorial Pool**

4 **College-Alumni Union** and **Ingle Memorial Auditorium; Ritskeller**

5 **Wallace Memorial Library**

6 **College of Liberal Arts**

7 **James E. Booth Memorial Building:** College of Fine and Applied Arts, Bevier Gallery;
Frank E. Gannett Memorial Building: College of Graphic Arts and Photography

8 **Chester F. Carlson Memorial Building:** College of Science

9 **James E. Gleason Memorial Building:** College of Engineering; School of Engineering Technology

10 **Ross Memorial Building:** Information Systems & Computing; School of Computer Science and Technology

11 **Information Center**

12 **Max Lowenthal Memorial Building:** College of Business

14 **The Hugh L. Carey Building:** NTID

15 **Bookstore**

16 **Kilian J. and Caroline F. Schmitt Interfaith Chapel**

17 **Center for Microelectronic and Computer Engineering**

18 **Center for Quality and Applied Statistics**

20 **Riverknoll:** Campus apartment housing

25 **Grace Watson Hall:** Resident dining facilities, Counseling Center, Campus Safety, Residence Life Office

35 **Kate Gleason, Eugene Colby, Frances Baker halls:** Residences

43 **Nathaniel Rochester, Helen Fish halls:** Residences

47 **Sol Heumann, Carleton Gibson halls:** Residences

50 **Mark Ellingson, Peter Peterson, Alexander Graham Bell halls:** NTID residences

55 **Hettie L. Shumway Dining Commons:** NTID residence dining facilities

60 **Lyndon B. Johnson Building:** NTID academics

90 **Perkins Green:** Campus apartment housing

94 **Alumni House:** 415 John Street

97 **Colony Manor:** Campus apartment housing

99 **Physical Plant buildings**

VP: visitors' parking areas

RIT City Center

RIT City Center, located at 50 West Main Street can be reached from campus via Scottsville Road to 390N. to 490E. Exit at Plymouth Avenue.

Rochester Institute of Technology

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