OFFICIAL BULLETIN

1964-1965

UNIVERSITY OF ROCHESTER

Undergraduate Studies

College of Arts and Science
College of Business Administration
College of Education
College of Engineering and Applied Science
Department of Nursing

SERIES 59 | NUMBER 4 | SEPTEMBER 1964

Bulletin of Undergraduate Studies 1964-1965

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Published by the University of Rochester, River Campus, Rochester, New York 14627 seven times a year—monthly in February, April, August, November and December; semi-monthly in September. Second-class postage paid at Rochester, New York.

OFFICIAL BULLETIN

UNIVERSITY OF ROCHESTER

COLLEGE OF ARTS AND SCIENCE
COLLEGE OF BUSINESS ADMINISTRATION
COLLEGE OF EDUCATION
COLLEGE OF ENGINEERING AND APPLIED SCIENCE
DEPARTMENT OF NURSING

The University of Rochester is interested in discovering the ways in which man's knowledge can be advanced, in applying those techniques to the important intellectual questions of our day, and in teaching its students the methods and fruits of this inquiry. The University is committed to no dogma except that knowledge is important for mankind, and to no technique except that all ideas merit serious consideration.

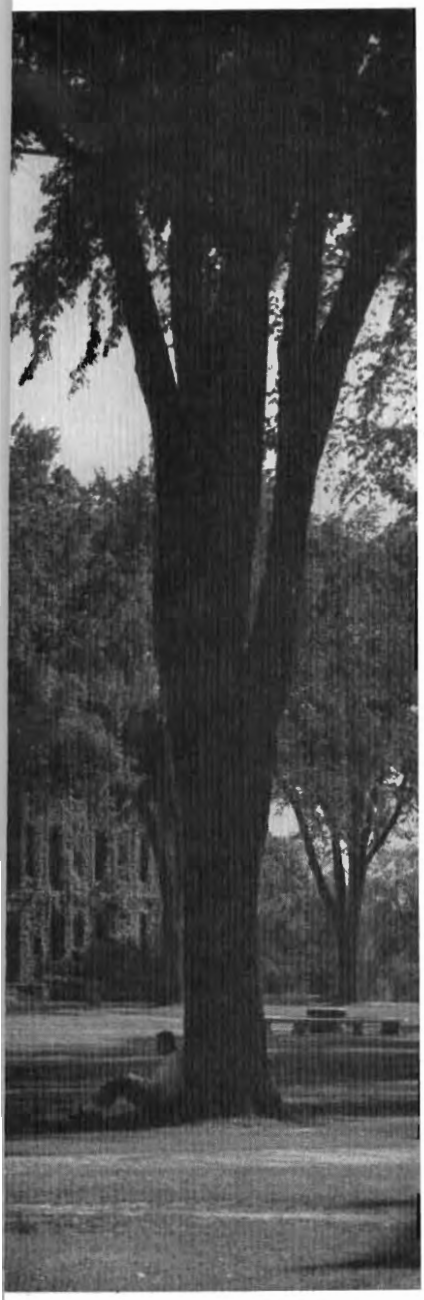
Calendar

FALL 1964

September	10—*Thursday*	Registration begins
	14—*Monday*	Classes begin
October	2—*Friday*	Last day for payment of undergraduate tuition
November	25—*Wednesday*	Thanksgiving recess begins at noon
	30—*Monday*	Classes resume
December	19—*Saturday*	Christmas recess begins after last class
January	4—*Monday*	Classes resume
	9—*Saturday*	Classes end
	12—*Tuesday*	Term examinations begin
	22—*Friday*	Term examinations end

SPRING 1965

January	27—*Wednesday*	Classes begin
February	12—*Friday*	Last day for payment of undergraduate tuition
March	20—*Saturday*	Spring recess begins after last class
	29—*Monday*	Classes resume
May	5—*Wednesday*	Dandelion Day
	14—*Friday*	Classes end
	17—*Monday*	Term examinations begin
	27—*Thursday*	Term examinations end
June	6—*Sunday*	Commencement



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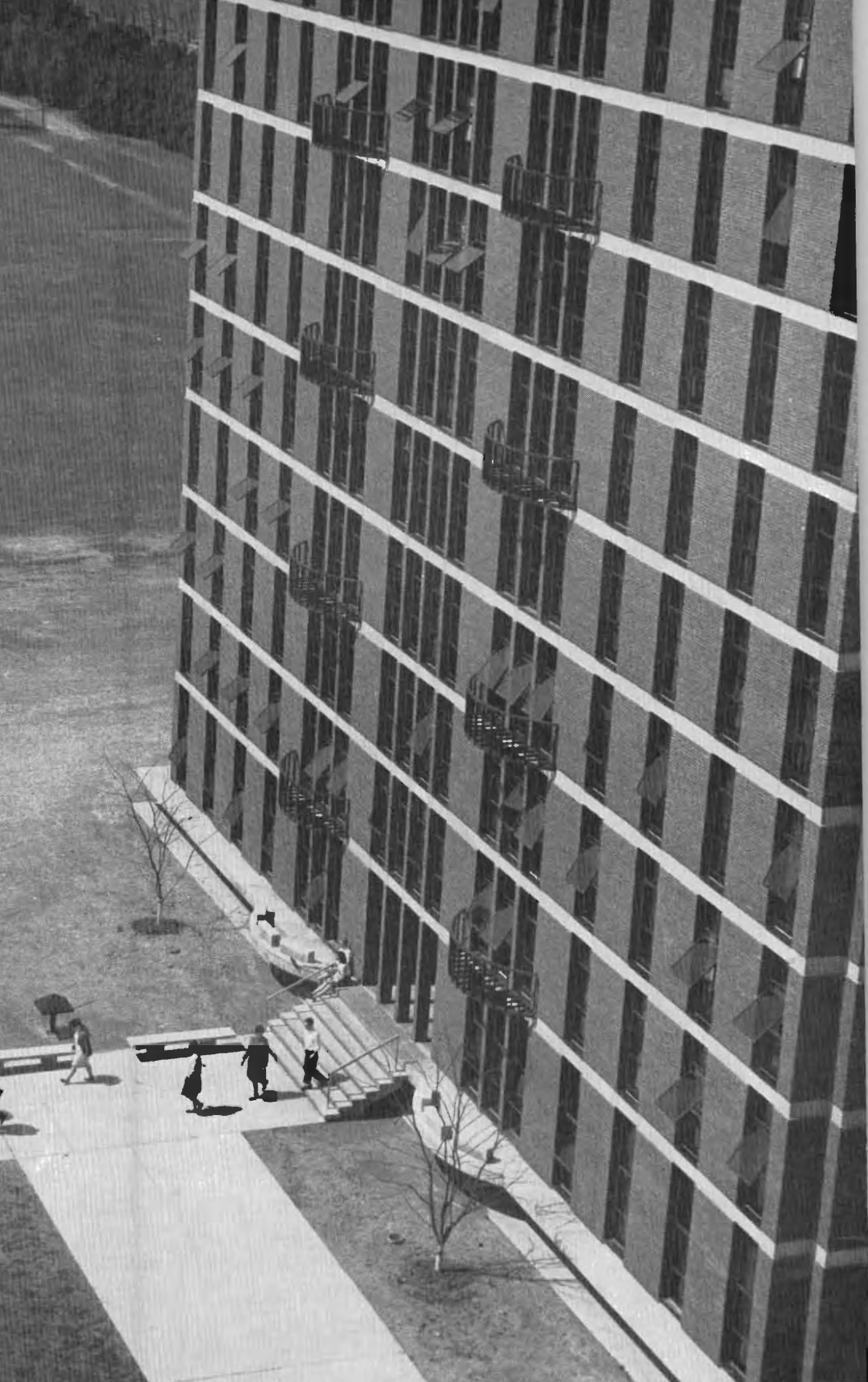


An Introduction to the University of Rochester

WE HOPE THAT the information about the University of Rochester presented herein will tell you a bit more about what life on the Rochester campus is like.

The University of Rochester was founded in 1850 as a small liberal arts college for men. It is now a coeducational, independently supported, nonsectarian institution.

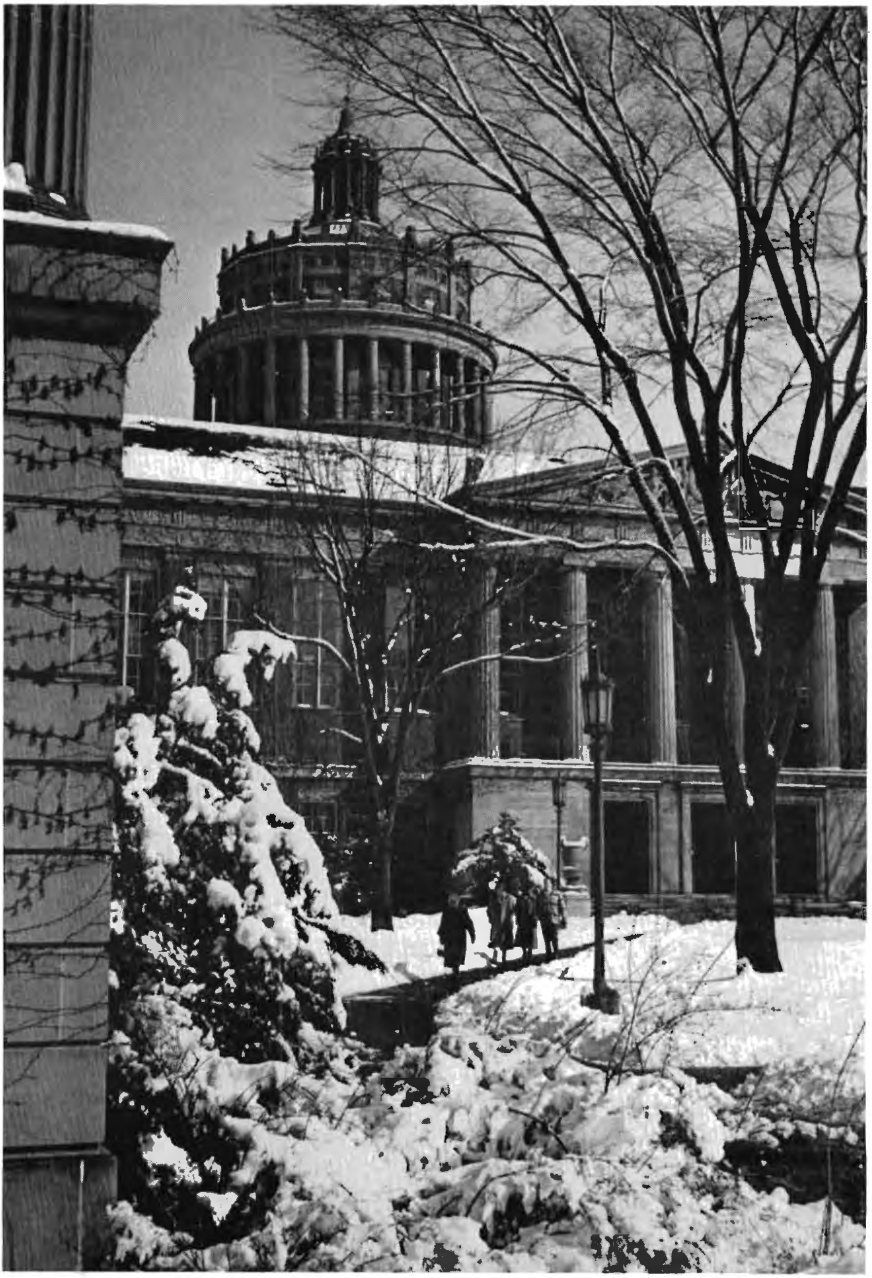
The University consists of seven colleges and schools. On the River Campus are the College of Arts and Science, which offers degree programs in twenty-two fields; the College of Engineering and Applied Science, with programs in chemical engineering, electrical engineering, mechanical and aerospace sciences, and optics; the College of Education, with programs in elementary and secondary school teaching; the College of Business Administration; and University School of Liberal and Applied Studies.

The University Medical Center, adjoining the River Campus, houses the School of Medicine and Dentistry, including the Department of Nursing; Strong Memorial Hospital, including the Wing R Psychiatric Clinic and the Rehabilitation and Diagnostic Clinic; and the Atomic Energy Project, conducted by the Department of Radiation Biology under contract with the Atomic Energy Commission.

The University's School of Music, in downtown Rochester, has its own academic buildings and a residential campus which it shares with the University's Memorial Art Gallery.

The College of Arts and Science is the heart of the River Campus complex. It will be the center of your academic life during your first two years at the University. If you plan to take a professional program in engineering, education, business, or nursing, you will enter the appropriate professional unit at the start of your junior year. Those of you who enter nursing will change your residence from the River Campus to the Medical Center. If you are eventually going to concentrate on the humanities, the social sciences, or the natural sciences, all four years of your undergraduate work will be done in the College of Arts and Science. Every college or school of the University demands through its curriculum and the quality of its faculty, the highest standards of performance from you.

You will find a 780,000 volume central library—supplemented by departmental and college libraries—offering you vast resources for perusal, study, and research.



You will be studying at an institution where both undergraduate and graduate work is pursued; where the search for new knowledge is as important as the dissemination of existing knowledge; where new facts, new theories, and new discoveries frequently may be discussed in your seminars long before they are published.

You will find that a number of the University's professors are among the nation's most eminent men in their respective fields. And, because a University setting brings together persons from many different fields, you will find a breadth of interest and background that is exciting and rewarding, as well as an awareness of the interdisciplinary approach that characterizes much of today's higher education.

You will find your classmates to be among the best students graduating from their high schools, for this is the caliber of student admitted to the University of Rochester. Full-time undergraduate enrollment on the River Campus currently totals some 2450 students, and intellectual competition is vigorous and keen.

Your fellow students will come from all parts of the United States and many parts of the world. Many of them will have plans and career interests different from yours; their experiences, backgrounds, attitudes, and training will be different. In your residence hall, fraternity house, or in the recreation center, you will live, eat, and talk with your undergraduate colleagues and graduate students as well. They will be studying comparative religions and political systems, biophysics, geography, chemistry, optics, investment management, nuclear physics, brain research, magnetohydrodynamics, modern art, educational psychology, narrative writing, Canadian studies, mathematical logic, Russian and Chinese—to name but a few.

Because you will be admitted to the University of Rochester as a student of some maturity, you will be treated as such, responsible for your own actions, activities, and work. Advisers, counsellors, deans, professors, instructors, and specialists will be available to help you, but they won't "oversee" you.

You will be given more responsibility for independent study than you have ever had before. Your required reading will be anywhere from three to five times greater than that expected of you in high school. You will be responsible for the amount and quality of work you do, and how you budget your time.

Budgeting of time will not always be easy for you. You will be encouraged to explore interests other than your area of major study, whether these interests be at the University's Memorial Art Gallery or at the Eastman School, at the Medical School, the Institute of Optics, or the Computing Center. You will find more extra-curricular activities going on than your time allows: an extensive program of intra-mural and inter-collegiate athletics; frequent coffee hour meetings with faculty members and visiting guests; symposia on the arts, sciences, and international affairs; colloquia in music, medicine, and the sciences; conferences on religion, poetry, and United States foreign policy; festivals of music, art, and the theatre; student government and fraternity meetings; concerts and plays.

The "mechanics" of your education will be different, too. For the most part, your work each semester will consist of only four courses; this is to enable you to concentrate intensively on each subject area. Some of your classes—certainly during your freshman year—will be taught in lecture fashion, with as many as 150–300 students in the class; for in this manner, the Uni-

versity can enable every student, rather than just a portion of the class, to hear outstanding lecturers. Smaller discussion sections will supplement the lectures. The discussion sections will be conducted by instructors—and, in some cases, graduate assistants—who will expect you to have done all of the assigned reading and to have thoroughly assimilated your lecture notes.

If you continue in the College of Arts and Science you may have an opportunity to participate in the University's Honors Program beginning in your sophomore or junior year. The Honors Program is offered in comparative literature, economics, English, history, philosophy, and political science, and is of special interest to those students desiring a high degree of intellectual challenge.

You also may find yourself in a situation to study at a foreign university during your junior year, for at the University of Rochester the rewarding opportunity for such study is available to superior students.

In short, your life as an undergraduate at the University of Rochester will be different, demanding, and multi-faceted. But throughout that life, you will be a member of an intimate, tightly-knit college community. You will be governed by a College Cabinet whose members you will help elect. You will be kept informed of campus affairs by your own student newspaper and radio station. You will live on a residential, self-contained, and attractive campus—one that has an "in the country" atmosphere, yet is within a ten or twelve minute drive from downtown.

You will be a student at a University which has distinctive features and unusual strengths. It is for you to evaluate those features and strengths in terms of your needs and in terms of what you want to get out of your college education. We hope that you will want to apply for admission to the University of Rochester. We hope, too, that your application will be a reflection of your decision that the University of Rochester is *the* institution offering you the best chance of achieving the goals you have set for yourself.

The Academic Units

THE UNIVERSITY OF ROCHESTER is accredited by the Middle States Association of Colleges and Secondary Schools and is a member of the Association of American Universities.

A brief description of the University's major divisions follows: Information on undergraduate courses appears on pages 88 to 208.

COLLEGE OF ARTS AND SCIENCE, oldest of the University's academic units, provides undergraduate and graduate courses in the humanities, the natural sciences, and the social sciences. It offers degree programs in twenty-two fields. Undergraduate programs lead to either a Bachelor of Arts or a Bachelor of Science degree; graduate programs, to a Master of Arts, Master of Science, or Doctor of Philosophy degree.

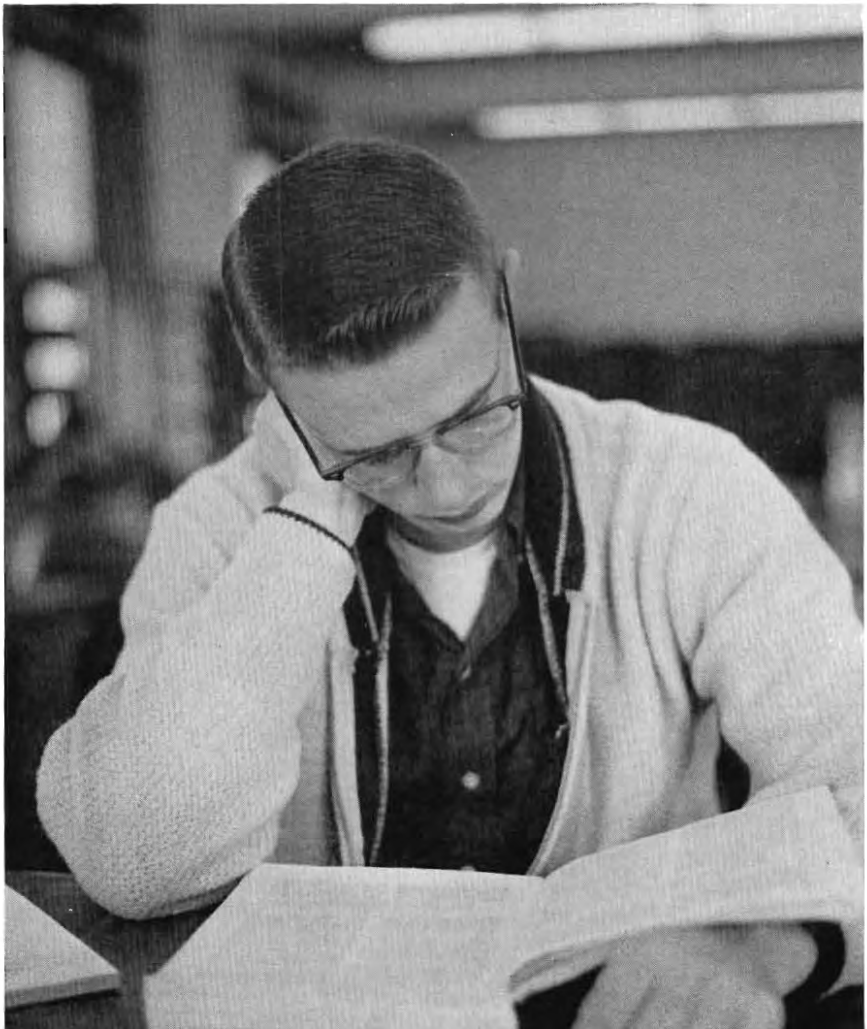
COLLEGE OF BUSINESS ADMINISTRATION offers, on a broad base of two or more years of study in the liberal arts, professional courses leading to a Bachelor of Science with a major in business administration, accounting, or industrial management. Graduate study leads to a Master of Business Administration (M.B.A.) or Master of Science (M.S.).

COLLEGE OF EDUCATION provides undergraduate and graduate courses in teacher education. Degrees offered are Bachelor of Science with majors in elementary or secondary education, Master of Education, Master of Arts in Education, Doctor of Education, and the Certificate of Advanced Study for completion of Specialist in Education programs.

College of Engineering and Applied Science, an upper-division and graduate-level college, offers work leading to the Bachelor of Science, Master of Science, and Doctor of Philosophy degrees with a major in chemical engineering, electrical engineering, mechanical engineering, and in optics. The College has a broad range of research activities and an organized program of service to industry via consultation, seminars, and conferences.

School of Medicine and Dentistry, located in the University Medical Center, offers a four-year program leading to the Doctor of Medicine degree; undergraduate and graduate programs in nursing; programs of postdoctoral medical education including internships and residencies in medicine and dentistry; postdoctoral programs in preclinical and clinical sciences, occupational medicine and dentistry; graduate studies in the preclinical sciences; radiation biology, and health physics.

Department of Nursing (School of Medicine and Dentistry) offers study leading to the Bachelor of Science with a major in nursing. Bachelor of Science with a major in general nursing, and Master of Science with a major in nursing education.



Eastman School of Music, which has its own academic buildings and residential campus, offers programs leading to the degrees Bachelor of Music, Master of Arts in Music, Master of Music, Doctor of Philosophy in Music, and Doctor of Musical Arts. The Eastman School participates with the College of Arts and Science in a program leading to the Bachelor of Arts with a major in music. Students of other divisions of the University also may elect music courses at the School.

University School of Liberal and Applied Studies provides university training to persons who cannot attend one of the other schools of the University, or whose needs are not met by the programs of such schools. Most classes are held in the late afternoon, the evening, or on Saturdays. Courses not generally given in the College of Arts and Science are available in University School to students of the College. University School also provides courses leading to a Bachelor of Science degree with a major in general studies, and a master's degree with a major in industrial statistics or applied mathematics.

GRADUATE STUDIES

The first graduate degree in course, Master of Arts, was voted by the Board of Trustees of the University in 1851. With the establishment of the Schools of Medicine and Music, the expansion of University library facilities and the provision of equipment and fellowships for research in the College of Arts and Science, graduate work developed rapidly during the 1920's. Following the steady expansion of graduate work at the University during the next three decades, it was decided in 1957 to decentralize much of the administrative control of work leading to advanced degrees. Currently each college or school in the University is responsible for recommending candidates for master's degrees. The work for the degree Doctor of Philosophy is under the general control of the University Council on Graduate Studies which recommends to the Board of Trustees the candidates for this degree. Each school of the University has an Associate Dean charged with the responsibility of administering graduate work.

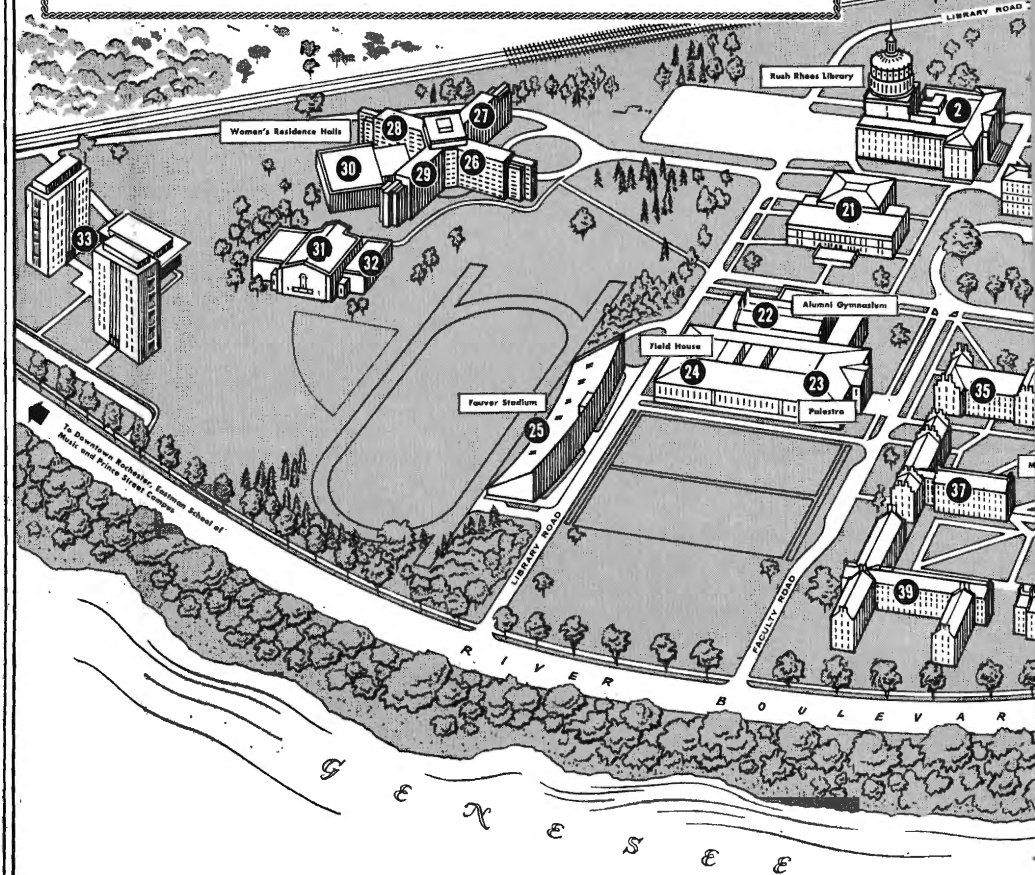
EVENING AND SUMMER SESSIONS

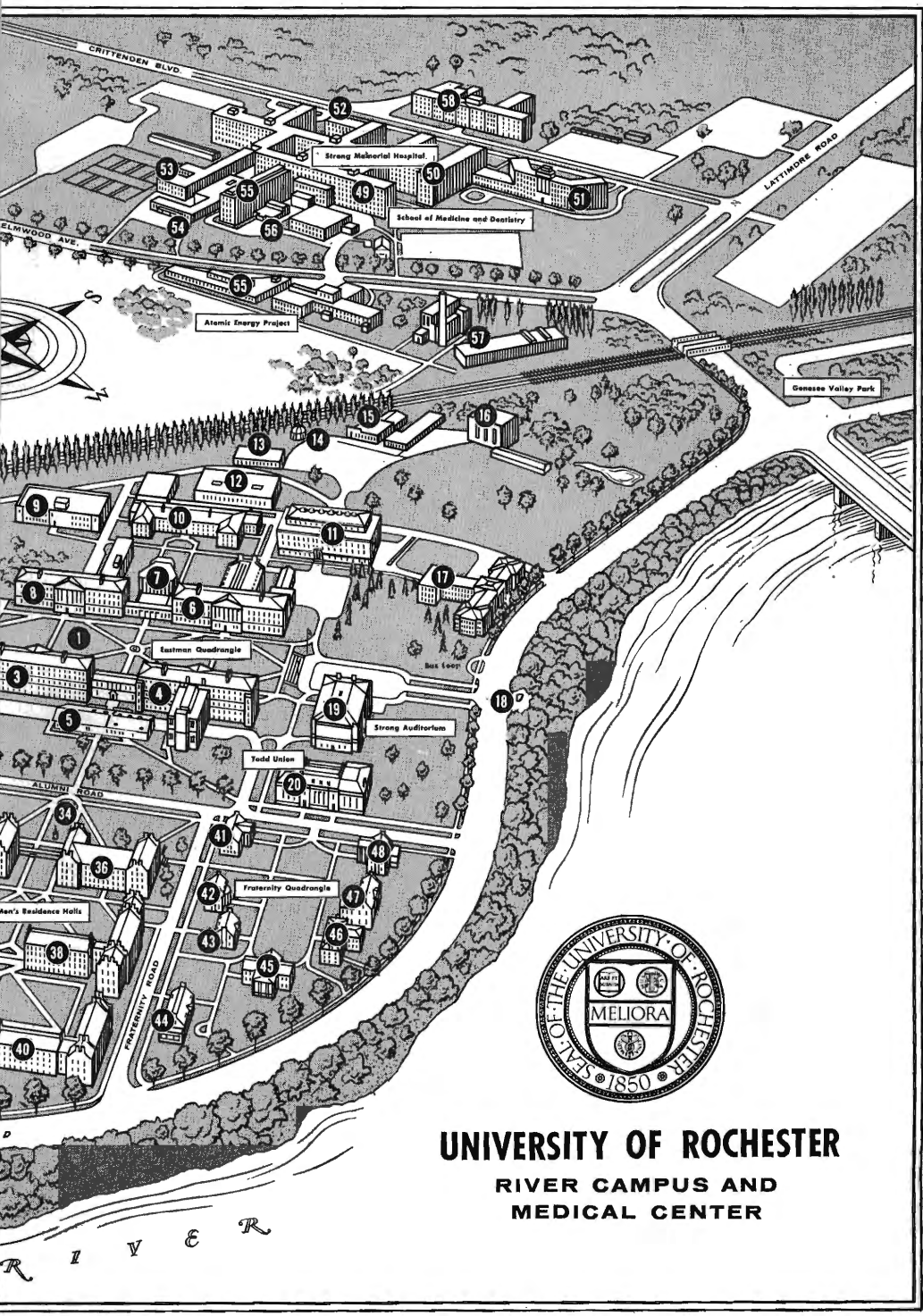
Evening Session provides offerings primarily designed for part-time students. Six academic units participate in the River Campus Evening Session. The College of Arts and Science and the College of Engineering and Applied Science give programs leading to the master's degree. The Colleges of Business Administration and Education and the Department of Nursing offer both undergraduate and graduate instruction. Part-time students planning to earn bachelor's degrees in one of the University's professional colleges are registered in the University School of Liberal and Applied Studies until admitted to the school or college of their choice.

Summer Session classes, first held in 1921, are offered on the River Campus and at the Eastman School of Music. Undergraduates at the University of Rochester and from other colleges and universities may take summer instruction and transfer credits earned to their own institutions. River Campus undergraduates may complete requirements for a degree in less than four years by attending Summer Session. Courses of interest to teachers, nurses, and others who desire to do regular college work during the summer are included in the River Campus summer offerings.

KEY

1. Eastman Quadrangle and Eastman Centennial
2. Rush Rhees Library
3. Morey Hall
4. Lattimore Hall
5. Brain Research Center
6. Dewey Hall
7. Hoyt Hall
8. Bausch & Lomb Hall
9. Harkness Hall
10. Gavett Hall (Engineering)
11. Hopeman Engineering Building
12. Taylor Hall
13. Particle Physics Building
14. Observatory
15. Cyclotron Control Building & Laboratory
16. Cyclotron (240,000,000 volt)
17. Administration Building
18. Swinburne Boulder & River Walk
19. Strong Auditorium
20. Todd Union
21. Men's Dining Hall
22. Alumni Gymnasium
23. Palestra
24. Field House
25. Fauver Stadium
26. Anthony Hall
27. Morgan Hall
28. Hollister Hall
29. Gannett Hall
30. Danforth Hall
31. Women's Gymnasium
32. Alumnae Swimming Pool
33. The Towers—Undergraduate Residence Halls
34. Martin Brewer Anderson Statue
35. Crosby Hall
36. Burton Hall
37. Heeing Hall
38. Lovejoy Hall
39. Gilbert Hall
40. Tiernan Hall
41. Delta Upsilon Fraternity
42. Phi Epsilon Pi
43. Sigma Chi
44. Theta Delta Chi
45. Psi Upsilon
46. Theta Chi
47. Alpha Delta Phi
48. Delta Kappa Epsilon
49. School of Medicine & Dentistry
50. Strong Memorial Hospital
51. Wing "R" Psychiatric Clinic
52. Rehabilitation & Diagnostic Center
53. Staff House
54. University Supplies & Accounts Bldg.
55. Atomic Energy Project (Wing "Q")
56. Radiation Therapy Center
57. Power Plant
58. Helen Wood Hall—Dept. of Nursing Dormitory





UNIVERSITY OF ROCHESTER

RIVER CAMPUS AND MEDICAL CENTER

River Campus Facilities

*2. ***Rush Rhees Library,*** center of the University Library system, contains some half-million volumes of the University's total of 780,000 volume collection. Annually, more than 6,200 periodicals are received by the University Library.

In Rush Rhees Library are regularly used books and periodicals for assigned and collateral course reading and a number of important collections. Outstanding collections include the papers of William H. Seward, Thurlow Weed, and Thomas E. Dewey.

In the Treasure Room are rare books, first editions, priceless manuscripts. The Welles-Brown Room, a browsing room in Rush Rhees, contains choice editions of the classics and a selection of the best work of modern authors.

Also centralized in Rush Rhees Library are the Department of History and some offices of the Department of Psychology and English.

Other University libraries are the Sibley Music Library at the Eastman School of Music, the Memorial Art Gallery Library, and the Edward G. Miner Library at the School of Medicine and Dentistry. All libraries are under the same administration and are joined by a delivery system which makes any book in the total collection available to any campus.

3. ***Morey Hall*** contains the classrooms and offices of several of the liberal arts departments, the office of the Dean of Students, the administrative offices of the College of Arts and Science, and the Laboratory of Psychology.

4. ***Lattimore Hall*** houses the Department of Chemistry and the national editorial offices of the *Journal of the American Chemical Society.*

5. ***The Brain Research Center*** houses 20 research and training laboratories, graduate seminar rooms, and animal quarters for research activities.

6. ***The Chester Dewey Building*** is shared by the Departments of Biology and Geology and Geography, and the College of Business Administration.

7. ***The Elizabeth Hoyt Hall*** provides special facilities for science demonstrations, lectures, and special meetings and conferences.

8. ***The John J. Bausch-Henry Lomb Memorial Laboratory,*** housing the Department of Physics and Astronomy, has special facilities for research including a cyclotron capable of producing eight-million volt protrons for nuclear research. A new building adjoining the main physics building provides space for programs in physics, astronomy, mathematics, and optics.

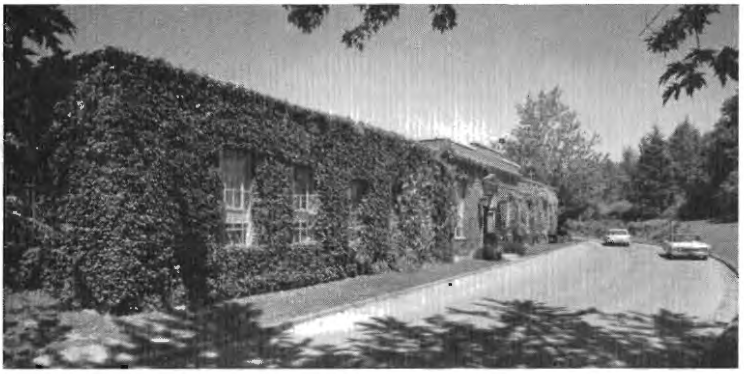
*Numbers refer to location on Campus map on pages 14 and 15.

9. ***Harkness Hall,*** the naval and air science building, contains classrooms, a practice range, naval reference library, and other facilities for the instruction of the Naval Reserve and Air Force Officers' Training Corps units, and offices of the Departments of Anthropology, Economics, Political Science, and Sociology.

10. ***Gavett Hall,*** of the College of Engineering and Applied Science, provides classrooms, laboratories, offices, and shop facilities for instruction and research in chemical and mechanical engineering and for instructional and research programs in optics. In addition to the large inventory of instruments and equipment required by a modern College of Engineering and Applied Science,

the laboratories at Rochester include such specialized equipment as a zero-power nuclear reactor, 48 amplifier analog computer, shock tube, X-ray diffraction apparatus, and spectrophotometer. Gavett Hall also houses a modern energy conversion laboratory which includes facilities for magnetohydrodynamics and hypersonic gas dynamics studies.

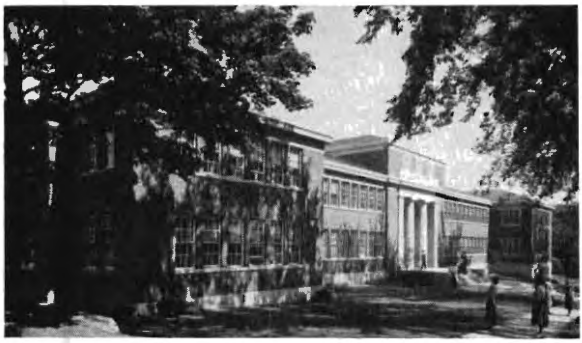
11. ***Hopeman Engineering Building*** is the four-story headquarters for all offices and laboratories of the Department of Electrical Engineering and more than half of the facilities for the Department of Mechanical and Aerospace Sciences. Facilities provided for electrical engineering by this new building include: seven major research laboratories (such as communications, an acoustics, a microwave, a servomechanisms and two special project laboratories), nineteen faculty offices, fourteen research laboratories for graduate students, and five graduate study rooms. Facilities provided for mechanical and aerospace sciences include: research laboratories for fundamental studies in energy conversion, gas dynamics, materials science, and related projects. Some areas of the Hopeman Building are occupied by the College of Education. One such area is a new science education laboratory for use by area science teachers and the University's education students.



12. ***Taylor Hall*** is headquarters of the College of Education and of the Computing Center.

13. A research building for the particle physics-cosmics ray program was constructed in 1958 with funds from the Atomic Energy Commision.

15–16. A large cyclotron and an associated laboratory are used for producing 240-million-volt protrons and investigating nuclear phenomena at these energies. An additional building providing augmented research facilities for the cyclotron program was completed in 1957. This project is supported by the United States Atomic Energy Commission.



17. ***The Administration Building,*** facing on River Boulevard, houses the central University administrative offices, offices of the University registrar and bursar, and the headquarters of University School of Liberal and Applied Studies.

19. ***The Henry Alvah Strong Auditorium*** contains a large hall used for many University functions, and an organ given by Mrs. Henry Alvah Strong. On a lower floor is a lecture room accommodating 500 persons. These two halls are used for assemblies, lectures, Chapel, stage productions, concerts, and other events.

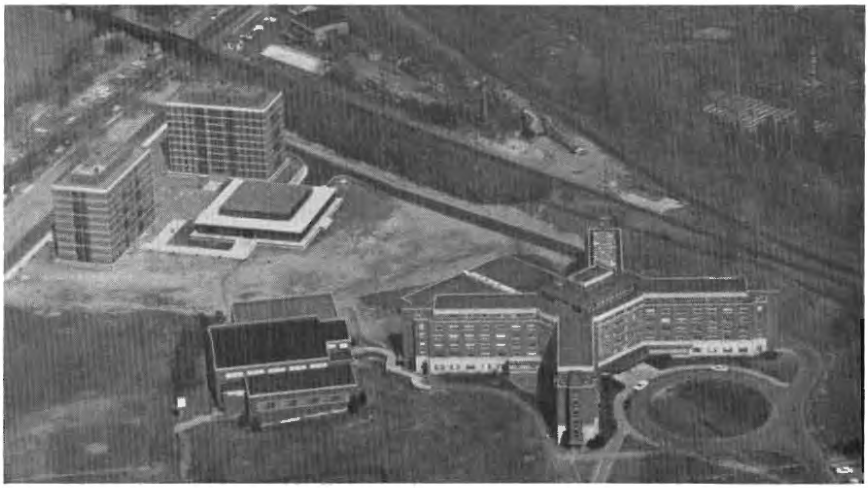
20. ***Todd Union,*** facing the men's residential area, is the student center. It has offices and meeting rooms for extra-curricular groups such as religious organizations, the campus newspaper, the campus radio station, glee clubs, and student government.

21. ***The Men's Dining Hall's*** first and second floor facilities include a spacious students' lounge and a main student dining hall with three small rooms. The University Bookstore is located on the first floor. The third floor houses seminar and meeting rooms and the quarters of the Placement Office. The fourth floor of this building is occupied by the University Faculty Club.

22–24. ***Alumni Gymnasium*** for men houses facilities for the Department of Physical Education. These include the main gymnasium, a natatorium seating 500 and containing a seventy-five by thirty-foot swimming pool, a basketball palestra seating 2,200, a large field house, handball and squash courts, and wrestling rooms.

25. ***Fauver Stadium*** is a permanent grandstand at the main athletic field. It seats 6,000 spectators and provides accommodations for contestants in football and other intercollegiate sports. The Sculpture Studio and offices of the Department of Languages and Linguistics are located in the building.

26–30. ***The Women's Residence Halls*** consist of residential facilities for 630 women and a connecting gymnasium with swimming pool. The residence center is divided into four wings, each of which is a separate unit with its own lounges, dining hall, and head resident. This arrangement provides an intimate and informal atmosphere. The four dining halls are so planned that they may be opened into one large area for dances or all-college suppers. A music room and a library are included in each of the units, and each lounge opens on a terrace. Other facilities are a large game room for coeducational use, snack bar, floor lounges, and a clinic and infirmary.



33. ***The Towers,*** two nine-story buildings, house 520 upperclass students, men and women. Women students live on floors four, six, and eight in each building; men occupy the other floors. Apartments for faculty families are located on the main floor and floors four and seven in each hall. Accommodations for students living in the Towers are arranged in six and four person suites, with a lounge, individual rooms and a bath for each unit. An adjacent dining room accommodates the residents of the buildings. The office of the Honors Program and a lounge area for students are located in the Solarium of the East Tower.

35–40. ***Crosby, Burton, Lovejoy, Hoeing, Tiernan, and Gilbert Halls*** form a pleasant men's residence area adjacent to Fraternity Quadrangle with accommodations for approximately 1,100 students.

41–48. ***Fraternity Quadrangle*** is comprised of houses built by eight national fraternities under a restricted agreement with the University. They are Alpha Delta Phi, Delta Kappa Epsilon, Delta Upsilon, Kappa Nu, Psi Upsilon, Sigma Chi, Theta Chi, and Theta Delta Chi.

Now under construction at the University are a graduate students' living complex and a nuclear structure laboratory. The graduate living complex, scheduled for completion in May, 1965, will provide 194 apartments. The nuclear structure laboratory, to be erected on the University's South Campus, is expected to be in operation by the fall of 1966.

THE MEDICAL CENTER

THE UNIVERSITY MEDICAL CENTER is located on a 60-acre tract adjacent to the River Campus. It contains some 1,000,000 square feet of floor area and was one of the first medical units in the country to house both medical school and hospital in a single building. Strong Memorial Hospital has a total bed capacity of 700 and provides unusual facilities for clinical teaching. Current enrollment at the Medical School is 290 students.

The principal units of the center are:

Strong Memorial Hospital, with a capacity of 700 beds, is a teaching hospital. It is devoted to the care of the sick in internal medicine, surgery, pediatrics, obstetrics-gynecology, and psychiatry.

Wing R Psychiatric Clinic, opened in 1948, is concerned with the study and care of patients whose illnesses promise improvement under modern therapy.

Helen Wood Hall contains academic and residence facilities of the Department of Nursing of the School of Medicine and Dentistry.

Rehabilitation and Diagnostic Center is a new self-contained unit with equipment and specialists on hand for treatment of the chronically ill. Facilities include areas for physical therapy, occupational therapy, an evaluation clinic, and speech and hearing clinics. Located on the third floor of the Center is the Children's Rehabilitation Unit which contains 15 beds and a full appointment of services for the rehabilitation of children.

The Atomic Energy Project, a center for research on medical aspects of atomic energy, is conducted by the Medical School's Department of Radiation Biology under contract with the United States Atomic Energy Commission.

FACILITIES OF THE EASTMAN SCHOOL OF MUSIC

The Eastman School's academic buildings in downtown Rochester contain facilities for instruction, research, practice, and performance. The main building, a five-story structure, and its eleven-story annex house classrooms, studios, practice rooms, and offices. The 500-seat Kilbourn Hall auditorium and the 3,355-seat Eastman Theatre, both integral parts of the School, are used for performances by Eastman School groups, by the community's major orchestras, and by visiting artists and ensembles. The School's Sibley Music Library is believed to house the largest collection of music literature and source materials of any music school in the world.

The residential campus on Prince Street, within easy walking distance of the School, contains men's and women's living centers, a student union, and recreational facilities. Nearby Hutchison House provides additional facilities for recitals, social events, and professional meetings. Eastman School has a current enrollment of approximately 420 undergraduate students and 205 graduate students.

THE MEMORIAL ART GALLERY

The Memorial Art Gallery, center of creative art activities for students and for the entire area, shares the Prince Street campus with the Eastman School of Music. Its increasingly important permanent collection totals 40,000 works in a $4,000,000 collection of paintings, sculpture, frescoes, tapestries and other art treasures. These serve as invaluable teaching aids to the University's Fine Arts Department. Outstanding among its possessions are paintings by El Greco, Rubens, Matisse, Picasso, Strozzi, Delacroix, Courbet, Gilbert Stuart, Winslow Homer, Monet, Degas, Renoir, and others.

Year-round services of the Art Gallery include scholarships for underprivileged children, special classes for the handicapped and aged, a lending library of more than 200 original works, and lectures and demonstrations at schools, hospitals, industrial plants and other institutions. The Gallery also sponsors an annual Clothesline Show, one of the nation's largest outdoor art shows.

The Gallery's Creative Workshop, consisting of more than ninety classes, has an enrollment of 1500 people in painting, sculpture, ceramics, weaving, and enameling classes.

Admissions

GENERAL STATEMENT

THE Committee on Admission seeks to admit young men and women who are well-equipped to take full advantage of the University's resources, who are strongly motivated to contribute their best efforts and mature enough in outlook to assume responsibility in the University community.

Selection starts with and then goes beyond the essentials of sound academic preparation and good potential for further learning. The Committee on Admission is vitally interested in an applicant's character, his accomplishments in extracurricular and community activities, his job experiences, his career goals and his personal philosophy and aspirations. A conscientious effort is made to select students who will make up a freshman class varied in interests, talents, goals and in social and economic background.

Careful consideration is given to all the evidence presented by candidates for admission. This evidence includes the secondary school record, results of College Entrance Examination Board tests of aptitude and achievement, the school recommendation and the student's own report in the application of his personal development.

Recommended Subject Preparation

The Committee on Admission places emphasis upon the quality of the applicant's secondary school record rather than upon any prescribed pattern of courses and credits.

In determining the quality of an applicant's secondary school record the committee is influenced by the type of courses selected by the applicant and the level of achievement in those courses. Sound preparation includes the study of English, social studies, foreign languages, mathematics and the laboratory sciences. Applicants for admission to engineering and science programs should include as much mathematics and laboratory science work as possible within the limits of their secondary school offerings.* The Committee values highly the more rigorous and challenging courses offered by many schools often referred to as "enriched," "honors," "accelerated," Advanced Placement, or by other similar terms.

Application Procedure

All applicants are required to make application on forms which are provided on request. These forms must be accompanied by an application fee of $10.00 which is non-refundable. Included with all application forms for admission is a sheet of instructions outlining the steps to be taken in completing the application for admission.

Applicants for admission are encouraged to submit their applications between October 1 and January 15 of the final year in secondary school. Applicants are also required to take the College Entrance Examination Board Scholastic Aptitude and Achievement Tests. It is to the advantage of the applicant to take either December or January tests (see section on Scholastic Aptitude and Achievement Tests on page 29). Applications completed before January 15 will receive best consideration.

Applicants for the degree Bachelor of Arts with concentration in music should request application forms from the Director of Admissions of the River Campus Colleges. The forms for this program will include a supplementary resume of musical training as well as reports by music teachers. All parts of the application (except music teacher report forms) should be returned to the Director of Admissions. Applicants should also communicate directly with the Director of Admissions of the Eastman School of Music to arrange for an audition or recording. Decisions on applications for admission to this program will be made after the musical qualifications of the candidate have been evaluated by the Eastman School of Music Admissions Committee. These applicants pay the regular $10.00 application fee.

Personal Interview

Applicants are encouraged to arrange a personal interview on campus whenever possible. Although not a requirement for admission consideration, such an informal conference is usually very helpful in making college plans. It affords the applicant an opportunity to gain a first-hand impression of the college. There is no adequate substitute for this in determining a college choice. Applicants are urged to arrange appointments during the summer and fall

*Chemistry is required as preparation for the B.S. degree in Chemistry, Chemical Engineering and Biology. Physics is required for the B.S. degree in Physics and Astrophysics and recommended for all departments in the College of Engineering and Applied Science.

months and to avoid February and March when applications are being processed. Appointments should be made by letter or telephone.

The Admission Office is open for appointments on weekdays from 9 A.M. to 5 P.M. and on Saturdays from 9 A.M. to Noon. The office is closed on Saturdays from the middle of June to the middle of September.

Scholastic Aptitude and Achievement Tests

All applicants for admission as freshmen are required to take the Scholastic Aptitude and Achievement Tests, offered several times a year by the College Entrance Examination Board at centers throughout the world. The months in which the tests are given are shown below:

December 1964	May 1965
January 1965	July 1965
March 1965	

Applicants for admission should take the Scholastic Aptitude Test in December or January (December preferred) of their senior year in secondary school. The Achievement Tests should be taken in English Composition (preferred to the Writing Sample, which may be offered as a substitute) and in two other fields related to those which the student will probably study in college. For example, the recommended test pattern for engineering and science candidates is English composition, mathematics, chemistry or physics. Applicants may offer achievement tests in either the junior or senior year. *Ordinarily, students will find it to their advantage to take these tests in December or January of the senior year in continuing subjects (English, foreign language, and mathematics) and in May of the junior year or in July in subjects completed that year.* Application to take these tests should be made to the College Entrance Examination Board at least three weeks before the scheduled date.

Application forms for the tests and a Bulletin of Information may be secured from secondary schools or the College Entrance Examination Board, Box 592, Princeton, New Jersey 08540, or the Pacific Coast Office of the Board, Box 1025, Berkeley, California 94701.

Notification of Action on Applications for Admission

Applicants will be notified of action taken on their applications for admission about April 1 and on financial aid by the middle of April. No action will be taken on an application until it is complete in detail.

Candidates' Reply Date

The University of Rochester subscribes to the Candidates' Reply Date. This procedure has been established to provide ample time for students to reach a decision on college choice. Admitted students are required to notify the University of acceptance of admission on or before the Candidates' Reply Date. (In 1965 the date is May 3.)

Early Decision Program

Exceptionally well-qualified applicants for admission who have reached a firm decision that Rochester is the college of their choice may apply for early decision upon their application for admission.

To be eligible for such early action the applicant must:

1. Complete formal application for admission prior to November 1 including College Entrance Examination Board Scholastic Aptitude and appropriate Achievement Test scores taken in the junior year.

2. Present certification by the secondary school that application is being made only to the University of Rochester.

Applicants admitted under this program will be notified not later than December 1 and will be expected to make formal acceptance of the offer of admission within two weeks of notification of admission.

Not more than 25% of the class will be accepted under this program. Those not accepted will be notified and their applications will be considered under the regular admission procedure later in the year.

Advanced Placement and Advanced Standing Credit

The University of Rochester participates in the Advanced Placement Program of the College Entrance Examination Board. Students desiring consideration for such placement or credit through Advanced Placement courses taken in secondary school should take the College Board Advanced Placement Examinations given in May of each year. Upon receipt of the scores of these examinations and other evidence presented in this procedure, action will be taken and notification sent to the applicant, usually in August preceding enrollment.

Admission of Transfer Students

Candidates for admission who have been enrolled in other colleges or universities must meet the admission requirements of the particular college or department to which they are applying. Credentials must include a statement of honorable dismissal. Credit for work done at other institutions will include only those subjects which can reasonably be accepted as the equivalent of work in the course the applicant plans to pursue at Rochester.

In order to qualify for graduation, all persons admitted must complete not less than one academic year of work at the University.

Students from other colleges or universities are ordinarily admitted only for the fall term beginning in September. Transfer applications are reviewed by the Committee on Admission after May 10 and candidates are notified of the Committee's decision as soon as circumstances permit. For best consideration completed applications should be filed no later than July 15.

A limited amount of financial aid is available to transfer students. Preference for financial aid is given to students who will enter the professional programs at Rochester (Business Administration, Education, Engineering, Nursing) and to students who will enter from two-year colleges. Application forms for financial aid are available from the Office of Admissions and Student Aid.

Students admitted with advanced standing from other colleges and universities are required to report for a brief orientation program to assist them in adapting to a new college environment. The program includes a library tour, two meetings, and a luncheon.

SPECIAL STUDENTS

Students desiring to pursue a special course not leading to a degree are admitted only for extraordinary reasons. Ordinarily special students are limited to persons holding a degree from a recognized college. Special students are subject to all general regulations and pay a tuition fee amounting to $57.00 per semester hour and all incidental fees attached to any course they take.

FRESHMAN WEEK

Freshman Orientation involves a testing program of two days which is run on four separate occasions during the summer and a fall program one week before regular instruction begins. This period is devoted to counseling and testing to help the new student select the most meaningful program. The objectives of the program are planned by the Orientation Committee of the College Cabinet, an advisory committee comprising faculty and students, and the Dean of Students and his staff.

Through the Orientation period entering students learn about the nature and aims of college study, personnel services available to students, and extra-curricular activities. Residence Halls meetings enable students to become acquainted with the Directors of Residence Halls and their staffs.

Detailed information on the summer program is mailed to freshmen in May. Fees for the week, including meals, are about $30.00. The Fall Orientation mailing is in August.

Expenses

Tuition and Laboratory Fees

Tuition for the 1964–65 academic year is $1800, or $900 per term, including laboratory fees. Under the four-course program of studies* this is equivalent to the rate of $57 per credit hour and except for the special situations noted below is applicable to all students enrolled in daytime River Campus programs.

1. Students enrolled in B.S. programs which specify more than four courses in certain terms as part of the degree requirements will not be charged tuition for the additional courses.

2. In exceptional cases, A.B. students who desire to enrich their programs may, with the specific approval of the Dean of Students, enroll in a fifth academic course in a given term up to a maximum of four such courses in their degree programs without additional tuition charges.

3. A student who audits a course with the specific approval of the instructor will not be charged tuition for that course.

4. Students who enroll in a fifth academic course for the purpose of accelerating their programs will be charged for the fifth course at the rate of $57 per credit hour in the term in which the course is taken.

5. Students who, with the specific approval of the Dean of Students, take less than the normal program of four courses in any term will be charged tuition at the credit hour rate of $57.

6. Students admitted as special, non-degree candidates will be charged tuition at the credit rate of $57 per credit hour.

Application Fee

An application fee of $10 must accompany all applications for admission. This fee is not refundable.

Health Service Fee

A health service fee of $35 is paid by all students. A description of the services covered is given on page 51.

Student Activity Fees

An activity fee is paid by all students. The fee varies slightly from year to year in accordance with the budget prepared by the Finance Board of the College Cabinet. For the year 1964–65 the fee is expected to be $29.

Women students and male freshmen pay an additional fee of $5 for support of the social program of the residence halls.

Other Fees

There are no extra laboratory fees. These fees are included in the tuition of $1800.

*See page 79 for the definition of a course.

A transcript fee of $1 per copy is charged for certified copies of a student's record, except for the first copy which is furnished free. Usually transcripts are not issued during the last two weeks of a term.

At the discretion of the Dean of Students, a special fee of $5 shall be assessed against all students missing a term examination through carelessness.

Laboratory breakage deposits are charged in all chemistry and some biology courses. Unused balances are refunded.

Resident students rent mail boxes from the River Campus Station Post Office at the rates of $.50 to $1.80 through the U. S. Post Office.

A special fee of $50 is charged to students who retain their status as Rochester undergraduates while they participate in a junior-year abroad program.

Fees for Students Enrolled for Courses in the Eastman School of Music

(1) Students who are concentrating in music shall be charged only the regular tuition fee of the College of Arts and Science. The tuition covers the courses in music required for concentration as outlined on page 137. The cost of any additional music subjects shall be paid by the student.

(2) Other students may elect courses at the Eastman School of Music without payment of an additional fee, except as follows: (a) if the program of the student involves courses in excess of the normal load for a degree, the elective will be regarded as the extra course and full tuition for the course will be charged at the normal rates of the Eastman School of Music; (b) if the elective is in Applied Music, an extra fee may be charged if, upon request, the student is assigned to certain teachers for instruction, but this fee will be less than the usual charge for such instruction. All resident students in Applied Music are charged a practice room fee. The fee varies depending upon the student's program of study.

ESTIMATED STUDENT EXPENSES

Because of possible severe fluctuations in cost of living and the instability of prices, such costs as tuition and fees, as well as estimates for total expenses, are subject to change. In the figures used below, estimates for such items as room and board are based upon the cost prevailing at the time of publication of this bulletin. Under any circumstances, the cost of a year at college is variable, depending largely upon the willingness and need of the student to curtail those expenditures which are not essential to education and reasonable comfort.

Expenses differ only slightly for men and women. The table below gives those items of expense which are fixed or only slightly variable:

ITEMS	
Tuition	$1800
Student activity, and social fee for women and freshmen men	34
Health fees	
Medical Service	35
Insurance Premium—Extended Medical Care	17
Books and supplies	80
Residence hall room (including linen service)	370
Board	525
	$2861

Expenditures for personal necessities, organization dues, recreation, and travel vary from one individual to another. Students who watch their expenditures closely report amounts ranging from $250 to $450 a year for these items. The minimum annual cost, including board and room in the usual type of college residence hall, may be estimated at $3150. The average annual expenditure is approximately $3300.

Full information regarding residence hall accommodations will be supplied by the Associate Director of Residence Halls.

Day students who live in their homes in the city report total expenditures of approximately $2600. Such students, in planning their budgets, will naturally deduct the items of residence hall room and board from the figures given above, but they should include an average of $150 for lunches and $200 for transportation.

Financial Aid

The University believes that its resources should be available to students at all economic levels on the basis of their developed ability and promise for future success. To this end, a strong program of financial aid is maintained to provide scholarship funds, loan funds and part-time jobs for students who could not attend Rochester without such assistance. No student should be deterred from applying to Rochester because he is of limited financial means.

Although the total amount of aid is large, it is not possible to assist all deserving students who apply and are offered admission. Very thoughtful and careful selection of recipients of financial aid is, therefore, necessary.

Basis for Scholarship Selections

Special conditions are attached to some of the scholarships, such as nomination by persons outside the University, residence in a particular place, or specific qualifications of the holder. In most cases selections for award are based upon the relative merits of the candidates, including character, personality, maturity of purpose, and high scholastic aptitude and achievement. The amount of the stipend granted in each case is determined solely by the financial need of the recipient. All applicants for freshman scholarships are required to take the Scholastic Aptitude and Achievement Tests offered by the College Entrance Examination Board. (See page 29)

Procedure for Making Application

Applicants for scholarships should file a complete application for admission no later than February 1. They are also required to submit financial statements to the College Scholarship Service, Princeton, N. J., in which the University of Rochester is one of the participating colleges. Detailed information and forms for this purpose are available in the secondary schools. A candidate for scholarship aid will be considered for any scholarship for which he is eligible and which meets his requirements.

Applications for scholarship aid from students already in college must be submitted on dates specified by the Committee on Student Aid.

Renewals of Scholarships

Holders of all University scholarships are required to apply for annual renewal. Certain scholarships, such as Rochester National, Centennial Prize, Rochester Prize, Bausch & Lomb, Genesee, Alumni Memorial, Casey-Long, Rochester City, and other prize scholarships as well as some other scholarships granted on nomination of persons outside the University are normally continued from year to year provided the record, conduct, and financial circumstances of the holders justify such continuation. Annual financial statements are required.

All other scholarships, however, are granted for an academic year. The holders of all scholarships, except those referred to above, must therefore make application at the times announced for such renewal application if they desire to have their scholarships renewed. Annual scholarships normally are renewed if renewal conditions are met. The usual conditions under which annual scholarships may be renewed are that the holder continue to need financial assistance, that he have no failures recorded against him, and that his academic performance for the preceding year be well above minimum satisfactory progress toward a degree. Renewal applications should be made on a form provided for the purpose, and must be returned to the Office of Student Aid not later than May 10, or date to be posted.

Scholarship Regulations as Applied to Students Receiving Other Forms of Aid

Recipients of scholarships granted outside the jurisdiction of the University may be eligible to hold University scholarships. In such cases the amount of the stipend granted under such scholarships will be adjusted to the individual student's actual needs.

All students are eligible for loan fund help if they meet the established requirements.

New York State Financial Aid

The University of Rochester is an approved university in which New York State Scholarships, Scholar Incentive awards, and New York Higher Education Assistance Corporation loans may be used. It is important that students seeking such aid obtain full information and meet promptly each application deadline.

(1) *Scholar Incentive Program:* Applications should be filed before July 1 for each academic year, but will be accepted up to December 1. Applications for the spring semester only have an April 1 deadline. Annual application is required.

(2) *Regents College Scholarships for Undergraduates:* Candidates should seek directions from their high school principal and/or guidance counselor.

Information on the above may be obtained by writing: Regents Examination and Scholarship Center, New York State Education Department, Albany, New York 12201. Students seeking New York State guaranteed loans should apply to: New York Higher Education Assistance Corporation, 111 Washington Avenue, Albany, New York 12201.

Additional Regulations

Scholarships are granted only to students who are pursuing one of the regular courses for a degree.[1] If a scholarship holder becomes subject to disciplinary action, he may forfeit his scholarship during the continuance of the discipline.

Statements of the conditions of award of the various types of scholarships begin below.

SCHOLARSHIPS OPEN TO MEN AND WOMEN

THE ROCHESTER NATIONAL SCHOLARSHIPS of which there are approximately nine available in each entering class, six for men and three for women, have an

[1]Holders of Baptist Education Scholarships may be freed from the operation of this regulation, on request of the Secretary of the Society.

adjustable stipend ranging from $100 to $2000 a year for four years. Criteria for award include character, motivation, stability, physical vigor and qualities of leadership as well as evidence of superior academic achievement and promise.

The Centennial Prize Scholarships, of which there are several available in each class, have an adjustable stipend, ranging from $100 to $1800 a year for four years. These scholarships are granted to students of exceptional intellectual promise, maturity of purpose, good character, good health, and personal qualities which should enable their possessor to work happily with his or her associates.

The Rochester Prize Scholarships, of which there are a number available in each class, have an adjustable stipend, ranging from $100 to $1800 a year for four years. These Scholarships are awarded upon the same basis as the Centennial Prize Scholarships described above.

Honorary Prize Scholarships may be awarded without stipend to a limited number of applicants who meet the qualifications for award and merit this distinction but who have no need for financial assistance.

The Genesee Scholarships, each yielding a maximum of $1200 a year, are granted by the Trustees for the benefit of graduates of secondary schools located at a distance from the City of Rochester. Awards are made on the basis of high scholarship, character, personality, and need.

Rush Rhees Scholarships were founded in memory of Rush Rhees, President of the University from 1900 to 1935. In making awards, consideration will be given to the candidate's financial need in addition to his personal qualifications, achievements, and aptitude for leadership. These scholarships are awarded for two years contingent upon satisfactory conduct and are renewable for the remaining two undergraduate years if the recipient's general performance and financial circumstances warrant.

The Rochester City Scholarships are granted by the Trustees to the City of Rochester for the benefit of graduates of the Rochester public high schools who for at least two years directly preceding graduation have been in attendance at those schools. The scholarships are of two kinds, those awarded by competition and those awarded on nomination. In the first group, those awarded by competition, five scholarships with maximum annual stipends of $1,000 each are granted in each class to the three men and the two women who, fulfilling the conditions of eligibility stated above, obtain the highest averages for the first term of the freshman year among men and women respectively. For the second group, the scholarships awarded on nomination, nominations of eligible students are made by the principals of the Rochester public high schools on the basis of high scholarship, character, personality, and need; and awards are made by the Committee on Student Aid to the nominees regarded as most meritorious. The number of these scholarships in each class and the stipend of each are determined by the Committee on Student Aid. The purpose of these scholarships is to provide a college education for graduates of the Rochester public high schools who would be unable to obtain such an education without financial aid, but whose circumstances are such that with aid they can meet the financial obligation of a college course.

The George Abbott Scholarships are awarded through the George Abbott Foundation. Criteria for award include character, academic achievement, aptitude,

industry and need for financial assistance. Stipend depends on the financial need of the student.

THE ALLIED CHEMICAL CORPORATION SCHOLARSHIP is provided by the National Aniline Division of the Allied Chemical Corporation and is awarded to an outstanding undergraduate student in Chemical Engineering who is a citizen of the United States or Canada.

THE AMERICAN SOCIETY FOR METALS SCHOLARSHIP IN METALLURGY is endowed by the Rochester Chapter of the American Society for Metals. Awarded to a senior engineering student who is studying in the metallurgy option, it is based on personal qualifications, academic promise and financial need.

BAUSCH AND LOMB SCIENCE SCHOLARSHIPS, of which there are several available for each entering class, have adjustable stipends based upon the financial need of the recipient. The Science Scholarships are open for competition among students who win the Bausch and Lomb Honorary Science Award Medal presented each year in secondary schools of the United States and its possessions to the graduating students with the highest scholastic standing in scientific subjects.

THE GEOFFREY BROUGHTON MEMORIAL SCHOLARSHIP is provided by income from endowment. Eligibility is limited to students in chemical engineering. Criteria for award include character, academic promise, and need for financial assistance.

THE ELLEN HAWKINS CARLSON SCHOLARSHIP FOR XEROX PEOPLE is provided in memory of Mrs. Carlson by her son. Eligibility is restricted to sons and daughters of Xerox employees with three or more years of service. Criteria for award include personal qualifications, evidence of general promise for successful college work and financial need.

MILTON S. COMFORT SCHOLARSHIPS were endowed by the late Frances B. Comfort. Stipends are determined in each individual case by the Committee on Student Aid.

THE ENGINEERING WOMEN'S CLUB SCHOLARSHIP is awarded to an engineering student entering his junior or senior year. Criteria for award include motivation for a career in engineering, academic promise and achievement. Preference is to be given to a qualified woman engineering student; in the absence of such the award may be held by a man.

THE GENERAL MOTORS SCHOLARSHIPS are provided by the General Motors Corporation and are awarded to students with distinctly high academic promise, achievement and personal qualifications. The adjustable stipends are based upon the financial need of the recipient.

THE EMMET BLAKENEY GLEASON SCHOLARSHIPS for students in engineering are provided through the generosity of the Emmet Blakeney Gleason Memorial Fund Incorporated in memory of Emmet Blakeney Gleason. Criteria for award include academic promise, motivation for a career in engineering, and financial need.

THE SAMUEL M. HAVENS PRIZE SCHOLARSHIPS are awarded to promising candidates for any of the colleges or schools of the University who are residents of the State of Illinois and who are in need of financial assistance. The stipends are determined by the appropriate committee on awards.

The Katy B. Hofheinz Freshman Scholarship, endowed in 1939 by a gift from Mrs. Rudolph Hofheinz, will be awarded upon entrance to that freshman man or woman, who, in the opinion of the Committee on Student Aid, combines most clearly high scholastic attainments and promise, character, and maturity of purpose, with financial need. This scholarship is tenable only during the freshman year.

The Fred S. and Ella F. Miles Scholarship Fund, the income from which is to be used by the University in assisting needy students, either boys or girls, from Rochester, New York, is awarded upon recommendation of the Superintendent of Schools of the City of Rochester.

The Pfaudler Permutit Scholarship is contributed by the Pfaudler Permutit, Inc., for the financial assistance of a promising entering student. The scholarship will be awarded alternately to a student in engineering and liberal arts and may be held for four years of undergraduate work contingent upon the maintenance of scholarship requirements and a need for financial assistance.

The Procter and Gamble Scholarships are contributed by the Procter and Gamble Fund. Criteria for award include academic achievement and aptitude, personal qualifications and need for financial assistance.

Rochester Section of American Institute of Chemical Engineers Scholarship, is provided by annual grants made by the Section for a deserving student in chemical engineering.

The Joseph R. Wilson Scholarship for Xerox People is provided by gifts of executives of the Xerox Corporation. Eligibility is restricted to sons and daughters of Xerox employees with three or more years of service. Selections will be made by the Committee on Student Aid and will be based upon the academic and personal qualifications of the candidates as well as financial need.

The Katherine Upton Wilson Scholarship for Xerox People is provided through gifts of members of the Wilson Family. Eligibility and method of selection of recipients are the same as for the Ellen Hawkins Carlson and Joseph R. Wilson scholarships described above.

The Regional Alumni Club Scholarships are sponsored by the Alumni of the University. The stipends are adjustable, depending upon the financial need of the recipient, with a maximum stipend of full tuition. Candidates for these awards are nominated by regional clubs of:

Baltimore, Maryland
Boston, Massachusetts
Buffalo, New York
Capital District (Albany, Troy area), New York
Chicago, Illinois
Cincinnati, Ohio
Finger Lakes (Geneva, Canandaigua), New York
Genesee Area (Batavia), New York
Greater Detroit, Michigan
Ithaca, New York
Long Island, New York
Mohawk Valley (Rome-Utica), New York
New Mexico
Metropolitan New York City
Niagara Falls, New York
Northern New Jersey
Northeast Ohio
Philadelphia, Pennsylvania
Pittsburgh, Pennsylvania
Rocky Mountain Area (Denver, Colorado)
St. Louis, Missouri
San Francisco Bay Area

Schenectady, New York
Seattle, Washington
Southern California (Los Angeles)
Southern Tier (Elmira-Corning), New York
Susquehanna Valley (Binghamton, New York)
Syracuse, New York
Twin Cities (Minneapolis-St. Paul)
Washington, D. C.
Wayne County, New York
West-Fair (Westchester County, N.Y., Fairfield County, Conn.)
Wilmington, Delaware

Nominees may also be considered for other scholarship awards for which they may be eligible. Criteria for award include academic achievement and aptitude, character, personality, and participation in high school and community activities. Application may be made through the Admissions Office or through the regional club presidents (whose names may be obtained through the Office of Alumni Relations). Nominations for Regional Alumni Club Scholarships should be forwarded not later than Feb. 1, and the applications of the nominees must be complete and on file in the Admissions Office by Feb. 1. Nominees for Regional Alumni Club Scholarships are not required to file duplicate applications or any special forms.

College Scholarships and Other Special Scholarships are provided by donors or from general funds. Unless special stipulations have been made by the donors, the income from endowments is granted for scholarship aid on the basis of need as well as upon superior qualifications of character and personality, maturity of purpose, and high scholastic attainment. If a donor who has reserved the right to designate a recipient fails to do so, the scholarship may be awarded by the University. A proportion of the sum available for these scholarships is set aside for entering students; the remainder is used for the three upper classes.

SCHOLARSHIPS FOR MEN

The following Prize Scholarships are awarded in competition upon the basis of literary and scholastic ability and attainments, qualities of manhood, force of character, leadership, and interest in student activities:

The Alumni War Memorial Scholarships, one to be awarded in each class, are supported by Alumni in memory of Alumni and undergraduates of the University who gave their lives in the service of their country. These scholarships are awarded on the basis of academic achievement, personal qualifications, promise and financial need.

The Alumni Prize Scholarships, two to be awarded in each class, are supported by Alumni in recognition of outstanding students with superior extracurricular records. These scholarships are awarded on the same basis as the Alumni War Memorial Scholarships.

The John Bradley Scholarship, endowed by the late Inez A. Bradley, indicates the recipient be chosen by the President of the University in such manner as to him seems best.

The Charles A. Brown Prize Scholarship, endowed by the late Charles A. Brown of Chicago, A.B., 1879, is awarded every four years to a candidate in the Chicago district.

THE MICHAEL L. CASEY-T. RICHARD LONG ALUMNI SCHOLARSHIPS, one to be awarded in each class, are awarded on the same basis as the Alumni War Memorial Scholarships described above.

GENESEE VALLEY DELTA UPSILON FOUNDATION SCHOLARSHIP is awarded to a student on the basis of achievement, promise, and financial need. Members of the fraternity are given preference.

THE ROCHESTER GAMMA PI OF SIGMA CHI FOUNDATION SCHOLARSHIP is awarded to a student on the basis of the general criteria of award used by the University in granting scholarship assistance. Preference is given to a member of the Gamma Phi Chapter of the fraternity.

THE GRAFLEX PRIZE SCHOLARSHIP IN MECHANICAL ENGINEERING, endowed by Graflex, Inc., is awarded to a student at the beginning of his junior year in mechanical engineering on the basis of personal qualifications, achievement and aptitude in this field. Preference is given to a child or grandchild of an employee of the company.

THE SOL HEUMANN SCHOLARSHIPS, endowed by the late Sol Heumann, select recipients in equal numbers from each of three faiths: Protestant, Roman Catholic and Jewish.

THE LUTHER EMMETT HOLT PRIZE SCHOLARSHIP is endowed by the late Francis R. Welles, A.B., 1875, in memory of his classmate, Dr. Luther Emmett Holt, and awarded every four years to a candidate from Chicago or New York who intends to follow a premedical course.

THE WILLIAM JUDSON HOWE PRIZE SCHOLARSHIP, endowed by the late Ella G. Howe, is awarded every four years without restriction as to the residence of the holder.

THE NEW YORK ALUMNI PRIZE SCHOLARSHIP is endowed by Alumni of the Greater New York area and awarded to a candidate residing in that area.

THE MARTIN F. TIERNAN PRIZE SCHOLARSHIPS, supported by a gift from Martin F. Tiernan, A.B., 1906, provide that some awards may be made partly in the form of loans. (See the Martin F. Tiernan Loan Awards.)

THE WELLES PRIZE SCHOLARSHIPS, five in number, endowed by the late Francis R. Welles, A.B., 1875, are awarded to candidates resident in the Chicago district.

THE RAY HILL WHITE MEMORIAL SCHOLARSHIP is endowed in his memory by his widow, Frances French White. He was a graduate of the College in the Class of 1901.

Other special scholarships are awarded only to men who meet the qualifications prescribed by the donors.

SCHOLARSHIPS FOR WOMEN

THE ALUMNAE SCHOLARSHIPS, contributed annually by the Alumnae Association of the University of Rochester are given preferably to the daughter of an alumna needing financial assistance.

The Augusta Laney Hoeing Scholarship is contributed by Alumnae of the Alpha Sigma Sorority in honor of Mrs. Charles Hoeing, an honorary member of the sorority. Preference is given to members of the Alpha Sigma Sorority.

The Susan Huntington Hooker Scholarship honors Mrs. Horace B. (Susan Huntington) Hooker, daughter of Elon Huntington, a founder and trustee of the University, who was widely known and loved for her cultural and civic interests and activities in Rochester over a long lifetime. In providing for this scholarship the donor expresses the hope that it will be of assistance to a woman undergraduate or graduate who gives promise of comparable service in her own community.

The Livingston Park Seminary Alumnae Scholarship, endowed by alumnae of the Livingston Park Seminary in commemoration of that institution, is awarded to a woman from Rochester on the basis of ability, achievement, character and need. The award may be held for four years, subject to renewal requirements.

The Rida S. Moore Scholarship, endowed by the late Mrs. Clarence King Moore, is awarded every four years.

The Margaret Parkhurst Morey Scholarship is contributed by Alumnae of the Alpha Sigma Sorority in honor of Mrs. William C. Morey, an honorary member of the sorority.

New York Alumnae Chapter Scholarship is contributed by Alumnae residing in the New York City area and awarded every four years to a candidate residing in the metropolitan district. Preference is given to the daughter of an alumna.

The Rush Rhees and Harriet Seelye Rhees Prize Scholarship, contributed annually by the Alumnae Association of the University of Rochester in honor of Dr. and Mrs. Rhees, is awarded on the basis of high intellectual ability and attainment, strength of character, personality, and qualities of leadership.

The Sigma Kappa Upsilon Scholarship, endowed by the Alumnae of Sigma Kappa Upsilon Sorority, is awarded annually to a woman undergraduate. Preference is given to the daughter of an alumnae of the sorority.

The Hazel Wilbraham Memorial Scholarship, named for an alumna and former professor of physical education, is provided by gifts from her former students.

STUDENT LOANS

Loan funds, including National Defense Education loans, are available to aid students to whom scholarships are not granted; and, in many cases, loans are made in addition to scholarship grants. The basis for the selection of students to whom loans are made is the same, in principle, as for the selection of scholarship holders. Loans may be made, however, to students whose academic standing is somewhat lower than that required for a scholarship. Ordinarily loans are not granted to students whose point-hour-ratio is less than two. The ability of the student to repay what he borrows receives careful consideration in all cases before a loan is granted.

Loan Applications

Students are urged to discuss with the Committee on Student Aid their probable needs for some time in advance. Loan applications are, however, received at any time. Forms for application are available at the Office of the Director of Admissions and Student Aid. When the Committee on Student Aid approves a loan, the applicant receives an authorization which, upon presentation to the University Student Loan Office in the Administration Building, is recognized as the basis for the applicant's signing a promissory note and receiving the loan.

Interest and Repayment

All arrangements regarding the payment of interest and repayment of principal must be made at the University Student Loan Office where the loan is secured. Some University of Rochester Loan funds may require the payment of interest before graduation; however, such interest will be credited toward the principal of the loan when the student graduates. After graduation the interest on all loans from University funds is five percent.

Repayment of part or all of a note may be made before the date of maturity. Funds received from the repayment of loans become immediately available for loans to other students. Arrangements for repayment of loans must be made with the University Student Loan Office before the student leaves the University.

LOAN FUNDS

The following loan funds are available to undergraduates in River Campus Colleges and the Department of Nursing:

National Defense Student Loans

The specific purpose of the Student Loan Program, established under the National Defense Education Act, is "to stimulate and assist in the establishment at institutions of higher education of funds for the making of low-interest loans to students in need thereof to pursue their courses of study in such institutions."

While making the loans available to needy students in any field of study in an institution of higher education, the Act specifies that "in the selection of students to receive loans...special consideration shall be given to (a) students with a superior academic background who express a desire to teach in elementary or secondary schools, and (b) students whose academic background indicates a superior capacity or preparation in science, mathematics, engineering, or a modern foreign language."

University of Rochester Regular Fund

Loans from this fund are usually for amounts not exceeding $500 and do not carry interest until the student receives a baccalaureate degree from the University or ceases to be a full-time undergraduate. After graduation the interest is five percent. The Regular Fund is a revolving fund in that funds received in repayment become available for loans to other students.

The Martin F. Tiernan Loan Awards

This loan fund, established through the generosity of Martin F. Tiernan, A.B., 1906, is available to men who meet the University's standards for character, academic work and promise, and eligibility for loan aid.

These awards, which are limited to students who are earning a part of their

own college expenses, are made for the freshman year in the first instance, but may be renewed for succeeding years by the Committee on Student Aid, at its discretion. Each recipient of an award from this fund shall prepare his personal budget in advance of each college year, and shall keep an accurate account of his personal expenses through each year submitting these to the Chairman of the Committee on Student Aid for approval at stated intervals. Recipients of awards from this fund shall be known as "Martin F. Tiernan Scholars."

Kellogg Loan Fund for Students in Nursing

This fund is available through the generosity of the W. K. Kellogg Foundation for the use of students in the Department of Nursing of the School of Medicine and Dentistry. Interest is charged at the rate of two percent per annum.

Alumnae Nurses Fund

The purpose of this loan fund shall be to assist Nursing students and graduates with financial aid for education and educational travel. A student in good academic standing who has completed at least the first year in the Department of Nursing or a graduate, shall be eligible to apply.

The Professor Horace W. Leet Loan Fund

A fund established by students in honor of Professor Leet's thirty-nine years of devoted service on the engineering faculty. This fund is available to any student in the engineering college without involvement in formal channels. The office of the Assistant Dean of the College of Engineering and Applied Science should be contacted for details.

WORK SCHOLARSHIPS

A number of Work Scholarships are available to financial aid applicants. A recipient is required to earn $350 in one or more campus positions from September to June. He will be credited with $550 at the Tuition Office ($225 per semester) of which $200 will be a grant (scholarship) and the remainder will be $350 of earnings.

STUDENT EMPLOYMENT

Each student is expected to devote full time to his academic work, but under certain circumstances arrangements can usually be made whereby he may earn a limited amount of money to help defray college expenses. It is important, however, that a student have enough money on hand or in sight upon entering college to meet the expenses of at least his first year. If work is needed, application may be made at the Office of Admissions and Student Aid concerning opportunities for part-time employment on or off campus. Ordinarily part-time work schedules should not exceed fifteen to twenty hours per week. Each year students obtain part-time employment on the campus in a variety of places—the library, the book store, departmental offices, laboratories, residence halls, dining halls, fraternity houses—and off-campus in retail and industrial firms, restaurants, hotels, and private homes.

UNDERGRADUATE PRIZES

For information regarding these prizes, consult the School, College or Department concerned.

Accounting

THE FINANCIAL EXECUTIVES CAREER AWARD is donated annually by The Rochester Chapter, Financial Executives Institute. Its purpose is to recognize individual student achievement and create interest among students and faculties in the career opportunities of Industrial Accounting and Controllership. The recipient is selected from the senior class of the College of Business Administration on the basis of scholarship, citizenship, and personal characteristics.

THE HASKINS & SELLS FOUNDATION annually presents an award of $500 for scholastic excellence in accounting to a senior of the College of Business Administration. It is made to an accounting major and is based upon scholastic excellence as well as personal traits. The purpose of the award is to stimulate higher academic achievement on the part of students majoring in accounting and to encourage talented students to major in this field.

THE SUPERIOR SCHOLARSHIP AWARD is granted annually by the New York State Society of Certified Public Accountants to a senior majoring in accounting in the College of Business Administration. This award is based on two considerations: the highest academic standing in all accounting courses and apparent potential for success in the profession of certified public accountancy.

Biological Sciences

THE DONALD R. CHARLES MEMORIAL AWARD, originating from funds subscribed by students, colleagues and friends of Professor Charles, is given annually to a worthy student who, in the judgment of the Department of Biology, shows promise of a kind which Professor Charles so regularly encouraged and aided. The award provides a sum to cover limited expenses or tuition costs for an undergraduate or graduate student who wishes to carry on advanced studies, or some special project, during the summer months. In special cases the award may be made for a period within the academic year.

THE CHESTER A. DEWEY SCHOLARSHIP of $150, awarded for proficiency in biological work, provides free tuition at the summer session of the Marine Biological Laboratory at Woods Hole, Massachusetts, or at any other recognized biological laboratory.

THE RIGBY WILE PRIZE IN BIOLOGY is awarded to a member of the freshman or sophomore class for proficiency in Biology 101 and/or 102.

Business Administration and Engineering

THE QUALITY CONTROL AWARD carries a stipend of $150 and is awarded annually to a student of the Colleges of Business Administration or Engineering and Applied Science who has demonstrated exceptional ability and interest in the field of Quality Control. The award is contributed by the Rochester Society of Quality Control.

Economics and Business Administration

THE WILLIAM MORSE HASTINGS PRIZE is awarded each year for the best essay or thesis upon some topic on the history of industry, to be selected by the Chairman of the Department of Economics and the Dean of the College of Business Administration.

Economics

THE JOHN DOWS MAIRS PRIZE is awarded annually to the member of the junior class who has done the best work in concentration in economics.

THE SHERMAN FELLOWSHIP, awarded in alternate years was endowed by Isaac Sherman of New York as a graduate fellowship in the Department of Economics. The award is made to the student who has shown the highest ability in the work of the Economics Department and who has completed not less than eighteen hours in that department. The sum is payable upon approval of the President of the University after the recipient has registered for a year of graduate study in economics.

Engineering and Applied Science

THE EMIL KUICHLING PRIZE is awarded annually to that man of the junior class in mechanics who has shown the greatest proficiency in the work of the course.

THE CHARLES L. NEWTON PRIZE is awarded to a student in the "Department of Applied Sciences who shall show a special proficiency in some subject connected with that department, either in oral or in written examination or by thesis."

THE MARIE PETZ LEHMANN PRIZE of $50 is awarded annually to the full-time mechanical engineering major who has shown the most improvement from his freshman through his junior year.

THE TAU BETA PI PRIZE of $25, donated by the Rochester Alumnus Chapter, is awarded each year to the senior engineering student who, in the opinion of the Faculty of the College of Engineering and Applied Science, through academic achievement, proven leadership and sterling character has excelled and inspired his fellow students.

English

THE ALUMNAE PRIZE of $10, provided by the Alumnae Association, is awarded annually to the woman in the sophomore class who has done the best work in English during her sophomore year.

THE CHARLES ELLIS CALDWELL PRIZE is awarded annually to the man of the senior class who in his college work has shown the greatest proficiency in the Department of English.

THE DAVIS PRIZES, founded in 1864, are open annually to the two men in the graduating class whose original expository or persuasive speeches exhibit the highest excellence in content, organization, style and delivery. Currently $35 and $25.

DEAN'S PRIZES IN CREATIVE WRITING. The College of Arts and Science awards prizes annually for the best undergraduate short fiction, drama, and poems. The Department of English of the College administers the competitions for all undergraduates of the University.

THE DEWEY PRIZES, founded in 1866, are open annually to the two men in the sophomore class who offer the most excellent delivery, *memoriter,* of a speech by a character in a work of literature, or by an actual person, living or dead. Currently $20 and $15.

The Hull Prize is awarded to the man in each senior class concentrating in English who has done the best work in English studies.

The Susan B. Anthony Prize, first offered in 1955, is open annually to the undergraduate woman of any class whose original argumentative or expository speech exhibits the highest excellence in content, organization, style and delivery. Currently $35.

The Pearl Sperling Evans Prize in Creative Writing, established in 1964, is awarded annually to that undergraduate woman who shall have demonstrated the greatest promise in creative writing.

The Williams Memorial Prize is awarded to the woman in the senior class concentrating in English who has done the best work in that department.

Fine Arts

The Elizabeth M. Anderson Prize is awarded annually to that senior who shows the highest proficiency in some subject connected with art.

French

The Neil C. Arvin Memorial Prize, established by the students, colleagues and friends of Professor Arvin, is awarded annually to the student in the senior class who has excelled in French during his undergraduate course.

Geology

The Lattimore Prize Scholarship for Geology Field Study, awarded to a deserving Geology student, carries a stipend of $150 to defray summer field study expenses. Eligible students should confer with the Geology department adviser.

German

The E. P. Appelt Memorial Prize in German of $100, provided annually by the Federation of German-American Societies of Rochester, is awarded each year to a student of German in the University of Rochester for progress toward over-all proficiency in spoken and written German.

The Kreyer Prize in German is awarded for facility in spoken German.

Greek

The Russell Mumford Tuttle Prize is awarded each year to a male student for proficiency in the study of Greek.

History

The N. B. Ellison Prize is awarded to the man in the senior class concentrating in history who has done the best work in that department.

The Hugh MacKenzie Prizes, provided from income from the Hugh MacKenzie Memorial Fund raised by friends, colleagues, alumnae, and alumni to honor the memory of Professor MacKenzie, are awarded each year to the woman student who has shown the highest achievement and interest in History 101–102 and to the woman student who has shown the greatest improvement in the same course.

Mathematics

THE STODDARD PRIZES in mathematics, are awarded annually to two men pursuing the course in analytic geometry and calculus.

Physics

THE STODDARD PRIZE is awarded to the man in each graduating class who shall present the best thesis on some assigned topic of investigation in physics.

Political Science

THE JAMES D. MCGILL MEMORIAL PRIZE, established by former students and friends of Professor McGill, is awarded annually to that undergraduate student who is deemed to have shown the greatest interest and demonstrated the highest achievement in the field of political science. The names of annual recipients will be recorded on a plaque hung in the classroom where political science classes meet.

THE TOWNSEND FELLOWSHIP, of $700 awarded in alternate years, was endowed by Charles John Townsend of Lockport, New York, as a graduate fellowship in the Department of Political Science, in memory of his father, John Pomeroy Townsend, LL.D., who founded the fellowship in 1876 and supported it by annual payments for many years. The award is made to the student who has shown the highest ability in the work of the Department of Political Science and who has completed not less than eighteen hours in the Department of Political Science or History.

General

THE ANDREW FRIED MEMORIAL PRIZE. This prize is given in the memory of Andrew Norman Fried of the Class of 1962 by his family and friends. The prize is awarded by the Dean of Students to that man who, upon completion of his freshman year, has shown outstanding qualities of character, superior moral judgment, and interest in serving his fellow students. In making the award, emphasis is placed upon that student who, in the judgment of residence advisers and selected fellow students, has shown himself to be a true and effective counselor to individual classmates and who plans to spend his future life in a vocation emphasizing social service, medical care or teaching.

THE DELNO G. SISSON PRIZE of $25 is awarded annually to the freshman who in the opinion of the faculty has shown the most improvement not only in college work but in adjusting himself to university life and the student body.

THE FANNIE R. BIGELOW AWARDS, silver trays bearing the insignia of the University, endowed by a fund contributed to the University in Mrs. Bigelow's memory by members of her family, is presented to an undergraduate woman on Susan B. Anthony Day, and to an alumna by the Alumnae Association. These awards are given in recognition of the importance of the contributions made by women to the cultural, intellectual, and civic life of their communities.

THE GAMMA PHI PRIZE of $25 is awarded each year to the sophomore woman who has contributed most to the general advancement of the River Campus.

THE JANET HOWELL CLARK PRIZE of $40 is awarded yearly in recognition of the esteem held for Dr. Clark, former Dean of the College for Women, by the Class of 1953. This Prize is given yearly to the senior woman who has shown the greatest promise in creative work in one of the following fields—Physics,

Chemistry, Biology, Astronomy—and who has shown outstanding versatility in the mastery of allied fields. She is chosen by the Dean of Students upon recommendation of the Chairman of the Departments of Physics, Chemistry, Biology, and Astronomy.

THE JESSE L. ROSENBERGER PRIZE is awarded to the man in the junior class whose work has shown the greatest improvement during the freshman and sophomore years.

THE JOSEPH A. O'CONNOR GRADUATE STUDY ENDOWMENT FUND, endowed by a bequest from Evelyn O'Connor, is awarded annually to a woman in the graduating class who has shown marked ability in original writing, in English literature, in classical languages and literature, or in archaeology. A committee composed of the Dean of Students, the Chairman of the English Department, the Chairman of the Foreign Language Department, Miss Eleanor Gleason, and Mrs. Alling Clements selects the recipient.

THE JOSEPH P. O'HERN SCHOLARSHIP for travel and study in Europe was endowed by the late Joseph P. O'Hern, of the Class of 1892. This scholarship is awarded to a graduate who has been elected to Phi Beta Kappa, and who wishes to prepare for a career in teaching. A committee, composed of the Dean of Students as chairman and the President and Secretary of the New York Iota Chapter of Phi Beta Kappa, selects the recipient.

THE LOUIS A. ALEXANDER ALUMNI AWARD, in the form of a trophy, is presented annually to a male member of the senior class who has made an outstanding contribution to student life through his significant achievements in athletics and general student activities; and whose character and leadership qualities have been a wholesome influence on his fellow students.

THE PERCY B. DUTTON PRIZE is awarded each year to the male member of the graduating class who in the opinion of the Dean of Students shall have excelled all his men classmates in wholesome, unselfish, and helpful influence among his fellow students.

THE SUSAN COLVER ROSENBERGER PRIZE is awarded to the woman in each junior class whose work has shown the greatest improvement during her freshman and sophomore years.

THE TERRY PRIZE is awarded annually to that man of the senior class who by his industry, manliness, and honorable conduct has done most for the life and character of the men of the River Campus.

THETA ETA PRIZE of $50 is awarded annually to the senior woman who, through her participation in campus life and by her influence, personality and achievement, has contributed most to the River Campus.

SCHOLARSHIP CUPS, one for men and one for women, are awarded annually to that fraternity and to that sorority whose average scholarship for the preceding year has been the highest.

Special Services

THE aim of the Office of the Dean of Students is to provide each student with an opportunity to develop to his fullest intellectual, spiritual, and social capacity. The student services are coordinated in the staff of the Office of the Dean of Students which includes the Associate and Assistant Deans of Students, Director of Residence Halls, Director of Student Life, Director of Special Services and Counselors.

Service is provided to students through a variety of persons and agencies, many of which are described elsewhere in this bulletin. Each student, upon admission, is assigned to a member of the faculty who serves as his academic adviser during his first two years, and is available to counsel him on non-academic matters as well. Students are often referred by their advisers to other members of the staff of the University for assistance. During his last two years each student is assigned a faculty member in the department of his field of concentration for academic guidance. The staff of the Office of the Dean of Students will counsel juniors and seniors who seek assistance in non-academic matters.

Counseling, Testing, and Placement Services

The counseling program supports and supplements the services provided by the faculty, faculty advisers, religious advisers, and deans.

Emphasis is placed upon counseling initiated by the individual student and every effort is made to assist each individual in accepting responsibilities for his decisions and actions. The program ranges from helping the freshman make the adjustment to college to assisting seniors to develop wise post-graduate plans. The placement function is broadly conceived to be all post-graduate planning and is an integral part of the counseling program.

Special attention is given to study skills, reading difficulties, and vocational and educational planning through a complete testing service, which aids in appraising students' aptitudes, interests and personality traits, and related factors. Group activities for men and women are sponsored by students, counselors, and alumni, including discussion meetings on job placement opportunities and graduate study, special programs for selecting a major sponsored by the Office of the Dean of Students and departments, opportunity for individual and group meetings with area alumni in various professions.

Contacts are maintained with business firms, governmental agencies, and educational and social institutions for the purpose of obtaining information concerning the general employment situation and specific opportunities open to seniors and graduates. Students register with the Placement Office early in their senior year to take advantage of both the on-campus and off-campus opportunities that may be available to them before and after graduation. Placement credentials are compiled in the senior year which are kept in a permanent file for use by potential employers of seniors and alumni. Students

who desire assistance in obtaining summer employment may register with the campus Placement Office. Whenever it is possible, summer placements are made with the aim of helping the student gain work experience in line with his career objective.

Testing functions include administration of major university group and individual testing programs, assisting faculty in preparation, scoring, and analysis of examinations, administration of a modest test, scoring and statistical analysis for area schools and colleges, and administering such national programs as the Graduate Record Examination, Medical College Admissions Test, Law School Admission Test, National League for Nursing Test, Navy College Aptitude Test, and National Selective Service Test.

Additional counseling services are available to students in the following persons or agencies: Student Health officers, member of the Department of Physical Education, Director of Religious Activities, adviser to the University Protestant Fellowship, adviser to Jewish students, adviser to Catholic students, Directors of Student Aid.

Educational Placement Bureau

The Educational Placement Bureau of the College of Education assists University of Rochester Teacher Education graduates to find desirable teaching, guidance, student personnel, administrative and other positions in the field of Education. The Bureau will also endeavor to assist candidates holding degrees from other institutions who have completed at least six semester hours of course work within the College of Education for the purpose of completing certification and/or graduate degree requirements.

HEALTH SERVICE

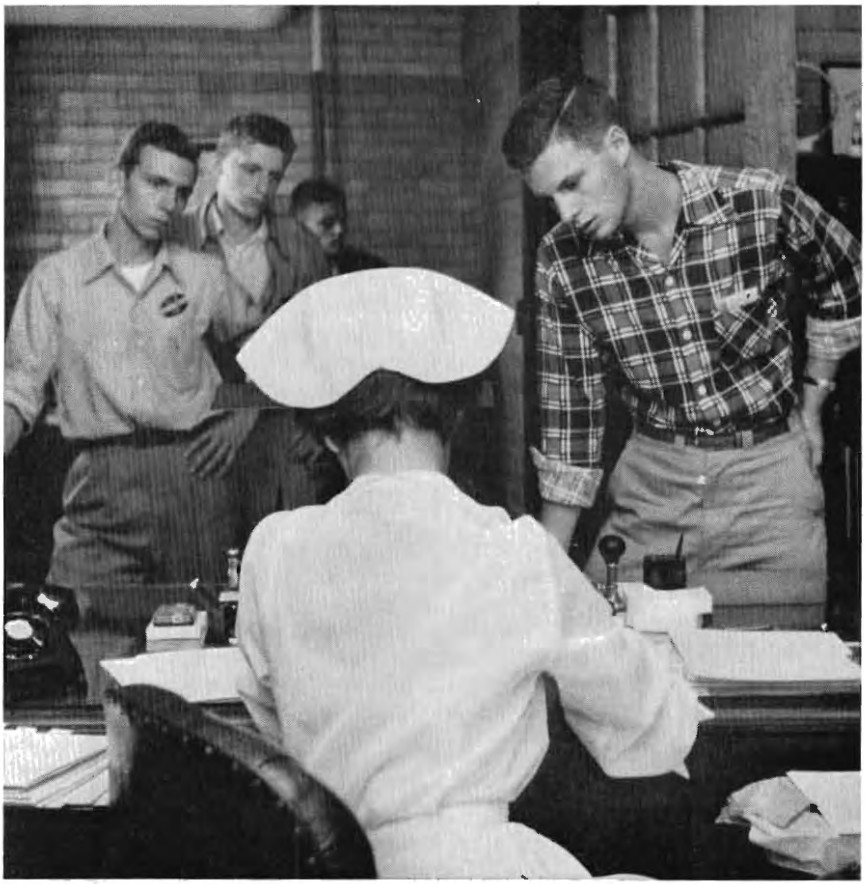
The health of the student body is under the care of the physicians of the Student Health Service. The out-patient department for all students is located in the medical office in the Morgan Wing of the Women's Residence Hall. Infirmary facilities for both men and women are located in the same area one floor above the medical office. The infirmary is staffed by the department's physicians and by registered nurses and is open twenty-four hours daily for the treatment of all types of illness. In case of serious illness or injury students are referred to Strong Memorial Hospital directly or transferred from the infirmary on the recommendation of the Student Health physicians. Short term psychiatric care and consultation are available in the medical office on campus.

All full-time students are entitled to the services of the physicians and to such out-patient and infirmary care as may be thought necessary by the physicians. If referred by the Student Health Service, the student may be hospitalized for ten days in Strong Memorial Hospital at semi-private rates and is eligible for $250 in extra charges either as an in-patient or in the out-patient clinics of Strong Memorial Hospital. Elective surgery, refractions, and dental care are not provided under the program. It is expected that students will pay for medications which are not stocked by the Student Health Service. If a student prefers to go to a private physician or to a hospital other than Strong Memorial Hospital, the cost of such treatment and care becomes his responsibility.

In addition to the Basic Student Health Benefits as described above, all full-time students of the University are required to carry health insurance to protect them not only in case of catastrophic illness or injury throughout the

year but also to provide coverage while they are not in attendance at the University, during vacation periods. The University sponsors such a supplemental insurance plan at a very low premium. Entering students will be contacted about this plan prior to matriculation.

All entering students must be vaccinated or submit evidence of recent successful vaccination. Before matriculation a preliminary medical examination is required and the correction of remedial defects is urged.



Student Life and Interests

STUDENT LIFE on the River Campus centers around the student's place of residence and the student activities building. A flexible program of activities is encouraged to meet the varying interests of the student body. This program offers opportunities to develop both vocational and avocational interests, to learn leadership skills, to foster friendships, and to promote wider acquaintance between faculty and students.

Todd Union, the student activities building, provides a popular gathering place for students in its snack bar and main lounges. The center of the organized activities program, it houses offices of student government, college publications, the campus radio station, and other groups, and is the headquarters for music and religious organizations. Rooms are available for scheduling meetings and social events. Student mail boxes are located in Todd Union, which houses a branch of the United States Post Office.

The Women's Residence Center includes an attractive coeducational recreation room and snack bar as well as lounges for use of groups and individuals.

Students Association

Every full-time student on the River Campus is a member of the Students Association which is governed by an executive committee of five and a cabinet of twenty-four elected student delegates. The Students Association has general responsibility for the development and supervision of the extracurricular activities and for the maintaining of high standards of student life. The government bodies in the residence halls are the Interhall Council for men, the Women's Residence Halls Government and the Towers Association. The Interfraternity Council and the Intersorority Council handle the special problems of the fraternities and sororities.

In addition to the opportunities for participation in extracurricular life through the student government program, there are many areas in which individual interests and skills can be fostered.

In publications, students obtain editorial, business and advertising experience. Publications include the CAMPUS TIMES, a semi-weekly newspaper; INTER-PRES, a yearbook edited by the Junior Class; PROLOGUE, a semi-annual literary magazine; UGH, a semi-annual humor magazine; a directory; a handbook; calendar; and the ROCHESTER INDICATOR, the publication of the engineering students published four times a year.

Drama groups include the Stagers, an organization under the direction of a faculty member, which presents two plays yearly; an experimental theatre group under student directorship; Co-Kast, a student group which produces a recent Broadway musical show each fall; in the spring the men and women join together to present a student written, student directed musical comedy. The debating program of the Forensic Society is both intercollegiate and intramural.

Social service and other organizations provide a wide range of outlets for the individual student's personal interests. Departmental clubs give students the opportunity to become acquainted with faculty and other students having similar academic interests.

Athletics

Ample provision is made for athletic interests. Intercollegiate sports for men include baseball, basketball, football, golf, soccer, tennis, swimming, track, wrestling, squash, and sailing. Intramural contests are an important part of the program.

> *The athletic policy of the University of Rochester has been developed to further the best interests of the students who participate in intercollegiate athletics.*

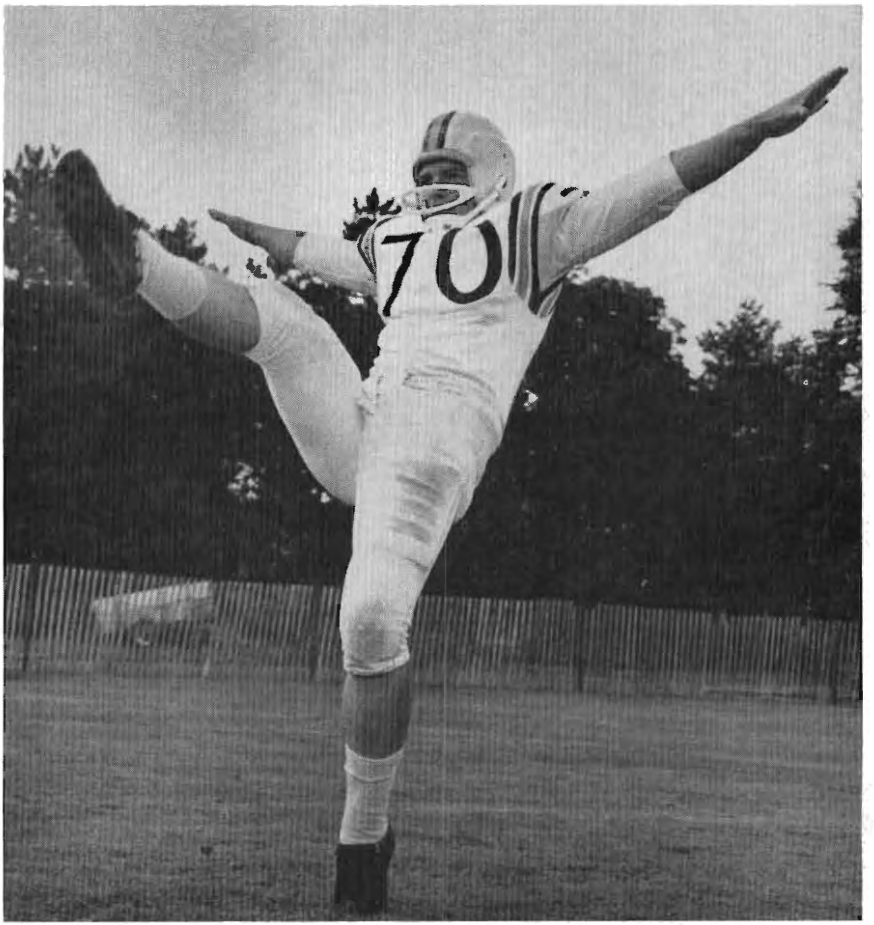
The definite objectives are to afford as many men as possible experience in intercollegiate sports; to devote only as much time to athletics as is necessary to give the participants all the worthwhile values that are derived from such participation, with as little interference with their scholastic endeavors as is possible; to arrange schedules, the playing of which entails only a minimum loss of time from classes, and, as far as practical, with teams of approximately the same ability, representing institutions not only of about the same enrollment of men but also of similar educational standards and athletic ideals; to have the membership of all varsity teams composed of students successfully carrying a full program of work and who play for recreation.

To this end, the University does not subsidize its teams. Members of all athletic squads must meet the same entrance requirements and scholarship standards required of the student body in general, and they enjoy the same privileges as are granted other qualified students.

Women's sports, sponsored by the Women's Athletic Association, include archery, badminton, baseball, basketball, dancing, fencing, hockey, skiing, swimming, tennis and volleyball. Women students participate in Play Days with women's groups from other colleges. Modern dance is an important part of the program and is sponsored through a Dance Club.

Honorary Societies

Honorary societies include Phi Beta Kappa, Sigma Xi, Tau Beta Pi, Beta Gamma Sigma, Delta Phi Alpha and Phi Sigma Iota. There are, in addition, the following local honorary organizations: Marsiens for senior women, Keidaeans for senior men, Mendicants for junior men, Yellow Key for sophomore men and D'Lions for sophomore women.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Fraternities, Sororities

There are thirteen social fraternities for men and four for women. Eleven of the thirteen men's fraternities are national; the other two and all sororities are local groups. The fraternities are Alpha Delta Phi (1851), Delta Upsilon (1852), Delta Kappa Epsilon (1856), Psi Upsilon (1858), Alpha Epsilon Pi (1961), Theta Delta Chi (1867), Phi Epsilon Pi (1911), Theta Chi (1920), Beta Delta Gamma (1926), Sigma Chi (1932), Tau Kappa Epsilon (1954), Sigma Alpha Mu (1954), and Gamma Sigma Phi (1962). The sororities are Theta Eta (1903), Alpha Sigma (1903), Theta Tau Theta (1906), and Gamma Phi (1909). The Interfraternity Council and the Intersorority Council deal with the common interests of the respective groups.

RELIGION

The University of Rochester was founded by men of strong religious convictions. Although the school is non-denominational, it recognizes the importance of religion in campus life.

A Chaplain and Director of Religious Activities is appointed by the University to counsel students and to coordinate the activities of all religious groups. He serves as Chaplain to Protestant students on an inter-denominational basis, assisted by Chaplains or advisers to Protestant denominational groups and by Chaplains for Roman Catholic and Jewish students, provided by their own organizations.

Religious Organizations

Voluntary student religious interest finds its expression through the activities of various campus organizations. Protestant students are organized through a University Protestant Fellowship which sponsors discussions, study, social service, and fellowship programs. Working closely with it and operating as parts of its total minstry are a Canterbury Club, a Lutheran Student Association, and a Wesley Fellowship. A Christian Science group, a Unitarian-Universalist group, and an Inter-Varsity Fellowship meet during the month.

Catholic students are organized through a Newman Program which provides regular lectures, study groups, annual retreats, daily afternoon Mass, and social fellowship. The Newman Oratory at 561 Mt. Hope Avenue provides a center for off campus activities as well as a residence for the full time Catholic Chaplain. Jewish students are organized through a chapter of Hillel which sponsors cultural meetings, breakfasts, religious discussions, and social activities.

All of the religious groups on campus are represented on an inter-religious council which coordinates programs and sponsors joint activities, such as brotherhood dinners, coffee hours, and the Campus Conference on Religion. It also takes an active interest in campus life, social service, and international affairs.

Chapel

University Protestant Chapel services are held each Sunday morning at 11 o'clock in Strong Auditorium. The University Chaplain preaches at all services except one each month when a distinguished clergyman recognized for national leadership, is invited to bring the message. The University Chapel Choir sings at these services.

Mass is celebrated each Sunday morning at 9 and 11 o'clock in the West Lounge of Todd Union, as well as daily at 4:45 in Upper Todd.

Jewish services are held on Friday evening in the upper lounge of Todd Union.

Holy Communion is served by the Episcopalian Chaplain each Sunday at 9:30 A.M. in the Men's Dining Center Lounge.

Religious Center

Offices for the Director of Religious Activities and for the various chaplains are on the second floor of Todd Union. A lounge and other facilities of Todd Union are available for group meetings. Opposite the lounge is a room for prayer and meditation.

MUSICAL ACTIVITIES

The program of musical activities on the River Campus is designed to contribute to the artistic and aesthetic development of the participating and listening student body. Active choral and instrumental organizations provide opportunity for those with musical interests and talents to develop these abilities under capable direction.

The Cecilian Chorale

The Cecilian Chorale is open to all undergraduate women students, admitted by audition. Performances are scheduled for important campus occasions and for local schools and clubs. The Orpheus and Cecilian Chorales combine for one rehearsal each week to learn and perform music selected from the large mixed chorus repertoire. The combined groups also appear in concert with the Concert Band, performing works arranged and written especially for mixed chorus and band.

The Orpheus Chorale

The Orpheus Chorale is open to all men students of the undergraduate River Campus Colleges admitted by audition. The group performs on campus in the Christmas Concert, for Parents' Weekend, and other significant events, and at local schools.

The Men's Glee Club

The Men's Glee Club, founded in 1875, enjoys an ever-increasing, enviable reputation. The men sing at numerous functions of the University and make a significant contribution to the cultural life of the city of Rochester through their appearances with the Rochester Philharmonic Orchestra; in concerts for high schools, local industries, and service clubs; and on television programs. Spring tours take the Glee Club to cities all over this country and Canada.

The Women's Glee Club

The Women's Glee Club appears locally and at special University events. The Club also participates in exchange concerts with men's choruses from other Eastern Universities.

The Men's and Women's Glee Clubs combine for one rehearsal each week to prepare oratorios and other large choral works which are presented in concert on the River Campus with members of the Rochester Philharmonic Orchestra.

The University Chapel Choir

The University Chapel Choir functions primarily in connection with the Protestant Chapel services and is open to students from all schools and colleges of the University. In addition, the Choir presents special musical programs taken from the finest *a cappella* music of the sixteenth century, the great cantatas and oratorios of the masters, and contemporary sacred compositions.

The All-University Symphony Orchestra

The All-University Orchestra draws its membership from the student bodies, faculties, and alumni of all schools and colleges of the University. Outstanding soloists are featured on some concerts, all of which are presented in Strong Auditorium. Reading sessions to familiarize members with a large symphonic repertoire are held during the winter months.

The Marching Band

The Marching Band, open to both men and women, provides music at "half-time" spectacles for home football games. The band accompanies the football team to at least one out-of-town game.

The Concert Band

The Concert Band begins rehearsals at the close of the Marching Band season and prepares musical presentations for University functions and civic organizations. The repertoire includes original music for band and arrangements of the symphonic masterpieces. The group also combines in concert with the Orpheus-Cecilian Chorale.

The Yellowjackets

The Yellowjackets, a group of twelve singers selected from the Men's Glee Club, perform on programs with the glee club and provide light entertainment for campus functions. The group also makes appearances at colleges and schools throughout the area.

STUDENT RESIDENCE

FULL-TIME STUDENTS on the River Campus, except local students who live with their parents or legal guardians, must live on campus unless excused by the Dean of Students. Freshmen must live in the residence halls; upperclassmen, in the residence halls or fraternity houses. Students who reside in or near the city and wish to live on campus will be accommodated to the extent that space is available. There is a compulsory board plan for all resident students.

The Towers

The Towers, two newly-constructed, nine-story buildings, house 520 upperclass students. Facilities are provided for both men and women. Emphasizing the concept of community living, these halls also permit the University to provide housing for a few faculty families.

Accommodations for students are arranged in six- and four-person suites providing a lounge, individual rooms, and a bath for each unit. Women students live on floors four, six, and eight in each building while the other floors house male students. Faculty apartments are located on the main floor and on floors four and seven in each hall.

An adjacent dining room serves all residents of the Towers. The dining hall accommodates all Towers residents and is designed to permit small group dining. It is expected students will dress in good taste for meals: coats and ties for men and dresses for women.

Men's Residence Halls

Undergraduate men from outside the Rochester area are provided with housing in Men's Residence Halls and the fraternity houses on the River Campus. Six residence units provide living quarters for about 1,100 students. About 170 upperclassmen live in eight fraternity houses. Tiernan and Gilbert Halls house freshmen.

Each residence hall operates as a unit. The students in each residence unit plan and participate in a social program within the hall. Student government is largely responsible for both social life and conduct. Within the Men's Residence Halls are recreation rooms, a snack bar, and lounges for the use of residence groups and individuals. Other facilities include typing rooms, kitchenettes, and laundry equipment. Dances, student-faculty coffee hours, intramural sports competition, ping-pong tournaments, and group discussions of current issues are typical of the social program within the residence units. Through activity of this sort each student is given experience in group living.

Selected graduate students live in the residence halls as advisers. They are aided by a group of undergraduates who also serve as advisers. A close contact is maintained between the residence advisers and other counselors. It is the duty of the residence hall advisers to help individual students with their problems, direct students to other advisory agencies in the University, and develop the individual halls as social units which will reflect the social and intellectual spirit of the University. The advisory program within the halls is coordinated by the Associate Director of Residence Halls.

Student rooms are equipped with desks, lamps, desk chairs, lounge chairs and beds. Linens (two sheets, one pillow case, two bath towels) are furnished and a weekly exchange provided. Students furnish their own blankets, bedspreads and draperies. Students receive their mail in Todd Union.

Room rental in the residence halls is $370 per academic year. Both single and double rooms are available. Most rooms, however, are doubles.

The Men's Dining Hall is located across the street from the residence quadrangle. Dining facilities are provided for residents of the Men's Residence

Halls and their guests. In addition to the main dining hall, there are several small private dining rooms for special parties. Breakfast and lunch are served cafeteria style; dinner is served by student waiters. Additional meeting rooms as well as the Faculty Club are housed in the building.

Special facilities for non-resident men students are provided in the Men's Residence Halls. City students affiliate themselves with a Residence, have full use of the city men's lounge and locker room, and take full part in all the activities and social functions of the Residence. All non-resident freshmen participate in these programs as well as upperclassmen who wish to do so. Several rooms are provided in the Residence for non-resident men. These rooms are furnished with bunk beds and dressing facilities. Commuting students may stay overnight in these rooms any time at a cost of fifty cents per night, with linen furnished for an additional fifty cents.

Detailed information regarding the residence halls will be sent with the room application which is mailed upon payment of the entrance deposit fee. Any questions concerning the residence should be addressed to the Associate Director of Residence Halls, River Campus.

Women's Residence Halls

Excellent accommodations for women students are provided in the Women's Residence Halls. Many attractive features for student living and social activities are offered in the Women's Residence Halls. There are spacious lounges and terraces on the main floor, music rooms, and a dining room which may be divided into four smaller dining rooms for a more intimate atmosphere. On the ground floor there is a coeducational recreational room with a snack bar. Situated on the seventh floor is a modern automatic laundry, solarium and sun-deck for the use of women residents, and on each of the living floors there are two lounges, kitchenettes, and small laundry rooms.

Student rooms are spacious and fully furnished with desks, beds, chairs, lamps, bookcases, chest of drawers, and built-in closet units for each occupant. The interiors of the rooms are furnished in contemporary style, decorated in warm colors, and highlighted by large picture windows with harmonizing draw-curtains.

Students furnish their own blankets, bedspreads and pillows. Freshman women are advised to wait until they arrive on campus to purchase bedspreads.

Linens (2 sheets, 1 pillow case, 2 bath towels) are furnished and a weekly exchange of 1 sheet, 1 pillow case, 2 bath towels is provided.

Double rooms and some single rooms are provided. Room rental is $370 per academic year. All undergraduate women from outside the Rochester area are expected to live in residence. Students who reside in or near Rochester will be accommodated to the extent that space is available.

All residents of the Women's Residence Halls are expected to take their meals in the residence dining room. The board plan includes all meals during the week except Sunday evening supper. Breakfast and lunch and Sunday dinner are served cafeteria style; dinner is served by student waitresses. A snack bar is open in the residence Sunday evening for students wishing to buy supper on the campus.

The advisory system of the residence halls is under the administration of the Assistant Dean of Students, and includes the Director of Residence Halls and staff, Head Residents, and student assistants. Their duties include the supervision of the four wings of the residence hall, personal counseling, advis-

ing of women students in their activities and social affairs, and supervision of the coeducational recreation program in the halls. Specially selected upper class women serve as advisers and live on the freshman corridors throughout the year.

The social program of the Residence Halls is planned and carried out mainly by the Women's Residence Halls Government and its standing committees, and includes a variety of women's activities and coeducational events. Throughout the year there is a full calendar of social occasions such as traditional women's college suppers, conferences, faculty coffee hours, formal and informal dances and parties, teas and receptions, pajama parties, picnics, open houses, and game nights.

All phases of community living, standards and regulations for women are under the jurisdiction of the Women's Residence Halls Government, which is the legislative and administrative body in the Women's Residence Halls. This Council is made up of an executive board, elected corridor representatives, and standing committees. Women students in the Women's Residence Halls make and enforce their own rules in matters of conduct and community life, and every woman is considered to be a participant in this form of government. Administration of these standards is under the jurisdiction of the Women's Judicial Board.

Facilities for non-resident women students are provided in the Women's Residence Halls. City students affiliate themselves with the Residence, have full use of all social areas in the building, and take part in all the activities and social functions of the Residence. Sleeping quarters are provided in the Residence for the use of non-resident women. Bunk beds are furnished. Non-resident women may stay overnight at a cost of fifty cents per night; linen is furnished for an additional fifty cents. Non-resident women are welcome in the dining room at all times and may buy their meals on a cash basis.

Further information will be sent with the application for a room, or may be had by writing to the Assistant Director of Residence Halls.

Room Deposits

Both men and women students who live in residence halls are required to deposit with the Accounting Office the sum of $10 against which charges may be made for damage to the halls. For new students, this deposit is taken from the $50 deposit fee paid prior to entrance. During the period of residency, occupancy charges of $2 or less are held against the deposit. Charges amounting to more than $2 are billed through the Accounting Office after advance notification to the resident.

General Regulations

General Responsibility

Each student is expected to abide by such rules as the University and its faculties may enact. The student also assumes the responsibility to conduct himself in a manner consistent with accepted standards of good citizenship, honesty, propriety, and with proper regard for the rights of others and the obligations of a member of the academic community. At its discretion, the University may delegate to student groups certain judicial and disciplinary responsibilities and the student must abide by the decisions of such groups as if made by the University itself.

Terms and Vacations

Terms and vacations of the college year are indicated on the calendar printed on page 4.

Attendance

All teachers are encouraged to keep a record of attendance and to report absences to the faculty advisers. Responsibility for attendance of juniors and seniors is assumed to rest directly upon the student. This privilege is extended for each term to freshmen and sophomores whose names appear on the Dean's List.

Absence From Class

(Trips, activities)—Travel with an authorized extra-curricular group does not constitute an automatic excuse from classes. Students should make their own arrangements with instructors. Coaches and other group advisers may, if they wish, utilize some sort of form letter testifying to the fact that the student is traveling semi-officially. This procedure emphasizes both the autonomy of the classroom instructor and the responsibility of the individual student.

Students who are under the care of the Health Officer for two or more consecutive days will receive a statement from the Health Officer certifying the dates of illness.

Report of Illness

Absence from any college exercise on account of illness should be promptly reported to the Medical Officer even though the student is under treatment by another physician.

Marriage

If a student plans to be married during an academic year, the Office of the Dean of Students should be notified at least two weeks in advance. It is also expected that parents or guardians will notify the Office of the Dean of Students that they are aware of the proposed marriage.

A student in the residence halls who marries during an academic year must obtain permission from the Director of Residence Halls in order to retain a room in the residence halls. Marriage and withdrawal from the residence halls do not release a student from a room contract.

Student Cars

Students driving cars on campus are required to register them. Freshmen and sophomore resident students are not permitted to bring cars to the University.

Residence Policy

See page 61.

Residence Requirement

The minimum residence requirement for the bachelor's degree is one full academic year, according to the requirements of the New York State Department of Education.

Dropping of Courses

1. During the first seven weeks of any semester a student may change his registration without penalty if he has the consent of the instructors of the respective courses.
2. Changes in registration which involve either an underload or an overload shall be submitted to the Dean of Students for approval.
3. After the seventh week of each semester, no changes in registration shall normally be permitted. Exceptions to this rule may be made if recommended by the adviser and instructor and approved by the Dean of Students.
4. A permanent grade of E will be recorded for the student in a course dropped after the first seven weeks, unless otherwise recommended by the adviser and instructor and approved by the Dean of Students.
5. Students who are permitted to withdraw from the University may drop their courses with or without penalty at the discretion of the academic adviser and the Dean of Students.

Junior Year Abroad

Superior students who receive the permission of their departments of concentration and of the Administrative Committee may apply for admission to a foreign university for study abroad in the junior year or for admission to one of the foreign-study programs conducted by an American college or university. Students who study abroad under this plan are retained on the rolls of the University of Rochester and receive full credit for work successfully completed abroad provided the student's registration has been approved in advance by the University. Students interested in the program of study abroad must apply to the Office of the Dean of Students early in the autumn of the sophomore year. A fee of $50 is charged students who retain their status as Rochester undergraduates while studying abroad.

Marking System

A student's work in any course will be rated in accordance with the following definitions: Grade A, Excellent; Grades B+ and B, Good; Grades C+ and C, Fair; Grades D+ and D, Poor; Grade E, Failure; I—incomplete; X—absent

from examination; W—drop without penalty; DE—drop with penalty, failure in course.

Students with Incompletes or X (absent from examination) must remove the deficiency prior to the end of the next academic term or a final grade of E will be recorded. Requests for an extension of time must be approved by the instructor and the Dean of Students, with notification to the Registrar's Office.

Hours of Credit and Points of Credit

Two units are employed in fixing the total requirements for graduation, the hour of credit and the point of credit. The hour of credit represents a passing grade (D or higher) in a course of one hour a week for one term. For each hour of credit the student will receive four points of credit if his grade is A; three and one-half points of credit if his grade is B+; three points of credit if his grade is B; two and one-half points of credit if his grade is C+; two points of credit if his grade is C; one and one-half points of credit if his grade is D+; or one point of credit if his grade is D. A minimum cumulative point hour ratio of 2.0 is required for the degree Bachelor of Arts or Bachelor of Science.

In laboratory courses at least two hours of attendance in laboratory are required to gain one hour of credit.

Examinations and Failure

A student whose work during the term has not been satisfactory to the instructor in charge may, at the discretion of the instructor, be excluded from the final examination, and be reported as *failed.*

The instructor's report at the close of the course includes a grade indicating the combined result of term work and examination. Any student who is absent from a regular examination through causes beyond his control may, by special permission of the Dean of Students, be allowed to take a make-up examination at a time appointed by the instructor.

Requirements for Bachelor's Degree with Distinction

The Bachelor degrees are awarded in three grades of distinction: with *distinction,* with *high distinction,* and with *highest distinction* in departmental major.

This award is based primarily on a point-hour ratio: at least 3.25 for distinction, 3.60 for high distinction, and 3.85 for highest distinction. However, a piece of creative work or a paper (critical or creative, or a report of the results of original research) may be offered in support of a recommendation for a distinction award not more than one level higher than would be indicated by the point-hour ratio. Students interested in submitting such a project should consult their departmental counselors not later than February 1 of the year in which they plan to graduate.

Except in unusual cases, no student shall be considered for a degree with distinction who has not had at least two years of academic work at the University of Rochester. Ordinarily nothing higher than a degree *with distinction* will be given in such cases.

In the College of Arts and Science students interested in receiving degrees with distinction or honors should inquire at the department office before November 1 of their Senior Year. Departmental recommendation is required for either of the above designations.

Deficiency in Academic Work

The Committee of Faculty Advisers and Deans periodically reviews the academic records of first and second year students; departmental counselors review the records of juniors and seniors. Students who do not make satisfactory progress toward the completion of requirements for a degree may be placed on probation or dropped from college.

It is not the policy of the University to apply rigid numerical criteria in determining when probation or dismissal action is warranted. All students are expected to maintain a cumulative point-hour ratio of 2.0 (C average) or better. An upperclass student may be placed on probation for an exceptionally poor term record, even though his cumulative record is 2.0 or better. All factors relevant to a student's academic progress are considered in making decisions regarding academic action.

Probation means that the student's academic performance is unsatisfactory.* Neglect of academic responsibility by a student who is on probation may result in his being dropped by the Dean of Students prior to the end of a term. A student who at the end of a period of probation has failed to show significant improvement in his academic record may expect to be dropped from the University.

Academic Honesty

Two of the chief purposes of education are to develop the intelligence of the student and to instill in him a sense of moral responsibility for his own actions. Fundamental to the accomplishment of both of these purposes is the duty of the student to perform *all* of his required work without illegal or unauthorized help.

Academic dishonesty is the appropriation of the work of other people by a student who claims it as his own in order to receive a better grade in a course. Any such act of borrowing or using the work of others without admitting that it is not one's own is a deliberate act of cheating, or plagiarism, and is liable to punishment. Plagiarism includes: 1) receiving or giving oral or written information on an outside assignment, a paper, a quiz, or an examination; 2) copying the paper of another person while taking a test or exam or permitting one's own paper to be copied; and 3) copying information from a book or other written material and using it in a student paper without acknowledging the source.

Students who are academically dishonest not only are depriving themselves of the full benefit of education but are unworthy of the respect of the faculty and their fellow students. In cases of academic dishonesty, the student will be referred to the River Campus Committee on Academic Honesty, a faculty-student board and, if found guilty, he will be punished by losing credits, having grades lowered, having a notation of plagiarism placed on his permanent college record, or being expelled.

Withdrawal

The continuance of each student upon the rolls of the University, the receipt by him of academic grades, his graduation, or the conferring of any degrees or the granting of any certificate, shall be strictly subject to the discretionary powers of the University. The University expressly reserves the right,

*For the purpose of faculty action "unsatisfactory" would normally include a cumulative or term PHR below 2.0 or failure(s) in required courses.

and each student expressly concedes to the University the right, to require his withdrawal at any time for any reason; no reason for requiring such withdrawal need be given.

Students who desire to withdraw on their own initiative should consult the Dean of Students. If a student withdraws on his own initiative while his academic standing is unsatisfactory, he may be recorded as *dropped.* A student who withdraws early in a college term may be excused from payment of a part of his tuition for that term. After five weeks the student must pay full tuition. Up to that time he pays a percentage of his tuition based on the length of his attendance.

Firearms

The following regulations apply to the possession and use of firearms:

1. No student may possess a firearm or airgun on the River Campus without registering his weapon in the Office of the Dean of Students within twenty-four hours after it is brought on campus.
2. Weapons registered with the Dean of Students must be deposited with the appropriate dormitory head or fraternity president. If such deposit is inconvenient the student may retain the firearm but deposit a major operating piece of the mechanism such as a bolt or a cylinder with the dormitory adviser or fraternity president.
3. No student may fire a rifle, shotgun, pistol or airgun on the River Campus except in places specifically designated for this purpose, i.e., the rifle range.
4. Students who are found with an unregistered firearm (including an airgun) in their possession or who are apprehended shooting a firearm or airgun on the River Campus or riverbank adjacent thereto are subject to expulsion from the University.

Master Keys

The unauthorized possession or use of a key to a University lock is forbidden, and students violating this regulation are subject to a fine and/or expulsion.

Soliciting Funds

Student groups engaged in any type of fund raising activity must restrict their efforts to the River Campus. Exceptions to this rule which would permit a group to contact the community at large are rare and must be approved by the Office of the Dean of Students.

Degree Programs

UNDERGRADUATE

THE UNDERGRADUATE DEGREE programs of the River Campus colleges first introduce students to the provinces of intellect: the humanities, the social sciences, and the natural sciences; and secondly, give them a thorough competence in the subject or area of their choice.

Some students will regard their undergraduate education as terminal. Others will go on to graduate and professional studies. For all, however, the University believes a broad, common education in the basic areas of human knowledge is essential. Generally, the major problem of specialization is the gap it creates between specialists. The first two years of college aim at developing the materials and techniques of intellect that span this gap. These same materials and techniques, drawn from the disciplines of the liberal arts, are the foundation of specialization as well as the foundation of an adequate and effective conduct of life.

Liberal studies, within the College of Arts and Science, are the basis of the undergraduate's first two years. The student then may complete his education within that college, or transfer to the College of Business Administration, the College of Education, the College of Engineering and Applied Science, or the Department of Nursing. Students planning to transfer to one of these units should consult both the Arts and Science section of this *Bulletin* and the section for their special college to be certain their course selection is acceptable.

COLLEGE OF ARTS AND SCIENCE

The College offers the Bachelor of Arts with the following majors:

Anthropology
Astrophysics
Biology
Chemistry
Chinese (Literature)
Classics (Literature)
Economics
English
Fine Arts
French (Language or Literature)
General Science
Geography
Geology
German (Language or Literature)
History
Linguistics
Mathematics
Music
Philosophy
Physics
Political Science
Psychology
Russian (Language or Literature)
Sociology
Spanish (Language or Literature)

Students may earn the Bachelor of Arts within the Program of Honor Studies in the following majors:

Comparative Literature
Economics
English
History
Philosophy
Political Science

The Bachelor of Science is offered for the following majors:

Astrophysics
Biology
Chemistry
Geology
Physics

COLLEGE OF BUSINESS ADMINISTRATION

The College offers courses leading to the Bachelor of Science in the following majors:

Accounting
Business Administration
Industrial Management

COLLEGE OF EDUCATION

Course of study leading to the Bachelor of Science with the following majors:

Elementary Education
Secondary Education

COLLEGE OF ENGINEERING AND APPLIED SCIENCE

The College offers the Bachelor of Science in the following majors:

Chemical Engineering
Electrical Engineering
Mechanical Engineering
Optics

EASTMAN SCHOOL OF MUSIC

The Eastman School offers the Bachelor of Music with majors in various instruments, public school music, theory, composition, voice, church music, and the history of music.

The School also offers a Bachelor of Music with a minor in humanities and a Bachelor of Arts with a major in music.

SCHOOL OF MEDICINE AND DENTISTRY

The Department of Nursing offers a Bachelor of Science with a major in nursing and a Bachelor of Science with a major in general nursing.

UNIVERSITY SCHOOL OF LIBERAL AND APPLIED STUDIES

The School offers a variety of courses and programs leading to the Bachelor of Science degree.

GRADUATE STUDIES

THERE ARE over 1,400 students engaged in graduate study or research throughout the University. Each school or college in the University is responsible for recommending candidates for master's degrees. The work for the Doctor of Philosophy degree is under the general control of the University Council on Graduate Studies. Each college has an Associate Dean to administer Graduate studies.

The College of Arts and Science offers graduate work leading to the degree of Doctor of Philosophy in the following departments: Anthropology, Biology,

Chemistry, Economics, English, Foreign and Comparative Literature (French Literature), Geology, History, Languages and Linguistics (Linguistics), Mathematics, Philosophy, Physics, Political Science, and Psychology. The degrees Master of Arts and/or Master of Science also are given for work in these departments and in the Fine Arts Department of the College.

The College of Engineering and Applied Science offers work leading to the Doctor of Philosophy and the Master of Science degrees in Chemical Engineering, Electrical Engineering, Mechanical Engineering, and Optics.

The College of Education offers work leading to the degrees Master of Education, Master of Arts in Education, Doctor of Education, and the Certificate of Advanced Study upon completion of Specialist in Education programs.

The College of Business Administration offers work leading to the degrees Master of Science with a major in Business Administration and Master of Business Administration.

The Eastman School of Music offers work leading to the degrees Doctor of Philosophy, Doctor of Musical Arts, Master of Arts, and Master of Music.

University School of Liberal and Applied Studies offers programs leading to Master of Arts and Master of Science degrees.

The School of Medicine and Dentistry offers programs of study leading to the degrees Doctor of Medicine, Doctor of Philosophy, and Master of Science. Information on the program for the degree Doctor of Medicine may be obtained from the Dean of the School of Medicine and Dentistry, University of Rochester, Rochester, New York 14620.

Detailed information on the University's graduate programs is given in the bulletin "Graduate Studies," which may be obtained from the Associate Dean for Graduate Studies in each school. Students requesting application forms should write to the Secretary of Graduate Admissions, Administration Building, University of Rochester, Rochester, New York 14627.

OFFICER CANDIDATE PROGRAMS

AIR FORCE RESERVE OFFICERS' TRAINING CORPS

The Air Force Reserve Officers' Training Corps at the University of Rochester is one of 186 such units located at colleges and universities throughout the United States. Its purpose is to prepare male college students to qualify for commissions as second lieutenants in the Air Force Reserve at the same time that they graduate from college. The training program is conducted by personnel assigned from the United States Air Force to the University, where they are organized into the Department of Air Science.

The Air Science program is divided into the basic course (freshman and sophomore years), and the advanced course (junior and senior years). The Air Science courses listed on page 94 must be successfully completed in order to qualify for a commission in the Air Force Reserve upon graduation.

Requirements for enrollment in the basic course (freshman and sophomore years) are that the student: (1) be a citizen of the United States; (2) if programmed for flying training must be less than 26 years six months of age at the time of completing the program; (3) if programmed for other than flying

training must be less than 28 years of age at the time of completing the program; (4) be physically qualified for entrance to the University. Selection for enrollment in the advanced course (junior and senior years) requires that the student: (1) complete the basic course or equivalent thereof; (2) meet the physical requirements for general military science in the scientific or administrative categories or for flight training; (3) have successfully completed such general survey or screening tests prescribed for entering into each of the categories; (4) must possess the overall academic average of "C" (2.0).

Accepted students are eligible for draft deferments after completing the first semester of the freshman year.

Basic students are issued a uniform from the University's stock, while advanced students receive a complete Air Force Officer's uniform which becomes theirs upon graduation. Including summer training session, advanced students are paid about $600 for their two years' training. One summer training period of four weeks' duration is required between the junior and senior years which consists of practical exercises in Survival Training, Air Base Defense, Aircraft and Aircrew Indoctrination and Junior Officer duties. The Summer Training Units are held at several different United States Air Force bases.

Students interested in the program should consult the Air Science section of the "Courses of Instruction" in the College of Arts and Science for pertinent academic regulations.

NOTE: Legislation on the Air Science program was before the Congress at the time this catalogue was being printed. This legislation may result in changes to the program. If significant program changes do occur, widespread campus and national publicity will advise of these changes. Interested personnel may also write to the Department of Air Science for information.

NAVAL RESERVE OFFICERS' TRAINING CORPS

The University of Rochester is one of fifty-three colleges or universities where a permanent Naval Reserve Officers' Training Corps Unit is established. A Department of Naval Science under a Professor of Naval Science and a staff of naval instructors is an integral part of the College of Arts and Science; a permanent building, Harkness Hall, houses the Department.

The Naval Science sequence, consisting of one course per term, complements the University's regular academic courses in arts and science. Those enrolled in the NROTC program may fulfill the requirements for a Baccalaureate degree in either arts or science, as well as the requirements for a commission in the naval service, in eight terms (four academic years).

There are two types of students enrolled in the NROTC program:

1. *Regular NROTC Students* are subsidized by the Navy for tuition, fees, textbooks, uniforms, and retainer pay of $600 per year. In return for these benefits, regular NROTC students obligate themselves to attend three cruises or summer training periods of six to eight weeks; to accept a commission as ensign, USN, or second lieutenant, USMC, upon graduation, and to serve on active duty at the pleasure of the President as career officers in the United States Navy or the United States Marine Corps. Depending upon the needs of the service, the Secretary of the Navy will accept resignations from those officers of the Regular Naval Service who have served a minimum period of active duty (four years at present) and who do not desire to continue on active duty as career officers.

2. *Contract NROTC Students* agree to make one summer practice cruise of three to six weeks; to accept a commission for three years in the Naval Reserve or the Marine Corps Reserve; to serve for three years on active duty; and not to resign such commission before six years from its original date. Contract students may, if granted permission by the Chief of Naval Personnel, delay their reporting for active duty in order to pursue (at their own expense) graduate study. Contract NROTC students are issued a complete uniform and Naval Science textbooks by the government and are paid subsistence allowance during their last two academic years.

Regular NROTC students are selected after nationwide competitive aptitude and screening tests and certified to the University by the Navy Department.

Contract students are selected from applicants from the incoming freshman class, the number being limited to a quota set by the Navy Department.

With the approval of the Professor of Naval Science and the academic authorities, civilian students, citizens of the United States, who have not entered into any contract with the Navy may be permitted to pursue Naval Science courses. They will be designated as Naval Science students. Since they are not members of the NROTC, either as regular or contract students, they will not be eligible to make NROTC practice cruises, to be issued uniforms, to have access to classified information or to be paid any compensation or benefits. Naval Science students may become eligible for enrollment as contract NROTC students, provided they comply in every respect with the requirements for such enrollment. They may also participate in the annual competition for entrance into the NROTC as regular students.

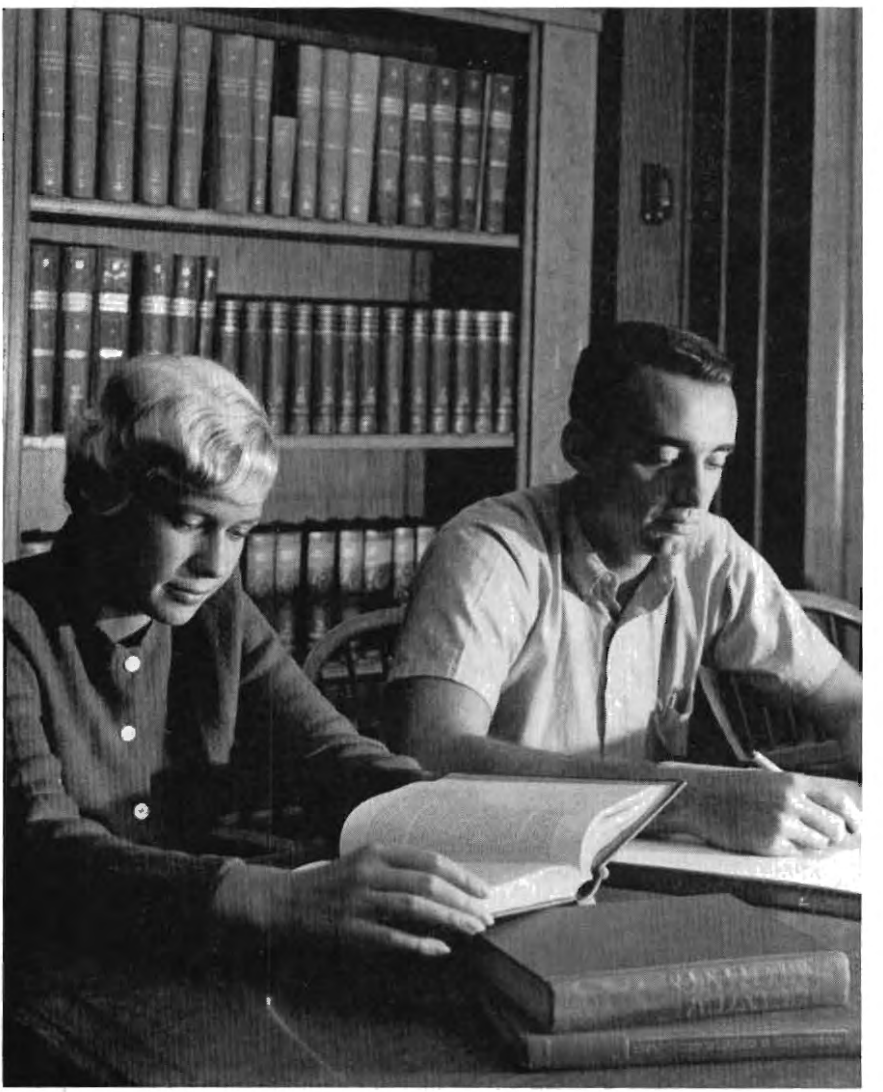
The requirements for enrollment in the ROTC program for both regular and contract students are that they: (1) must be unmarried male citizens of the United States and must agree to remain unmarried until commissioned or disenrolled; (2) must be not less than seventeen years of age nor more than twenty-one years of age on July 1 of the year in which they enter college (contract students may be accepted at age sixteen if considered of sufficient maturity by the Professor of Naval Science); (3) must meet all of the entrance requirements of the University, and be granted admission by the University; (4) must agree to remain in college for at least four years; (5) must be physically qualified.

Both regular and contract NROTC students are deferred from the draft while enrolled in the NROTC Unit. Naval Science students are not deferred from the draft by the Navy.

PLATOON LEADERS' CLASS U.S. MARINE CORPS

Qualified undergraduates may enroll in this course, which consists of two summer training periods of six weeks each. There is no military training during the academic year. Undergraduates who are enrolled in this program are draft deferred. Applications or requests for further information may be submitted to the Marine Officer instructor in the Department of Naval Science.

The College of Arts and Science



THE COLLEGE OF ARTS AND SCIENCE is devoted to the values of liberal education. As defined by the faculty, liberal education consists of acquiring the knowledge and the skills adequate to conduct a rational and sophisticated search for the answers to the major questions which confront mankind. Liberal education precedes applied education and is basic to it. Thus the College of Arts and Science provides the basic knowledge on which other academic units must draw. All fields of theoretical knowledge are appropriate to the arts and sciences, and the study and teaching of these at the undergraduate and graduate levels as well as the conduct of research are the major functions of this college.

The College of Arts and Science is administered by a Dean and an Associate Dean, and includes twenty departments: Air Science, Anthropology, Biology, Chemistry, Economics, English, Fine Arts, Foreign and Comparative Literature, Geology and Geography, History, Languages and Linguistics, Mathematics, Naval Science, Philosophy, Physical Education for Men, Physical Education for Women, Physics and Astronomy, Political Science, Psychology and Sociology. In addition, there are several special programs: Brain Research, a research and graduate instruction center focusing the skills and knowledge of numerous disciplines on the study of the central nervous system; Canadian Studies, a center for the study of Canada and Canadian-United States relations from an interdisciplinary point of view; East Asian Studies, an organized elective sequence in Chinese and Japanese language and culture; and General Science. A joint program with the Eastman School of Music enables undergraduates in the College of Arts and Science to receive an A.B. with a concentration in music. A series of courses in religion is offered in cooperation with the Colgate-Rochester Divinity School.

In cooperation with the College of Engineering and Applied Science, students may plan a five-year program which leads to a B. S. in Engineering and an A. B. with a concentration in the social sciences or humanities.

Undergraduate students on the River Campus are enrolled in the College of Arts and Science for their first two years. Their courses are designed to prepare them for advanced studies and to give them the breadth essential to a liberal education. At the end of the sophomore year students who intend to complete their degrees in the College of Engineering and Applied Science, the College of Education, the College of Business Administration, or the Department of Nursing in the School of Medicine and Dentistry make formal application for admission and, upon acceptance, are transferred.

The College offers courses of study leading to the degrees Bachelor of Arts and Bachelor of Science. The Bachelor of Arts program is directed toward a broad comprehensive education with special attention to the integration of many fields of knowledge. The Bachelor of Science program emphasizes specialized training in the student's major field of study. In the Bachelor of Arts program, there is the general program and the Honors Program. The general program enables the student to concentrate in one of the important fields of knowledge with a maximum opportunity for breadth of study. The Honors Program provides a maximum opportunity for independent work.

The Bachelor of Arts program is available in the following fields: Anthropology, Astrophysics, Biology, Chemistry, Chinese, Classics, Economics, English, Fine Arts, French, General Science, Geography, Geology, German, History, Linguistics, Mathematics, Music, Philosophy, Physics, Political Science, Psychology, Russian, Sociology, and Spanish. The A.B. program with honors is available in Comparative Literature, Economics, English, History, Philosophy, and Political Science. The Bachelor of Science program is available in Astrophysics, Biology, Chemistry, Geology and Physics.

METHODS OF INSTRUCTION

The units of instruction in the College of Arts and Science consist of lecture and discussion courses, laboratory courses, and honors seminars.

Courses

The ordinary unit of undergraduate instruction is the *course*. Each course requires one quarter of the A.B. student's work time for one term. Lecture and discussion courses normally meet for three fifty-minute periods each week, with the equivalent of a fourth period provided by a block of time spent in independent study. Laboratory courses ordinarily involve four fifty-minute class periods or their equivalent in laboratory sessions each week. Each course numbered between 100 and 299, unless otherwise stated, carries the equivalent of four hours of credit.

Freshman Preceptorial Courses

A special type of course is offered to freshmen by a number of departments in the College of Arts and Science. In addition, several departments are teaching one section of a regular course in a preceptorial manner. Each course is directed by a faculty preceptor and is open to a small number (generally 10 to 15) of selected freshmen. These students are introduced to certain problems or areas of intellectual inquiry involving one or more disciplines by means of

special, intensive readings, seminar discussions, and critiques. The Freshmen Preceptorial Courses receive full credit in the College and may be applied toward the group distribution requirements as described in this bulletin. Among departments offering such courses are Anthropology, English, Fine Arts, Foreign and Comparative Literature, Geology, Philosophy, and Physics.

Honors Seminar

The Honors Program is distinguished from the regular program by the seminar system and by a special system of examinations and grades. Enrollment in each seminar is limited to approximately ten students; seminars meet once a week for a three-hour session in an informal atmosphere that stimulates the exchange of ideas. The work of each student consists of independent reading, research, criticism, and analysis; oral reports or written papers form the basis of seminar discussions. The seminar system provides the discipline and training valuable to the student planning to do graduate study, but it does more than that. The excitement generated by the joint scrutiny of ideas and the cooperative search for truth in a seminar session is one of the most rewarding experiences a college education can offer.

A detailed description of other aspects of the Honors Program will be found under Degree Requirements.

DEGREE REQUIREMENTS

The degree programs in the College of Arts and Science offer each student an opportunity to choose one suited to his needs and interests. Each A.B. program includes, primarily in the first two years, work in the humanities, the social sciences, and the natural sciences. During the last two years the A.B. student studies in the field of concentration of his choice and chooses electives from other areas. The B.S. student follows a prescribed program throughout; however, each B.S. program allows for some breadth of study as well as a high degree of specialization.

Quantitative Requirement

Candidates for an A.B. must complete 32 courses or their equivalent. Candidates for a B.S. must complete between 32 and 36 courses; the exact number depends on their specific program.

Common Requirements

For all degree programs three specific requirements should be met during the first two years:

1. *English 101:* A course of instruction in writing expository and argumentative prose should be taken in the freshman year. A student may be exempt from this requirement if proficiency in English is indicated in an entrance examination or by the high school record.

2. *Foreign Language:*[1] A student must show proficiency in a foreign language. Entering students with three years of a foreign language in high school may take a proficiency examination during Freshman Week. The result of the examination may excuse the student from further study in the language or may require him to take from one to three courses. Most students will need to complete only

[1]Consult specific programs in Professional Schools for requirements of that college.

one course. Students are free to meet their foreign language requirement by studying a language new to them; in such cases the satisfactory completion of three courses is required.

3. *Physical Education:* All students are required to take physical education during each of their first four terms. Physically handicapped students may be excused or given modified programs on recommendation of the university health service.

4. *In addition, students must meet the distribution requirements.* Students considering the Honors Program should plan to complete these by the end of the sophomore year.

Courses in the College of Arts and Science which may be offered toward distribution requirements are classified as follows[2]:

Humanities (I)—East Asian Studies, English, Fine Arts, Foreign and Comparative Literature, Languages, Music, and Religion.

Social Science (II)—Anthropology, Economics, Geography, History, Linguistics, Philosophy[3], Political Science, Sociology.

Natural Science (III)—Astronomy, Biology, Chemistry, Geology, Mathematics, Physics, and Psychology[4].

To meet the distribution requirements students in a Bachelor of Arts program must take, ordinarily in the first two years, four courses in each of the two areas other than that in which their field of concentration lies. Students in a Bachelor of Science program must take three or four courses (as specified in the curriculum synopsis) in such areas.

[2]The following courses may not be applied toward distribution requirements—English 101, 115, 116, 123, 124, 126, 128; language courses numbered 101–102; all courses offered by the departments of Air Science, Naval Science and Physical Education.

[3]Philosophy courses classified under Humanities include 103, 104, 211, 241, and 244 etc; all other Philosophy courses are classified under Social Science.

[4]Psychology courses classified under Natural Science include 101, 201, 220, 251–252, 253, 255, 256, 260, 293, 297. All other Psychology courses are classified as Social Science.

In satisfying distribution requirements all students are required to include at least two laboratory science courses (selected from one or more of the following departments—Biology, Chemistry, Geology, and Physics and Astronomy) and at least two literature courses (selected from departments of English and/or Foreign and Comparative Literature).

The Plan of Study

A.B. students need not decide finally on their field of concentration until the second term of their sophomore year. At that time each A.B. student consults with his adviser and submits a tentative plan of study for his junior and senior years. B.S. students are assigned to the specific program of their choice when they are admitted to the College and normally follow the prescribed studies through the four years.

Students interested in the Honors Program should consult with their faculty advisers in order to include in freshman and sophomore years the recommended prerequisites for the program. Prospective honors students should meet the distribution requirements by the end of their sophomore year and should try to include any introductory courses that might furnish useful background for the material of the seminars. The Honors Program is administered by a director and an executive committee, who review applications for admission. A grade average of B is usually considered the minimum demonstration of a capacity to do successful independent work; however, each application is judged on its own merits.

The General A.B. Program

The requirements for a concentration in the general A.B. aim at producing a unified and, at the same time, broad and sophisticated program of study. For this reason, students concentrate their effort and course load both in the principal department of their choice, and in related departments. (See page 79 for departments offering study for the A.B.) The Bachelor's degree requires a minimum of 32 courses, but may require as many as 36 courses in certain programs (A.B. or B.S.). A.B. students are required to take ten courses beyond the elementary level within the area of concentration. Six to eight of these must be in the department of concentration. Since some departments have specific recommendations and requirements, students should study the departmental statements which follow. The two to four remaining courses are selected to form a related field with the purpose of enriching the student's understanding of the field of concentration.

The College offers an interdepartmental program in General Science. Since the requirements in this field vary from the requirements for the usual departmental concentration, interested students are urged to consult the special section on this program in this *bulletin*.

The A.B. Program With Honors

Honors seminars are offered by nine departments: Anthropology, Economics, English, Fine Arts, Foreign and Comparative Literature, History, Philosophy, Political Science and Sociology. There is also an Honors Program in Biology. A student can concentrate in any one of these departments except Anthropology, Fine Arts, and Sociology. The Honors student is required to complete four to

eight seminars for the A.B. degree.[5] Each Honors student will ordinarily supplement his program of seminars with a group of courses. A normal load will consist of two seminars and a course during each semester of the junior and senior year. However, a semester's program might consist of three courses and one seminar.[6] Every Honors student must take at least one seminar in each semester of his junior and senior years (except that students seeking to be certified in secondary education may be excused from seminars during the first semester of their senior year, and students taking their junior year abroad may substitute the work taken at a foreign university for the seminars they would have taken during their junior year).

A concentrator may not take fewer than four nor more than five seminars in the department of concentration. During his junior and senior years an Honors student must take at least two courses or seminars from the offerings of departments other than his department of concentration. A particular department may require that its concentrators take this allied field work in seminars rather than in courses. Each department participating in the Honors Program will specify prerequisites and sequences for its Honors concentrators and for other students who wish to enter its Honors seminars. Honors students are urged to take work in a foreign literature at least through the 131, 132 level.

Qualified Sophomores may enter the Honors Program. A normal load for a Sophomore in Honors will ordinarily consist of one seminar and two courses. Ordinarily a student must have participated in the Honors Program for at least two years in order to be considered for a degree with Honors. Therefore, students expecting to spend their junior year abroad should plan to enter the Honors Program in their Sophomore year.

Qualified students who are not in the Honors Program are permitted to register for a seminar if places are available.

The B.S. Program

Students interested in a B.S. program should consult the departmental sections which follow, where specific curricula are outlined.

Electives

The program for the B.S. degree often restricts the choice of electives; the A.B. candidate in the general program elects approximately ten courses to broaden his education in any direction that his special interest or curiosity leads him. The electives may be used to complete professional work in education if the student plans to teach in a public secondary school. (See Page 166) Other students may use their electives to complete pre-professional courses for medical or dental school. Students who wish to do so may use their electives to build a second area of concentration. Students working in the Honors Program may choose their electives from Honors seminars in addition to the four required and from lecture or laboratory courses in place of the seventh and eighth seminars.

Additional Courses

Permission to carry a fifth course, not required by the student's program, in any term after the freshman year may be granted if the student has high

[5]Honors students in Biology are welcome in seminars, but are not required to take seminars. For the regulations governing Biology Honors see page 99.

[6]Two seminars alone, or one seminar and two courses are also permitted.

academic standing and is judged capable of carrying the extra work. Permission for a fifth course, not required by the student's program, is granted by the appropriate faculty adviser or departmental adviser and the Dean of Students. Students who receive such permission may take a fifth course without payment of extra tuition. The maximum number of courses to which this policy applies is 36 courses.

A student may not carry a fifth course in the freshman year, excepting only courses in Applied Music, unless he is enrolled in the B.S. program in Biology, Plan B. A sixth course is not permitted in any term.

EXAMINATIONS

In addition to course quizzes and examinations, the College has two major examination systems. One is for students in the general A.B. program and the other for A.B. students in honors.

The Comprehensive Examination

A.B. candidates are required to take a comprehensive examination in their field of concentration at the end of their senior year unless their department provides an approved substitute.[1] B.S. students do not normally take comprehensives.

The comprehensive consists of two to four three-hour examinations prepared by the department of concentration. The examination tests the student's knowledge of his field of concentration and his ability to correlate material from different courses. It gives the student the opportunity to evaluate the relative importance of the facts and principles presented in different courses on the basis of his wider knowledge of the general field.

When the comprehensive is taken during the regular examination period at the end of the senior year students taking comprehensives are excused from final examinations in courses offered by the College of Arts and Science. The department of concentration uses the student's performance on the comprehensive, along with all other indications of his academic achievement, in recommending graduation and in awarding a degree with distinction.

Honors Examinations and Grades

Although honors students write the regular examinations in lecture or laboratory courses which they take, they have a special system of annual examinations in their seminar work. At the end of the junior year honors students take a three-hour written examination covering each of the seminars in which they have been enrolled. In the senior year the examinations are both written and oral. The examinations are set, administered and graded by a Board of Outside Examiners ordinarily drawn from the faculties of other universities and colleges. Seniors in Honors are exempted from the departmental comprehensive. For each seminar a student receives one of the following grades: Highest Honors, High Honors, Honors, Pass (credit, but not toward degree with honors), Fail (no credit).

The final ranking of seniors is made by the Committee of Examiners and, in special cases, with the counsel of seminar instructors and the Honors Committee.

[1]Approved substitutes are used by the departments of Biology, Chemistry, General Science, Geology, Mathematics, and Psychology.

PREPARATION FOR GRADUATE AND PROFESSIONAL STUDY

Students who intend to enter graduate or professional schools should consult with their faculty advisers, departmental advisers, and vocational counselors as early as possible in their undergraduate years to plan programs of study that will prepare them for advanced and professional training in their chosen fields.

Graduate Studies

Students interested in earning the A.M. degree should be prepared for one to two years of full-time study. The Ph.D. degree usually requires two to three years of full-time study plus an additional year to write the thesis. Students who need financial assistance in graduate school should apply early to the school of their choice.

Medicine

Students who are planning a professional career in medicine should realize that it requires a broadly educated person with a good grounding in science. Two plans of study are open:

I. Premedical students may choose a program leading to the Bachelor of Arts degree. A concentration in any department of study is acceptable, provided that the requirements for admission to medical school are fulfilled. Besides qualifying the student to enter medical schools requiring a college degree, this plan enables concentration in a particular field of learning. Premedical students may study for the degree in the Honors Program.

II. Especially capable and mature students are admitted to some medical schools after three years of college work. The University of Rochester will accept the first year's work in an approved medical school as equivalent to the fourth year in college, provided that: (a) distribution requirements have been met; (b) at least 24 courses have been completed with an average of C+ before entrance to medical school; (c) the first year of medical school has been completed satisfactorily.

The degree granted students in this category is the Bachelor of Arts in General Science. These degrees are not automatically granted; each student is expected to make formal application.

It should be noted that completion of three years of college study and a meeting of stated requirements does not insure admission to a medical school. The program of study should be so planned, therefore, that it may be adapted after three years to the College's requirements for concentration in some department of study.

Although medical schools vary considerably in their admission requirements, the following courses represent the minimum commonly required for a premedical program: Biology, 1 year; Chemistry, 1 year each in inorganic and organic; Physics, 1 year; English, 1 year; Foreign Language. Inasmuch as a solid foundation in the sciences is required for the medical curriculum, additional courses in Biology, Chemistry and Mathematics are strongly recommended. Further, since some medical schools have other requirements beyond those mentioned above, the student should plan carefully to meet the stated requirements of those schools to which he will apply. (See catalogues of the medical schools.)

New York State residents planning to compete for the Regents Scholarships

for Medicine and Dentistry should complete organic chemistry by the end of the third year of college (second year for three-year students).

The Premedical Advisory Committee assists students in preparing their programs of study and in applying for admission to medical schools. Consult the Dean of Students Office concerning advisers in this area.

Dentistry

The recommendations given above for premedical study apply also for the predental student, except that some dental schools admit students upon completion of two years of college work and the course requirements are somewhat less stringent. (See catalogues of dental schools for specific requirements for admission.) The Premedical Advisory Committee advises predental students on programs of study and application for admission to dental schools.

Law

There is no one field in which a student preparing for the study of law is advised to concentrate. Consult the Dean of Students Office concerning advisers in this area. (See catalogues of law schools for specific requirements for admission.)

Librarianship

A student preparing to be a librarian should take a wide range of subjects. The humanities, the social sciences, and the natural sciences are all valuable. Foreign languages are important, and the student should have a good reading knowledge of at least one modern foreign language.

The development of libraries devoted to special subjects has created opportunities for college graduates having specialized training in a subject in addition to training for librarianship. Those interested in becoming school librarians must meet the requirements for teaching certificates in the state where they will work.

Members of the library staff will be glad to discuss with students their undergraduate programs and plans for graduate study in library schools. Experience as a student assistant in a library is helpful, but is not a requirement for admission to a library school.

THE COLLEGE OF ARTS & SCIENCE

THE ADMINISTRATIVE OFFICERS

Kenneth E. Clark, PH.D. (Ohio State).....Dean of the College of Arts and Science
Morton F. Kaplon, PH.D. (Rochester).....Associate Dean of the College of Arts and Science
Marian A. McClintock, ED.M. (Rochester).....Executive Assistant to the Deans of the College

Janet Howell Clark, PH.D. (Johns Hopkins).....Dean Emeritus of the College for Women
Lester Oatway Wilder, A.M. (Harvard).....Dean Emeritus of the College for Men

Courses of Instruction

EXPLANATION OF COURSE NUMBERING SYSTEM

1–99	Non-credit courses.
100–199	Introductory courses—usually at the freshman and sophomore level—no graduate credit.
200–289	Courses at the junior and senior level carrying graduate credit unless otherwise specified.
290–299	Undergraduate reading or research courses.
300–399	Courses in the Honors Division.
400–489	Graduate courses at the master's level or the first-year of graduate study. Open to undergraduates only by special arrangement.
490–499	Master's level, reading or research courses.
500–589	Advanced or specialized graduate courses, usually at the doctoral level.
590–599	PH.D. reading or research courses.

All courses meet three times a week unless otherwise specified.
Each course carries credit for *one course* unless otherwise specified.

Honors Seminar

(Note that French or German 131 and 132 are required of all students—even those concentrating in other fields—who wish to enter most seminars in Foreign and Comparative Literature.)

ANTHROPOLOGY

314. Mythology and Religion. Reading of selected mythologies of Oceania, Africa, and the Americas, and of related materials on rituals; consideration of anthropological contributions to the comparative study of myth and ritual, including the works of Malinowski, E. R. Leach, Lévi-Strauss, Kluckhohn, A. F. C. Wallace and others.

Omitted 1964–65

349. Studies in Indian Civilization. Emphasis on interrelationships between Indians and Europeans as expressed in literary texts. Various Indian traditions examined in historical context.

Omitted 1964–65

368. Problems in Social Anthropological Analysis. Consideration of current approaches to problems in social anthropology. Particular emphasis is placed on methodological and theoretical questions and on assessment of recent progress and possible lines of new development.

Omitted 1964–65

COMPARATIVE LITERATURE

(Adviser to concentrators: Mr. Bernard N. Schilling, 415 Morey Hall)

This concentration is available to Honors students wishing to emphasize the study of English, French, or German literature for comparative purposes. The requirements are as follows:

With emphasis on English literature. All students entering this program will be expected to have taken Comparative Literature 108 during their Freshman or Sophomore year. (1) A course in Shakespeare (English 212), one genre course (English 131, 132, or 133), and one century or period course at the 200 level. (2) French or German 131, 132 and one other course in French or German literature. (3) Four seminars in Comparative Literature.

With emphasis on French or German literature. All students entering this program will be expected to have taken Comparative Literature 108 during their Freshman or Sophomore year. (1) Five courses in one of these literatures including French or German 131, 132. (2) Five seminars in Comparative Literature.

For the above concentrations only the following seminars will be acceptable: 304, 307, 350, 351, 352, 357, 359, 367, 375. In certain exceptional cases the foreign literature prerequisite for *entrance* into certain of the seminars may be modified at the discretion of the instructor.

NOTE: It should be borne in mind by students intending to do graduate work in Comparative Literature that the requirements stated above are *minimal.* All of the better graduate programs in Comparative Literature in American universities will presuppose, and often demand, more extensive preparation in foreign literatures (read in the original) than is stipulated here. Accordingly, those planning to pursue graduate study in Comparative Literature are strongly urged to do as much additional course work as time will allow in the foreign literature chosen for their concentration. It should be further noted that M.A. and Ph.D. work in Comparative Literature demand a sound reading knowledge of *at least* one other foreign language in addition to the language of the concentration. Latin, French, and German are almost universally required by the better graduate schools.

304. Medieval Epic and Romance. Detailed study of the structure of selected medieval epics and romances, including the *Beowulf; The Song of Roland; the Nibelungenlied;* Chrétien's *Perceval, Yvain, Lancelot,* the Tristan legend; an investigation into the sensibility underlying the two types of literature; the classical and medieval Latin background. Readings in English.

307. Post-symbolism. Comparative study of two poets (Yeats and Valéry) and of two novelists (Joyce and Proust), considered as descendants of the Symbolist-Decadent School of the late 19th century. Consideration of the themes and techniques of their creative works and of the principles which inform their critical essays. Prerequisite: French 131, 132.

320. The Idea of Indian Civilization. Emphasis on interrelationship between Indians and Europeans as expressed in literary texts. Various Indian traditions examined in historical context.

Omitted 1964–65

321. Studies in Modern Russian Fiction. Russian prose from Chekhov to Pasternak with auxiliary reading in the theater and poetry. Readings in English.

341. Studies in Chinese Literature and Thought. The major literary genres and schools of thought; emphasis on relationships between literature and Confucianism, Taoism, and Buddhism. Readings in English.

Omitted 1964–65

350. Literary Criticism. Studies of major literary critics from the time of Aristotle to the present.

351. Archetypal Analysis. The theory of archetypes (Freud, Frazer, Jane Harrison, J. Campbell, M. Eliade); application of the theory to the analysis of literary texts, classical or in the classical tradition.

Omitted 1964–65

352. Tragedy. A study of tragic themes and tragic behavior in drama and fiction with texts chosen from Aeschylus to Mann, Camus, and Brecht. Prerequisite: French or German 131, 132.

Omitted 1964–65

355. Dante and Medieval Culture. Emphasis on allegory and structure in the *Divine Comedy;* introduction, through the poem, to the spirit of the Middle Ages. Readings in English.

Omitted 1964–65

357. The Enlightenment. Critical analysis of works of major French and English authors of the eighteenth century. Prerequisite: French 131, 132.

359. Baroque Lyric and Reflective Poetry. Contemporary theories of renaissance and baroque poetry; stylistic analysis of the impact in continental Europe of Petrarchism, Cultism, Marinism. Prerequisite: French, German, or Spanish 131, 132.

Omitted 1964–65

367. The Modern European Novel. Studies in French, German and English prose fiction. Prerequisite: French or German 131, 132.

375. Problems in Comparative Literature. Confessional literature; the gradual intrusion of the novelist on his work; the problem of literary sincerity; representative writers from Rousseau to Kafka. Prerequisite: French or German 131, 132.

Omitted 1964–65

ECONOMICS

Students majoring in Economics are required to take course work in Economics 207, 209, and 231 as a substitute for one Honors Seminar. Normally, Economics 207 and 231 will be taken in the fall semester of the junior year along with an Honors Seminar. In the spring semester of the junior year, Economics 209 will be taken in addition to two Honors Seminars.

Prerequisite: Economics 101.

307. Economic Theory. Theories of value, production and distribution, with emphasis on modern work in these areas. Analysis of market structures. Introduction to general equilibrium theory and Keynesian modern income analysis.

Omitted 1964–65

323. Labor Economics. Labor in a modern, industrial economy, with emphasis on economic analysis of such problems as wages, labor productivity, employment and unemployment. History and growth of trade unions and their relations with government.

327. Strategic Factors in American Economic Growth. Main features of American economic growth since 1800. Recent statistical studies of national product, industrial structure and capital formation are evaluated. Considerable use is made of price theory and modern growth theory.

329. Monetary Theory. Functions and services of money; factors governing the demand for, and supply of, money and money substitutes; the relationships between money and levels of prices, employment, interest rates and the balance of payments; the effectiveness of monetary policy; and the coordination of monetary policy with debt management and fiscal policy.

Omitted 1964–65

337. The Soviet Economy. The Soviet economy will be examined as a system of economic organization. Its problems with respect to efficiency will be considered, and its performance in terms of growth will be evaluated and analyzed.

Omitted 1964–65

363. Public Finance and Fiscal Policy. Economic criteria for judging government policies which alter the allocation of resources and the distribution of income. Government policies to stabilize prices, reduce unemployment, and foster economic growth. Concentration on United States' policies and institutions, but student papers may be based on experience in other countries.

369. International Economics. Theory of international trade and balance of payments problems. Commercial policy in its effects on the export-import pattern, the distribution of income, and the gains from trade. A discussion of postwar monetary institutions and the problems they are designed to solve.

Omitted 1964–65

ENGLISH

Before beginning seminar work, English majors must ordinarily have taken English 102, English 144, and one of the following: English 131, 132, 133 or 141. A program of concentration in English Honors will ordinarily consist of four Honors seminars in English or American literature, two to four courses in English or American literature at the 200 level, and at least two seminars or courses in fields offered by other departments participating in the Honors Program. The four year program of every concentrator must include a course or seminar in (1) Chaucer, (2) Shakespeare, (3) Milton, (4) 16th or 18th century English literature, and (5) American literature.

301. Chaucer. A study of his chief literary works, with emphasis on *The Canterbury Tales* and *Troilus and Criseyde.*

304. Shakespeare. A study of his complete works.

307. Renaissance Literature. A consideration of the main themes in poetry and prose as expressed by the leading writers of the age.

310. Milton. A study of his works.

313. Eighteenth Century Literature. A study of poetry and prose from the Restoration to the death of Johnson with special emphasis on the literary and social criticism of the Neo-classical movement.

316. Romantic Literature. A study of the major writers.

319. Victorian Literature. Poetry and prose of the period.

Omitted 1964–65

322. Modern Poetry. Theories and techniques of modern British and American poets.

Omitted 1964–65

325. American Literature to the Civil War. A study of authors who have made important contributions to American thought with emphasis on Emerson, Hawthorne, Melville, and Whitman.

Omitted 1964–65

328. American Literature from the Civil War to the Present. Major works of chief American writers of the modern period. Novel: Mark Twain to Thomas Wolfe; poetry: Emily Dickinson to T. S. Eliot; drama: Eugene O'Neill to Arthur Miller.

331. The English Drama. A study of the drama both as a social force and as artistic form from classical times to the present.

332. Renaissance Drama. A study of plays by Shakespeare's contemporaries.

336. The English Novel. Development of English prose fiction from Defoe to the present.

Listed under Comparative Literature courses below, but acceptable as English seminars when offered by a member of the Department of English: 350 *Literary Criticism* and 352 *Tragedy.*

FINE ARTS

300. Mythology. Study of the outstanding myths of the ancient Greek world, including their origin and their association with early painting, sculpture, and literature. The relation of Greek myths to those of the Orient and the Germanic peoples.

Omitted 1964–65

HISTORY

Students taking seminars in American History must have completed History 231, 232; those taking seminars in European History must have completed History 101, 102.

322. The British Empire and Commonwealth. The British Empire and Commonwealth, with particular emphasis on the period since the American Revolution. Some previous knowledge of the political and social history of Britain since the Revolution of 1688 is expected.

Omitted 1964–65

325. French Canada. Persistence of the French tradition in North America from colonial times to the present. The effect of political and economic developments upon French-Canadian culture.

Omitted 1964–65

327. Seventeenth Century. Seventeenth century history, primarily in England; political, economic, social, intellectual, and religious aspects.

328. Canada-United States Relations. Problems in the relations of Canada and the United States from 1763 to the present. Opportunity for students to study the analogies and differences between developments in Canada and the United States or Canada and other members of the British Commonwealth. Previous knowledge of British Commonwealth or American History is expected.

Omitted 1964–65

333. American Economic History. Economic evolution of the United States from the simple agrarian nation of 1789 to the complex industrial society of today. Topical questions: the development of American agriculture; the growth of business organization; and the role of government in economic change.

Omitted 1964–65

335. The United States in the Twentieth Century. Parallel evolution of American domestic and diplomatic history between 1890 and 1945, with stress on the relationship between domestic reform and the politics of American foreign policy.

Omitted 1964–65

337. American Colonial History. Origins of American civilization to 1789, emphasizing a comparative approach to the colonial empires in the New World and examining the emergence of a separatist movement in the North American colonies, the structure of colonial society and the era of the American Revolution.

Omitted 1964–65

340. American Social History. The development of American society and culture as reflected in the observations of foreign commentators and American social critics.

Omitted 1964–65

341. American Intellectual History. Development of American thought from Winthrop through Melville, with emphasis on theology, philosophy, social theory, and literature.

342. Nineteenth Century American Reform Movements. The sources, activities, and achievements of political and religious dissenters and uplifters from the Locofocos of the 1830's to the Populists of the 1890's.

Omitted 1964–65

343. The South Since 1800. Development of the American South from the rise of the Cotton Kingdom to the present day.

344. Empire and Kingdom: The Early Middle Ages. The political and cultural implications of the reformulation of the Roman Empire; the rise and significance of the succession kingdoms of the West and the Christian Empire of the East. Reading knowledge of French or German required.

345. Renaissance and Reformation. Transition of European civilization from the later Middle Ages to modern times.

351. Europe in the 18th and Early 19th Centuries. European history, 1715–1815, with particular stress on the shifting balance of power, the evolution of arts and letters, the Enlightenment, and the era of the French Revolution and Napoleon.

Omitted 1964–65

356. European Civilization in the Liberal Period. Historical studies conducted through topical analyses of the political and social foundations and of the intellectual and cultural vicissitudes of Western Europe dur-

ing the height of the last classic era of European hegemony, 1880–1910.

Omitted 1964–65

357. **Culture and Politics in the History of Modern Italy.** Studies in the interrelations between cultural change and political crisis in the making of modern Italy.

Omitted 1964–65

361. **History of East Asia in Modern Times *(China).*** Social, political, and intellectual development of China in the last one hundred years.

362. **History of East Asia in Modern Times *(Japan).*** Evolution of Japan as a modern state, with special emphasis on those forces which contributed to Japan's successful response to the West.

Omitted 1964–65

364. **Marxism.** Its origins, significance, development and tendencies, from Marx to Mao.

365. **Russian Intellectual History.** A consideration of the main themes of Russian intellectual history in the 19th and 20th centuries.

Omitted 1964–65

366. **Russia since Waterloo.** Domestic history, with some attention to diplomacy.

Omitted 1964–65

367. **The Modern Middle East.** Rapid survey of the historical background, with stress on the period since 1800. Particular attention is given to the genesis of Turkish and Arab nationalism, to the problems of economic development, and to the changing relations between the Middle Eastern states and the Western powers.

392. **Modern European Intellectual History.** A study of the main currents of European intellectual life since the French Revolution.

Omitted 1964–65

See also **Philosophy 340.**

See also **Foreign and Comparative Literature 321.**

PHILOSOPHY

There is no prerequisite for Philosophy 303. Before taking any other Philosophy Seminars, students should have completed Philosophy 101 *or* 104, except that 303 may be accepted as a prerequisite to 304.

303. **Plato.** Analysis of the early and middle dialogues, especially the *Republic,* with attention to the ethical and political doctrines. The influence of Plato upon Western thought and culture, and contemporary criticisms of his philosophy.

Omitted 1964–65

304. **Aristotle.** Readings in the principal works; philosophical and historical studies.

Omitted 1964–65

306. **Recent Philosophy.** Studies of some of the chief philosophical movements and their leading representatives.

Omitted 1964–65

310. **The Structure and Scope of Knowledge.** An introduction to theories of knowledge, with special emphasis upon the various views of the origin, conditions of growth, criteria, and limits of knowledge.

Omitted 1964–65

315. **Language and Philosophy.** A study and evaluation of the claims of contemporary linguistic philosophers that a careful analysis of language will enable us to either solve or dissolve the classical problems of philosophy.

320. **The Theory of Value.** Common philosophical problems in the study of values in art, morals, religion, economics; distinction between value and factual judgments, and the possibility of confirming value judgments in these fields. Readings in important recent theorists of value.

Omitted 1964–65

330. **Existential and Analytical Philosophy.** Confrontation of two leading philosophical schools and attitudes, existentialism and analytical (linguistic) philosophy, through intensive study of the philosophical works of Jean-Paul Sartre and A. J. Ayer.

340. **Philosophy of History.** Certain explicit theories of history such as those of Marx, Spengler, Toynbee, Niebuhr and others, with a consideration of problems of historical knowledge and the views implicit in varieties of historical writing.

341. **Aesthetics.** Analysis of the problems of "truth" and "knowledge" in art: In what sense, if any, does art convey "truth" or embody "knowledge"? What is the relation between "artistic truth" and the value or greatness of the work of art? How does

artistic discourse differ from scientific discourse? Concrete reference to specific works of art, particularly in literature.

350. **Concepts of Mind.** Metaphysical and psychological problem of the relation of mind and consciousness to bodily conditions; foundations of psychological theory; the concept of human freedom, and philosophical disputes about immortality. The study is based on important works in philosophy and psychology from Aristotle to Gilbert Ryle.

Omitted 1964–65

352. **Philosophy of Science.** A study of the methodology of science, and the nature of scientific proof and reasoning, designed to explain the significance of science in the modern world. No specific knowledge of science is presupposed.

Omitted 1964–65

380. **American Philosophy.** European and American cultural influences on American philosophical thought; philosophical tradition and innovation in American culture; the problems of philosophy as dealt with by leading American thinkers of the past two centuries.

Omitted 1964–65

390. **British Empiricism.** Studies in the philosophy of Locke, Berkeley, and Hume.

Omitted 1964–65

POLITICAL SCIENCE

All students registering for Honors Seminars in Political Science must have completed Political Science 101 and 102 unless excused by the instructor. Students majoring in Political Science must take Political Science 298 by the end of their junior year and must elect at least one seminar in Anthropology, Economics, or History.

300. **The Role of War in International Politics.** An examination of war as an institution and its relation to the policy-making process.

Omitted 1964–65

305. **The Politics of Nation Building in Tropical Africa.** An appraisal of the problems involved in the interadaptation of traditional political systems and non-African values and institutions.

310. **Problems of Democratic Policy Formulation.** A study of the legislative and administrative processes as instruments of policy formulation in a democratic state. Attention will be given to the strengths and weaknesses of each and the relationships between the two. British and American experience will be used as the basis of the study.

315. **Positive Political Theory.** An examination of recent descriptive theories of political behavior including theories derived from the theory of games, economic models, and the theory of systems.

Omitted 1964–65

320. **Constitutional Issues.** A study in the growth of governmental power as determined by judicial interpretation of the Constitution. Emphasis will be placed upon the economic, social and political background of court cases as well as upon court decisions.

Omitted 1964–65

325. **Political Behavior.** An analysis of public opinion, voting behavior and other forms of political participation.

330. **Political Philosophy.** An examination of various approaches to the study of politics using classical and contemporary works of political theory.

Omitted 1964–65

350. **Government and Politics in Canada.** An analysis of the background, institutions, and power structure of the Canadian political system. Special attention will be focused on the role of parties, their organization and the social basis of their support. Comparative aspects will be stressed with reference to British and American experience.

SOCIOLOGY

305. **Contemporary Sociological Theories.** Rigorous and systematic examination of a few contemporary theories in sociology, with topics selected from small group research, the analysis of complex organizations, the study of social structure and models of mass behavior such as voting. Some of the specific theories which have developed in the study of crime and delinquency, mental illness, industrial behavior and social mobility are examined. With consent of instructor.

Omitted 1964–65

Courses of Instruction

In The College of Arts and Science

Air Science

Richard V. Collins, LT. COL. (USAF) B.C.E. (Rensselaer).....Professor of Air Science and *Chairman of the Department*

W. H. Bell, CAPT. (USAF), A.B. (Syracuse).....Assistant Professor of Air Science
K. D. Stahl, CAPT. (USAF), B.S. (University of Kentucky).....Assistant Professor of Air Science

Robert E. Harris, S/SGT. (USAF).....Instructor in Air Science
John D. Johanson, S/SGT. (USAF).....Instructor in Air Science
Gust T. Tekely, T/SGT. (USAF).....Instructor in Air Science

THE AIR SCIENCE PROGRAM* is divided into two parts, the basic course (freshman and sophomore years), and the advance course (junior and senior years). The physical and academic requirements for entering each course are discussed in the section on the Air Force Reserve Officers' Training Corps. All the Air Science courses listed here must be successfully completed in order to qualify for a commission in the Air Force Reserve upon graduation.

Credit is granted towards the A.B. or B.S. degrees for one to three courses in Air Science depending upon the student's academic program. If the student carries the full Air Science course, in most programs, he may in his third, fifth and sixth semesters, reduce his program of civilian courses by one. The difference in load will be made up in credited Air Science courses. A few programs which are the exception to this condition may be identified and program assistance obtained through the Department of Air Science. At specified terms, select courses within the student's program are accepted in lieu of an Air Science course. These terms and courses are:

1) First term, freshman year: a course in the social sciences or the natural sciences, or a foreign language.

2) Second term, sophomore year: a course in social sciences, natural sciences, or foreign language.

3) Senior year: selected courses in Geography, History, and Political Science. This applies to the class of 1965 only. Subsequent classes will take an Air Science course in the senior year.

The student must complete at the proper time any departmental prerequisite requirements for the above courses.

During the first term of the freshman year and the second term of the sophomore year the cadet's work in Air Science includes only the Leadership Laboratory.

81. Air Force Leadership Laboratory I. Elementary indoctrination in the manual of the airman, customs and courtesies of the service, maintenance of military manner and appearance, and the fundamentals of military drill. A freshman fall course.
One one-hour Leadership Lab a week.

82. Foundations of Aerospace Power. Introductory examination of the factors of aerospace power, major ideological conflicts, requirements for military forces in being, responsibilities of citizenship, development and traditions of the military profession, role and attributes of the professional officer in American democracy, organization of the armed forces as factors in the preservation of national security, and the United States Air Force as a major factor in free world

*See note under Officer Candidate Programs, page 74, for possible program changes.

security. The Leadership Laboratory begun in the first semester is continued. A freshman spring course.

Two lecture-recitations
One one-hour Leadership Lab a week.

92. **Air Force Leadership Lab II.** Continuation of Air Force Leadership Laboratory with emphasis on proficiency in instructing and directing the laboratory activities of subordinate cadets. Military organization and functions up to wing level. Military exercises in use of the command voice and conducting personal inspections. A sophomore spring course.

One one-hour Leadership Lab a week.

93. **Air Operations.** Meteorology and navigation to include air mass phenomena, weather hazards and operational problems, use of navigational charts, computors and dead reckoning navigation. Mandatory for cadets in the Flight Instruction Program and optional for all other cadets. Acquaint senior cadets with the opportunities available for duty and training in a non-flying capacity. A senior fall course.

Two lecture recitations
**Two one-hour Leadership Labs a week

94. **Air Force Officer.** Preparation for active duty and the adjustment to military service; the duty assignments; and personal and professional considerations for the newly commissioned officer during his early period of service. A senior spring course.

One lecture recitation
One one-hour Leadership Lab a week

101. **World Military Systems.** A comparative study of world military forces to include Free World land and naval forces, Free World air forces, Communist military system, and trends in the development and employment of military power.

Two lecture-recitations
One one-hour Leadership Lab a week

201. **Military History and Aerospace Power I.** A study of the nature and the history of warfare, and of modern military strategy in the air and in space. The history of air power in the United States is emphasized. In the second term, the fundamentals of space science are introduced and used to discuss space vehicles of the past, present, and future. A junior fall course.

Three lecture-recitations
One one-hour Leadership Lab a week

202. **Military History and Aerospace Power II.** Continuation of Air Science 201. A junior spring course.

**Senior cadets enrolling for the Fall Leadership Lab only, register for 93 and do not receive academic instruction.

Anthropology

René Millon, PH.D. (Columbia).....Professor of Anthropology

Alfred Harris, PH.D. (Cambridge).....Associate Professor of Anthropology and *Chairman of the Department*

Robert S. Merrill, PH.D. (Chicago).....Associate Professor of Anthropology and *Associate Chairman of the Department*

Walter Hinchman Sangree, PH.D. (Chicago).....Associate Professor of Anthropology

Gerald Williams, PH.D. (Chicago).....Associate Professor of Anthropology

Edward E. Calnek, PH.D. (Chicago).....Assistant Professor of Anthropology

Arnold Green, B.A. (Antioch).....Assistant Professor of Anthropology

James Bennyhoff, PH.D. (California).....Research Associate in Anthropology

Bruce Drewitt, M.A. (Toronto).....Research Associate in Anthropology

THE DEPARTMENT OF ANTHROPOLOGY offers work leading to a concentration for the A.B. degree.

A program of concentration for the A.B. degree will normally consist of six to eight courses taken in the Department of Anthropology beyond the introductory work.

A student, in addition, is expected to take additional courses to bring the total in his concentration to ten in the related fields of Biology, Economics, English, Fine Arts, Foreign Languages, History, Philosophy, Political Science, and Psychology.

The departmental counsellor should be consulted to determine in each student's case what courses in the department will be required for the fulfillment of the concentration requirement and to select the field outside of the department which will support and enhance his work in the department.

101. Introduction to Anthropology. The nature and development of culture; social and cultural patternings; social and cultural universals and diversities; the individual and society.

190. Preceptorial: The Images of Man. Discussion of some of the "exotic" peoples studied by European and American Anthropologists; anthropological views of other societies compared with those of historians, biographers, travellers, missionaries, government officers, and writers of fiction.

201. The Development of Man, Culture and Society. Evolution of man and development of culture and society from earliest Pleistocene remains to beginnings of civilization in the Near East; development of human skill; religion and art in the Upper Paleolithic; agricultural revolution; development of cities and civilization in Southern Mesopotamia; spread of man into the New World.

202. Early Civilizations of the Old World and the New. Comparative study of Mesopotamian, Egyptian, Indus, Chinese, Middle American and Central Andean civilizations; theoretical approaches to such studies, with special emphasis on the value and limitations for the study of ancient civilizations of comparative evidence from existing societies.

209. Selected Studies in Ethnography. Examination of some of the basic descriptive studies in ethnography with particular attention to demonstrating the relation between field work and the development of method and theory in social anthropology.

210. Primitive Art. Consideration of art and the artist especially in the aboriginal societies of Oceania, Africa, and the Americas; comparison with European and Asiatic materials.

211. Systems of Kinship and Descent. The major elements of kinship and descent; critical examination of specific systems, and of different approaches to the study of them; the relations between kinship and descent and other aspects of social structure.

212. Habitat, Economy and Society. Major types of ecological adaptation; modes of subsistence, land-use, and land-tenure; ecology in relation to economic organization; ecological problems viewed as socially and culturally defined.

Omitted 1964–65

213. Pre-Industrial Economic Systems. An examination of exchange systems in selected non-European societies.

Omitted 1964–65

214. Comparative Religious Systems. Ritual practices and related beliefs of selected societies. Associated phenomena of magic, mythology and witchcraft. Examination of outstanding theoretical approaches.

215. Comparative Political and Legal Systems. An analysis of the mechanisms for sanctioning and arbitrating social behavior in selected non-European cultures.

Omitted 1964–65

239. Peoples of the Far East I. Survey of the tribal and peasant peoples of China, Japan, Korea, Tibet, Manchuria, Mongolia, and Sinkiang. Outline of the prehistoric and ethnohistoric background of the area. Discussion of the various traditional ways of life presented in the ethnographic present.

Omitted 1964–65

240. Peoples of the Far East II. Rise and spread of civilization in the Far East. Comparison of the cultural, social, and political institutions of China, Japan, Korea, and Tibet prior to the impact of the west. Discussion of the relationship between civilized and non-civilized peoples and the conflict between nomad and farmer.

Omitted 1964–65

241. Indians of North America. A survey of the cultures of the aboriginal peoples in America north of Mexico. Culture area concept and its applications; major types of social structure and their variations; historical problems.

Omitted 1964–65

242. The Civilizations of Aboriginal Middle America. Growth of aboriginal civilization in Middle America from the earliest time to the Spanish Conquest; Olmec, Zapotec, Maya, Teotihuacan, Toltec, Mixtec, Veracruz and Aztec civilizations; problem of relationship with the Old World; evaluations and comparisons; Indian Mexico since the Conquest.

244. **Indians of South America.** An introduction to the society and culture of peoples of aboriginal South America; growth of civilization in the Central Andes; Empire of the Inca; Spanish Conquest; contemporary Indian peoples.

Omitted 1964–65

246. **Peoples of Africa I.** Major culture areas of Negro Africa; detailed ethnographic studies; nature and diversity of indigenous social structure.

Omitted 1964–65

247. **Peoples of Africa II.** Selected problems in social anthropology and ethnography as they relate to the peoples of Africa or particular regions in Africa.

Omitted 1964–65

249. **Peoples of India.** Ethnology of South Asia with emphasis upon the relationship between tribal and village cultures and the high civilizations of the area.

261. **Cultural and Social Change.** Problems of cultural diffusion; analysis of types of culture contact and cultural interchange; the nativistic movement; the charismatic leader and the legitimatization of authority.

Omitted 1964–65

263. **Society, Culture and Personality.** Relation of culture and social structures to the development of personality; analysis of national character; relation of sub-cultures and personality traits.

Omitted 1964–65

265. **The Study of Complex Societies.** Problems and theoretical approaches in the study of complex societies and civilizations; emphasis is on contemporary pre-industrial societies, and on selected ancient civilizations.

Omitted 1964–65

267. **Theories of Culture and Society I.** Thought, research and writings of major theorists and schools of anthropology until 1930.

Omitted 1964–65

268. **Theories of Culture and Society II.** Thought, research and writings of major theorists in anthropology from 1930 to the present.

Omitted 1964–65

269. **Dynamics of Culture and Society.** Problems in methodology and theory of selected aspects of society and culture.

Omitted 1964–65

271. **Language and Culture.** The roles of linguistics in anthropology. Language differences and cultural differences. Language in society; the reflection of social organization in the formal aspects of verbal behavior.

281. **Mathematical Models in Anthropology and Sociology.** The application of mathematics to the study of social organization, communication, decision-making, and kinship systems. An examination of measurement models, game theory, information theory and of their utility for sociology and anthropology.

291. **Special Problems.** The investigation, under guidance, of a special problem in selected areas of anthropology and sociology. By special permission of instructor only.

416. **Anthropological Linguistics I.** Training in linguistic analysis as applied to the description of the second systems of language, with particular emphasis on the uses of such analysis in anthropological fieldwork.

417. **Anthropological Linguistics II.** Training in linguistic analysis as applied to the description of grammatical systems, with special stress on anthropological fieldwork.

Biology

Allan McCulloch Campbell, PH.D. (Illinois) ..... Professor of Biology
Ernst Wolfgang Caspari, PH.D. (Göttingen) ..... Professor of Biology and *Chairman of the Department*
Johannes Friedrich Karl Holtfreter, PH.D. (Freiburg, Germany) ..... Professor of Zoology
Arnold Warren Ravin, PH.D. (Columbia) ..... Professor of Biology
Wolf Vishniac, PH.D. (Stanford) ..... Professor of Biology

William Breuleux Muchmore, PH.D. (Washington).....Associate Professor of Biology
**Babette Brown Coleman,* PH.D. (Cornell).....Associate Professor of Botany and Research Associate in Botany
**James Charles Peskin,* PH.D. (Columbia).....Associate Professor of Biology and Associate Professor of Optics

Thomas T. Bannister, PH.D. (Illinois).....Assistant Professor of Biology
Jerram L. Brown, PH.D. (California).....Assistant Professor of Biology and in the Center for Brain Research
Jerome Sidney Kaye, PH.D. (Columbia).....Assistant Professor of Biology
Uzi Nur, PH.D. (California).....Assistant Professor of Biology

Jakov Krivshenko, D.SC. (Ukraine).....Senior Research Associate in Biology
Brian Colman, PH.D. (Aberystwyth, Wales).....Research Associate in Biology
Herman S. Forest, PH.D. (Michigan State).....Research Associate in Biology
Peter Hull, PH.D. (Edinburgh).....Research Associate in Biology
Ajit K. Mishra, PH.D. (Calcutta).....Research Associate in Biology
Pritindra M. Naha, PH.D. (Calcutta).....Research Associate in Biology
Minna B. Rotheim, PH.D. (Rochester).....Research Associate in Biology
Lotte Schwinck, PH.D. (Tübingen).....Research Associate in Biology
Charles R. Weston, PH.D. (Princeton).....Research Associate in Space Biology
Sydney Sze Yih Young, PH.D. (Sydney, Australia).....Research Associate in Biology
**Alice del Capillo Campbell,* PH.D. (Michigan).....Research Associate in Biology
**Rachel McMaster Kaye,* PH.D. (Columbia).....Research Associate in Biology
Marvin B. Seiger, PH.D. (Toronto).....Postdoctoral Trainee in Biology

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*Part-time.

THE DEPARTMENT OF BIOLOGY offers work leading to the A.B., B.S., M.S., and Ph.D. degrees.

Biology 101 is prerequisite.

A. B. Program

The A.B. program, while preparing students adequately for graduate work in Biology, provides a somewhat broader opportunity for study in non-scientific fields than the B.S. program.

Students planning a concentration program towards the A.B. degree in Biology should take ten semester courses of advanced work in Biology and allied fields beyond Biology 101 and introductory courses in the allied fields. Of these advanced courses, at least six and not more than eight must be in Biology. There are no specific course requirements (except for prerequisites as indicated in the course descriptions).

Students planning a concentration towards the A.B. degree in Biology should obtain a broad background in chemistry, physics and mathematics during their first two years. Freshmen should take two from among the introductory courses in Biology (1 term), Chemistry (2 terms) and Mathematics (2 terms). Chemistry should be elected if the student has not had chemistry in secondary school. If possible, the student should acquire a reading knowledge of a foreign language: French, German or Russian.

At least two and not more than four semester courses should be advanced courses in one or more of the allied fields: Chemistry, Geology, Mathematics, Physics, Psychology.

Seniors in Biology are required to take the Senior Seminar, Biology 295–296. This course takes the place of the comprehensive examination for the A.B. degree.

B.S. Program

Two programs lead to the B.S. degree in Biology. Plan A is intended for students whose interests tend toward the genetic, evolutionary and developmental aspects of Biology. Plan B serves the needs of students wishing to specialize in the functional and analytical aspects of biology, such as physiology, biophysics, and biochemistry. Plan B requires that the student develop a more extensive background in Physics

and Mathematics than Plan A. Synopses for the course requirements for the B.S. degree under Plans A and B are given below.

Honors Program in Biology

Students who have demonstrated to the Department's satisfaction a high level of competence may, at the end of their sophomore year, elect Honors in Biology. A faculty member must be willing to guide the student in his Honors work during his junior and senior years. The Honors work will consist of the following:

a. An Elective course in Third Year, Semester I, would be Biology 291, *Readings in Biology*. In Semester II of the Third Year, an Elective course would be Biology 291 or Biology 293, *Problems in Biology*. The main purpose of these courses would be to prepare the student for his research project conducted in the fourth year. He will participate in the Senior Seminar in his Fourth Year.

b. An elective course in each semester of the Fourth Year would be Biology 293, in which the student would carry out a piece of research under the supervision of the faculty member advising him.

c. At the end of Fourth Year, the student would prepare a research paper and defend it in an oral examination before outside examiners.

d. Also at the end of the Fourth Year, the student would take a written examination, which would be read by the outside examiner.

PLAN A

FIRST YEAR

1. Math. 161 Analysis I
2. Biol. 101 General Biology I
3. Chem. 123 General Inorganic
4. Engl. 101 English Composition

Physical Education

1. Math. 162 Analysis II
2. Biol. 125 Comparative Chordate Anatomy
3. Chem. 124 General Inorganic
4. Foreign Language (Group I)‡

Physical Education

SECOND YEAR

1. Phys. 101 General Physics
2. Biol. 122 Invertebrate Zoology
3. Biol. 131 The Plant Kingdom
4. Group I
5. Group II

Physical Education

1. Phys. 102 General Physics
2. Chem. 142 Quantitative Analysis
3. Elective
4. Group I
5. Group II

Physical Education

THIRD YEAR

1. Chem. 161 Organic Chemistry
2. Biol. 241 Embryology
3. Group I
4. Group II
5. Elective

1. Chem. 162 Organic Chemistry
2. Biol. 221 Genetics
3. Group I
4. Group II
5. Elective

FOURTH YEAR

1. Biol. 265 Cellular Phys. and Metabolism
2. Biol. (elective)
3. Elective
4. Elective

Biol. 295 Senior Seminar

1. Biol. 272 Comparative Microbiology
2. Biol. (elective)
3. Elective
4. Elective

Biol. 296 Senior Seminar

‡Most students can complete their requirement in foreign languages with one term of college work. Students who need more than one term must take the necessary courses in place of electives.

PLAN B

FIRST YEAR

1. Math. 161 Analysis I
2. Chem. 123 General Inorganic
3. Engl. 101 English Composition
4. Biol. 101 General Biology I
5. Group II
   Physical Education

1. Math. 162 Analysis II
2. Chem. 124 General Inorganic
3. Foreign Language (Group I)‡
4. Biol. 125 Comparative Chordate Anatomy
5. Group II
   Physical Education

SECOND YEAR

1. Math. 163 Analysis III
2. Biol. 131 The Plant Kingdom
3. Group I
4. Group II
5. Chem. 142 Elem. Quant. Analysis **OR**
   Physical Education

1. Math. 164 Analysis IV
2. Biol. 221 Genetics
3. Group I
4. Group II
5. Chem. 213 Quantitative Analysis I
   Physical Education

THIRD YEAR

1. Biol. 241 Embryology
2. Chem. 161 Organic Chemistry
3. Phys. 115 Physics I
   or
   Phys. 117 Physics IA
4. Elective

1. Group I
2. Chem. 162 Organic Chemistry
3. Phys. 116 Physics I
   or
   Phys. 118 Physics IA
4. Elective

FOURTH YEAR

1. Biol. 265 Cellular Phys. and Metabolism
2. Phys. 125 Physics II
   or
   Phys. 127 Physics IIA
3. Elective in science other than biology
4. Biology Elective
   Biol. 295 Senior Seminar

1. Biology Elective
2. Phys. 126 Physics II
   or
   Phys. 128 Physics IIA
3. Elective in science other than biology
4. Elective
   Biol. 296 Senior Seminar

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‡Most students can complete their requirement in foreign languages with one term of college work. Students who need more than one term must take the necessary courses in place of electives.

101. **General Biology I.** Principles unifying modern biological knowledge. Introduction to the structure and physiology of cells. Principles of development, genetics and evolution. The laboratory introduces the students to the methods of observation and experimentation from which our present concepts of Biology have been derived. The course serves as a prerequisite to all more advanced courses in Biology, and is intended to form the basis for knowledge of the present state of general Biology for students wishing to include Biology in their cultural and intellectual education. Prerequisite: At least one course in high school or college chemistry.

Three lectures and one three-hour lab a week.

102. **General Biology II.** A continuation of Biology 101, especially designed for students not intending to take advanced courses in Biology. Understanding of the problems facing Biology at the present time, particularly at the level of the organism. Interactions between organisms of the same and of different species and modern aspects of the theory of evolution are considered. Biology 101 prerequisite.

Three lectures and one three-hour lab a week.

122. **Invertebrate Zoölogy.** Anatomy, physiology, behavior, life histories and evolution of animals constituting the principal groups of invertebrates. Biology 101 prerequisite.

Three lectures and one three-hour lab a week.

125. **Comparative Chordate Anatomy.** Structural changes in the line of descent leading from primitive jawless fish to modern mammals. Background for the understanding of human anatomy. The structure of fossil vertebrates and the development and structure of modern chordates are dealt with by

laboratory observation, dissection or lecture. Biology 101 prerequisite.

Two lectures and two three-hour labs a week.

131. **The Plant Kingdom.** General biology of plants. Survey of the plant kingdom. The structural, developmental, and ecological adaptations of plants are examined, and provide the basis for an understanding of the evolution of plants, of their distribution, and of their roles in the organic world. Biology 101 prerequisite.

Three lectures or conferences, one three-hour lab or field trip a week.

132. **Biology of Flowering Plants.** Introduction to plant anatomy, systematics, ecology and field work by study of the most advanced and dominant plants of the earth's vegetation. The evolutionary success of flowering plants is interpreted in terms of the advantages conferred by the vascular system and seed habit, two notable specializations which historically have linked plants to man. Biology 101 prerequisite, as is Biology 131, or permission of the instructor.

Three lectures or conferences, one three-hour lab or field trip a week.

213. **Statistical Analysis in Biology.** Elements of probability and combinatorial analysis. Principles of statistical inference and the testing of hypotheses as applied to biological problems. The design of experiments. Some acquaintance with principles of the calculus prerequisite.

Omitted 1964–65

220. **Cytology.** Introduction to the study of cells. Topics include: the morphology and chemistry of chromosomes, mitochondria, the Golgi apparatus, centrioles, and the ergastoplasm. Prerequisites: Biology 101, Chemistry 121 and 122. Chemistry 161–162 is recommended.

Three lectures or demonstrations, one three-hour lab a week.

221. **Genetics.** Genes and cytoplasmic factors as the units of heredity; a general introduction to modern genetics including physiological, morphogenetic and evolutionary implications. Biology 101 prerequisite.

Three lectures, one lab a week.

222. **Evolution.** The evidence for organic evolution and the principles governing the evolution of plants and animals. Biology 101 prerequisite.

Three lectures a week, no lab.

241. **General Embryology.** Early stages of development, including maturation and fertilization, cleavage and the formation of the primary germ layers. Development of tissues, organs and systems in vertebrates. Biology 101 and Biology 125 prerequisite.

Two lectures or conferences, two three-hour labs a week.

242. **Experimental Embryology.** A practical and theoretical introduction to the experimental analysis of embryogenesis. Open, on approval of the instructor, to students who have satisfactorily completed Biology 241.

Two lectures or conferences, six hours lab a week.
Omitted 1964–65

260. **Animal Behavior.** Physiological, evolutionary, and developmental mechanisms in behavior. Animal communication; courtship; threat; navigation and migration; behavioral isolating mechanisms. Special attention is devoted to modern neurological approaches to the classical problems of ethology and to the interrelationships between studies under natural conditions and in the laboratory. Prerequisite: Senior status in Biology or Physiological Psychology.

Three lectures a week.

265.* **Cellular Physiology and Metabolism.** Processes common to all cells. Topics include: substances of which cells are composed, the metabolic processes by which the substances are formed, thermodynamic and kinetic characteristics of these processes, processes of diffusion, osmosis, and passive and active transport and origin of bioelectricity. Laboratory work includes quantitative experiments on respiration, mineral nutrition, water relations, permeability, reactions of isolated organelles, and other cellular phenomena. It is strongly recommended that students registering for the course have prior training in quantitative analysis, organic chemistry, general physics, and calculus.

Two lectures, one discussion period, and one four-hour lab per week.

270. **Plant Physiology.** Physiological phenomena peculiar to higher plants. Topics include: water relations, translocation, growth and differentiation, tissue culture, plant hormones, germination, flowering and fruit development. Students are required either to write a term paper on a selected problem or to perform some selected experiments under supervision in laboratory. Biology 265 prerequisite.

*Although the lab sections of Biology 265 and Biology 272 are not identical, students taking both courses will take only one semester of lab work, either in spring or in fall.

272*. **Comparative Microbiology.** Physiological patterns of certain algae, bacteria and protozoa, and the evolutionary trends in these patterns. Topics considered: growth curves and their interpretation, adaptation and mutation, the evolution of metabolic pathways, the limitation imposed by size, and the evolution of structure. Prerequisites: Biology 265 and Chemistry 161–162 (which may be taken concurrently).

Three lectures, four hours lab a week.

291. **Readings in Biology.** A special program of reading in advanced topics may be arranged according to the needs and interests of individual students. Biology 101 prerequisite. *Registration upon approval of departmental adviser.*

293. **Problems in Biology.** Special problems may be arranged for advanced students wishing individual instruction in the methods of general biological, botanical, or zoölogical investigation. Biology 101 prerequisite. *Registration upon approval of departmental adviser.*

295–296. **Senior Seminar.** A required course for all senior students concentrating in Biology, in which several questions related to important problems in modern biology are considered. After a series of conferences and seminars with the staff, each senior is expected to write essays which will evaluate the significance of these problems and the methods by which the problems are being or may be explored.

No credit.
One hour per week.

*See page 101.

COURSES OFFERED IN THE EVENING SESSION, with approval for college credit in the case of undergraduates *other than* Biology concentrators and pre-medical students.

115. **Genetics and Human Heredity.** Principles of inheritance with emphasis on genetically-determined human characteristics. Prerequisite: Biology 101 or the instructor's permission.

Two lectures a week.

COURSES OFFERED IN THE SCHOOL OF MEDICINE, with approval for college credit in the cases of undergraduates *other than* Biology concentrators and pre-medical students.

117. **Microbiology.** A course in which bacteria, fungi, and viruses are studied from the point of view of their biological characteristics and of their importance in public health, industry, and agriculture. Biology 101 and Chemistry 121 and 122 or 123 and 124 prerequisite.

Lectures, two three-hour labs a week.
Medical School.

Center for Brain Research

Leo Abood, PH.D. (Chicago).....Professor in the Center for Brain Research
Robert Doty, PH.D. (Chicago).....Professor in the Center for Brain Research
Karl Lowy, M.D. (Vienna).....Professor in the Center for Brain Research
Ray S. Snider, PH.D. (Washington University).....Professor in the Center for Brain Research and *Director of the Center*

Jerram L. Brown, PH.D. (California).....Assistant Professor in Biology and in the Center for Brain Research

Robert L. Burdick, M.D. (Rochester).....Research Associate in the Center for Brain Research
Shigeyoshi Teramoto, M.D. (Nagasaki).....Research Associate in the Center for Brain Research

John W. Donahoe, PH.D. (Kentucky).....Postdoctoral Fellow in Brain Research
Jorge Pecci-Saavedra, M.D. (Buenos Aires, Argentina)....Postdoctoral Fellow in Brain Research

Edward T. Greenstein, D.V.M.....Staff Veterinarian in the Center for Brain Research

The Center for Brain Research, jointly sponsored by the College of Arts and Science, the College of Engineering and Applied Science and the School of Medicine and Dentistry, is concerned with education at the Ph.D. level and with research in problems of the nervous system. Undergraduates with special permission may take special research or reading courses offered by the Center.

Chemistry

Frank Paul Buff, PH.D. (California Institute of Technology).....Professor of Chemistry
Albert Benjamin Ford Duncan, PH.D. (Johns Hopkins).....Professor of Chemistry
Marshall DeMott Gates, Jr., PH.D. (Harvard).....Professor of Chemistry
William Hundley Saunders, Jr., PH.D. (Northwestern).....Professor of Chemistry
Dean Stanley Tarbell, PH.D. (Harvard).....Charles Frederick Houghton Professor of Chemistry and *Chairman of the Department*
Winston Danae Walters, PH.D. (Johns Hopkins).....Professor of Chemistry
Edwin Odde Wiig, PH.D. (Wisconsin).....Professor of Chemistry

David Wilson, PH.D. (California Institute of Technology).....Associate Professor of Chemistry

Robert Luis Autrey, PH.D. (Harvard).....Assistant Professor of Chemistry
Bernard Baker, PH.D. (Northwestern).....Assistant Professor of Chemistry
Marshall Blann, PH.D. (California).....Assistant Professor of Chemistry
Lawrence David Colebrook, PH.D. (Aukland).....Assistant Professor of Chemistry
Jack Kampmeier, PH.D. (Illinois).....Assistant Professor of Chemistry
Robert W. Kreilick, PH.D. (Washington University, St. Louis)..Assistant Professor of Chemistry
George C. Nieman, PH.D. (California Institute of Technology)....Assistant Professor of Chemistry

Madeline Brickman, PH.D. (University College, London).....Postdoctoral Fellow in Chemistry
Antonio Damiani, DR. (Triest).....Postdoctoral Fellow in Chemistry
Rose Marie de Sousa, PH.D. (Catholic University).....Postdoctoral Fellow in Chemistry
Brahm Dev Mehta, M.SC. (Delphi).....Postdoctoral Fellow in Chemistry
Brian Reynolds, PH.D. (Queens University, Belfast).....Postdoctoral Fellow in Chemistry
****Clarence Heininger,*** PH.D. (Rochester).....Postdoctoral Fellow in Chemistry
Hihmet Kazimi, PH.D. (Rochester).....Postdoctoral Fellow in Chemistry
Mazir Khawaja, PH.D. (McGill).....Postdoctoral Fellow in Chemistry
Victor Powell, M.SC. (Queensland).....Postdoctoral Fellow in Chemistry

Ethel Louetta French, PH.D. (Rochester).....Professor Emeritus of Chemistry
Ralph William Helmkamp, PH.D. (Harvard).....Professor Emeritus of Chemistry
Willard Riggs Line, PH.D. (Columbia).....Professor Emeritus of Chemistry

W. Albert Noyes, Jr., D-ES-SC (D'ETAT), SC.D. (Paris).....Distinguished Senior Professor Emeritus of Chemistry

THE DEPARTMENT OF CHEMISTRY offers work leading to a concentration in Chemistry for the A.B. or the B.S. degree and to the M.S. and Ph.D. degrees. Training at the post-doctoral level is also offered.

Two introductory courses are offered. Chemistry 123 and 124 are designed specifically for majors in Chemistry (both A.B. and B.S.), Chemical Engineering, Physics, and Biology. Students planning to take Chemistry 123 and 124 should present high school Chemistry for admission. A few other students may be admitted to this course provided their records warrant it. Chemistry 121 and 122, which do not have high school Chemistry as a prerequisite, are taken by concentrators and majors other than those mentioned above, either for the purpose of satisfying professional requirements or of meeting the science distribution requirement.

A.B. Program

The minimum requirements for students concentrating in Chemistry for the A.B. degree are:

A. Chemistry 121 and 122 or 123 and 124
B. Chemistry 141, 142 and 214 or Chemistry 213, 214
C. Chemistry 161–162
D. Chemistry 251 and 252
E. Chemistry 295–296

*Part-time.

Chemistry 251 and 252 require as prerequisites one year of Physics, and Mathematics through differential and integral calculus with some differential equations. At least one year of Chemistry in addition to the senior seminar must be taken in the senior year. If a student wishes to meet the requirements for membership in the American Chemical Society upon graduation, he should take, in addition to the minimum requirements, an advanced lecture course, an advanced laboratory course, and German.

Additional courses in Physics and Mathematics and courses in other sciences, such as Biology, Geology, etc. may be taken as part of the concentration program. Students are urged to elect German to satisfy the foreign language requirement.

The Senior Seminar, Chemistry 295–296, is the prescribed substitute for the comprehensive examination.

B.S. Program

This program is designed to give the student the minimum training deemed essential to qualify as a professional chemist or to give him a thorough preparation for graduate work in Chemistry. A reading knowledge of technical German is required (German 105 or 103). It is advantageous to present two years of preparatory school German for admission since this allows the student two additional electives. The synopsis of this curriculum follows:

FIRST YEAR

1. Chem. 123 General Inorganic Chem.	1. Chem. 124 General Inorganic Chem. and Qual. Anal.
2. Engl. 101 English Composition	2. Group I
3. Math. 161 Analysis I	3. Math. 162 Analysis II
4. Phys. 115 Physics I	4. Phys. 116 Physics I
or	
Phys. 117 Physics IA	Phys. 118 Physics IA
Physical Education	Physical Education

SECOND YEAR

1. Chem. 163 Organic Chemistry	1. Chem. 164 Organic Chemistry
2. Foreign Language (Group I)*	2. Germ. 105 Special Technical Readings**
	or
	Germ. 103 Intermediate German*
3. Math. 163 Analysis III	3. Math. 164 Analysis IV
4. Phys. 125 Physics II	4. Phys. 126 Physics II
or	
Phys. 127 Physics IIA	Phys. 128 Physics IIA
Physical Education	Physical Education

THIRD YEAR[1]

1. Chem. 213 Quantitative Analysis I	1. Chem. 214 Quantitative Analysis II
2. Chem. 251 Physical Chemistry I	2. Chem. 252 Physical Chemistry II
3. Group I	3. Elective
4. Group II	4. Group II

*Most students can complete their requirement in foreign languages with one term of college work. Students who need more than one term must take the necessary courses in place of electives.

**Prerequisite: German 101 and 102 or equivalent.

[1]In the second term of the junior year, each student should select a thesis adviser and possibly the general area in which he will plan to do his thesis research. His adviser should be consulted with regard to registration for the senior year.

FOURTH YEAR[2]

1. Chem. 291 Thesis research
2. Chem. 415 or 435
3. Chem. (431, 451)[3,4]
4. Elective[5]
5. Elective

Chem. 295 Senior Seminar

1. Chem. 292 Thesis research
2. Chem. (412, 452)[3,4]
3. Group II
4. Elective[5]
5. Elective

Chem. 296 Senior Seminar

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[2]The choice of courses required in the senior year will be determined by the department counsellor.

[3]Courses in Biology, Mathematics or Physics approved by the Department of Chemistry may be substituted.

[4]Two of these courses must be elected.

[5]Students who intend doing graduate work in Physical Chemistry should make every effort to include additional work in mathematics and physics. For students planning to do graduate work in Organic Chemistry, Biochemistry 401 is recommended.

121. **General Chemistry I.** Fundamental principles of chemical science and the chemistry of several important metals and non-metals and their compounds. This course, less advanced than Chemistry 123, is primarily intended for premedical students and others who may plan to follow with Chemistry 141, 142 and for mechanical and electrical engineers and others not planning to continue work in Chemistry. Upon recommendation of the department, students may be transferred to Chemistry 123 during or at the end of the first term.

Two lectures, two recitations, one lab a week.

122. **General Chemistry II.** A continuation of the concepts introduced in Chemistry 121 with more emphasis placed on the descriptive chemistry of the various elements of the periodic table. Organic chemistry is discussed briefly. An abbreviated scheme of semi-micro qualitative analysis is carried out in the laboratory. Emphasis is placed on structure of the atom and related topics. Prerequisite: Chemistry 121.

Two lectures, two recitations, one lab a week.

123. **General Inorganic Chemistry.** A more advanced course than Chemistry 121, designed primarily for students majoring in Chemistry, Chemical Engineering and Physics. General principles underlying chemistry and some of the important non-metals and their compounds. Upon recommendation of the department, students may be transferred to Chemistry 121 during the semester. Entrance Chemistry prerequisite.

Two lectures, two recitations and two labs a week.

124. **General Inorganic Chemistry and Qualitative Analysis.** A continuation of Chemistry 123. The chemistry of the metals and their compounds, atomic structure, natural and artificial radioactivity and the principles underlying qualitative analysis. The laboratory work is devoted entirely to semi-micro qualitative analysis. Upon recommendation of the department, students may be transferred to Chemistry 122 during the semester. Chemistry 123 or its equivalent prerequisite.

Two lectures, two recitations and two labs a week.

141. **Qualitative Analysis.** A study of the physico-chemical principles of aqueous solutions of electrolytes which are of importance in qualitative analysis. Semi-micro methods are used in the laboratory. Chemistry 121 or 123 and Chemistry 122 prerequisite.

Two hours, two labs a week.

142. **Elementary Quantitative Analysis.** A course designed for students preparing for medicine and dentistry and for those who may wish to take a one-term elementary course in the subject. Biology, geology, or general science majors may wish to take this course. The principles, stoichiometry and techniques of quantitative analysis are developed and applied. Chemistry 121 and 122 or 123 and 124 prerequisite.

Two hours, two labs a week.

154. **Selected Topics in Physical Chemistry.** Limited to sophomore Mechanical Engineering students. Basic thermodynamics, with application. Kinetic theory of gases. Application to kinetics of homogeneous gas reactions.

161. **Organic Chemistry I.** A study of the more important classes of carbon compounds and the fundamental theories of organic chemistry. Chemistry 121, and 122 or 123 and 124 prerequisite.

Three hours, two labs a week.

162. **Organic Chemistry IA.** Continuation of Chemistry 161.

163–164. **Organic Chemistry II.** An introduction to the structural theory of organic chemistry and the important types of organic

reactions with special emphasis on reaction mechanisms and the dependence of reactivity on structure. Laboratory work will include modern techniques, representative syntheses, and an extended introduction to qualitative organic analysis. Required for the B.S. in chemistry, recommended for the A.B. in chemistry. Prerequisite: Chemistry 121 and 122, or 123 and 124.

Three lectures, two labs a week.

213. **Quantitative Analysis I.** Designed primarily for chemists and chemical engineers. The theories, fundamental principles and stoichiometry of quantitative analysis, and the techniques of quantitative methods are developed and applied. More rigorous and exacting than Chemistry 142. Chemistry 123, 124, and 161–162 prerequisite. May not be taken for graduate credit.

Two lectures and two labs a week.

214. **Quantitative Analysis II.** Continuation of Quantitative Analysis I. A more comprehensive study of the principles of the science. Some of the laboratory work involves the quantitative separation and determination of constituents in materials of industrial importance. Electrochemical, colorimetric, and other photometric methods. May not be taken for graduate credit. Chemistry 213 or consent of instructor prerequisite.

Two lectures and two labs a week.

251. **Physical Chemistry I.** The first semester's work consists of an introduction to thermodynamics and its interpretation from the molecular standpoint. The ability to apply these concepts is developed both by a large variety of problems, which the student is required to solve, and by laboratory work. Prerequisites: Physics (101–102 or 125–126 or 127–128); Mathematics (163, 164).

Three lectures, one lab a week.

252. **Physical Chemistry II.** The second course continues the application of thermodynamics to heterogeneous and homogeneous chemical equilibria and concludes with a treatment of chemical kinetics. Prerequisite: Chemistry 251.

Three lectures, one lab a week.

291–292. **Laboratory Problems in Chemistry.** Each student selects a thesis topic, the investigation of which will teach him how to attack a problem involving laboratory and library work. Chemistry 415 or 435 prerequisite for Chemistry 292.

*293–294. **Senior Reading Course in Chemistry.** Students majoring in chemistry who are unable to register for other regularly scheduled, advanced courses may, with special permission of the department, register for this course.

Three hours a week.

295–296. **Senior Seminar.** Required of all senior students majoring in chemistry. Papers requiring journal or other library research are prepared under supervision of the staff members and presented orally before the seminar group. Satisfactory participation is the approved substitute for a comprehensive examination in chemistry.

No credit.
One hour a week.

401. **General Biochemistry.** Will be given at the River Campus by members of the Biochemistry Department of the Medical School provided at least ten students register for credit. Designed primarily for graduate students and senior year undergraduate students in Chemistry who have had Organic Chemistry 161, 162 and Physical Chemistry 251, 252 or their equivalents, but other students may attend by special permission. Topics include: the reaction sequences and cycles involved in the metabolism of carbohydrate, fat, nucleic acids, and amino acids, biosynthetic pathways, enzymatic mechanism, biological oxidation, and energy considerations. Less emphasis is placed on biological and physiological aspects and on areas of the chemistry of natural products offered in other courses.

Credit—two hours.
Two hours a week.

*412. **Advanced Inorganic Chemistry.** An advanced course in systematic inorganic chemistry taken up from the standpoint of the periodic law and supplemented by the study of special topics illustrative of recent advances in the subject.

Credit—three hours.

*415. **Advanced Analytical Laboratory.** Recently developed analytical procedures, colorimetry, spectrophotometry, spectroscopy, electrical methods, and other physico-chemical methods of analysis. The lectures, credit one hour, may be taken by graduate students who are not registered for the laboratory.

Credit—two hours.

*431. **Advanced Organic Chemistry.** An advanced study of the reactions of carbon compounds and the theories of organic chemistry.

Credit—three hours.

*435. **Advanced Organic Laboratory.** The identification of organic compounds, organic semi-micro quantitative determinations, and

*Taken with the consent of the instructor.

advanced preparations. Open to students who have had or are taking Chemistry 431.

Credit—four hours.

*451. **Advanced Physical Chemistry I.** Thermodynamics and its application to chemical systems.

Credit—two hours.
Two hours a week.

*452. **Advanced Physical Chemistry II.** Emphasis is placed primarily on those parts of Physical Chemistry which usually receive inadequate emphasis in a first course in the subject: (1) introduction to quantum problems, such as the laws of radiation, photoelectric effect, energy levels of atoms and simple molecules, heat capacities, ionization and resonance potentials; (2) nuclear phenomena; (3) reaction kinetics including photochemistry, radiation effects, and heterogeneous reactions.

Credit—two hours.
Two hours a week.

*Taken with the consent of the instructor.

For Industrial Chemistry and other courses in Chemical Engineering see pages 186–188.

East Asian Studies Program

COMMITTEE ON EAST ASIAN STUDIES

Diran Dohanian, A.M. (Harvard).....Assistant Professor of Fine Arts

Robert B. Hall, Jr., PH.D. (Michigan).....Associate Professor of Geography
Harry Harootunian, PH.D. (Michigan).....Associate Professor of History

George Kent, PH.D. (California).....Assistant Professor of Chinese
Daniel Pfeifer, M.A. (Michigan).....Assistant Professor of Japanese

THE EAST ASIAN STUDIES PROGRAM is offered and administered by an inter-departmental committee and is designed to permit students concentrating in the social sciences and humanities to develop knowledge of East Asian problems and languages as a complement to their disciplinary concentration. A student selecting this program will, in addition to fulfilling the requirements of his department, arrange the following special program which will be drawn from his electives.

1. Basic course in East Asian history and civilization.
2. Two years of either Chinese or Japanese language.
3. Three courses from the offerings listed below.
4. Inter-disciplinary seminar for seniors participating in the program.

Upon graduation the student will receive a certificate in East Asian Studies as well as an A.B. in his department of concentration.

Students planning to take work in the East Asian Studies program should consult with Mr. Harootunian or Mr. Kent.

101. **Great Literature of East Asia.** An introduction to the humanistic traditions of East Asia through reading, discussion, and analysis of selections from the great poetry, prose, fiction, and dramatic literatures of China and Japan; the functions of literature within East Asian cultural traditions.

102. **Introduction to East Asian Civilizations.** An introductory study of East Asian civilizations in terms of the physical and geographical features of the area, the evolution of man and culture, social and political configurations, the impact of the West, and problems of industrialization, urbanization, and rationalization.

Departmental offerings acceptable in the Program are: Anthropology 239, 291; Fine Arts 103, 222; Foreign and Comparative Literature-Chinese 251, 284, 285, Japanese 285; Geography 260; History 261, 262, 263; Languages and Linguistics-Chinese 201, 202, 203, 205, Japanese 201, 202, 203. (See departmental headings for course descriptions.)

Economics

William Edward Dunkman, PH.D. (Columbia).....Professor of Economics
Robert R. France, PH.D. (Princeton).....Professor of Economics
Norman Kaplan, M.A. (Chicago).....Xerox Professor of International Economics
Lionel Wilfred McKenzie, PH.D. (Princeton).....Professor of Economics and *Chairman of the Department*
Kazua Mizutani, PH.D. (Kobe).....Visiting Professor of Economics[1]
Sho-Chieh Tsiang, PH.D. (London).....Professor of Economics
W. Allen Wallis, A.B. (Minnesota).....Professor of Economics and Statistics

Michio Hatanaka, PH.D. (Vanderbilt).....Associate Professor of Economics
Ronald Winthrop Jones, PH.D. (Massachusetts Institute of Technology).....Associate Professor of Economics
Richard N. Rosett, PH.D. (Yale).....Associate Professor of Economics
Edward Zabel, PH.D. (Princeton).....Associate Professor of Economics

Stanley Engerman, PH.D. (Johns Hopkins).....Assistant Professor of Economics
Harry Grubert, B.A. (Manitoba).....Assistant Professor of Economics
Rudolph Penner, PH.D. (Johns Hopkins).....Assistant Professor of Economics
Sherwin H. Rosen, PH.D. (Chicago).....Assistant Professor of Economics

Roth Clausing, PH.D. (Columbia).....Professor Emeritus of Economics

[1]Term I.

THE DEPARTMENT OF ECONOMICS offers a program of study for Bachelor of Arts candidates and, at the graduate level for the Master of Arts and Doctor of Philosophy degrees.

Economics 101 and Economics 207 are prerequisites for all other courses in economics except with special permission of the Department. Students who plan to concentrate in economics will normally be expected to have completed Economics 101 with a grade of C or better. This will not, however, assure admission to the concentration program unless the Department is confident that the student shows promise of successful academic work in this field of study. Students majoring in economics are required to present two courses of mathematics, which normally will be taken during the first two years.

Departmental requirements for concentration include Economics 207, 209, 231, and 285. Eight of the ten courses specified by the College of Arts and Science for a concentration program must be courses in economics.

The remaining two courses may be taken in the following related fields: Anthropology and Sociology, Business Administration, Geography, History, Mathematics, Philosophy, Political Science, and Psychology.

Economics majors in the Honors Program are required to take the following regular courses in lieu of one Honors Seminar: Economics 207, 209, and 231.

101. **Principles of Economics.** Survey course of economic principles and problems. Economics 101 is prerequisite for all advanced courses in economics.

207. **Intermediate Economic Theory.** An analysis of economic equilibrium under conditions of free competition and various degrees of monopoly control. Attention also is given to the theory of distribution of wages, rent, interest, and profits.

209. **National Income Analysis.** National income accounting concepts are discussed as measures of social welfare, and as quantities whose changes and fluctuations can be explained by theories of income determination and business cycles.

211. **Money, Credit, and Banking.** Introduction to the study of money and credit. Major emphasis is placed on those institutions in which the money supply is generated and on the influence of monetary and fiscal policy on economic stability and growth. Descriptions, statistics and historical experiences are taken mainly from internal problems of the United States.

213. **Monetary and Central Banking Policy.** An intensive study of Federal Reserve policies against the background of monetary

theory. Inter-relations of fiscal and monetary policies are analyzed theoretically and empirically. International as well as national effects of monetary policy are considered. Major emphasis is placed upon post-World War II problems.

223. **Labor Problems.** Analysis of wages and other conditions of employment in an industrial society. Emphasis is placed on the impact of unions on workers, management and the public. Consideration is given to economic factors and other issues involved, including labor legislation.

227. **Strategic Factors in American Economic Growth.** Analysis of the main features of American economic growth since 1800. Recent statistical studies of national product, industrial structure and capital formation are evaluated.

231. **Economic Statistics.** Basic ideas and methods of descriptive statistics and statistical inference. Sampling distributions, statistical tests, estimation of parameters, regression, and time series.

249. **Comparative Economic Systems.** Primary emphasis on the Soviet economy as a system of economic organization to be compared with a market economy. Some attention to difference between the Soviet economy and other East European economies. An appraisal of the performance of the Soviet economy in terms of efficiency and growth.

253. **The Canadian Economy.** Development and structure of the expanding Canadian economy in terms of population growth, gross product and other basic characteristics. Critically important economic relations between the United States and Canada receive special attention.

263. **Public Finance and Fiscal Policy.** Economic criteria for judging government policies which alter the allocation of resources and the distribution of income. Government policies to stabilize prices, reduce unemployment, and foster economic growth. Special reference to United States' policies and problems.

269. **International Economics.** Trade patterns according to comparative advantage. The use of commercial policy in altering the gains from trade and distribution of income. Balance of payments, problems of adjustment. The role of the United States in the world-trading community.

279. **General Equilibrium Analysis.** Exposition of traditional general equilibrium analysis with an introduction to welfare economics, input-output analysis, and activity analysis. Prerequisites: Economics 207, Mathematics 161, 162 (or equivalent mathematics courses as determined by the instructor).

Omitted 1964–65

285. **Senior Seminar.** Required of all seniors concentrating in economics, with the exception of Honors majors. Students write short essays on particular problems in economics which serve as a basis for discussion in seminar meetings.

291. **Junior Reading Course.** By arrangement with the department to permit work beyond regular course offerings.

293. **Senior Reading Course.** By arrangement with the department to permit work beyond regular course offerings.

471–472. **Modern Value Theory.** A treatment of leading topics in value theory since 1870 with special attention to the writings of major economists, such as Marshall, Walras, Chamberlin, and Hicks. The approach is analytical, and subjects are developed to their present state in economic theory.

Credit—three hours.

481. **Introduction to Mathematical Economics.** Introduction to the use of modern algebra in economic theory and applied economics. Particular attention is given to linear programming and input-output analysis. Prerequisites: Mathematics 161, 162, Economics 207, 209.

Credit—three hours.

485. **Introduction to Econometrics.** Application of statistics to economics. Design and estimates of economic models. Estimation of simultaneous equation systems. Prerequisites: Mathematics 100, Economics 231, 207, 209.

Credit—three hours.

English

Wilbur Dwight Dunkel, PH.D. (Chicago).....Rosewell S. Burrows Professor of English
George H. Ford, PH.D. (Yale).....Professor of English
and *Chairman of the Department*
Joseph Frank, PH.D. (Harvard).....Professor of English
William Henry Gilman, PH.D. (Yale).....Professor of English
McCrea Hazlett, PH.D. (Chicago).....Professor of English
Robert Benedict Hinman, PH.D. (Johns Hopkins).....Professor of English
Cyrus Hoy, PH.D. (Virginia).....Professor of English
Ralph James Kaufmann, PH.D. (Princeton).....Professor of History and English
Kathrine Koller, PH.D. (Johns Hopkins).....Joseph H. Gilmore Professor of English
Bernard Nicholas Schilling, PH.D. (Yale)..Trevor Professor of English and Comparative Literature

Richard M. Gollin, PH.D. (Minnesota).....Associate Professor of English
Howard C. Horsford, PH.D. (Princeton).....Associate Professor of English
James William Johnson, PH.D. (Vanderbilt).....Associate Professor of English
Leon Katz, PH.D. (Columbia).....Associate Professor of English

Harvey D. Goldstein, PH.D. (Northwestern).....Assistant Professor of English
Rita K. Gollin, PH.D. (Minnesota).....Assistant Professor of English
Husain Haddawy, PH.D. (Cornell).....Assistant Professor of English
Bruce Johnson, PH.D. (Northwestern).....Assistant Professor of English
John Nabholtz, PH.D. (Chicago).....Assistant Professor of English
Russell A. Peck, PH.D. (Indiana).....Assistant Professor of English
Lisa Rauschenbusch, A.M. (Cornell).....Assistant Professor of English
and Adviser for Student Play Productions

Kenneth Cameron, M.F.A. (Carnegie Tech).....Instructor in English
and Adviser for Student Play Productions
Charles Daves, A.M. (Pennsylvania).....Instructor in English
Barbara M. Hole, A.M. (Rochester).....Instructor in English
Stanley J. Kahrl, PH.D. (Harvard).....Instructor in English
****Marcia D. Landy,*** PH.D. (Rochester).....Instructor in English

George Chester Curtiss, A.M. (Harvard)..Professor Emeritus of Rhetoric and English Literature
John Rothwell Slater, PH.D. (Chicago).....Professor Emeritus of English

*Part-time.

THE DEPARTMENT OF ENGLISH offers work leading to a concentration for the A.B. degree, for the A.B. degree in the Honors Program, and, at the graduate level, for the A.M. and Ph.D. degrees.

The Colleges of the River Campus require English 101 or its equivalent of all students seeking a bachelor's degree (see general statement under Degree Requirements). Before taking any English course numbered 200 or higher, a student must take two of the following: English 102, 103, 131, 132, 133, 141, 144. Further requirements for concentration are listed below. Courses numbered between 110 and 129 may be taken as electives, but do not ordinarily count toward satisfaction of either general College distribution or departmental concentration requirements.

Courses numbered from 200–249 are customarily open to juniors and seniors, and to qualified sophomores. Courses numbered from 250–299 are customarily open to seniors, and to qualified juniors; approval of the instructor may be required for enrollment.

*A program of concentration must include at least eleven acceptable courses in English and American literature beyond English 101, and at least two related courses in acceptable allied fields. Three of the courses at the 100 level must include English 102 (Continental Masterpieces), 144 (Shakespeare), and at least one of the following: 131, 132, 133, and 141. The Department strongly advises that these courses be completed before the end of the sophomore year. It also recommends The History of England and Greater Britain (History 221, 222), preferably by the end of the sophomore year.

In the upperclass program, at least eight courses in English and American literature must be chosen from those numbered 200 or above.

One must be English 206 (Chaucer and Medieval Poetry).

One must be English 213 (Milton and the Later Renaissance).

At least two others must be chosen from the literature of two of the three centuries, sixteenth, eighteenth or nineteenth, among the following courses: English 210; 214, 215, or 216; 217, 218, or 219.

At least two of the above specific requirements must be met by the end of the junior year, including either or both 206 and 213.

At least one of the eleven courses offered for the major must be in American literature.

Concentrators working for a secondary school teaching certificate may substitute not more than one of English 115, 123, or 124 for one of the 200 courses in English not listed as a requirement.

On the basis of this historical foundation, the concentrator will wish in the remainder of his choices to pursue particular interests—for example, in the drama or in the novel. The minimum two courses in allied fields should be selected, in consultation with the student's adviser, from among specified courses in History, Philosophy, Fine Arts, Foreign and Comparative Literature, Anthropology, Languages and Linguistics, and certain others.

Students majoring in the Honors Program are required to fulfill similar requirements, except that they may do so by taking a combination of courses and seminars; see page 90.

Students transferring into the College from elsewhere and who wish to be admitted for a concentration in English will need to make individual arrangements with the Department regarding the satisfaction of underclass requirements.

101. English Composition. Introduction to expository and argumentative writing through critical anaylsis, and evaluation of various types of literature. The student will write approximately ten essays during the semester, including one two thousand word research paper. Required of all freshmen except those exempted by the department on the basis of previous school record and exceptionally high standing in placement tests.

102. Continental Masterpieces. A course which aims to develop the understanding and enjoyment of literature through the reading of great works, especially for their expression of enduring problems of mankind. Books are selected from the classics of ancient and medieval periods. Open to all students. Required of English concentrators.

103. English and American Masterpieces. Books are by English and American writers

*For concentrators from the Classes of '65 and '66, unfulfilled remaining requirements according to the former regulations in effect when they began their programs can be met with the following changes in course numbers or substitutions.

Class of '65: Shakespeare, 144 or 212; medieval or renaissance literature, 206, 210, 254; seventeenth or eighteenth century literature, 211, 213, 214, 215, 216; nineteenth century literature, 217, 218, 219.

Class of '66: Underclass prerequisites should have been fulfilled according to former regulations by the end of the sophomore year; if not, equivalent courses should be completed. Former Shakespeare 222 or present 144 or 212 will satisfy the Shakespeare requirement and may also count toward the eight required 200 courses in English. The course English 105, taught in 1963–64, may be substituted for one of the specific period courses, 206, 210, 213, 214, 215, or 216, but some other English 200 course should be chosen to fulfill the eight upperclass courses required.

and are selected from the Renaissance and modern periods. Open to all students except juniors and seniors who are concentrating in English. Prerequisite: English 103.

115. **Advanced Expository Writing.** Principles and practice of expository and narrative writing; frequent papers and exercises, with class discussion of student work. Generally open to sophomores, juniors and seniors with grades of B or better in English 101, 102 or 103. Sophomores by special arrangement with the instructor. For admission to this course, written permission of the instructor is needed.

116. **Creative Writing.** Short story, poetry, and playwriting workshop. A weekly three-hour meeting for criticism and discussion. Frequent conferences. The student is encouraged to improve by constant comparison of his work with the best achievements in fiction or poetry. May be repeated for credit with the consent of the instructor. For admission to this course written permission of the instructor is needed. English 116 ordinarily cannot be substituted for English 115 in order to satisfy requirements for teaching English in secondary schools.

123. **Speech.** A basic course designed to clarify the principles underlying sound and effective speaking of all kinds. Training in, for example, group discussion, individual expository, argumentative, and other speeches, and oral interpretation of literature. Sections limited to 15 students.

124. **Oral Interpretation of Literature.** Advanced training in reading aloud various kinds of literature, including poetry and dramatic roles, with attention to voice production and articulation, as well as use of the International Phonetic Alphabet. By permission of the instructor.

126. **Drama and Theatre.** Designed primarily to enable students to "hear" and "see" plays as they read them. A close study of plays of various kinds, with reading aloud by the students and discussion of the relations of the written drama to its suitable production.

128. **Acting and Directing.** Training in the methods by which actor and director embody the dramatic text; emphasis on studio practice. The class will present publicly one play from the classic repertoire. Limited to 20 students.

131. **The Lyric in English.** An examination of works from selected representative poets of major stature, considered as illustrations of the range of poetic exploration and definition of human experience.

132. **Narrative Literature.** A study of representative ways in literature of dealing with experience, using narrative forms, the reading to be drawn primarily from works in English.

133. **Dramatic Literature.** A study of a broad selection from world drama of many periods, considered as illustrations of the range of representations of experience within the conventions of the theaters which produced the plays.

141. **Classic American Literature.** A study of the most significant achievements by American writers of poetry, fiction and other prose in the nineteenth and twentieth centuries.

144. **Shakespeare.** An introductory study of Shakespeare's major plays. Required of all students concentrating in English.

195. **Preceptorial:** A course on a special topic for selected Freshmen.

200. **History of the English Language.** Development of English sounds, inflections, syntax, and vocabulary, with special emphasis on the structure of present-day English as described by modern linguistic analysis. Recommended for those planning to teach English.

201. **Introduction to Old English.** Development of a reading knowledge of Old English poetry and prose, with emphasis on specimens of Old English literature rather than on the structure of the language.
Omitted 1964–65

202. **The Old English Epic.** The structure of Old English heroic poetry, with emphasis on *Beowulf*. Prerequisite: English 201.
Omitted 1964–65

206. **Chaucer and Medieval Poetry.** Major medieval writers; Langland, the Pearl poet, and—especially—Chaucer. Required of all concentrators.

210. **The English Renaissance.** A study of such influential continental writers as Petrarch, Boccaccio, Castiglione, Erasmus, and Montaigne, and of the writers of the English Renaissance from More to Spenser.

211. **English Literature of the Earlier Seventeenth-Century.** Leading poets and prose writers from Donne and Bacon to 1660.

212. **Shakespeare and His Contemporaries.** A study of a restricted number of plays by Shakespeare and others, with special reference to some leading political and literary concerns. Prerequisite: English 144 or permission of the instructor.

213. **Milton and the Later Renaissance.** A study of the works of Milton in their historical and intellectual context. Required of all concentrators.

214. **The Restoration (1660–1700).** Poetry, prose and selected drama with special emphasis on John Dryden.

Omitted 1964–65

215. **The Augustan Age (1700–1750).** Prose, poetry, criticism and selected drama with emphasis on Swift, Addison and Pope.

216. **The Age of Johnson (1750–1798).** Literature of the later part of the Neo-Classical era, particularly the writings of Dr. Johnson and his circle.

217. **Romantic Literature.** Major writers, other than novelists, of the early part of the nineteenth century, with particular emphasis on poets from Blake through Keats.

218. **Victorian Issues.** The major intellectual controversies of the Victorian period as framed by the chief prose writings from Carlyle to Pater.

Omitted 1964–65

219. **Victorian Poetry and Poetics.** A study of the major Victorian poets from Tennyson to the early Yeats, and of the critical problems they confronted.

221. **The Growth of American Literature.** A study of American poetry and prose as an expression of change and conflict in the American experience.

Omitted 1964–65

223. **American Fiction.** The historical development of American fiction in the nineteenth and twentieth centuries.

224. **Experiment and Dissent in Later American Literature.** Literature trying to deal with the changes in American life since the Civil War. Emphasis may vary, drawing from writers in the later nineteenth century or the twentieth.

231. **The English Novel.** The novel from the beginnings to the late nineteenth century, emphasizing such major novelists as Defoe, Fielding, Austen, and Dickens.

232. **The Modern English Novel.** The novel from the late nineteenth century to the present, emphasizing such novelists as Conrad, Joyce, and Lawrence.

234. **English Drama.** History and development of English drama from its medieval beginnings to Oscar Wilde.

235. **Modern Drama.** Great modern dramas from Ibsen to Eliot as reflectors of the main currents in modern thought and feelings.

Omitted 1964–65

237. **Modern British and American Poetry.** An introduction to representative twentieth century poetry.

Omitted 1964–65

238. **Literary Criticism in a Changing Culture.** Interaction between literary criticism and society from the Romantic era to the present. Enrollment limited; permission of instructor required.

Omitted 1964–65

241. **Comedy and Satire.** The uses of the comic spirit in a range of great literature.

243. **Style and Linguistics.** The interrelations of English structure, lexicon, and style. Close study of selected literary texts.

Omitted 1964–65

245. **Literary Criticism.** A survey of the major critics from Aristotle to Coleridge.

Courses numbered 250 to 299 are designated studies courses. These are limited enrollment courses. They will usually be devoted to intensive examination of particular writers, forms, or literary problems. The content of these courses is not specified, because it will be determined by the interests of students and instructors and will vary from time to time. Annual schedules will describe the content of a given course in a given semester and will indicate prerequisites for admission, if any.

250. **Special Studies in Literature.**

Omitted 1964–65

251. **Studies in Medieval Literature.**

Omitted 1964–65

252. **Studies in American Literature.**

Omitted 1964–65

253. **Studies in Fiction.**

Omitted 1964–65

254. **Studies in Drama.**

255. **Studies in Poetry and Poetics.**

257. **Studies in the History of Ideas.**

Omitted 1964–65

290. **Reading Course.**

Fine Arts

Carl Kenneth Hersey, PH.D. (Harvard)...Professor of Fine Arts and *Chairman of the Department*
Howard Sutermeister Merritt, PH.D. (Princeton).....Professor of Fine Arts
Harris King Prior, M.A. (Trinity).....Professor of Fine Arts
Elmer Suhr, PH.D. (Johns Hopkins).....Professor of Classical Art and Archeology

Diran K. Dohanian, A.M. (Harvard).....Assistant Professor of Fine Arts
Robert Janson-La Palme, M.F.A. (Princeton).....Assistant Professor of Fine Arts
Archibald Miller, M.F.A. (Cranbrook).....Assistant Professor of Fine Arts
**Kurt K. Feuerherm,* M.F.A. (Cranbrook).....Assistant Professor of Fine Arts
**John Conway Menihan,* B.S. (Pennsylvania).....Assistant Professor of Fine Arts

*Part-time.

THE DEPARTMENT OF FINE ARTS offers courses in the history and theory of the visual arts and in creative art. Such work may lead to a concentration for the A.B. degree, and, at the graduate level, to the A.M. degree. These programs provide basic training for college teaching, museum work, and other professional applications of the discipline.

Fine Arts 101 and 102 are prerequisite to most Fine Arts courses and to the concentration program. Concentrators are expected to have completed Fine Arts 101 and 102 by the end of the sophomore year.

A concentration program normally consists of eight advanced courses in Fine Arts. Ordinarily at least one course will be taken in each of the main fields: ancient, medieval, renaissance, modern, and oriental. Work in creative art is strongly recommended, but not more than one studio course may be counted toward the concentration program.

The remaining two courses in the concentration, making up the related field, may be selected from one of the following areas: English, Foreign Literatures, History, Philosophy, and Religion.

101. Introduction to Ancient and Medieval Art. This course and its sequel introduce the student to western art through the interpretation of selected works of architecture, sculpture, and painting presented in relation to the historical and cultural forces that influence them. The aesthetic and expressionistic aspects of the visual arts are stressed, as well as their historical development. This course is devoted to Egyptian, Greek, Roman, Early Christian and Medieval art.

102. Introduction to Renaissance and Modern Art. General introduction to Renaissance and modern art with special emphasis on the Italian, Flemish, Dutch, and French schools of painting. It is a sequel to Fine Arts 101, but may be taken separately.

103. Introduction to the Art of India and the Far East. A selective survey of the art of India, China, and Japan. Examples of architecture, sculpture, painting, and metal work are discussed in their historic sequence and interpreted with regard to form and content.

109. Representation and Design with Studio Practice. Lectures on the theory of design and on the modes of drawing and painting, supplemented by actual practice in drawing and painting, including a systematic study of color relations. Analysis of different methods of artistic expression. Designed primarily for freshmen. No previous art training necessary.

Two labs of two hours and one lecture a week.
Omitted 1964–65

111–112. Introduction to Sculpture. A studio course designed to familiarize the student with the nature of sculpture. Problems of three dimensional design and life modelling are assigned. Students are allowed a free choice of projects in wood, stone, ceramics, and plaster. Some lectures and papers. No previous experience required. The class is limited to fifteen students.

Two supervised periods of three hours and one period of independent work a week.

113–114. Drawing and Painting. Practice of basic principles of drawing and painting in various media. Consists mainly of studio work from life, supplemented by field trips. Emphasis in the first term is on various phases of line drawing; the second term is devoted mainly to water color. Previous experience in art is not prerequisite. Regis-

tration is limited to twelve students. Admission only by consent of the instructor.
Two three-hour studio periods a week.

190. Preceptorial: The Art of East and West. A comparative study of master-works of painting and sculpture. Selected works of art are analyzed in detail and interpreted with reference to the aesthetic ideals of the civilization which produced them. This course is intended as an introduction to the great tradition of world art.

200. Mythology. Outstanding myths of the ancient Greek world, including their origin and their association with early painting, sculpture, and literature. The relation of Greek myths to those of the Orient and the Germanic peoples is stressed. No graduate credit.
Two hours a week.

201. The Art of Early Civilizations. Review of painting, sculpture, and architecture of the Stone Age, the Aztec, Mayan and Incan civilizations of our own hemisphere, and of Egyptian, Mesopotamian, Persian and Minoan peoples. The illustrated lectures are designed to throw light on the religion, traditions, society, and cultural values of ancient peoples as expresed in their art forms.
Three hours a week.
Omitted 1964–65

202. Greek and Roman Art. Review of the painting, sculpture, and architecture of ancient Greece and Rome. The illustrated lectures are designed to throw light on the religion, traditions, society, and cultural values of the Greeks and Romans as expressed in their art forms.
Omitted 1964–65

203. Ancient Painting. A comprehensive review of ancient painting beginning with that of the Egyptians and the Minoans, and emphasizing Greek vases and Roman mural decoration. The course in Classical Mythology is strongly recommended as a precursor.
Two periods a week.

204. Medieval Art. Origin and development of Romanesque and Gothic art in France, Italy, Spain, Germany, and England, with emphasis on architecture and sculpture.

206. Renaissance Architecture. Aims to develop a knowledge of the theory and problems of Renaissance architectural design and to trace the development of architecture in Europe from the beginning of the Renaissance to the end of the eighteenth century.
Omitted 1964–65

215. Interrelations of Art, Literature, and Philosophy I. The motivating ideals in the viewpoints of the Egyptian, Mesopotamian, Hebrew, Hindu, Chinese, and Greek cultures are sought through an examination of the interplay of the art, literature, and philosophy of these peoples. No graduate credit.
Two periods a week.

216. Interrelations of Art, Literature, and Philosophy II. The motivating ideals in the viewpoints of the Roman, Medieval and Modern cultures are sought through an examination of the interplay of the art, literature, and philosophy of these peoples. No graduate credit.
Two periods a week.

218. Modern Sculpture. An examination of the nature of sculptural expression in Europe and America from Daumier to the present. Attention is given to such movements as cubism and constructivism, to the influence of painting on sculpture, and to certain technical considerations which have led to the development of new forms of sculpture.

222. The Painting of China and Japan. Masterpieces of Far Eastern painting are studied in their historic contexts and in their relation to each other. Oriental painting techniques as well as individual, period, and national styles are stressed.

224. The Arts of Japan. A survey of the major arts of Japan in their historical sequence with special emphasis upon the development of a national style.

226. The Arts of Buddhist Asia. The development of Buddhist art is traced from its origins in India to its easternmost manifestations in Japan and Indonesia. Factors of art style as well as those of iconographical and iconological character are considered.
Omitted 1964–65

231. Italian Art of the Early Renaissance. A survey of the development of the principal schools of Italian painting and sculpture from the latter half of the 13th century to the end of the 15th. Fine Arts 102 normally prerequisite.

232. Italian Art of the 16th and 17th Centuries. Painting and sculpture from the High Renaissance through the evolution of the Baroque style in Italy. Continues Fine Arts 231, but may be taken independently. Fine Arts 102 normally prerequisite.

236. Five Italian Masters of the High Renaissance. A careful examination of five great figures—Leonardo de Vinci, Raphael, Michelangelo, Giorgione, and Bramante—and their contributions to the art of 1490–1520. Open only to Fine Arts concentrators and graduate students.

238. Northern European Painting I. A study of the development of painting in the Netherlands, France, and Germany from about 1400 to 1600. Jan van Eyck, Roger van der Weyden, Bosch, and Bruegel receive special emphasis.

Two periods a week.

239. Northern European Painting II. Baroque and rococo painting in the North, including Spain, from about 1600 to 1800. El Greco, Velasquez, Rubens, Rembrandt, Poussin, and Watteau are given special consideration.

Omitted 1964–65

241. Modern European Painting to 1885. Rise of modern painting in Europe, especially France, from the late eighteenth century to about 1885. Neo-Classicism, Romanticism, Realism, and Impressionism are the main movements considered. Emphasis is placed on outstanding artistic personalities such as David, Delacroix, Goya, Daumier, Manet, Renoir, Degas, Monet, and Seurat. Fine Arts 102 prerequisite.

242. Modern European Painting Since 1885. After brief consideration of Impressionism, the anti-academic and experimental nature of modern tendencies in art is brought out by examination of the credos and chief exponents of Post-Impressionism, Expressionism, Fauvism, Cubism, Abstractionism, and Surrealism. Cezanne, Gauguin, Vincent van Gogh, Munch, Matisse, and Picasso receive special emphasis. Fine Arts 102 prerequisite.

245. American Architecture. Colonial, Early Republican, eclectic, and modern styles of American architecture from the seventeenth century to the present, with reference to the historical and cultural background which explains their character. Special attention is given to the English colonial tradition, to the spirit of nationalism underlying the architecture of the Early Republic, and to the American contributions to modern architecture. Study is made of structures in Rochester which illustrate phases of American architecture.

Two periods a week.

246. American Painting. A survey of the development of painting in America from the seventeenth century to the twentieth century. Relationships with European art and the problems of amateur and artisan painting are considered.

Two periods a week.

251. Advanced Sculpture Studio I. The figure, life modelling, and composition based on the figure in stone, wood or metal. Some lectures and papers. Fine Arts 111–112 or previous experience prerequisite. No graduate credit.

Two supervised periods of three hours and one period of independent work.

252. Advanced Sculpture Studio II. Problems in composition. Students are encouraged to work toward greater technical competence and more personal expression. Fine Arts 111–112 or previous experience prerequisite. No graduate credit.

Two supervised periods of three hours and one period of independent work.

255–256. Advanced Painting Studio. A continuation of Fine Arts 113–114 with further development of the principles of drawing and painting. The course includes a study of color and composition and experiments with such materials as tempera, casein, watercolor, and oil paint. The course is based on a progressive series of advanced studies which stress independent research and individual development. Demonstrations, special assignments, and field trips to museums are an integral part of the course. Prerequisite: Fine Arts 113–114 or previous creative work.

Two supervised periods of three hours and one period of independent work.

290. Senior Reading Course. Independent study under faculty guidance of a limited field of art history, or investigation of a problem related to an area of knowledge already familiar to the student. Open ordinarily only to senior concentrators in Fine Arts.

Aesthetics and Art Criticism. See Philosophy 241, 244.

Primitive Art. See Anthropology 210.

475–476. Art Museum Theory and Practice. A study of the art museum in society, including its history, philosophy, and current functions. Seminars, assigned readings, reports, research projects, and some actual participation, under staff supervision, in the day-to-day activities of the Memorial Art Gallery. Admission by consent of the instructor.

One three-hour meeting per week, Memorial Art Gallery

Foreign and Comparative Literature

Jules Brody, PH.D. (Columbia).....Professor of French and *Chairman of the Department*
Norman O. Brown, PH.D. (Wisconsin).....Professor of Classics and Comparative Literature
Frederick W. Locke, PH.D. (Harvard).....Professor of Medieval Literature
Jacques Morel, Agrégé de l'Université (Paris).....Visiting Professor of French[1]
Bernard N. Schilling, PH.D. (Yale).....Trevor Professor of English and Comparative Literature
Virgil W. Topazio, PH.D. (Columbia).....Professor of French
Kurt Weinberg, PH.D. (Yale).....Professor of French and Comparative Literature

Eduardo Betoret-Paris, PH.D. (Kansas).....Associate Professor of Spanish
Wilhelm Braun, PH.D. (Toronto).....Associate Professor of German
Nathan Rosen, PH.D. (Columbia).....Associate Professor of Russian

Annie-Claude Dobbs, M.A. (Bryn Mawr).....Assistant Professor of French
Alfred Geier, PH.D. (Johns Hopkins).....Assistant Professor of Classics
George W. Kent, PH.D. (California).....Assistant Professor of Chinese
Neil M. Larkin, PH.D. (Johns Hopkins).....Assistant Professor of French
Maurice Z. Shroder, PH.D. (Harvard).....Assistant Professor of French
Henry Wood, PH.D. (Columbia).....Assistant Professor of Classics

Philip R. Berk, M.A. (Columbia).....Instructor in French

Howard Graham Harvey, PH.D. (Harvard).....Professor Emeritus of French
L. Alfreda Hill, PH.D. (Johns Hopkins).....Professor Emeritus of French
Robert Alexander MacLean, PH.D. (Chicago).....Professor Emeritus of Classics
Virginia Moscrip, PH.D. (Chicago).....Professor Emeritus of Classics

[1]Term I.

THE DEPARTMENT OF FOREIGN AND COMPARATIVE LITERATURE offers work in Chinese, Classics, French, German, Spanish, and Russian literature leading to the A.B. degree. The Department also offers the A.M. and Ph.D. degrees in French Literature.

REQUIREMENTS AND RECOMMENDATIONS FOR CONCENTRATIONS

Chinese: Mr. Kent, adviser (513 Morey Hall)

1. A minimum of six literature courses numbered 203 and above.
2. At least four courses in related fields to be chosen from among the following: Anthropology 239, 240; Fine Arts 222, 224, 226; Geography 260; History 261, 262, 263; Japanese 201, 202, 203, 285, 286.
3. Concentrators intending to go on to graduate study are strongly urged to do formal work in the Japanese language, and to develop a sound reading knowledge of French and German.

Comparative Literature (Honors): See p. 88.

Classics: Mr. Geier (509 Morey Hall), adviser.

A student must concentrate in either Greek or Latin literature. This concentration will consist of:

1. At least eight courses numbered 103 and above.
2. A minimum of two courses in related fields (e.g., other ancient languages, ancient history, art, archeology, or philosophy, linguistics, literature).
3. Concentrators intending to go on to graduate study are strongly urged to pursue formal work *both* in Latin *and* Greek literature, and to develop a sound reading knowledge of *at least* one of the following modern languages: French, German, or Italian.

French, German, and Spanish

French advisers: Mr. Shroder (511 Morey Hall)
Mr. Brody (423 Morey Hall)
German adviser: Mr. Braun (420 Morey Hall)
Spanish adviser: Mr. Betoret-Paris (417 Morey Hall)

1. At least six literature courses numbered 131 and above.
2. Two advanced composition courses: French, German, or Spanish 200 *and* 220, or equivalent work done during an approved Junior Year Abroad program.
3. A minimum of two courses in related fields (e.g., history, linguistics, literature, philosophy).
4. Concentrators intending to go on to graduate study in French or Spanish are strongly urged to develop a sound reading knowledge of German *and* Latin; in preparation for graduate work in German, French *and* Latin are recommended as secondary languages.

Russian: Mr. Rosen, adviser (512 Morey Hall)

1. At least six literature courses numbered 131 and above; these must include 141, 142, and one course on a major Russian writer.
2. A minimum of four courses in related fields (e.g., advanced Russian language, history, literature).
3. Concentrators intending to go on to graduate study are strongly urged to include in their related work as many as possible of the following: English 231; French 131, 132, 221; German 131, 132; History 265, 266.

THE SENIOR ESSAY

All concentrators in foreign literatures are required to write a Senior Essay during their last year of study. In the Fall of the Senior year students must register for the 291 course in the field of concentration. The subject of the Essay will be chosen in consultation with the professor in charge of that course and, at his recommendation, with appropriate members of the Department. The major part of the research for the Essay will be done during the Fall term; the completed Essay is to be submitted in mid-April. Precise indications as to the scope of the Essay, research, bibliographical and stylistic procedures, will be made known at the first meeting of the 291 course.

STUDENT TEACHING

Concentrators interested in student teaching experience for the purpose of New York State certification should be in touch with Mr. W. H. Clark (327 Hopeman) as well as their adviser.

CHINESE

251. Introduction to Classical Chinese. Reading and analysis of Confucian and Taoist texts. Prerequisite: Chinese 203.

261. Essays of the T'ang and Sung. Selected essays in the *ku wen* style by such writers as Han Yu, Liu Tsungyuan, and Ouyang Hsiu. Prerequisite: Chinese 251.

Omitted 1964–65

262. Poetry of the T'ang and Sung. Selected *shih* style poems from the works of such poets as Wang Wei, Li Po, Tu Fu, Wang An-shih, and Su Shih. Prerequisite: Chinese 251.

271. Chinese Ideological Texts I. Texts of the Chou-Han, Confucian, Taoist, and Legalist schools. Readings in English; concentrators will be required to read selected portions in the original.

Omitted 1964–65

272. Chinese Ideological Texts II. "Neo-Confucian" texts of the Sung, Ming, and Ch'ing periods. Readings in English; concentrators will be required to read selected portions in the original.

Omitted 1964–65

273. Chinese Historical Texts. The Standard Histories (*cheng shih*) and other pre-modern historical materials. Readings in English; concentrators will be required to read selected portions in the original.

Omitted 1964–65

284. Chinese Literature in Translation. Selected poetry, short stories, essays, and novels, from the classical period to the present.

285. The Growth of Chinese Thought. The rise and development of Confucianism, Taoism, the *Yin-yang* school, Mohism, Legalism, and the School of Names; Buddhism; "Neo-confucianism" in its various forms. Persisting conceptual elements in the Chinese world view. Readings in English.

286. The Confucian Tradition. Chinese traditional thought from Confucius, Mencius, and Hsun Tzu, through Tung Chung-shu and the "Neo-Confucians" of Sung and Ming, to the re-evaluations of Ch'ing and modern times. Readings in English.

Omitted 1964–65

291. Reading Course. Study of special literary problems under the direction of a member of the staff.

CLASSICS

GREEK

103. Introduction to Greek Literature I. Selections from Xenophon's *Anabasis.*

104. Introduction to Greek Literature II. Selected dialogues of Plato.

291. Reading Course. Study of special literary problems under the direction of a member of the staff.

LATIN

103. Introduction to Latin Literature. Representative samples of Roman poetry and prose; principally Cicero, Virgil, Horace, and Ovid.

200. Roman Philosophy. Cicero, Lucretius, Seneca; their debt to Greek philosophy and influence on Christian thought.

201. Horace. *Odes, Epodes, Satires,* and *Epistles* (including the Art of Poetry).

Omitted 1964–65

202. Roman Historians. Livy, Tacitus, Suetonius, Augustine; influence of the Greek historiographical traditions.

203. Roman Comedy. Plautus and Terence; their relation to Greek New Comedy and influence on later comedy.

Omitted 1964–65

204. Ovid: Metamorphoses. Elementary knowledge of Latin required. The *Metamorphoses* will be read in Latin, with the aid of an English translation, and studied as poetry and as mythology; its position in European literature as a whole will be examined.

Omitted 1964–65

205. Roman Lyric and Elegiac Poetry. Catullus, Horace, Tibullus, Propertius, Ovid.

206. Virgil. Selections from the *Aeneid, Bucolics,* and *Georgics.*

Omitted 1964–65

220. Medieval Latin. Literary Latin from the 6th to the 13th century; the distinction between Vulgar and Medieval Latin; rapid reading of texts from Harrington's anthology; close reading of a couple of select complete texts; the influence of Medieval Latin writing on the vernacular literatures.

291. Reading Course. Study of special literary problems under the direction of a member of the staff.

CLASSICS IN TRANSLATION

151. Preceptorial: Classics of the Graeco-Roman Tradition: Philosophy and History. The Ancients' views on the nature of the soul, the divine, the world, the state, human excellence, human history, and the irrational; discussion of the Presocratics, the orphic tradition and the mysteries, Plato, Aristotle, Lucretius, Seneca, Augustine; Herodotus, Thucydides, Livy, Tacitus, and Suetonius.

152. Classics of the Graeco-Roman Tradition: Poetry and Drama. The form and content of Greek and Roman tragedy, comedy, epic and lyric poetry; Homer, Virgil, Hesiod, Pindar, Aeschylus, Sophocles, Euripides, Aristophanes, Horace, Catullus, and Ovid.

COMPARATIVE LITERATURE

108. Masterpieces of European Literature. From Rabelais and Machiavelli to Dostoyevsky and Kafka. Readings in English.

NOTE: In the Fall term only, section 1 of this course will be offered as a Preceptorial with enrollment limited to 15 Freshmen.

131. The Concept of the Tragic Spirit. Concepts of the tragic spirit in great literature from the classics to the present.

Omitted 1964–65

190. Preceptorial: The Mystical Tradition in Literature. Readings in the mystical tradition: from modern poetry back through Blake to the ancient mystery religions and mystical philosophers.

Omitted 1964–65

205. Archetypes. Lectures on the psychoanalytical interpretation of recurrent patterns of symbolism in human thought and affairs. Introductory readings in the psychoanalytical, cultural, and literary theory of archetypes; also ancient religious texts.

Omitted 1964–65

291. **Reading Course.** Intended primarily for advanced students wanting to study specific literary problems across national boundaries. Prerequisites to be set by the instructor.

FRENCH

NOTE: French 131 and 132 are prerequisite for all 200-level courses in French literature.

131. **Introduction to Modern French Literature.** Critical reading of representative 19th- and 20th-century poetry and fiction; practice in the *explication de texte* method. Prerequisite: satisfactory performance on Placement Examination or in French 103, or permission of the instructor.

NOTE: In the Fall term only, section 4 of this course will be offered as a Preceptorial with enrollment limited to 15 Freshmen.

132. **Masterpieces of French Literature to 1800.** Survey of chief literary movements and forms from the late Middle Ages through the Enlightenment. Prerequisite: French 131 or consent of the instructor.

200. **French Prose Style.** Inquiry into the artistic and expressive resources of the French literary idiom through *explication de texte,* composition, and translation into French of a wide variety of samples of English prose.

Not for graduate credit

221. **The French Novel to 1850.** Development of the genre from the classical period to its triumph in the first half of the 19th century.

222. **The French Novel Since 1850.** Evolution of the genre from Realism to the *nouveau roman.* Prerequisite: French 221.

223. **French Lyric Poetry to 1800.** An introduction to the French lyric tradition from the Middle Ages to André Chénier, with emphasis on renaissance poetry.

224. **French Lyric Poetry Since 1800.** *Explication de texte* of the lyric and the short epic: Lamartine, Hugo, Vigny, Nerval, Baudelaire, Rimbaud, Mallarmé.

Omitted 1964–65

225. **The French Drama to 1800.** Survey of the genre from the Renaissance to Beaumarchais; emphasis on Corneille, Racine and Moliere.

226. **The French Drama Since 1800.** Representative plays from romantic melodrama to the "theater of the absurd"; some attention will be paid to the relevant theoretical statements.

239. **Rabelais and Montaigne.** Intensive study of Rabelais' *Gargantua* and *Pantagruel* and of Montaigne's *Essais;* introduction to the main intellectual and esthetic currents of the French Renaissance.

Omitted 1964–65

240. **Descartes and Pascal.** An introduction to the major works of Descartes and Pascal; study of their thought, milieu, and influence on French classicism.

250. **French Classical Tragedy.** Detailed analysis of the chief plays of Corneille and Racine; frequent reference to Greek theory and practice.

Omitted 1964–65

265. **18th Century French Literature.** Montesquieu, Voltaire, Diderot, Rousseau, Beaumarchais; also other playwrights and *philosophes.*

270. **Balzac and Zola.** Selected novels will be read in an attempt to define the diverse aims of Realism and Naturalism.

Omitted 1964–65

281. **Giraudoux and Sartre.** Close study of two representatives of the theater of ideas.

Omitted 1964–65

291. **French Reading Course.** Study of special literary problems under the direction of a member of the staff.

GERMAN

NOTE: German 131 and 132 are prerequisite for all 200-level courses in German literature.

131. **Introduction to Modern German Literature.** Close reading and analysis of representative works of poetry and fiction of the 19th and 20th centuries. Prerequisite: satisfactory performance on Placement Examination or in German 103, or permission of the instructor.

132. **Masterpieces of German Literature to 1832.** An introduction to selected works of German literature as seen in their historical and stylistic context. Prerequisite: German 131 or consent of the instructor.

200. **German Prose Style.** Inquiry into the artistic and expressive resources of the German literary idiom through *explication de texte,* composition, and translation into German of a wide variety of samples of English prose.

Not for graduate credit

210. **German Lyric Poetry.** Intensive textual analysis of selected poets from the Baroque to the present. Principally: Opitz, Logau, Goethe, Schiller, Hölderlin, Novalis, Heine, Rilke, George, Brecht.

265. Eighteenth-Century Literature I. Development of German literature from 1720 to 1785, with emphasis on Lessing and the young Goethe.

Omitted 1964–65

266. Eighteenth-Century Literature II. Works of Goethe and Schiller from 1785 to 1805, in the "Classical" period of German literature.

Omitted 1964–65

269. Goethe. Intensive study of *Faust* with emphasis on Part 2.

275. Nineteenth-Century Drama and Poetry. Major dramatists of the period: Kleist, Grillparzer, Hebbel. Introduction to representative poets.

276. Nineteenth-Century Prose. Selected works by Keller, Stifter, Raabe, and Fontane.

Omitted 1964–65

285. Modern German Drama and Poetry. Readings in Hauptmann, Hofmannsthal, Brecht, and Rilke.

Omitted 1964–65

286. Modern German Prose. The major prose writers since 1880: Mann, Kafka, Hesse.

Omitted 1964–65

291. Reading Course. Study of special literary problems under the direction of a member of the staff.

INDIAN

191. Preceptorial: Introduction to the Study of Literary Traditions. A major Indian text will be examined in relation to the entire civilization; emphasis on sources, structure, literary context, and subsequent influence. Readings in English.

Omitted 1964–65

201. Philosophy and Religion of Classical India. An introduction to the various systems of thought and ethics. Readings in English.

Omitted 1964–65

285. Literature of Classical India. Emphasis on the secular philosophies of logic, aesthetics, grammar; social and political theory; *belles lettres;* interrelation of these topics in the light of the various systems of Indian thought. Readings in English. Prerequisite: Sanskrit 201 or consent of instructor.

Omitted 1964–65

JAPANESE

285. Classical Japanese Literature. The Imperial Anthologies; Heian Prose; The War Tales; the fugitive essay; the No Drama. Readings in English.

Omitted 1964–65

286. Modern Japanese Literature. The evolution of *haiku, joruri, kabuki;* tokugawa fiction; the new literature of Meiji; the modern novel. Readings in English.

Omitted 1964–65

LITERATURE IN TRANSLATION

See: Chinese Literature 271, 272, 273, 284, 285, 286
Classics in Translation 151, 152
Comparative Literature 108, 131, 190, 205
Indian 191, 201
Japanese 285, 286
Russian 141, 142, 232, 233

RUSSIAN

131. Introduction to Modern Russian Literature I. Readings in 19th-century fiction. Prerequisite: Russian 103.

132. Introduction to Russian Modern Literature II. Analysis of the language and style of the major Russian writers. Prerequisite: Russian 103.

Omitted 1964–65

141. Survey of Russian Literature I. From the beginnings in folklore to Pushkin, Lermontov, Griboyedov, Gogel; literary and historical inquiry into the origins of the "Russian soul." Readings in English.

142. Survey of Russian Literature II. Belinsky, Turgenev, Goncharov, Saltykov-Shchedrin, Dostoyevsky, Tolstoy, Chekhov. Readings in English.

201. Pushkin. His life and times; intensive study of *Eugene Onegin* and other poems. Prerequisite: Russian 121 or 131. Not for graduate credit.

232. Tolstoy. Major novels, stories, and plays. Readings in English; Russian concentrators will be assigned selected portions in the original language.

Omitted 1964–65

233. Dostoevsky. Representative early works and all the major novels. Readings in English; Russian concentrators will be assigned selected portions in the original language.

Omitted 1964–65

291. Reading Course. Study of special literary problems under the direction of a member of the staff.

SPANISH

NOTE: Spanish 131 and 132 are prerequisite for all 200-level courses in Spanish literature.

131. **Introduction to Modern Spanish Literature.** Close reading and analysis of representative works of poetry, drama, and fiction of the 19th and 20th centuries. Prerequisite: satisfactory performance on Placement Examination or in Spanish 103, or permission of the instructor.

132. **Masterpieces of Spanish Literature to 1800.** Survey from the late Middle Ages to the beginning of Romanticism; emphasis on the *siglo de oro*. Prerequisite: Spanish 131 or consent of the instructor.

200. **Spanish Prose Style.** Inquiry into the artistic and expressive resources of the Spanish literary idiom through *explication de texte,* composition, and translation into Spanish of a wide variety of samples of English prose. Not for graduate credit.

255. **Spanish Golden Age Prose.** A critical study of the picaresque novel, the *Quijote* and other works of Cervantes, Quevedo, etc.
Omitted 1964–65

256. **Spanish Golden Age Drama and Poetry.** A critical study of the theater of the Spanish Golden Age, from Lope de Vega to Calderón, and the poetry of the same period.
Omitted 1964–65

258. **Don Quixote.** The thought and style of Cervantes' novel; its themes and manner of expression in the intellectual and esthetic context of the late 16th century.

275. **Nineteenth-Century Prose.** Romanticism, Realism, and Naturalism in Spain, with special reference to the *costumbrismo* movement.
Omitted 1964–65

276. **Nineteenth-Century Spanish Drama and Poetry.** A critical study of the Spanish theater and poetry of the 19th century, from Moratín to Benavente.
Omitted 1964–65

281. **Spanish-American Literature.** A critical study of the literary developments among the independent nations of Hispanic America; the political essay, the Modernist Movement in poetry, and the novel of social protest.
Omitted 1964–65

285. **Twentieth-Century Spanish Novel and Essay.** The Generation of '98, the introspective essay, and the Spanish 20th-century novel to the present.

286. **Twentieth-Century Spanish Drama and Poetry.** A critical study of Spanish drama and poetry, from Benavente to the present.
Omitted 1964–65

291. **Reading Course.** Study of special literary problems under the direction of a member of the staff.

General Science

THE COMMITTEE ON GENERAL SCIENCE supervises a program leading to the A.B. degree which gives the student an opportunity to acquire a broad education in the sciences and at the same time to devote approximately half of his time to the study of the humanities and social sciences. This program is especially well suited for the student who wishes to prepare to teach science at the secondary school level. It is also attractive to the premedical student who wishes a broad, general preprofessional education. Students who are planning to enter medical school after only three years of undergraduate work should consider this program.

The program of concentration includes, during the entire four years, sixteen courses chosen from among the offerings in biology, chemistry, geology, mathematics, physics and astronomy, and the work in psychology which is oriented toward the natural sciences (Psychology 101, 201, 220, 251–252, 253, 255, 256, 260, 293, 297). The concentrator in general science must take introductory courses in four or five departments. Four or more courses beyond the introductory level must be taken in one department, and

two or more courses beyond the introductory level must be taken in two other departments. At least two courses must be taken in a department in order to count toward the concentration.

Because of the broad, general nature of the general science program, the requirement of the related field is met by the completion of the program described above.

The student should consult with his adviser concerning the requirement of a comprehensive examination or substitute therefor.

Geology and Geography

Robert Burnett Hall, Jr., PH.D. (Michigan).....Associate Professor of Geography
Lawrence William Lundgren, Jr., PH.D. (Yale).....Associate Professor of Geology
Robert George Sutton, PH.D. (Johns Hopkins).....Associate Professor of Geology and *Chairman of the Department*

William Akers Bassett, PH.D. (Columbia).....Assistant Professor of Geology
Zeddie Paul Bowen, PH.D. (Harvard).....Assistant Professor of Geology
Alan Gibson Macpherson, M.A. (Edinburgh).....Assistant Professor of Geography
Reginald Shagam, PH.D. (Princeton).....Assistant Professor of Geology
Taro Takahashi, PH.D. (Columbia).....Assistant Professor of Geology

John Edward Hoffmeister, PH.D. (Johns Hopkins).....Professor Emeritus of Geology

THE DEPARTMENT OF GEOLOGY AND GEOGRAPHY offers programs in Geology leading to the A.B. and B.S. degrees, and, at the graduate level, to the M.S. and Ph.D. degrees. In Geography, work is available for a concentration for the A.B. degree.

GEOLOGY

A.B. Program

A program of concentration for the Bachelor of Arts degree in geology will consist of from six to eight courses in geology beyond Geology 101 and 102. In this group four courses are required: Geology 121, 124, 235 and 246. The additional two to four courses may be selected from the current offerings of the department.

Students concentrating in geology are also expected to become well grounded in the fundamentals of the related sciences by taking the following courses before the junior year: Math 161, Physics 101–102 or 115–116, Chemistry 121 and 122 or 123 and 124, and Biology 101. In addition, two to four courses beyond the elementary level are required. They may be selected from one or more of these departments. The department recommends that one of these courses be Math 162.

It is recommended that freshmen take one of the following languages: French, German or Russian.

B.S. Program

A synopsis of the courses required in the B.S. program, term by term, follows:

FIRST YEAR

1. Geol. 101 Introductory Geology
2. Engl. 101 English Composition
3. Chem. 121 General Chemistry

or

Chem. 123 Inorganic Chemistry

4. Math. 161 Analysis I
Physical Education

1. Geol. 102 Introductory Geology
2. Foreign Language (Group I)*
3. Chem. 122 General Chemistry

or

Chem. 124 Qualitative Analysis

4. Math. 162 Analysis II
Physical Education

SECOND YEAR

1. Geol. 121 Introductory Paleontology
2. Biol. 101 General Biology I
3. Math. 163 Analysis III
4. Group I
Physical Education

1. Geol. 124 Introductory Mineralogy
2. Group I
3. Group II
4. Elective
Physical Education

THIRD YEAR

1. Geol. 227 Intermediate Mineralogy
2. Geol. 235 Stratigraphy
3. Elective
4. Phys. 115 Physics I

or

Phys. 117 Physics IA

1. Chem. 142 Elementary Quant. Analysis
2. Geol. 246 Structural Geology
3. Elective
4. Phys. 116 Physics I

or

Phys. 118 Physics IA

**Summer: Field Camp

FOURTH YEAR

1. Geol. 252 Regional Geology
2. Geol. 241 Introductory Petrology
3. Adv. Elective (Chem., Biol., Phys., Math.)
4. Group II
5. Elective

1. Geol. 274 Advanced Paleontology
2. Geol. 248 Geochemistry

or

3. Adv. Elec. (Chem., Biol., Phys., Math.)
4. Group II
5. Elective

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*Most students can complete their requirement in foreign language with one term of college work. Students who need more than one term must take the necessary courses in place of electives.

**A summer course in field geology, equivalent to 6–8 credit hours, is required during the summer following the junior year.

101. Introductory Physical Geology. The earth; its origin, topography, composition, and structure. The common rocks and rock-making minerals are examined in the laboratory and field. The geologic agents and processes which have produced the present land forms and structural features are stressed.
Two lectures, one recitation, 1 lab a week.

102. Introductory Historical Geology. Major developments in the history of the earth from its origin to the present as interpreted from the geologic records. In addition to the physical changes which have occurred, the development of life as revealed by the fossils preserved in the rocks receives attention. Prerequisite: Geology 101.
Two lectures, one recitation, 1 lab a week.

121. Introductory Paleontology. Introduction to the subject by an examination of the principles of Paleontology and by a review of the invertebrate faunas of the past. Field trips. Prerequisite: Geology 101.
Two lectures, one lab a week.

124. Introductory Mineralogy. Basic principles involved in the description, classification, and genetic interpretation of minerals. Laboratory work is divided between a study of elementary crystallography and an examination of common minerals and rocks. Prerequisite: Chemistry 121 or 123.
Two lectures, one recitation, 1 lab a week.

227. Intermediate Mineralogy. The optical properties, crystallography, and atomic structure of minerals. The laboratory is devoted to solving crystallographic problems and to the measurement of optical properties of minerals with the polarizing microscope. Analytic geometry, Chemistry 121, 124 and Physics 115–116 or 117–118 prerequisite.
Two lectures, one lab a week.

231. Economic Geology I. The geology of petroleum and natural gas.
Omitted 1964–65

232. Economic Geology II. The geology of metalliferous ore deposits: fundamental principles of ore deposition combined with a

study of specific mining districts. Geology 227 prerequisite.

Two lectures, one lab a week.
Omitted 1964–65

235. **Stratigraphy.** Principles of stratigraphy, including the application of fundamental principles of physical geology and paleontology to problems of stratigraphy and paleography.

Three lectures and one lab a week.

241. **Introductory Petrology.** Discussions of the occurrence and classification of igneous and metamorphic rocks and an introduction to the study of these rocks as chemical systems. Laboratory work consists of a study of rocks in thin section. Geology 227 prerequisite.

Two lectures, one lab a week.

246. **Structural Geology.** The attitude of rocks in the earth's crust. The classification and origin of folds, faults, joints, and related features are discussed and shown in laboratory experiments. The geometric solution of structure problems is carried on in the winter months and the recognition and interpretation of structures are emphasized in the field.

Two lectures, one lab a week.

248. **Geochemistry.** Discussion will center on the elements and their isotopes, their role in the evolution of the earth, and their use as tools in geological investigations. Prerequisites: Chemistry 121 and 122 or 123 and 124 and Physics 115–116 or permission of the instructor.

Omitted 1964–65

249. **Introductory Physical Geochemistry.** An introductory survey of applications of physical chemistry to earth science. Elementary thermodynamics, theories of solutions, chemistry of surfaces, and chemical kinetics will be discussed. Prerequisite: Chem 121 and 122; Math 162, Geol. 101 and 102.

Three lectures and one lab a month.

252. **Regional Geology.** Study of geologically strategic regions in the United States. In addition, the course emphasizes the interrelationships of the geological sciences as applied to regional studies. Geology 235 and 246 prerequisite.

Two lectures, one lab a week.

274. **Advanced Paleontology.** A detailed study of the several invertebrate groups most important to the geologist. Stress will be placed on origin, evolution, and comparison with recent organisms. Field trips. Prerequisite: Geology 121.

Two lectures, one lab a week.

295. **Senior Reading Course.**

Credit to be arranged.

GEOGRAPHY

A program of concentration in geography consists of six to eight courses beyond Geography 103 and 104. Included in this number is a required senior reading course.

The remaining courses required to make up ten for a concentration are to be drawn from advanced course offerings in the following related fields: Anthropology, Economics, Geology, History, and Political Science.

Students planning to concentrate in geology should consult the departmental adviser concerning the selection of courses.

103. **Fundamentals of Physical Geography.** A systematic study of the elements of the natural environment: climates, soils, associations of natural vegetation and wildlife, landforms, and the water bodies of the world; and their global and regional relationships. Laboratories will include the elements of map interpretation and detailed, large-scale, map studies of selected parts of the world.

104. **Principles of Cultural Geography.** An introduction to the basic concepts of social, economic, and political geography, and their application to the study of regions. Laboratory work will involve the map-study of selected regions in various parts of the world. Prerequisite: Geography 102 or 103.

203. **Geomorphology.** The characteristics and evolution of landforms, including such topics as the cycle of erosion, classification of landforms and type-terrain, slope evolution, denudation chronology under different climatic regimes, and problems of regional geomorphology.

Three lectures, one lab a week.
Omitted 1964–65

207. **Economic Geography I.** A presentation of the world's most important agricultural resources and the environmental factors that control their production. Discussions on domestic animals, forests, and the major agricultural patterns as they occur in different parts of the world.

208. **Economic Geography II.** A study of the world's important mineral resources dealing principally with factors controlling regional distribution, production, conservation, trans-

portation, and consumption. The bearing of these factors on economic and political problems and on future regional changes is considered.

215. **Historical Geography.** A critical review of objectives and methods in historical geography. Discussion centers on the role of environment in history, the evolution of man-made landscapes, and the problems of reconstructing the human geography of particular historical periods. Detailed regional studies will apply principally to the North American continent.

220. **Cartography.** A course in the basic principles of map-making and map-interpretation, including work with aerial photographs and elementary field mapping.
Omitted 1964–65

253. **Geography of Europe.** Physical and cultural geography of the continent of Europe.

258. **Geography of North America.** Physical, cultural, and economic aspects of the geography of the United States and Mexico.
Omitted 1964–65

260. **Geography of Asia.** A geographical study of the continent of Asia, including China, Japan, southeast Asia, India, and the Soviet Far East. Stresses the influence of the physical environment on the cultural and economic development of the various regions.

264. **Geography of Canada.** A geographical study of Canada, stressing the influence of the physical environment on the economic and cultural development of the various parts of the country. Special emphasis is placed on the problems of resource development, transportation, and industrialization.

295. **Senior Reading Course.**
Credit to be arranged.

History

Marvin B. Becker, PH.D. (Pennsylvania) ..... Professor of History
Michael Cherniavsky, PH.D. (Berkeley) ..... Professor of History
Willson Havelock Coates, PH.D. (Cornell) ..... Professor of History
Ralph James Kaufmann, PH.D. (Princeton) ..... Professor of History and English
Sidney Monas, PH.D. (Harvard) ..... Professor of History
A. William Salomone, PH.D. (Pennsylvania) ..... Professor of History
Mason Wade, M.A. (McGill) LL.D. (New Brunswick) ..... Professor of History and Director of Canadian Studies
Bernard A. Weisberger, PH.D. (Chicago) ..... Professor of History and *Chairman of the Department*
Hayden V. White, PH.D. (Michigan) ..... Professor of History

Loren Baritz, PH.D. (Wisconsin) ..... Associate Professor of History
Milton Berman, PH.D. (Harvard) ..... Associate Professor of History
John Barrett Christopher, PH.D. (Harvard) ..... Associate Professor of History
Harry Harootunian, PH.D. (Michigan) ..... Associate Professor of History

Christopher Lindley, PH.D. (Cornell) ..... Assistant Professor of History
Dean A. Miller, PH.D. (Rutgers) ..... Assistant Professor of History

Arthur James May, PH.D. (Pennsylvania) ..... Professor Emeritus of History
Dexter Perkins, PH.D. (Harvard) ..... Professor Emeritus of History
Glyndon Garlock VanDeusen, PH.D. (Columbia) ..... Professor Emeritus of History

THE DEPARTMENT OF HISTORY offers work leading to a concentration for the A.B. degree, to the A.B. degree in the Honors Program, and to the A.M. and Ph.D. degrees.

History 101–102 is prerequisite to all other courses in history. Exceptions to this regulation may be made by the departmental counselor.

A program of concentration for the A.B. degree will normally consist of six to eight courses in History beyond History 101–102. However, if a student elects to take more than two of the sophomore-level survey courses (History 221, 222; 223, 224; 231, 232) he will be required to complete a minimum of seven courses in history for the concentration.

A student will be expected to add to his advanced work in History enough additional courses to bring the total in his concentration to ten. The related field may be chosen from among the following: Anthropology, Economics, English, Fine Arts, Foreign Languages, Geography, Philosophy, Political Science. A student interested in a related field not listed above should consult the departmental counselor. All courses in the related field should lie beyond the introductory level, except that a student who elects to study a second foreign language will be permitted to include the first year course in that language.

Qualified History concentrators will be approved by the department for the junior year abroad.

For Honors Seminars in History see page 91.

101–102. Introduction to Western Civilization. A broad survey of the European background of western civilization from ancient times to the present. Intellectual, religious, social, economic, and scientific developments. Political evolution and international affairs.

211. Hellenic Civilization. A study of the main lines of Greek development from Minoan times to the end of the Peloponnesian Wars.

212. Hellenistic Civilization. A study of the ancient world from the early fourth to the first century B.C.

Omitted 1964–65

213. Roman Civilization. A study of Roman culture and society from the foundation of the city of Rome to the foundation of Constantinople.

Omitted 1964–65

214. Byzantine Empire. History of Byzantium from 330 to 1453, including a consideration of the Islamic world and the early medieval Slavonic states.

215. Byzantine Culture and Civilization. A study of the cultural foundations of Byzantium, its accomplishments in thought, art, and literature.

216. Emergence of Western European Civilization. A study of the fusion of Graeco-Roman, Christian and Germanic traditions and an analysis of the main institutions, artistic trends, and intellectual components of the nascent European culture, from ca. 300 to ca. 1200 A.D.

Omitted 1964–65

217. The Medieval Synthesis. A study of Western European civilization from ca. 1200 to ca. 1350.

218. The Italian Renaissance. A study of Italian cultural life from ca. 1300 to ca. 1550.

219. The Northern Renaissance and the Reformation. A study of the cultural history of Northern Europe from the fourteenth to the late sixteenth century.

Omitted 1964–65

221. The History of England and Greater Britain I. A historical survey of the development of British civilization from its beginnings to 1685 with the emphasis on England.

222. The History of England and Greater Britain II. A historical survey of the development of British civilization since 1685, including the development of the Empire and Commonwealth, with the emphasis on England.

223. The History of Canada, 1000–1867. A general course in Canadian history from the age of discovery until Confederation. Canadian developments are related to those in the United States, Great Britain, and France. Emphasis is given to the French regime and the evolution of responsible government under British rule.

224. The History of Canada, 1867–1963. A general course in Canadian history from the beginnings of the Dominion until the present. Canadian developments are related to those in the United States, Great Britain and France. Emphasis is given to the rise

of national feeling and to relations with the United States.

226. **Economic History of the St. Lawrence and Great Lakes Region.** An historical approach to the study of the economic relations between Canada and the United States.
Omitted 1964–65

227. **Seventeenth Century England.** A study of all aspects of English history during a most critical and decisive phase, and in the context of the expanding Western European civilization. History 221 or 219 prerequisite or by permission of the instructor.
Omitted 1964–65

231. **The History of the United States I.** A general history of the United States from colonial times to the Civil War.

232. **The History of the United States II.** A general history of the United States from the Civil War to the present.

233. **Exploration and Settlement of North America. (1400–1800)** An examination of European expansion into the New World with special emphasis on the imperial struggle for the continent, upon the influence of geography and sea power, and upon the emergence of American institutions and cultures.
Omitted 1964–65

234. **The Colonial Mind.** An analysis of the dominant patterns of thought in colonial America, with emphasis on theology, philosophy, and social theory.
Omitted 1964–65

235. **The American Revolution.** A study of the causes and consequences of the American Revolution.
Omitted 1964–65

236. **The Jacksonian Era, (1824–1850).** Political and social developments underlying and accompanying westward expansion, sectional conflict, and growing economic sophistication.
Omitted 1964–65

237. **Civil War and Reconstruction, (1850–1877).** The coming of the war, its political and social effects, and the short-run and long-term results of the postwar reshaping of the nation.
Omitted 1964–65

238. **Recent History of the United States, 1890–1929.** A survey of domestic and diplomatic developments in the United States from the emergence of the Populist movement to the eve of the Great Depression.

239. **Recent History of the United States, 1929–1945.** A survey of domestic and diplomatic developments in the United States from the beginning of the Great Depression to the end of World War II.

240. **The History of the American West.** A survey of the expansion of the American West from the Revolution to the early 20th Century.

241. **American Economic History I.** An advanced course covering the principal events in the economic life of the United States from the Colonial period to the Civil War.
Omitted 1964–65

242. **American Economic History II.** An advanced course covering the principal events in the economic life of the United States from the Civil War to the present.
Omitted 1964–65

243. **American Social History I.** The development of American society and culture from the seventeenth century to the Civil War.
Omitted 1964–65

244. **American Social History II.** The development of American society and culture from the Civil War to the present.
Omitted 1964–65

245. **American Intellectual History I.** The American mind from colonial times to the end of the Civil War.

246. **American Intellectual History II.** The American mind from the Civil War to the present.

247. **Religion in American Society.** The impact of religion on life in America, and the adaptation of religion to a changing American society, from the Puritans to the present. The course will deal with religion primarily as a social phenomenon.

248. **The American Historiographical Tradition.** A study of the development of American historiography from the early 19th Century to the present.
Omitted 1964–65

249. **Nineteenth Century American Diplomatic History.** A survey of the foreign policy of the United States to 1890.

251. **The Age of Absolutism.** A study of European thought and institutions, 1556–1789. Special attention is given to the Age of Louis XIV and the Enlightenment.
Omitted 1964–65

252. **The Age of Revolution, 1789–1870.** Special attention is given to the era of the French Revolution and Napoleon and to the

industrial, political and intellectual revolutions of the mid-nineteenth century.

Omitted 1964–65

253. **France Since 1870.** Economic, political, diplomatic, imperial, and cultural developments, concluding with an estimate of the changes resulting from World War II.

Omitted 1964–65

255. **Europe in the Liberal Era, 1870–1914.** Analytical studies of European history from the close of the epoch of traditional statemaking to the opening of the age of world wars and revolutions. Emphasis will be placed on the inter-European character of the larger political, diplomatic, social, economic, and cultural problems of the period.

256. **Europe in the Twentieth Century.** An historical analysis of Europe's era of crises, world wars, and revolutions. Emphasis will be placed upon the origins and impact of the two great European wars of the twentieth century with a view to elucidating the dual transformation of Europe from hegemony to potential "third force" and from nationalism through totalitarianism to an emergent European Community.

257. **The History of Italy from the Renaissance to the Risorgimento.** A study of the origins, character, and significance of modern Italian civilization conducted through historical analysis of major expressions during the eras of the Renaissance, the Baroque, and the Enlightenment.

Omitted 1964–65

258. **The History of Italy from the Risorgimento to the Present.** A study of Italian history during the nineteenth and twentieth centuries which emphasizes the rise, rule, and decline of the Liberal State.

Omitted 1964–65

259. **Russian Intellectual History.** A consideration of the main themes of Russian intellectual history in the 19th and 20th centuries.

Omitted 1964–65

260. **Japanese History to 1800.** A survey of Japanese institutions and culture before modernization.

261. **History of China and Southeast Asia Since 1800.** Economic, political, social, diplomatic and intellectual developments from about the beginning of the nineteenth century to the present. Special emphasis will be devoted to China's response to the West and the resulting tensions.

262. **Japan Since 1800.** An historical analysis of the economic, political, social, and cultural forces which contributed to Japan's emergence as a modern state.

263. **Intellectual History of Modern East Asia.** The development of Chinese and Japanese thought from the 18th century to the present. This course is conducted as a discussion group.

Omitted 1964–65

265. **A History of Russia I.** History of Russia from the earliest times to 1861. Stress placed on the origins and development of characteristic Russian political, social and economic institutions.

266. **A History of Russia II.** This course covers the history of Russia from 1861 to the present.

267. **The Middle East in Modern Times.** Rapid survey of the background before 1800; emphasis on the growth of Turkish and Arab nationalism, the strategic importance of the Middle East, and the record of attempts to modernize and "Westernize" the Middle Eastern states.

281. **Totalitarianism.** The background and development of totalitarian movements in the twentieth century, with special emphasis on Soviet Russia and Nazi Germany.

292. **Intellectual History of Modern Europe.** A reading course in the history of western thought from ca. 1300 to the present. The course meets in small discussion sections once a week. Students not concentrating in history will be admitted to this course only by special permission of the instructors.

299. **Directed Reading.** For students whose interests cannot be satisfied by the normal range of course offerings. Permission of the Chairman of the Department required.

Languages and Linguistics

D. Lincoln Canfield, PH.D. (Columbia).....Professor of Spanish and *Chairman of the Department*
Arthur Monroe Hanhardt, PH.D. (Cornell).....Professor of German
Stanley M. Sapon, PH.D. (Columbia).....Professor of Psycholinguistics

William H. Clark, Jr., PH.D. (Columbia).....Associate Professor of German and Education
Antanas Klimas, PH.D. (Pennsylvania).....Associate Professor of German

John G. Chidaine, M.A. (Ohio State).....Assistant Professor of French
William A. Coates, PH.D. (Harvard).....Assistant Professor of Linguistics
Ronald V. Harrington, PH.D. (Harvard).....Assistant Professor of Russian
Richard M. Harris, PH.D. (Cornell).....Assistant Professor of Linguistics
Demetrius Moutsos, PH.D. (Chicago).....Assistant Professor of Linguistics
Dean H. Obrecht, PH.D. (Pennsylvania).....Assistant Professor of Linguistics
Daniel Pfeifer, M.A. (Columbia).....Assistant Professor of Japanese
Donald G. Reiff, PH.D. (Michigan).....Assistant Professor of Linguistics
Guy R. Welbon, PH.D. (Chicago).....Assistant Professor of Sanskrit

Vladimir Butkoff, M.A. (Syracuse).....Instructor in Russian
Robert Maples, M.A. (Yale).....Instructor in French
**Alex Wieber*.....Instructor in German and Russian[1]
**Caroline Wood,* B.A. (Tsing Hua).....Instructor in Chinese

*Part-time.
[1]Term I.

THE DEPARTMENT OF LANGUAGES AND LINGUISTICS offers courses in Chinese, French, German, Greek, Italian, Japanese, Latin, Russian, Sanskrit and Spanish at the undergraduate level, with concentration for the A.B. degree in French, German, Russian, Spanish, and in Linguistics; toward the M.A. degree in French, German, Linguistics and Spanish; and toward the Ph.D. degree in General Linguistics.

For the A.B. degree in French, German, Russian or Spanish, a student's program of concentration will consist of six to eight courses beyond 121. In consultation with the departmental adviser for the language in question, the student will plan a program with emphasis on *language* but including the Survey of Literature courses (131 and 132, in the Department of Foreign and Comparative Literature) and Linguistics 205. Allied courses bring the total to ten.

For the A.B. degree in Linguistics, a student's program of concentration will consist of six to eight courses, including Linguistics 205 (the prerequisite for all other courses in Linguistics; the College's foreign language requirement must be completed before a student takes Linguistics 205), 206, 207, and either Linguistics 209 or Anthropology 216. Allied courses, to bring the total up to ten, are normally in Foreign Languages or in Foreign Literature, but may include certain courses given by the Departments of Anthropology, English, Mathematics, Philosophy, and Psychology.

The facilities of three established laboratories are used in the training of students: the Phonetics Laboratory, the Verbal Behavior Laboratory, and the Language-Teaching Laboratory.

The Department encourages the Junior Year Abroad for qualified students of French, German, and Spanish, and has regular exchange agreements with institutions in France, Germany, and Colombia. The Department also encourages sponsored summer tours to the Soviet Union for qualified students of Russian.

CHINESE

201. Elementary Chinese I. Introductory training in the structure of modern Chinese and its basic vocabulary. Practice in speaking; reading of selected graded texts. No graduate credit.

Three class hours and two labs a week.

202. Elementary Chinese II. A continuation of Chinese 201. No graduate credit.

203. Intermediate Chinese. Continuing study of modern Chinese in its spoken and written forms. Reading of graded texts in the Chinese script. Prerequisite: Chinese 202 or equivalent. No graduate credit.

205. Readings in Modern Chinese Prose. Practice in reading selected short prose works as preparation for the use of Chinese as a research tool in the humanities and social sciences. Prerequisite: Chinese 203 or equivalent. No graduate credit.

221. Chinese Conversation. Practice in understanding and speaking modern mandarin Chinese; attention to Chinese grammar. Prerequisite: Chinese 202 or equivalent. No graduate credit.

FRENCH

101. Elementary French I. Introductory training in the structure of modern French and its basic vocabulary. Practice in speaking; reading of selected graded texts.

Three class hours and two labs a week.

102. Elementary French II. A continuation of French 101.

103. Intermediate French. Continuing study of modern French in its spoken and written forms. Prerequisite: French 101 and 102 or equivalent.

Three class hours and one lab a week.

121. French Conversation and Composition. Study of current French structure, usage, and vocabulary. Practice in expository writing and in speaking, to increase fluent active command of the language; problems of translation. Required of French majors. Prerequisite: French 103 or equivalent.

Three class hours and two labs a week.

211. The Linguistic Structure of French. Synchronic analysis of the phonemic, morphological, syntactic, and semantic systems of present-day French; dialectal variations. Prerequisites: French 121 or equivalent and Linguistics 205, or permission of instructor.

220. Advanced French Conversation and Composition. Advanced study of structure and usage; examination of problems of translation. Expository writing; prepared and extemporaneous speaking. Emphasis on diction, effectiveness, levels of speech, and style. Prerequisites: French 121 or equivalent and French 131 and 132. Permission of instructor required. No graduate credit.

235. History of the French Language. Diachronic analysis of French as one of the Romance languages; its formation, development, and present state. Examination of selected texts from the earliest period to modern times illustrating the development of French. Prerequisites: French 121 or equivalent and Linguistics 205, or permission of instructor.

241. Practicum in French. Investigation of special problems in French.

GERMAN

101. Elementary German I. Introductory training in the structure of modern German and its basic vocabulary. Practice in speaking; reading of selected graded texts.

Three class hours and two labs a week.

102. Elementary German II. Continuation of German 101.

103. Intermediate German. Continuing study of modern German in its spoken and written forms. Prerequisite: German 102 or equivalent.

Three class hours, one lab a week.

105. German Specialized and Technical Reading. Controlled readings in specialized and technical prose as a preparation for use of the language in fields of the student's interest. Prerequisite: German 102 or equivalent.

121. German Conversation and Composition. Study of current German structure, usage, and vocabulary. Practice in expository writing and in speaking, to increase fluent active command of the language; problems of translation. Required of German majors. Prerequisite: German 103 or equivalent.

Three class hours and two labs a week.

211. The Linguistic Structure of German. Synchronic analysis of the phonemic, morphological, syntactic, and semantic systems of present-day German; dialectal variations. Prerequisites: German 121 or equivalent and Linguistics 205, or permission of instructor.

220. Advanced German Conversation and Composition. Advanced study of structure and usage; examination of problems of translation. Expository writing; prepared and extemporaneous speaking. Emphasis on diction, effectiveness, levels of speech, and style. Prerequisites: German 121 or equivalent and

German 131 and 132. Permission of instructor required. No graduate credit.

235. **History of the German Language.** Diachronic analysis of German as one of the Germanic languages; its formation, development, and present state. Examination of selected texts from the earliest period to modern times illustrating the development of German. Prerequisites: German 121 or equivalent and Linguistics 205, or permission of instructor.

236. **History of the German Language from 1500.** A continuation of German 235.

241. **Practicum in German.** Investigation of special problems in German.

GREEK

101. **Elementary Greek I.** Introductory training in the structure of Greek and its basic vocabulary. Reading of selected graded texts.

102. **Elementary Greek II.** Continuation of Greek 101.

ITALIAN

101. **Elementary Italian I.** Introductory training in the structure of modern Italian and its basic vocabulary. Practice in speaking; reading of selected graded texts.
Three class hours and two labs a week.

102. **Elementary Italian II.** Continuation of Italian 101.

JAPANESE

201. **Elementary Japanese I.** Introductory training in the grammar of modern Japanese with reading of simple texts and practice with tapes. No graduate credit.

202. **Elementary Japanese II.** Continuation of Japanese 201. No graduate credit.

203. **Intermediate Japanese.** Reading of a variety of texts with emphasis on comprehension. No graduate credit.

LATIN

101. **Elementary Latin I.** Introductory training in the structure of Latin and its basic vocabulary. Practice in speaking; reading of selected texts.
Three class hours and two labs a week.

102. **Elementary Latin II.** Continuation of Latin 101.

RUSSIAN

101. **Elementary Russian I.** Introductory training in the structure of modern Russian and its basic vocabulary. Practice in speaking; reading of selected graded texts.
Three class hours and two labs a week.

102. **Elementary Russian II.** Continuation of Russian 101.

103. **Intermediate Russian.** Continuing study of modern Russian in its spoken and written forms. Prerequisite: Russian 102 or equivalent.

121. **Russian Conversation and Composition.** Study of current Russian structure, usage, and vocabulary. Practice in expository writing and in speaking, to increase fluent active command of the language; problems of translation. Required of Russian majors. Prerequisite: Russian 103 or equivalent.
Three class hours and two labs a week.

211. **The Linguistic Structure of Russian.** Synchronic analysis of the phonemic, morphological, syntactic, and semantic systems of present-day Russian; dialectal variations. Prerequisites: Russian 121 or equivalent and Linguistics 205 or permission of instructor.

220. **Advanced Russian Conversation and Composition.** Advanced study of structure and usage; examination of problems of translation. Expository writing; prepared and extemporaneous speaking. Emphasis on diction, effectiveness, levels of speech, and style. Prerequisites: Russian 121 or equivalent and Russian 131 and 132. Permission of instructor required. No graduate credit.

235. **History of the Russian Language.** Diachronic analysis of Russian as one of the Slavic languages; its formation, development, and present state. Examination of selected texts from the earliest period to modern times illustrating the development of Russian. Prerequisites: Russian 121 or equivalent and Linguistics 205, or permission of instructor.

241. **Practicum in Russian.** Investigation of special problems in Russian.

(SANSKRIT COURSES ARE LISTED IN THE GRADUATE BULLETIN)

SPANISH

101 P. **Elementary Spanish (Programmed) I.** Intensive training in speaking, comprehension, reading, and writing through the use of programmed learning materials, presented on tape and in workbooks. Students work

independently under supervision and also participate in periodic meetings with the instructional staff.

102 P. Elementary Spanish (Programmed) II. A continuation of Spanish 101 P.

103. Intermediate Spanish. Continuing study of modern Spanish in its spoken and written forms. Prerequisite: Spanish 102 or equivalent.

121. Spanish Conversation and Composition. Study of current Spanish structure, usage, and vocabulary. Practice in expository writing and in speaking, to increase fluent active command of the language; problems of translation. Required of Spanish majors. Prerequisite: Spanish 103 or equivalent.

Three class hours and two labs a week.

211. The Linguistic Structure of Spanish. Synchronic analysis of the phonemic, morphological, syntactic, and semantic systems of present-day Spanish; dialectal variations. Prerequisites: Spanish 121 or equivalent and Linguistics 205, or permission of instructor.

220. Advanced Conversation and Composition. Advanced study of structure and usage; examination of problems of translation. Expository writing; prepared and extemporaneous speaking. Emphasis on diction, effectiveness, levels of speech, and style. Prerequisites: Spanish 121 or equivalent and Spanish 131 and 132. Permission of instructor required. No graduate credit.

235. History of the Spanish Language. Diachronic analysis of Spanish as one of the Romance languages; its formation, development, and present state. Examination of selected texts from the earliest period to modern times illustrating the development of Spanish. Prerequisites: Spanish 121 or equivalent and Linguistics 205, or permission of instructor.

241. Practicum in Spanish. Investigation of special problems in Spanish.

LINGUISTICS

204. Applied Linguistics for Language Teachers. Introduction to principles of linguistic analysis and their effective application in second-language teaching. Prerequisite: fulfillment of the foreign language requirement.

205. Introduction to Linguistics. Principles of structural analysis of speech phenomena, both synchronic and diachronic. Examination of material from a wide variety of languages. Prerequisite: fulfillment of the foreign language requirement.

206. Articulatory Phonetics. An introduction to the science of phonetics. Historical perspectives of descriptive, developmental and comparative phonetics. Physiological bases of speech production and perception. Analysis and classification of speech sounds in isolation and in context.

207. Experimental and Acoustic Phonetics. Introduction to the structure of the speech wave, problems of acoustical and linguistic speech segmentation, and perceptual relationship between acoustic features and linguistic units. Practical experience in laboratory phonetics. Prerequisite: Linguistics 205 and permission of instructor.

209. Informant Work. Intensive practice in the transcription and analysis of an unknown language from speech. A native informant will be provided. Elements of phonological, morphological and syntactical analysis and presentation. Prerequisite: Linguistics 205 and permission of instructor.

210. Introduction to Historical Linguistics. A diachronic study of the phases and processes of linguistic change: phonological, grammatical and semantic.

213. Languages in the World. A survey of the world's languages; by language families; basic types of linguistics structure; language and society; writing systems. Prerequisite: Linguistics 205 or permission of the instructor.

236. Transpyrenean Dialects. Language and dialect changes in the area of the Pyrenees.

Omitted 1964–65

237. Introduction to Romance Linguistics. Comparative study of the development of the principal Romance Languages from their Latin origins. A study of the evolution of French, Provençal, Italian, Spanish, and Portuguese.

241. Practicum in Linguistics. Investigation of special problems in linguistics.

Mathematics

William Frederick Eberlein, PH.D. (Harvard).....Professor of Mathematics
Leonard Gillman, PH.D. (Columbia).....Professor of Mathematics and *Chairman of the Department*
Richard Edward Johnson, PH.D. (Wisconsin).....Professor of Mathematics
Johannes Henricus Bernardus Kemperman, PH.D. (Amsterdam).....Professor of Mathematics
Leopoldo Nachbin, PH.D. (Brazil).....Professor of Mathematics
John Adam Fitz Randolph, PH.D. (Cornell).....Fayerweather Professor of Mathematics
Arthur Harold Stone, PH.D. (Princeton).....Professor of Mathematics
Dorothy Maharam Stone, PH.D. (Bryn Mawr).....Professor of Mathematics
W. Allen Wallis, A.B. (Minnesota).....Professor of Economics and Statistics

Norman Gustav Gunderson, PH.D. (Cornell)....Associate Professor of Mathematics and Education
Ralph Alexis Raimi, PH.D. (Michigan).....Associate Professor of Mathematics and *Associate Chairman of the Department*

William Wistar Comfort, PH.D. (Washington).....Assistant Professor of Mathematics
John Arthur Ernest, PH.D. (Illinois).....Assistant Professor of Mathematics
Newcomb Greenleaf, PH.D. (Princeton).....Assistant Professor of Mathematics
Govind Shrikrishna Mudholkar, PH.D. (North Carolina).....Assistant Professor of Statistics
Sanford Leonard Segal, PH.D. (Colorado).....Assistant Professor of Mathematics
Charles Edward Watts, PH.D. (California).....Assistant Professor of Mathematics
James Juei-Chin Yeh, PH.D. (Minnesota).....Assistant Professor of Mathematics

Antonio Diego, PH.D. (Buenos Aires).....Research Associate in Mathematics

Charles William Watkeys, A.M. (Harvard).....Professor Emeritus of Mathematics

THE DEPARTMENT OF MATHEMATICS offers the A.B., A.M., and Ph.D.

Undergraduate majors are limited to students who do well in Mathematics 161–164 or 171–174. The first of these is the standard sequence in analysis; it may be entered with advanced standing. The second is an accelerated sequence covering the standard material more deeply and with additional theoretical work.

A concentration consists of ten courses; six to eight are mathematics courses numbered 200 or higher; the rest are nonintroductory electives in biology, chemistry, economics, philosophy, physics, or psychology.

The A.B. requires Mathematics 237 and 265. To earn Distinction, the student must present additional advanced work of high quality.

There is considerable flexibility in mathematics electives. All students planning graduate work in mathematics are urged to take at least two courses from among Mathematics 266, 267, 268, and 275; they should also study two of the languages: French, German, Russian. Mathematics majors planning a career in industry are advised to take Mathematics 200, 207, 210, 267, 268, and 280; those planning to teach in the secondary schools should consider Mathematics 200, 210, 230, and 250.

Mathematics 267 and 268 are recommended for majors in the natural sciences and engineering. Mathematics 100 and 110 are appropriate for majors in management and social sciences. Mathematics 140 is intended primarily for students planning to teach in the elementary school or in a non-science area at the secondary school level.

Mathematics 100, 130, and 150 are recommended electives for students in the liberal arts.

100. Finite Mathematics. Logic and the algebra of sets; partitions; combinatorial probability; vectors and matrices; linear programming and the theory of games.

110. Elementary Statistics. Relative frequencies; probability models; sampling from a finite population. Random variables, probability distributions, expectations and variances. Binomial, Poisson, and normal distributions. Introduction to statistical inference. Theory of estimation; confidence intervals; choice of estimator. Testing of hypotheses; significance level and power. Some nonparametric tests.

130. Mathematical Snapshots. Prime numbers, rationals, complex numbers; traveling

salesman problems; memory wheels; algebraic systems; Latin squares; map coloring problems; infinite sets.

140. Topics in Elementary Mathematics. The real number system and its subsystems. Sets and relations. Topics in geometry. Intended primarily for the student planning to teach in the elementary school or in a non-science area at the secondary school level.

150. Analytic Geometry and Calculus. Differential calculus and its application to the geometric properties of elementary curves.

161. Analysis I. Equations of the line; sets, functions; limits; derivatives; conic sections; the definite integral.

162. Analysis II. Integration; solid analytic geometry; series; vector analysis. Prerequisite: Math. 161.

163. Analysis III. Multiple integrals; partial derivatives; differential equations. Prerequisite: Math. 162.

164. Analysis IV. Further topics in differential equations; linear algebra. Prerequisite: Math. 163.

171. Analysis Ia. Math. 161 at a deeper theoretical level. Consent of the department required.

172. Analysis IIa. Math. 162 at a deeper theoretical level. Prerequisite: Math. 171.

173. Analysis IIIa. Math. 163 at a deeper theoretical level. Prerequisite: Math. 172.

174. Analysis IVa. Math. 164 at a deeper theoretical level. Prerequisite: Math. 173.

200. Probability. Random variables; binomial, Poisson, and normal distributions; mathematical expectation, law of large numbers; central limit theorem; Markov chains. Prerequisite: Math. 163.

207. Linear Programming and the Theory of Games. The basic properties of convex sets. The linear programming problem and its dual. Principal theorems; applications, in particular to finite games. Some infinite games. Prerequisite: Math. 162.

210. Statistical Inference. Sample space; estimation; testing of hypotheses. Prerequisite: Math. 163.

220. Mathematical Logic. Propositional calculus, functional calculus of first and higher order, the decision problem, consistency, completeness.

Omitted 1964–65

230. Theory of Numbers. Divisibility, primes; congruences; Euler's ø-function; quadratic residues and quadratic reciprocity; algebraic integers.

235. Finite Dimensional Vector Spaces. Bases, dimension, linear transformations, rank and nullity, eigenvalues, inner products, orthogonality.

Omitted 1964–65

237. Introduction to Abstract Algebra. Fundamental algebraic structures: rings, fields, polynomial domains, groups, vector spaces, modules.

247. Theory of Sets. Sets, relations, mappings; equivalence, order; cardinals, ordinals, transfinite arithmetic; axiom of choice and equivalents.

Omitted 1964–65

250. Higher Geometry. Foundations of geometry; isometry, similarity, inversions; introduction to affine, projective, and various non-Euclidean geometrics.

Omitted 1964–65

265. Functions of a Real Variable I. Real number system; uniform continuity; mean value theorems; bounded variation; Riemann-Stieltjes integral; sequences of functions. Prerequisite: Math. 163.

266. Functions of a Real Variable II. Differentials; implicit functions, functional dependence; transformations of multiple integrals; arc length, surface area; differential forms, vector analysis. Prerequisite: Math. 265.

267. Functions of a Complex Variable. Complex numbers, analytic functions, elementary functions, line integrals, Cauchy theorems, Laurent series, residues, applications. Prerequisite: Math. 164.

268. Orthogonal Functions and Fourier Series. Orthogonal functions. Sturm-Liouville equations; integral operators, Dirichlet kernel, Fourier series, Gibbs phenomenon; generalized functions; Legendre polynomials, Bessel functions; heat and temperature, harmonic functions, waves and vibrations; Fourier integral. Prerequisite: Math 265 or 267.

275. Topological Methods in Analysis. Metric spaces, compactness, contracting mapping theorem and applications to differential equations, implicit function theorem, fundamental theorem of algebra, Weierstrass approximation theorem. Prerequisite: Math. 265.

280. Numerical Methods. Numerical approximations to solutions of linear, transcendental, differential, and partial differential equa-

tions. Some time may be spent at the Computing Center. Prerequisite: Math. 164.
Omitted 1964–65

290. **Reading.** Special work, arranged individually. Consent of the department required.

297. **Seminar.** Topics to be selected. Consent of the department required.

299. **Senior Thesis.** A paper based upon independent study.

436. **Abstract Algebra I.** Basic algebraic structures, including semi-groups, groups, rings, fields, vector spaces, modules, linear algebras, lattices.

437. **Abstract Algebra II.** Rings of endomorphisms of abelian groups, multilinear algebras, exterior algebras, Galois theory. Prerequisite: Math. 436.

440. **General Topology.** Continuity. Compactness, connectedness, metrizability. Product spaces. Prerequisite: Math. 265.

443. **Introduction to Algebraic Topology.** The combinatorial structure of complexes and the homology of polyhedra. Application of algebraic techniques in topology to classification of surfaces, fixed point theory, and analysis. Prerequisite: Math. 237 and 265.

467. **Theory of Analytic Functions.** Cauchy theorems, Taylor and Laurent series, residues, conformal mapping, analytic continuation, product theorems. Prerequisite: Math. 265 or 267.

471. **Measure and Integration I.** Lebesgue measure on the line. Measure spaces. Integration. Convergence theorems. The Radon-Nikodym theorem. Differentiation. Prerequisite: Math. 265.

472. **Measure and Integration II.** Fubini's theorem. Convergence in measure, in mean. Hölder and Minkowski inequalities. The function spaces L_p and C. The Riesz representation theorem. Hilbert space, Fourier series. Prerequisite: Math. 471.

Music

COLLEGE OF ARTS AND SCIENCE

**Ward Woodbury,* PH.D. (Rochester) ..... Associate Professor of Music
**Allan Ross,* M.M. (Indiana) ..... Teaching Assistant in Music

EASTMAN SCHOOL OF MUSIC

Charles W. Fox, PH.D. (Cornell) ..... Professor of Musicology
Verne Thompson, PH.D. (Rochester) ..... Professor of Music Literature

William Cerny, M.M. (Yale) ..... Associate Professor of Humanities
David Geppert, PH.D. (Rochester) ..... Associate Professor of Theory
Louis Mennini, PH.D. (Rochester) ..... Associate Professor of Composition
Robert V. Sutton, PH.D. (Rochester) ..... Associate Professor of Theory
Elvera Wonderlich, M.M. (Rochester) ..... Associate Professor of Theory

Robert Gauldin, PH.D. (Rochester) ..... Assistant Professor of Theory

*Part-time.

AN A.B. PROGRAM with a concentration in music is offered by the College of Arts and Science in cooperation with the Eastman School of Music. Students planning to pursue this curriculum must be auditioned and accepted by the Eastman School of Music as well as the College of Arts and Science.

Since such concentrators have such a high level of sophistication in music, the courses in Music 101, 103, and 104 offered in the College of Arts and Science are not open to them.

Students concentrating in music are required to meet the general requirements of the College of Arts and Science in English, foreign language, distribution, and physical education. In addition they are required to take sixteen courses in music at the rate of two in each of the eight terms, as indicated in the following sample program:

FIRST YEAR

1. Applied Music	1. Applied Music
2. 101 Theory	2. 102 Theory
3. 101 English	3. Group I (Foreign Language)
4. Group III (Lab)	4. Group III (Lab)
Physical Education	Physical Education

SECOND YEAR

1. Applied Music	1. Applied Music
2. 111 Theory	2. 112 Theory
3. Group II	3. Group II
4. Group III	4. Group III
Physical Education	Physical Education

THIRD YEAR

1. Applied Music	1. Applied Music
2. Music Elective	2. Music Elective
3. Group II	3. Group II
4. Elective (CAS)	4. Elective (CAS)

FOURTH YEAR

1. Applied Music	1. Applied Music
2. Theory Elective	2. Theory Elective
3. Elective (CAS)	3. Elective (CAS)
4. Elective (CAS)	4. Elective (CAS)

Non-music majors may take electives in music at the Eastman School of Music with the permission of the Registrar. One year of work in a single field of applied music is defined as a *course* and non-music majors will be permitted to submit for degree credit no more than two such courses. Students electing such courses should confer with their faculty advisers concerning the courses for which they are eligible. Practice facilities are available on the River Campus to all students who are enrolled in courses in applied music. Practice rooms supplied with pianos are located in the Women's Gymnasium and the Men's Dining Center.

OFFERED BY THE COLLEGE OF ARTS AND SCIENCE

Music 101. Fundamentals of Music. Introduction of basic aspects of the theory of music to students not concentrating in music. Elementary ear-training. Practice in writing simple exercises in harmony. Study of rhythm, melody, musical form and the characteristics of orchestral instruments.

Music 103. Introduction to the Literature of Music I. This course and its sequel, Music 104, aim to introduce the student to the subject of Western music through analysis of selected masterpieces of that art. It is devoted to the development of music from early Christian times until 1830 with special attention being given to the Renaissance, Baroque and Classical periods in their relationship to the cultural and social forces of the times. A knowledge of the fundamentals of music is prerequisite.

Music 104. Introduction to the Literature of Music II. Development of music during the Romantic and Modern periods. Correlation between music and the other arts is given special consideration. A knowledge of the fundamentals of music is prerequisite.

OFFERED BY THE EASTMAN SCHOOL OF MUSIC

Theory 101. First-Year Theory I. The melodic, harmonic and rhythmic elements of music. The four types of triads; intervals,

keys, scales, cadences, notation, rhythmic reading, sight-singing; melodic and harmonic dictation.

Five hours a week.

Theory 102. First-Year Theory II. Continuation. Dominant seventh chord, modal scales, key relationship, modulations, transposition, four-part writing, and two-part counterpoint. Rhythmic reading, sight-singing, melodic and harmonic dictation continuing. Prerequisite: Theory 101.

Five hours a week.

Theory 111. Second-Year Theory I. Two-, three-, and four-part music of J. S. Bach and his contemporaries. Analysis, part-writing, practical application at the piano, and dictation. Harmonic and formal analysis of music by K. P. E. Bach, Haydn, Mozart, and Beethoven. Writing includes chorale harmonization, chorale-preludes, a two-part invention, recitatives, piano accompaniments for folk songs, and three- and four-part vocal arrangements. Prerequisite: Theory 101, 102. Required of music majors; open to other majors with the permission of the instructor.

Five hours a week.

Theory 112. Second-Year Theory II. A continuation of Theory 111. Prerequisite: Theory 111.

Five hours a week.

Theory 131. Styles I. Technical analysis of works of the late eighteenth- and nineteenth-century composers with written assignments in the styles under consideration. Prerequisite: Theory 112.

Theory 132. Styles II. Continuation of Theory 131. Styles of twentieth-century American and European composers. Prerequisite: Theory 131.

Counterpoint 101. Modal Counterpoint I. Modal counterpoint of the sixteenth century; the motet and the Mass. Writing in up to three voices. Prerequisite: Theory 112. To receive credit, Counterpoint 102 must be completed.

Counterpoint 102. Modal Counterpoint II. Continuation of Counterpoint 101. Writing in four and five voices. Prerequisite: Counterpoint 101.

Orchestration 201. Fundamentals of Orchestration I. Instruments of the orchestra; practical scoring for individual choirs.

Two hours a week.

Orchestration 202. Fundamentals of Orchestration II. Continuation of 201. Scoring for chamber and full orchestra. Prerequisite: Orchestration 201.

Two hours a week.

History 101. Historical Survey I. A general consideration of Western civilization from antiquity to the present with special emphasis upon the development of Western musical forms and styles.

History 102. Historical Survey II. Continuation of 101.

Music Literature 211. Piano Literature I. Analysis and performance of keyboard music from the pre-piano period to Beethoven; special attention to the piano sonata and other characteristic forms. Primarily for majors in piano, composition, or history of music.

Two hours a week.

Music Literature 212. Piano Literature II. Continuation of 211. From the Romantic Period to the present.

Two hours a week.

Ensemble 101. Eastman School Chorus. *A cappella* literature and larger works for chorus and orchestra. Required of voice majors and recommended if voice is studied as an elective.

No credit
Two hours a week.

Naval Science

William H. Game, CAPT. (USN), M.S. (Massachusetts Institute of Technology).... ....Professor of Naval Science and *Chairman of the Department*

Amos L. Wooten, CDR. (USN), A.B. (Florida Southern).....Associate Professor of Naval Science

James L. Bayne, LT. (USN), B.S. (Naval Academy).....Assistant Professor of Naval Science
Larry C. Brooks, LT. JG. (USN), A.B. (Oklahoma).....Assistant Professor of Naval Science
R. R. Mason, LT. (USN), B.A. (Miami).....Assistant Professor of Naval Science
Raymond A. Pettigrew, LT. COMDR. (USN), B.S. (Holy Cross)..Assistant Professor of Naval Science
Charles B. Webster, MAJ. (USMC), B.S. (Ohio State).....Assistant Professor of Naval Science

Kenneth M. Browning, FTC (USN).....Instructor in Naval Science
John J. Gribbin, Jr., GMGI (USN).....Instructor in Naval Science
Robert W. Leftwich, SKC (USN).....Instructor in Naval Science

Ralph E. Smith, YNC (USN).....Instructor in Naval Science
Phillip L. Stinson, GYSGT (USMC).....Instructor in Naval Science
John E. Sullivan, QMC (USN).....Instructor in Naval Science

THE NAVAL SCIENCE SEQUENCE consists of work in each of the eight undergraduate terms. The College of Arts and Science grants three courses of credit for work in Naval Science toward the A.B. and the B.S.

In addition to the requirements for enrollment in the NROTC program and the requirements for commission discussed in the Officer Candidate Programs section of the catalogue, the following specific requirements must be met:

1) By the end of the sophomore year, every regular NROTC student must have satisfactorily completed one year of college physics and one year of college mathematics. Contract students are encouraged but not required to take physics.

2) All Contract students must have completed mathematics through trigonometry by the end of the sophomore year. Contract students who have completed the mathematics requirements in secondary school need not take more mathematics unless it is required by the courses they are pursuing in the University.

3) Every student must achieve proficiency in written and oral expression represented by successful completion of English 101, or its equivalent.

4) Physical training will be taken by every student.

5) Each student shall take instruction in swimming, and qualify as a First Class Swimmer.

101. Naval Orientation. A study of the basic customs and traditions of the Navy and of functions of the Naval Establishment and its components in the defense of the nation; the duties and responsibilities of a line officer in the Naval Service.
Three lecture-recitations.
One two-hour practical instruction period a week.

102. Evolution of Sea Power. Influence of Sea Power upon global history in general, and upon the world balance of power in particular, with especial reference to the role of Sea Power in maintaining the peace.
Three lecture-recitations.
One two-hour practical instruction period a week.

151. Naval Weapons. Fundamentals of naval weapons and weapons systems, stressing basic principles, and their application to control of the seas.
Three lecture-recitations.
One two-hour practical instruction period a week.

221. Navigation. Theory and techniques of the art of navigation, including dead reckoning, piloting, electronic and celestial navigation.
Three lecture-recitations.
One two-hour practical instruction period a week.

222. Naval Operations. Naval operations in general at the junior watch officer level, including rules of the nautical road, OOD

and CIC operational duties, and maneuvering board. Capabilities, restrictions, and security of naval communications. Radar navigation, polar operations and operational meteorology.

Three lecture-recitations.
One two-hour practical instruction period a week.

232. Principles and Problems of Naval Leadership. Principles and problems of human relations, the principles of management, and the responsibilities of the junior officer in his role as a Division Officer. Topics include: concepts of leadership; principles of interviewing; the functions of management; recent developments in management; concept of command; the Uniform Code of Military Justice; and other similar topics.

Three lecture-recitations.
One two-hour practical instruction period a week.

233. Naval Machinery Nuclear Power and Ship Stability. Basic principles relating to the transformation of energy from fuel, including nuclear fuel, to heat to power. Application of steam, internal combustion and other prime movers to propulsion and auxiliary uses in Naval vessels and aircraft. Principles of ship stability and buoyancy and their application to the problems of damage control.

Three lecture-recitations.
One two-hour practical instruction period a week.

261. Evolution of the Art of War. Classic principles, tactics, and techniques of land warfare and their development.

Three lecture-recitations.
One two-hour practical instruction period a week.

262. Modern Basic Strategy and Tactics. Modern military tactical principles and techniques, especially on the small unit level, and development of a general understanding of strategy.

Three lecture-recitations.
One two-hour practical instruction period a week.

271. Amphibious Warfare. Concept, history, development and techniques of amphibious warfare; critical analysis of selected amphibious operations.

Three lecture-recitations.
One two-hour practical instruction period a week.

272. Amphibious Planning, Naval Justice and Leadership. Planning in the amphibious operation, the administration of naval justice, and principles and techniques of leadership.

Three lecture-recitations.
One two-hour practical instruction period a week.

Philosophy

Lewis White Beck, PH.D. (Duke).....Burbank Professor of Moral and Intellectual Philosophy and *Chairman of the Department*

Murray Jerome Stolnitz, PH.D. (Harvard).....Professor of Philosophy

Colin Murray Turbayne, PH.D. (Pennsylvania).....Professor of Philosophy

James Welton Cornman, PH.D. (Brown).....Assistant Professor of Philosophy

Robert Lawrence Holmes, PH.D. (Michigan).....Assistant Professor of Philosophy

Keith Lehrer, PH.D. (Brown).....Assistant Professor of Philosophy

John Powers Stewart, M.S. (Pennsylvania).....Assistant Professor of Philosophy

Alfred Harrison Jones, PH.D. (Cornell).....Professor Emeritus of Philosophy

THE DEPARTMENT OF PHILOSOPHY offers a program leading to the A.B. degree and, at the graduate level, to the A.M. and Ph.D. degrees.

A program of concentration for the A.B. degree will normally consist of seven courses beyond Philosophy 101. Included in these will be Philosophy 102, 103, 104, and either 107 or 216.

The remaining courses to make up the number of ten for the concentration may be drawn from advanced courses in any other field of the humanities and social sciences and most fields of the natural sciences. (English, Foreign and Comparative Literature, History, Languages and Linguistics, Political Science, Anthropology, Economics, Biology, Physics, Psychology, and Mathematics are the related fields most often chosen.)

Colloquia for all seniors concentrating in Philosophy are held throughout the academic year. They are planned to help students integrate their work in courses and to prepare them for the comprehensive examinations.

The following courses in Philosophy may be taken to meet some of the distribution requirements in the Humanities: 103, 104, 211, 242, and 244. Others may be taken to fulfill the distribution requirements in the Social Sciences.

Students who wish to do advanced work in Philosophy are strongly urged to enter the honors program in Philosophy. In their programs, Philosophy 303 may be substituted for Philosophy 103, but they must take Philosophy 104 and Philosophy 107 or Philosophy 216 in addition to four honors seminars in Philosophy.

Qualified concentrators in Philosophy may be approved by the Department for the junior year abroad.

101. Introduction to Philosophy. Critical examination of some of the central beliefs and methods of thinking in common sense, science, and religion. Topics include: the existence and nature of God; why is knowledge gained by the scientific methods reliable? Can science decide questions of value? Classroom discussion and conference sections.

102. Ethics. Examination of the principles of duty and right conduct which are applied in making moral choices, and of the leading conceptions of the good life in ethical philosophy. The religious, psychological, sociological, and philosophical approaches to morality contrasted. Moral conflict in literature, the drama, and everyday life. Classroom discussion and conference sections.

103. History of Ancient Philosophy. An introduction to ancient philosophy through a study of important philosophers from the sixth century B.C. to the third century B.C., and of their significance for the problems of today. Readings in the Pre-Socratics, Plato, Aristotle, Epicureans and Stoics.

104. History of Modern Philosophy. An introduction to modern philosophy through a study of important philosophers from the seventeenth to the end of the eighteenth century, and of their position in the cultural history of the West.

107. Logic. An investigation of arguments and common fallacies with the purpose of establishing a criterion for distinguishing between valid and invalid arguments. Classical logic will be covered as a special case of modern logic. Special attention will be paid to the handling of material in ordinary language.

108. Philosophy of Mind. An historical and philosophical study of some problems in the philosophy of mind, including such topics as: the nature of mental phenomena, the relation between body and mind, our knowledge of other minds, the concept of a person, and the privacy of mental states. Prerequisite: Philosophy 101 or permission of the instructor.

190. Preceptorial: Logical Positivism. A study of A. J. Ayer's *Language, Truth and Logic* and its significance in present-day thought.

191. Preceptorial: Self-Knowledge. A study of some problems in the philosophy of mind, including our knowledge of the self and of other selves, and the privacy of mental states. Readings from three of the most important recent works in philosophical psychology, viz. Strawson's *Individuals,* Hampshire's *Thought and Action,* and Ayer's *The Concept of a Person.*

205. Recent and Contemporary Philosophy. A study of several of the most influential philosophers of the nineteenth and twentieth centuries; an introduction to contemporary views in philosophy. Prerequisite: Philosophy 104 or permission of the instructor.

Interrelations of Art, Literature and Philosophy. (See Fine Arts 215, 216)

211. Philosophy of Religion. A critical and systematic study of the main problems of religious thought today, such as the existence of God, religious knowledge, and the relation of religion and culture.

216. Formal Logic. A formal presentation of logic and a discussion of axiomatic systems. Applications of logic to philosophy and mathematics.

221. Ethics and Society. The application of ethical theory to concrete problems of moral choice in society. The relation between morality and the law, the theory of punishment, the nature of human rights. Moral analysis of specific decisions in government and the law which have been of historic importance. Prerequisite: Philosophy 102.

Omitted 1964–65

237. Social and Political Philosophy. An enquiry into the nature of human society and its institutions with special stress on the role of the state. What is political allegiance and how is it related to moral and legal obligation and to economic interests? Distinction between fact and value in social and political discussion and the idea of a philosophical justification of particular forms of government.

Omitted 1964–65

241. Aesthetics. Examination of the experience of appreciating beauty, both in nature and art; critical analysis of leading theories of the creation of art and the structure and value of works of art, e.g., formalism, expressionism, religious and moral influence; the semantic problem of the "meaning" of art, particularly the difference between scientific and poetic uses of language. Concrete reference to specific works of art in the various media—painting, music, poetry, drama, etc.

Omitted 1964–65

244. The Philosophy of Criticism. Examination of the meaning of value judgments in the arts; whether and by what means such judgments can be confirmed; the problems of "good taste." Analysis of the validity and scope of the principles employed in criticism of the arts, including literature. Readings in critical texts and application to specific works of art.

Omitted 1964–65

252. Philosophy of Science. An examination of scientific definitions and postulates, the functions and structure of theories, the nature of causal and statistical explanation, and the role of mathematics in science. Special emphasis placed on actual scientific systems in the physical sciences.

Mathematical Logic. (See Mathematics 220)

282. The Theory of Knowledge. A study of the character of human knowledge. Main emphasis will be placed on problems such as: sense perception, truth, belief, and necessary knowledge.

Chinese Philosophy. (See Chinese 285. The Growth of Chinese Thought)

Indian Philosophy. (See Indian Literature 285. Literature of Classical India.)

291. Reading Course. The reading of philosophical literature under guidance. Planned primarily in the interest of seniors majoring in philosophy. Other students may register only with the consent of the chairman of the Department of Philosophy.

Physical Education for Men

Louis A. Alexander, A.M. (Columbia) ..... Professor of Physical Education and *Chairman of the Department*

Paul E. Bitgood, M.ED. (Springfield) ..... Professor of Physical Education

Lyle D. Brown, M.S. (Ithaca) ..... Associate Professor of Physical Education

Donald C. Smith, M.ED. (Springfield) ..... Associate Professor of Physical Education

Clarence I. Aikey, M.S. (Ithaca) ..... Assistant Professor of Physical Education

David R. Ocorr, M.A. (Columbia) ..... Assistant Professor of Physical Education

Everett J. Phillips, B.S. (Springfield) ..... Assistant Professor of Physical Education

William L. Boomer, M.ED. (Rochester).....Instructor in Physical Education

Elmer H. Burnham, B.S.P.E. (Notre Dame).....Professor Emeritus of Physical Education
Roman L. Speegle, M.A. (Columbia).....Professor Emeritus of Physical Education

The aim of the department is to provide physical activity and recreation for the students, to stimulate interest and develop skills in a wide variety of individual and team games, encourage participation in intramural and intercollegiate athletics, and stress in the required program the games and sports that have a high carry-over value for after class hours as well as after college years. Each instructor takes an individual interest in counseling students.

11. **Physical Education I.** Required of all freshmen. Instruction is provided in swimming, tennis, handball, basketball, softball, track, volleyball, soccer, tumbling, apparatus, squash, golf, wrestling, and weight training.
No credit.

13. **Physical Education II.** A continuation of Physical Education II.
No credit.

21. **Physical Education I.** Required of all sophomores. Each student must demonstrate satisfactory ability in handball, tennis, squash racquets, and swimming. More advanced instruction is provided in the above activities as well as the following: basketball, softball, track, volleyball, soccer, golf, wrestling, and badminton.
No credit.

23. **Physical Education II.** A continuation of Physical Education 21.
No credit.

Physical Education for Women

Sylvia Fabricant, M.S. (Wellesley).....Associate Professor of Physical Education and *Chairman of the Department*

Berthaida Fairbanks, M.S. (Colorado).....Assistant Professor of Physical Education

Joan Bates, M.A. (Sarah Lawrence).....Instructor in Physical Education
Jessie Disston Mason, (Bouve Boston School).....Instructor in Physical Education
Geraldine Stugis, B.S. (Tufts).....Instructor in Physical Education
Sylvia Yeager, A.B. (DePauw).....Instructor in Physical Education

Merle Spurrier, B.A. (Ohio Wesleyan).....Professor Emeritus of Physical Education

The aim of the department is to present a program that will develop an appreciation of the value of intelligent participation in motor activity; to teach skills and encourage interest in these activities; to direct an intramural program, which includes a wide variety of interests; to promote the maintenance of good health habits.

Three hours a week are required during the freshman and sophomore years. Each girl buys a regulation costume and provides her own tennis racquet. Other equipment is furnished. The activities are taught for a period of eight weeks during four seasons: Fall, Winter, Winter II, and Spring. Activities are offered from the following: American Red Cross Life Saving, archery, badminton, basketball, body conditioning, diving, field hockey, folk dance, golf, lacrosse, modern dance, skiing, soccer, softball, swimming, tennis, trampoline, volleyball, water safety instructor's training.

12. Physical Education I. Each girl is required to take a season of fundamentals of movement or fundamentals of dance. A safety proficiency swimming test is given prior to the start of the fall season. Those who do not qualify are expected to enroll for one season of swimming. Activities for all other students are on an elective basis.

No credit.

14. Physical Education II. A continuation of 12.

No credit.

22. Physical Education I. Each girl is expected to enroll for one season of instruction in a sport if it was not elected during her freshman year.

No credit.

24. Physical Education II. A continuation of 22.

No credit.

Physics and Astronomy

Sidney W. Barnes, PH.D. (Cornell).....Professor of Physics
Arthur Cunliffe, PH.D. (London).....R.T. French Visiting Professor of Physics
David L. Dexter, PH.D. (Wisconsin).....Professor of Physics
J. Bruce French, PH.D. (Massachusetts Institute of Technology).....Professor of Physics
Harry W. Fulbright, PH.D. (Washington).....Professor of Physics
Harry E. Gove, PH.D. (Massachusetts Institute of Technology).....Professor of Physics
Edward H. Jacobsen, PH.D. (Massachusetts Institute of Technology).....Professor of Physics
Morton F. Kaplon, PH.D. (Rochester).....Professor of Physics and *Acting Chairman of the Department* and Associate Dean of the College of Arts and Science
Leonard Mandel, PH.D. (London).....Professor of Physics
Robert E. Marshak, PH.D. (Cornell).....Distinguished University Professor
Susumu Okubo, PH.D. (Rochester).....Professor of Physics
Malcolm P. Savedoff, PH.D. (Princeton).....Professor of Astronomy
Stewart Sharpless, PH.D. (Chicago).....Professor of Astronomy and *Director, Kenneth E. Mees Observatory*
John H. Tinlot, PH.D. (Massachusetts Institute of Technology).....Professor of Physics
Emil Wolf, PH.D. (Bristol) D.S. (Edinburgh).....Professor of Physics

W. Parker Alford, PH.D. (Princeton).....Associate Professor of Physics
Theodore G. Castner, PH.D. (Illinois).....Associate Professor of Physics
Everett M. Hafner, PH.D. (Rochester).....Associate Professor of Physics
H. Lawrence Helfer, PH.D. (Chicago).....Associate Professor of Astronomy
Robert S. Knox, PH.D. (Rochester).....Associate Professor of Physics
Adrian C. Melissinos, PH.D. (Massachusetts Institute of Technology).....Associate Professor of Physics
Jerome L. Rosen, PH.D. (Columbia).....Associate Professor of Physics
E.C.G. Sudarshan, PH.D. (Rochester).....Associate Professor of Physics

Iwo Bialynicki-Birula, PH.D. (Warsaw).....Visiting Senior Research Associate
Riazuddin, PH.D. (Cambridge).....Visiting Senior Research Associate

Robert L. Burman, PH.D. (Illinois).....Assistant Professor of Physics
J.G.M. Duthie, PH.D. (Bristol).....Assistant Professor of Physics
Kenneth F. Kinsey, PH.D. (Rochester).....Assistant Professor of Physics
Daniel S. Koltun, PH.D. (Princeton).....Assistant Professor of Physics
Frederick Lobkowicz, PH.D. (Edg. Tech. Hochschule Zurich).....Assistant Professor of Physics
M. Emergy Nordberg, PH.D. (California Institute of Technology).....Assistant Professor of Physics
Ronald D. Parks, PH.D. (Stanford).....Assistant Professor of Physics
Donald C. Schmalberger, PH.D. (Indiana).....Assistant Professor of Astronomy
Edward H. Thorndike, PH.D. (Harvard).....Assistant Professor of Physics

Neville W. Reay, PH.D. (Minnesota).....Instructor in Physics
James W. Ryan, PH.D. (California).....Instructor in Physics

Masayoshi Azuma, PH.D. (Tohoku University).....Research Associate in Physics
Hrishikesh Banerjee, PH.D. (Calcutta).....Research Associate in Physics
Douglas Cline, PH.D. (Manchester).....Research Associate in Physics
Clifford L. Deney, PH.D. (Louisiana State).....Research Associate in Physics

Brian R. Dennis, PH.D. (Leeds).....Research Associate in Physics
George D. Gaspari, PH.D. (California-Riverside).....Research Associate in Physics
Haim Goldberg, PH.D. (Tel Aviv).....Research Associate in Physics
Carl Richard Hagen, PH.D. (Massachusetts Institute of Technology)....
....Research Associate in Physics and *Assistant Professor
Adam Kujawski, PH.D. (Polish Academy of Sciences).....Visiting Research Associate in Physics
Chandra Lal Mehta, PH.D. (Rochester)..Research Associate and *Assistant Professor of Physics
L. K. Pandit, PH.D. (Zurich).....Research Associate in Physics
Arne Reitan, PH.D. (Norwegian Institute of Technology).....Research Associate in Physics
Ciaran P. Ryan, PH.D. (National University of Ireland).....Research Associate in Physics and *Assistant Professor
Peter Thurnauer, PH.D. (Oxford).....Research Associate in Physics
Richard L. West, PH.D. (University of Washington).....Research Associate in Physics
Taiji Yamanouchi, PH.D. (Rochester).....Research Associate in Physics
Sophia Bialynicka-Birula, PH.D. (Warsaw).....Visiting Research Associate in Physics

Arthur K. Hamann, E.E. (Munich).....Technical Associate in Physics
Roman A. Hawrylak, Diplom-Ingenieur (Munich).....Technical Associate in Physics
William Stinson, Diploma (Oswego).....Technical Associate in Physics

Richard W. Mortenson, B. of M.E. (Clarkson).....Administrative Head

James E. Eden, B.S. (Muhlenberg).....Assistant Administrative Head

Herbert R. Childs, A.B. (Rochester).....Associate Professor Emeritus of Physics

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*Part-time.

THE DEPARTMENT OF PHYSICS AND ASTRONOMY awards the A.B., B.S., and Ph.D. in physics and astrophysics. The following description of requirements refers to the A.B. and B.S. in physics; corresponding requirements for astrophysics are decribed on page 147. Students wishing to advance as rapidly as possible elect to work toward the B.S. The A.B. program, while also constituting an adequate preparation for graduate work, is less intensive and should be elected by students desiring a broader academic experience.

The introductory sequence of courses in any physics program i.e. 115–116, 125–126 or 117–118, 127–128. The sequence beginning with 117 covers the same material as the normal sequence, but at a deeper physical and mathematical level. Students can enter the higher sequence at the beginning of any term, but *only* by consent of the Department.

B.S. Program

The first year of work toward the B.S. consists of Math 161–162, Physics 115–116, two additional courses in natural science (Chem 121–122, Chem 123–124, Astronomy 111, 112, or Geology 101–102), and two courses in humanities. Since this pattern is common to all programs in physical science and engineering, it does not commit students to the physics degree. The Department therefore delays recognition of physics candidates until their second year.

A typical synopsis of courses for the last three years is given below. The program is not entirely inflexible, but the distribution among the several groups cannot be very different from that of a typical program.

FIRST YEAR

1. Physics 115 or 117 Physics I	1. Physics 116 or 118 Physics I
2. Math. 161 Analysis I	2. Math. 162 Analysis II
3. Engl. 101 English Comp.	3. Group I
4. Group III*	4. Group III*
Physical Education	Physical Education

SECOND YEAR

1. Physics 125 or 127 Physics II	1. Physics 126 or 128 Physics II
2. Math. 163 Analysis II	2. Math. 164 Analysis IV
3. Foreign Language (Group I)*	3. Group I
4. Group II	4. Group II
Physical Education	Physical Education

THIRD YEAR

1. Physics 235 Theor. Phys. IA	1. Physics 236 Theor. Physics IB
2. Physics 237 Mod. Phys. IA	2. Physics 238 Mod. Physics IB
3. Math. 267**	3. Math. 268**
4. EE 221 or Chem 251	4. Group II
5. Elective	5. Elective

FOURTH YEAR

1. Physics 245 Theor. Phys. IIA	1. Physics 246 Theor. Phys. IIB
2. Physics 247 Mod. Phys. IIA	2. Physics 248 Mod. Phys. IIB
3. Physics 243 Senior Lab. I	3. Physics 244 Senior Lab. II
4. Elective	4. Elective
5. Elective	5. Elective

The Department is currently offering part-time research assistantships to a limited number of qualified undergraduates during the academic year. Full-time summer assistantships are also available.

*Most students can complete their requirements in foreign languages with one term of college work. Students who need more than one term must take the necessary courses in place of electives.

**ME 201–212 may be substituted.

A.B. Program

Aside from an introductory sequence at least six advanced courses in physics are required for an A.B. concentration. The Department recommends Physics 235, 236, 237, 238 and either Physics 245 and 246 or Physics 247 and 248 as the minimum program. Substitutions can be made with the approval of the departmental counsellor.

An A.B. concentration program must include at least four courses beyond the introductory level in fields related to physics. The Department recommends that two of these courses be mathematics.

All candidates for the A.B. in physics must take a comprehensive examination in the senior year.

ASTROPHYSICS

The description of programs in physics on page 146 generally applies as well to the program in astrophysics. Astronomy 111–112 is recommended for those students without an extensive prior knowledge of elementary astronomy. Aside from the introductory four-course sequences in physics and mathematics, the A.B. program must contain at least six courses from Group III related to Astrophysics and must include Astronomy 231 and 232. In both the A.B. and B.S. programs, the chosen program of Group III (science) electives must be approved by the Department Chairman or his representative as constituting a coherent degree program. Ordinarily four physics courses above the 200 level are recommended in the A.B. program and three in the B.S. program for these electives.

A synopsis of a typical program leading to the B.S. degree is given below. Students planning to pursue graduate study in astronomy should elect the B.S. program; they are encouraged to take advantage of opportunities for reading or research by taking Astronomy 293 in their Senior Year. In planning their programs, students should remember that proficiency in French, German, or Russian is usually required by graduate schools.

FIRST YEAR

1. Physics 115 or 117 Physics IA	1. Physics 116 or 118 Physics IA
2. Math. 161 Analysis I	2. Math. 162 Analysis II
3. Astronomy 111*	3. Astronomy 112*
4. English 101 English Comp.	4. Group I
Physical Education	Physical Education

SECOND YEAR

1. Physics 125 or 127 Physics II	1. Physics 126 or 128 Physics II
2. Math. 163 Analysis III	2. Math. 164 Analysis IV
3. Foreign Language (Group I)*	3. Group I
4. Group II	4. Group II
Physical Education	Physical Education

THIRD YEAR

1. Physics 235 Theor. Phys. IA	1. Physics 236 Theor. Phys. IB
2. Physics 237 Mod. Phys. IA	2. Physics 238 Mod. Phys. IB
3. Math. 267	3. Math. 268
4. Astronomy 231	4. Astronomy 232
5. Elective	5. Elective

FOURTH YEAR

1. Physics 247 Mod. Phys. IIA	1. Group III
2. Group III**	2. Group II
3. Group III**	3. Group III**
4. Elective	4. Elective
5. Elective	5. Elective

Astronomy 111, 112 is recommended for those students without an extensive prior knowledge of Astronomy. Students with a prior knowledge may substitute a Group III elective.

*Most students can complete their requirements in foreign languages with one term of college work. Students who need more than one term must take the necessary courses in place of electives.

**The chosen Group III (science) electives must be approved by the Department Chairman or his representative as constituting a coherent degree program. Ordinarily three physics courses above the 200 level are recommended.

PHYSICS

101–102. Survey Course in General Physics. An introduction to the primary phenomena and fundamental concepts of physics, including demonstrations. The subjects covered in the lectures are mechanics, heat, sound, electricity and magnetism, light, and atomic and nuclear physics. Calculus is not required.
Two lectures, one recitation.
One lab a week.

115–116. Physics I. The first year of a two year sequence. An introductory course covering topics in mechanics, wave motion, kinetic theory, and thermodynamics. Mathematics 161, 162 to be taken concurrently.
Two lectures, two recitations a week.
Laboratory in alternate weeks.

117–118. Physics IA. Covers the content of Physics 115–116 at a deeper mathematical level. Consent of the Department required.
Three meetings a week.
Laboratory in alternate weeks

125–126. Physics II. A continuation of Physics 115–116 covering topics in electromagnetism, electronics and circuit theory, geometrical and wave optics. Mathematics 163, 164 to be taken concurrently. Satisfactory performance in Physics 115–116 or 117–118 prerequisite.
Two lectures, two recitations a week.
Laboratory in alternate weeks.

127–128. Physics IIA. Continuation of Physics 117–118.

162. Physical Optics I. (See Optics 162)

203. Introduction to Modern Physics. A survey course for non-specialists, covering selected topics in modern physics.

221. Introduction to Quantum Mechanics and Atomic Structure. Includes the special theory of relativity, an introduction to quantum theory and solutions to the Schroedinger equation for simple atomic systems, quantum statistics and atomic spectroscopy. Prerequisite: Math. 164 and Physics 126. Taught by the Institute of Optics.
Three lectures and one lab a week.

222. Introduction to the Theory of the Solid State. Includes a study of the energy band theory of solids, conduction in solids, thermionic and photoelectric emission, semiconductors, dielectrics, crystalline imperfections, mechanical properties of solids, luminescence, and photoconductivity. Prerequisite: Optics 221. Taught by the Institute of Optics.
Three lectures and one three hour lab a week.

235. Theoretical Physics IA. Advanced Mechanics. Covers kinematics, dynamics of systems of particles, coordinate transformations, rigid body motion, LaGrange's and Hamilton's Equations. Satisfactory performance in Physics 125–126 or Physics 127–128 and Mathematics 163–164 prerequisite. Advanced Calculus to be taken concurrently.

236. Theoretical Physics IB. Advanced Mechanics. A continuation of Physics 235. Covers theory of small oscillations, the special theory of relativity, mechanics of continuous media, including elasticity and wave motion in solids and fluids. Physics 235 prerequisite. Advanced Calculus to be taken concurrently.

237. Modern Physics IA. Thermodynamics and introduction to statistical mechanics. A survey of thermodynamics, both from the classical and the statistical point of view. Covers the three laws of thermodynamics and some of their consequences, and introduces statistical mechanics. Satisfactory performance in Physics 125–126 or Physics 127–128 and Mathematics 163–164 prerequisite. Advanced Calculus to be taken concurrently.

238. Modern Physics IB. Introduction to wave mechanics. Covers the breakdown of classical theory, the quantum hypothesis of Planck and the Bohr theory of atomic phenomena. The DeBroglie hypothesis and Schroedinger's wave equation are developed and applied to atomic systems. Introductory laboratory in modern experimental methods accompanies the course. Physics 237 prerequisite. Advanced Calculus to be taken concurrently.

243. Senior Laboratory I. An advanced course in experimental physics, using techniques and principles of modern research. Introduces design and interpretation of measurements rather than construction of equipment. Experiments in atomic physics, nuclear physics and the solid state physics, including X-ray diffraction, Compton scattering, nuclear resonance, mass spectrometry, γ-γ angular correlation, μ-meson lifetime, Zeeman effect, Hall effect in semiconductors. Lectures cover topics on statistics, detector theory, electronic functional assemblies, scattering theory. Prerequisites: Physics 237–238. Two lectures and two laboratories each week.

244. Senior Laboratory II. A continuation of Physics 243.
Two lectures and two laboratories each week.

245. Theoretical Physics IIA. Electromagnetic Theory. An advanced course emphasizing the field point of view. Electrostatic phenomena including the concepts of microscopic and macroscopic fields, solution of electrostatic boundary value problems and the development of the Maxwell stress tensor. The interactions of currents and the study of magnetic materials and boundary value problems is followed by a discussion of Maxwell's equations, the concepts of energy, force and momentum in the electromagnetic field, the development of the field equations and their consequences. Physics 235, 236, Advanced Calculus prerequisite.

246. Theoretical Physics IIB. Electromagnetic Fields and Waves. A continuation of Physics 245. A discussion of electromagnetic fields in conducting media, the generation of electromagnetic waves and a thorough discussion of optical phenomena both from the point of view of field theory and from the geometrical optical point of view developed as a limiting case of the field theory. Physics 245 prerequisite.

247. Modern Physics IIA. Quantum Mechanics and the Structure of Matter. A rigorous development of quantum mechanics with application to Atomic physics. Physics 235, 236, 237, 238 and Advanced Calculus prerequisites.

248. Modern Physics IIB. Quantum Mechanics and the Structure of Matter. A continuation of Physics 247. A discussion of quantum statistics and the development of the basic concepts of solid state and nuclear physics. Physics 247 prerequisite.

261. Physical Optics II. (See Optics 261)

262. **Physical Optics III.** (See Optics 262)

291. **Reading or Research in Physics.** Normally open to seniors majoring in Physics.

293. **Special Topics in Physics.** Selected topics offered when justified by sufficient interest.

ASTRONOMY

111. **Elementary Astronomy I.** Primarily a course designed to provide a general knowledge of the universe as well as some understanding of the techniques and logical methods by which such knowledge is obtained. Three lectures, one laboratory each week.

112. **Elementary Astronomy II.** Continuation of 111.

231. **Intermediate Astronomy.** Instruments and techniques in classical and modern astronomical research; introduction to celestial mechanics including figures of celestial bodies, orbit determination, the three and n-body problems and problems of stellar systems. Prerequisites: Physics 125–126 or 127–128; Math 163, 164. Astronomy 111, 112 recommended but not required.

232. **Introductory Astrophysics.** Basic physical aspects of typically astronomical phenomena: stellar interiors, stellar atmospheres, interstellar medium and galactic structure, the solar system and vignettes of cosmological problems. Prerequisites: Astronomy 231 or consent of instructor.

291. **Reading or Research in Astronomy.** Normally open to seniors majoring in physics or astronomy.

293. **Special Topics in Astronomy.** Selected topics offered when justified by sufficient interest.

Political Science

William Edwin Diez, PH.D. (Chicago).....Professor of Political Science
Richard Francis Fenno, PH.D. (Harvard).....Professor of Political Science
William H. Riker, PH.D. (Harvard).....Professor of Political Science and *Chairman of the Department*
Glenn Gordon Wiltsey, PH.D. (Chicago).....Professor of Political Science

William Theodore Bluhm, PH.D. (Chicago).....Associate Professor of Political Science

Arthur Goldberg, A.B. (Connecticut).....Assistant Professor of Political Science
Gerald H. Kramer, B.S. (Massachusetts Institute of Technology).....Assistant Professor of Political Science

Dale Allen Neuman, PH.D. (Northwestern).....Assistant Professor of Political Science
S. Peter Regenstreif, PH.D. (Cornell).....Assistant Professor of Political Science and Canadian Studies

THE DEPARTMENT OF POLITICAL SCIENCE offers programs leading to the A.B. degree, the A.B. degree with honors and, at the graduate level, the A.M. and Ph.D. degrees.

Political Science 101 and 102 are prerequisites to all other courses in Political Science; however, exceptions to this rule may be made by the department.

A program of concentration for the A.B. degree consists of seven courses in Political Science beyond 102. Of the seven, at least one must be chosen from each of groups A, B, C, and D. Honors students concentrating in Political Science are required to enroll in course 298.

The remaining three courses to make up ten in the concentration will be chosen from among advanced course offerings in one of the following related fields: Anthro-

pology, Economics, Geography, History, Philosophy, and Psychology. A student interested in a related field not here listed should consult the departmental counsellor.

Political Science 101 and 102 are required of all students enrolling in Political Science seminars in the Honors Program unless excused by the department counsellor.

101. European Political Systems. A comparative study of the background, political processes, institutions, and ideologies of selected European states including Great Britain, France, and the Soviet Union.

102. The American Political System. An examination of the background, political processes, institutions, and ideologies of the United States with comparative illustrations drawn from the governmental systems studied in Political Science 101. Political Science 101 is a prerequisite.

Group A. International Relations and Foreign Political Systems

251. International Politics I. An examination of the nature, environment and objectives of nation-states and other significant groups.

252. International Politics II. An examination of processes, techniques, and patterns of behavior characteristics of international politics. Prerequisite: Political Science 251.

256. Problems in Comparative Politics. An examination of topics in comparative political analysis. Major emphasis will be on aspects of political affiliation, organization and participation in the major developed areas of the world.

258. Federalism. A comparative study of the constitutional form and administrative devices of the main examples of federal government.

Omitted 1964–65

259. Government and Politics in Continental Africa. An examination and analysis of selected political, economic, and social problems in Africa south of the Sahara.

260. Africa in International Politics. An analysis of the patterns of action and interaction among African states in the environment of continental and extracontinental politics. Prerequisite: 259.

Group B. American Politics and Institutions

261. Party and Pressure Politics in the United States. An analysis of the activity of political parties and pressure groups in the American system of government. Attention will be given to the nature of the two-party system, national, state and local; the social bases of partisanship; electoral behavior; party organization, leadership, and strategy. Parties and pressure groups will be studied as participants in the making of public policy decisions.

262. The Legislative Process. An analysis of decision-making in legislative bodies. Major emphasis on the American Congress, with comparative materials from state legislatures and non-American political systems.

281. The Constitutional Power Structure. A study of the constitutional pattern of power distribution between agencies of government and within the federal system as determined by the American judiciary.

282. Civil Rights. An examination of the permissible limits of governmental restraints on private rights and liberties as determined by the American judiciary. Prerequisite: Political Science 281.

Group C. Political Theory

285. Classics of Political Thought. Systematic political theories from Plato to Lasswell. An assessment of the university of the great political theories and their relevance to the understanding of contemporary political systems.

286. Modern Political Ideologies. A comparative study of important ideological currents in the age of nation-state, and their relationship to political events; constitutionalism, liberalism, conservatism, anarchism, socialism, communism, traditional authoritarianism, fascism, nationalism, corporatism.

289. Positive Political Theory. An examination of recent descriptive theories of political behavior including theories derived from the theory of games, economic models, and the theory of systems.

Group D. Methodology

295. Senior Reading Course. By arrangement with the department to permit work beyond regular course offerings.

298. Scope and Methodology of Political Science. An examination of political science as a field of study. Emphasis will be placed upon scope, method, bibliography, and the relation of Political Science to allied disciplines. Required of all Political Science concentrators and open only to Political Science concentrators and graduate students in Political Science.

Psychology

Robert Merrill Boynton, PH.D. (Brown) ..... Professor of Psychology and Director of the Center for Visual Science

Kenneth Edwin Clark, PH.D. (Ohio State) ..... Professor of Psychology and Dean of the College of Arts and Science

Emory Leland Cowen, PH.D. (Syracuse) ..... Professor of Psychology and Associate Chairman of the Department

William Duwayne Neff, PH.D. (Rochester) ..... Professor of Psychology and in the Center for Brain Research

Vincent Nowlis, PH.D. (Yale) ..... Professor of Psychology

Sidney Durward Shirley Spragg, PH.D. (Yale) ..... Professor of Psychology and *Chairman of the Department*

G. Richard Wendt, PH.D. (Columbia) ..... Professor of Psychology

****Helen H. Nowlis,*** PH.D. (Yale) ..... Professor of Psychology and Associate Dean of Students

Burton G. Andreas, PH.D. (Iowa) ..... Associate Professor of Psychology

John Hurley Flavell, PH.D. (Clark) ..... Associate Professor of Psychology

Russel Frank Green, PH.D. (Southern California) ..... Associate Professor of Psychology

Ralph Norman Haber, PH.D. (Stanford) ..... Associate Professor of Psychology

Melvin Zax, PH.D. (Tennessee) ..... Associate Professor of Psychology

Ralph Barocas, PH.D. (Pennsylvania State) ..... Assistant Professor of Psychology

Jay Steven Efran, PH.D. (Ohio State) ..... Assistant Professor of Psychology

James Ison, PH.D. (Michigan) ..... Assistant Professor of Psychology

Joel F. Lubar, PH.D. (Chicago) ..... Assistant Professor of Psychology

*Part-time.

Robert C. Radtke, PH.D. (Iowa).....Assistant Professor of Psychology
Edward E. Ware, PH.D. (Illinois).....Assistant Professor of Psychology

Alex Braiman, M.D. (New York State).....Clinical Associate in Psychology
Daniel Cecil Broida, PH.D. (Syracuse).....Clinical Associate in Psychology
Ilona M. Engel, PH.D. (Michigan).....Clinical Associate in Psychology
Howard Friedman, PH.D. (Clark).....Clinical Associate in Psychology
Robert H. Goldstein, PH.D. (Michigan).....Clinical Associate in Psychology
Norman Harway, PH.D. (Rochester).....Clinical Associate in Psychology
D. Wilson Hess, PH.D. (Rochester).....Clinical Associate in Psychology
Armin Klein, PH.D. (Teachers College, Columbia).....Clinical Associate in Psychology
Sydney Koret, PH.D. (Boston).....Clinical Associate in Psychology
Benjamin F. McNeal, PH.D. (Pennsylvania).....Clinical Associate in Psychology
Francis H. Parsons, PH.D. (Pennsylvania).....Senior Clinical Associate in Psychology
John Mark Reisman, PH.D. (Michigan State).....Clinical Associate in Psychology
Leonard Franklin Salzman, PH.D. (Rochester).....Clinical Associate in Psychology
A. Donald Smith, PH.D. (Rochester).....Clinical Associate in Psychology
Martin Gene Staiman, PH.D. (New York).....Clinical Associate in Psychology
Earl Franklin Telschow, ED.D. (Columbia).....Clinical Associate in Psychology
Irving Weiner, PH.D. (Michigan).....Clinical Associate in Psychology
Donald L. Weston, PH.D. (Boston).....Clinical Associate in Psychology

Karl Lowy, M.D. (Vienna).....*Senior Research Associate in Psychology and Professor in the Center for Brain Research
Robert Ader, PH.D. (Cornell).....Research Associate in Psychology
Jean Schaefer Cameron, B.A. (Rochester).....Research Associate in Psychology
Donald W. DeMott, PH.D. (Rochester).....Research Associate and *Assistant Professor of Psychology
Howard P. Iker, PH.D. (Rochester).....Research Associate in Psychology
Judith Onley, PH.D. (Rochester).....Research Associate and *Assistant Professor of Psychology

Priscilla Specht, B.A. (Cornell).....Technical Associate in Psychology

*Part-time.

THE DEPARTMENT OF PSYCHOLOGY offers programs of study leading to the A.B. degree and, in graduate studies, to the Ph.D. degree.

Psychology 101 is prerequisite for all other courses in Psychology. Psychology 201 and 251–252 are required of all students concentrating in Psychology. A program of concentration in Psychology includes completion of ten courses beyond Psychology 101. Of these, six to eight are taken in the Psychology Department. Students contemplating concentration in Psychology should, if possible, take Psychology 101 in the freshman year, Psychology 201 in the sophomore year, and Experimental Psychology (251–252) in the junior year. Psychology 210, 212, 213, 217, and 220 are appropriate for upper classmen who have had Psychology 101. Psychology 255 and 256 require previous completion of introductory courses in both Psychology and Biology, while Psychology 251–252, 253 and 254 have various Psychology courses as prerequisites.

The remainder of the ten courses required for a concentration in Psychology should consist of a carefully planned set of allied courses. Depending upon the student's interests and plans, certain courses in Biology, Chemistry, Mathematics, Physics, Anthropology, Economics, History, Philosophy, Political Science, Sociology, Comparative Literature, English, Fine Arts, Linguistics, Religion, Education, Business Administration, or Engineering or Optics may be approved. As far as possible these courses should be at the 200 level or beyond. Students planning to pursue graduate studies in Psychology should seek a broad foundation in related disciplines and should, for example, include

courses in Biology, Mathematics, and Philosophy to the extent possible. Such students should consult with a departmental adviser at the earliest possible date.

101. Introduction to Psychology. A systematic study of the principles of human behavior and experience. Lectures and class discussions supplemented by experiments and demonstrations. Prerequisite for all other courses in the department.

201. Statistics in Psychology. An introduction to the application of statistical methods. Although illustrations of applications are taken primarily from the field of Psychology, the course will also be suitable for students interested in the application of statistical methods to sociology, education, and biology. Requires completion of, or concurrent enrollment in, Psychology 101.

210. Child Psychology. Development of the child in the periods before and immediately after birth, during infancy, and adolescence. Special attention is given to the development of socialization, personality, emotion, language. Class lectures supplemented by demonstration films. Psychology 101 prerequisite.

212. Social Psychology. Individual behavior in relation to a variety of social environments; emphasis on such concepts as social interaction, influence, and control and on such topics as socialization of behavior systems, group processes, leadership, mass media, prejudice, and behavior in various institutional settings. Psychology 101 prerequisite.

213. Personality Dynamics. A survey of the basic methods in studying personality. Analysis of factors determining the course of behavior and personality development. Emphasis on the study of modern personality theories as they bear on areas such as conflict, frustration, the defense mechanisms and allied phenomena. Consideration given to current research in the field. Psychology 101 prerequisite.

217. Psychology in Business and Industry. Applications of psychological findings and methods to problems encountered in business, industry and the professions. Topics include: personnel selection, training, and evaluation; motivation and morale; problems of supervision and management; factors in efficient performance; human engineering; problems of safety (industrial and transportation accidents); market, product, advertising, and selling research; a brief consideration of applications of psychology to the professions. Psychology 101 prerequisite.

220. Psychology of Learning. An intensive study of psychological theory and findings which bear upon problems in conditioning and learning. Principles of transfer of training will be discussed in relation to their applicability to education and to other training situations.

251–252. Experimental Psychology. Techniques and methods in the experimental study of human behavior. The laboratory experiments are selected on the basis of their factual content and their illustration of basic experimental design and procedures. Psychology 101 and 201 prerequisite.

253. Psychological Measurement. A comprehensive treatment of the problems, statistical techniques, and theoretical concepts basic to psychological measurement. Consideration is given to the criteria used in selecting and developing tests. Emphasis is placed on the methodology of measurement as applied to the areas of achievement, aptitude, attitude, interest, motivation, and personality measurement. Psychology 101, 201 prerequisite.

254. Abnormal Psychology. Etiological factors, clinical description, and treatment of personality aberrations emphasizing the more serious forms of mental disorder. Class lectures are supplemented by demonstrations. Psychology 101, 213 prerequisite.

255. Physiological Psychology. Physiological basis of co-ordination, learning, perception, thought, emotion, and motivation of behavior. Some material on sensory processes. Psychology 101, Biology 101, 102 prerequisite.

256. Comparative Psychology. The concepts of the science of behavior and the application of scientific method to the study of animal conduct. Evolution of behavior and intelligence, the receptor control of activity, periodicity in behavior, and higher mental processes in animals. Psychology 101, and Biology 101, 102 prerequisite.

258. The Psychology of Motivation. The study of theories of motivation, motivational antecedents, and the consequence of such antecedents on instrumental behavior, learning, and perception. Open to advanced undergraduates and to graduate students by permission of the instructor.

260. Junior Seminar. Opportunity for familiarization with the problems of research in Psychology. During each section of the course, ongoing research is discussed by the sponsoring department member. Papers pertaining to that research area are prepared by each student for further dis-

cussion. In one semester a majority of the areas of research interest within the department will be covered. Open to Junior Psychology concentrators by permission only.

280. Senior Seminar in Current Psychological Literature. The seminar will consider recent experimental and theoretical contributions in several selected areas of psychology. Students will prepare written reports for presentation and intensive discussion. Open to Senior Psychology concentrators by permission only.

293. Reading Course. Supervised reading on topics not covered by existing courses or on specialized topics. Open only by special permission of the instructor.

297. Special Problems Course. The investigation, under guidance, of a special problem in experimental psychology and the presentation of the result of the research in a paper. Open only by special permission of the instructor.

NOTE: For graduate courses in Psychology consult the Graduate Studies Bulletin.

Sociology

Hanan Selvin, PH.D. (Columbia).....Professor of Sociology and *Chairman of the Department*

Dean Harper, PH.D. (Columbia).....Assistant Professor of Sociology and Psychiatry

Walter Charles Kaufman, PH.D. (Northwestern)..Assistant Professor of Psychiatry and Sociology

Alan Madian, M.A. (Yale).....Assistant Professor of Sociology

THE DEPARTMENT OF SOCIOLOGY offers work leading to a concentration for the A.B. degree. A program of concentration will ordinarily consist of six to eight courses in the Department of Sociology beyond Sociology 101. Additional courses for the required total of ten courses may be taken in any of the other social sciences with the approval of the departmental counselor. All concentrators must have taken one course in statistics, such as Psychology 201, prior to the beginning of their senior year.

101. Introduction to Sociology. Elements of social organization; the nature of society; study of the social group and bureaucracy.

201. The Literature of Social Research. A critical examination of several major empirical studies, emphasizing such problems as validity, causal inference, the control of error, and generalization. Prerequisites: Sociology 101 and a course in statistics, such as Psychology 201.

211. Contemporary Sociological Theories. A rigorous examination of some contemporary theories in the sociological literature. Social interaction, small group behavior, mass phenomena, and crime and delinquency will be among the topics considered.

216. Deviant Behavior. Formal and informal social control; the development of individual and collective forms of norm violation; theories of criminality.

221. The Social Organization of Industrial Society. Social class and social stratification; differential class behavior; sub-group organization of modern society; institutional patterns of behavior and the effect of the class structure on these institutional patterns.

228. Complex Organizations. Analysis of groups wih bureaucratic structures, such as schools, hospitals, factories, and offices; the impact of the organization on the individual; functions of informal groups in organizations.

Omitted 1964–65

245. Urbanization. Patterns of urban and suburban growth; the spatial distribution of buildings and people; urban culture and urban blight.

Omitted 1964–65

250. Medical Sociology. Social and cultural factors in illness; social organization of the hospital.

Mathematical Models in Anthropology and Sociology. (See Anthropology 281.)

Courses of Instruction

Offered in Fields Where There are no Departments

RELIGION

**Vinjamuri Everett Devadutt,* TH.D. (Toronto) ..... Professor of Religion (Term II)
**William Hughes Hamilton,* PH.D. (St. Andrews) ..... Professor of Religion (Term I)

**Robert Haddow Beaven,* PH.D. (Chicago) ..... Assistant Professor of Religion
**Grace Harris,* PH.D. (Cambridge) ..... Assistant Professor of Religion

*Part-time.

101. Introduction to Biblical Thought. A study of the major elements in the thought of the Hebrew-Christian tradition with emphasis on careful analysis of Biblical material, and on the contemporary significance of this tradition. Lecture and discussion.

Omitted 1964–65

103. History of Religion. An introductory comparative survey of the major religions in the world today in terms of their basic ideas and practices. Special attention will be given to Hinduism, Buddhism, Taoism, Confucianism, Judaism and Christianity.

104. Religion and Our Civilization. An introductory survey of the role of the Judaeo-Christian tradition in Western civilization, with special reference to the contemporary significance of the New Testament.

Omitted 1964–65

121. Problems in Religious Thought. An advanced course, open to any student who has completed one of the two introductory religion courses, dealing with selected subjects in the development of and in the rebellion against the Hebrew-Christian religious tradition. Among the works discussed will be those of Augustine, Aquinas, Luther, Shakespeare, Bach, Pascal, Dostoevsky, Tolstoy, Freud, and Camus. Prerequisite: Religion 101 or 103.

CREATIVE ARTS

101. Fundamentals of Dance Composition. Students will compose and perform dance studies for individuals and groups, using modern dance techniques. Readings in history of the dance will be required. Prerequisite: three semesters of non-credit dance technique classes, or their equivalent, and permission of the instructor.

Two three-hour supervised periods, plus additional studio work on assignments.

Miss Bates

College of Business Administration

Henry C. Mills, ED.D. (Harvard) ..... Acting Dean of the College

Richard W. Fortner, D.B.A. (Indiana) ..... Assistant Dean

Richard R. Schulz, M.B.A. (Syracuse) ..... Director of Academic Office

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John M. Brophy, PH.D. (Cornell) ..... Professor
Myron J. Gordon, PH.D. (Harvard) ..... Professor
Melvin R. Marks, PH.D. (Tulane) ..... Professor
Eric C. Vance, M.A. (Columbia) ..... Professor

Marcus Alexis, PH.D. (Minnesota) ..... Associate Professor
Marshall Freimar, PH.D. (Harvard) ..... Associate Professor
Joseph W. Gavett, PH.D. (Cornell) ..... Associate Professor
Vernon G. Lippitt, PH.D. (Harvard) ..... Associate Professor
Jack H. Matthews, D.B.A. (Indiana), C.P.A. New York ..... Associate Professor
Philip T. Meyers, M.S. (Oklahoma State), C.P.A. Oklahoma ..... Associate Professor

Richard W. Fortner, D.B.A. (Indiana), C.P.A. Indiana ..... Assistant Professor
**David J. Hall,* M.A. (Oxford, England) ..... Assistant Professor
Bertrand N. Horwitz, PH.D. (Minnesota) ..... Assistant Professor
Leonard S. Simon, PH.D. (Columbia) ..... Assistant Professor
George Schwartz, PH.D. (Pennsylvania) ..... Assistant Professor
Allan Wolk, LL.B. (Syracuse) ..... Assistant Professor
**Charles C. Ying,* M.A. (Yale) ..... Assistant Professor

**Kenneth F. Gordon,* S.M. (M.I.T.) ..... Instructor

*Appointment effective Sept. 1964.

PART-TIME FACULTY

James C. Duffus, B.A. (Yale) C.P.C.U. ..... Lecturer
James T. Henderson, A.B. (Rochester) ..... Lecturer
N. Joseph Houghton, M.B.A. (Harvard) ..... Lecturer
Curtis W. Howard, B.A. (Kentucky) ..... Lecturer
Leslie J. Knox, M.B.A. (Syracuse) ..... Lecturer

Richard K. Schalk, B.S. (Iowa State) ..... Lecturer
Richard R. Schulz, M.B.A. (Syracuse) ..... Lecturer
Charles H. Schwartz, B.A. (Niagara) ..... Lecturer

Frank P. Hart, M.B.A. (Detroit) C.P.A. Illinois ..... Associate Lecturer
Laurance G. Locke, B.A. (George Washington) ..... Associate Lecturer
Vincent Swoyer, M.A. (Rochester) ..... Associate Lecturer
Robert M. Tyle, LL.B. (Syracuse) C.P.A. New York ..... Associate Lecturer

Thomas E. Byrne, B.S. (St. Peters) C.P.A. New York ..... Assistant Lecturer
Edward J. Carstens, B.S. (Oklahoma State) ..... Assistant Lecturer
Robert S. Hager, M.B.A. (Syracuse) ..... Assistant Lecturer
Walter E. Loebmann, B.S. (Wesleyan) ..... Assistant Lecturer
James R. Mills, M.S. (Columbia) ..... Assistant Lecturer
T. Richard Olney, B.A. (Hobart) ..... Assistant Lecturer

HISTORY

A growing sense of responsibility for aiding the development of administrative talent in an expanding business and industrial economy resulted in the University offering business subjects in the early 1920's. Increasing student interest and a corresponding need for higher education among business men led in 1945 to degree programs in business administration both in the College of Arts & Science and in University School. Continued growth in interest and need resulted in the establishment of a separate School of Business Administration in 1958 and to its designation as a College of Business Administration in 1961.

PURPOSE

The objectives of the College of Business Administration are:

1. To improve understanding of the role of business in society, the function of the administrator in business, and the forces and relationships conditioning administrative performance; further to foster the development of those values, insights and skills required to analyze, decide, and act effectively in the presence of new business experience.
2. To encourage and support research and publication.
3. To provide, in cooperation with the business and industrial community, special non-degree programs and services designed for employed managers wishing to improve their present performance or to increase their potential.

ADMISSION REQUIREMENTS

Students are admitted to the College of Business Administration at the beginning of their junior year or its equivalent in credit hours. Due to limited housing facilities on campus, students with two or more full years of college work elsewhere are encouraged to apply as early as possible with the purpose of arranging appropriate living accommodations.

Applications for admission to the College are received from students in the College of Arts and Science and University School by the Office of Admissions and referred to the College's Committee on Admissions for formal action by the faculty.

To qualify for unconditional admission, a student must have satisfactorily completed, at the University of Rochester or at some other accredited institution, not less than 16 courses, distributed as follows:

Distribution Requirements for Majors in Accounting and Business Administration

I. Preprofessional Study in Business Administration		**2 courses**
ACC 153, Principles of Accounting	1 course	
QNT 205, Business Statistics	1 course	
II. Minimum Study in Liberal Arts and Science		**12 courses**
ENG 101, English Composition	1 course	
ENG 102, Continental Masterpieces	1 course	
ENG 103, Eng. & Amer. Masterpieces	1 course	
ECO 101, Principles of Economics	1 course	
Laboratory Science	2 courses	
Mathematics (Two of following, Math. 100, 150, 161, 162)	2 courses	
History and Political Science Electives	3 courses	
Humanities Elective	1 course	
III. Additional Liberal Arts and Science Electives		**2 courses**
(Business Administration majors should elect one course from the Humanities.)		
TOTAL		**16 courses**

Distribution Requirements for Majors in Industrial Management

I. Preprofessional Study in Business Administration		**2 courses**
ACC 153, Principles of Accounting	1 course	
QNT 205, Business Statistics	1 course	
II. Minimum Study in Liberal Arts and Science		**15 courses**
ENG 101, English Composition	1 course	
ENG 102, Continental Masterpieces	1 course	
ENG 103, Eng. & Amer. Masterpieces	1 course	
ECO 101, Principles of Economics	1 course	
MATH 100, Finite Mathematics	1 course	
MATH 161, Analysis I	1 course	
MATH 162, Analysis II	1 course	
PHY 101, 102, General Physics	2 courses	
CHM 121, 122, General Chemistry	2 courses	
Hist. & Pol. Sci. Electives	2 courses	
Humanities & Social Sci. Electives	2 courses	
TOTAL		**17 courses**

Some deviation from the above specific distributions of courses, particularly in evening session programs, may be permitted if it can be demonstrated that the student will be able to meet all the distribution requirements for his Bachelor of Science degree in not over two more years of full-time study (or the equivalent in part-time study).

Normally it will be expected that the admission requirements have been completed in a period of not over two years of full-time study in the case of students from the College of Arts and Science and transfer students from other institutions where a full-time course of study has been pursued.

The student's grades in the courses presented in fulfillment of these requirements must have been such as to give him a total of quality points of credit not less than double the hours of credit. A full course is considered as carrying four credit hours.*

*For purposes of this computation, quality points of credit per hour of credit are assigned as follows: A—4; B—3; C—2; D—1; E—0. Intermediate grades such as C+ are assigned corresponding intermediate values, such as 2.5, when such grades are recognized as part of the granting institution's official grading system.

DEGREE PROGRAMS OFFERED

The College administers programs of study leading to the degree Bachelor of Science, with majors either in Accounting, Business Administration, or Industrial Management; and to the degree Master of Science with a major in Business Administration or the professional degree, Master of Business Administration.

Although the undergraduate student is not formally admitted to the College until the beginning of his junior year, the requirements for the Bachelor's degrees are stated in terms of four years of full-time study (or the equivalent in part-time study).

Students who wish to complete an undergraduate degree elsewhere in the University and a graduate degree in Business Administration within a five year period by appropriate combinations of electives and advanced business administration courses, should consult the Director of the Academic Office in the College of Business Administration.

REQUIREMENTS FOR BACHELOR'S DEGREE WITH DISTINCTION

The Bachelor degrees are awarded in three grades of distinction: with *distinction,* with *high distinction,* and with *highest distinction.*

This award is based primarily on a point-hour ratio: at least 3.25 for distinction, 3.60 for high distinction, and 3.85 for highest distinction. However, a piece of creative work or a paper (critical or creative, or a report of the results of original research) may be offered in support of a recommendation for a distinction award not more than one level higher than would be indicated by the point-hour ratio.

Except in unusual cases, no student shall be considered for a degree with distinction who has not had at least two years of academic work at the University of Rochester. Ordinarily nothing higher than a degree *with distinction* will be given in such cases.

BACHELOR OF SCIENCE WITH A MAJOR IN BUSINESS ADMINISTRATION

The degree program in Business Administration consists of a well-balanced and coordinated group of liberal and professional studies designed to prepare the student for successful progress toward a rewarding and socially useful business career. Required courses in the humanities, mathematics, natural sciences, and social studies, including economics, comprise more than half of the four-year program and may include approximately two-thirds of all study completed, depending on the choice of electives. Professional education in business administration, exclusive of economics, includes approximately a third of the total program. Flexibility in the choice of electives enables each student to adapt his program to his own needs and interests.

The professional studies consist principally of a core of business administration and allied courses which reflect both the breadth of preparation required for managerial responsibility and the high degree of interdependence of major business functions. This core includes (1) introductory courses in basic accounting and basic economics; (2) more intensive course work in behavioral sciences, business law, financial management, marketing, production management and statistics; and (3) two advanced courses which are designed to integrate the previous studies, and which are taught primarily by the case method. One of these latter courses stresses human factors in administrative management and the other, the analysis and decision-making involved in comprehensive business problems.

Throughout the core curriculum, analysis of concrete business situations is stressed. In addition, field trips to industrial establishments, direct contact with visiting executives and, for some, participation in internship programs facilitate the adaptation of formal course study to business requirements.

A synopsis of the general distribution of requirements for the *degree Bachelor of Science with a major in Business Administration* follows:

A. Minimum study in Business Administration:* 11 courses, including two pre-professional courses, eight required core courses, and one Business Administration elective.
B. Minimum study in Economics: 3 courses.
C. Minimum study in Liberal Arts and Science: 15 courses.
D. General Electives: 5 courses.**
E. Physical Education.

Total minimum requirement is 34 courses. Specific courses required for the *degree Bachelor of Science with a major in Business Administration* are listed on the typical program which follows.

*See Admissions Requirements, page 159.

**At least two courses must be in fields other than Business Administration. Work in Air Science or Naval Science courses may be credited toward the fulfillment of the requirements of the B.S. degree to the maximum of *three* academic courses.

TYPICAL PROGRAM*

B.S. in Business Administration

FIRST YEAR

1. English 101	1. English 102
2. Mathematics**	2. Mathematics**
3. Laboratory Science	3. Laboratory Science
4. History 101	4. History 102
or	
Political Science 101	Political Science 102

SECOND YEAR

1. English 103	1. Economics 101
2. Accounting 153	2. QNT 205
3. Liberal Arts & Science Elective	3. Liberal Arts and Science Elective
4. History & Pol. Sci. Elective	4. Humanities Elective

THIRD YEAR

1. Accounting 209	1. BSI 205
2. Law 203 (½ course)	2. Law 204 (½ course)
3. Humanities Elective	3. Production 208
4. Finance 205	4. Economics Elective
5. Marketing 203	5. General Elective

FOURTH YEAR

1. BSI 251	1. GBA 282
2. Business Administration Elective	2. History or Political Science Elective
3. Economics Elective	3. General Elective
4. General Elective	4. General Elective
5. General Elective	

*Students participating in Officer Candidate programs should consult with the appropriate ROTC unit for program planning.

**The two-course mathematics requirement may be satisfied by Math 100 and 150, 100 and 161, or 161 and 162.

In choosing his electives a student majoring in business administration may emphasize either breadth of preparation for administration or a limited specialization in one functional area of business. A specialization ordinarily consists of at least three courses in one of the following areas:

ACCOUNTING: Within the Business Administration major, specialization in accounting is designed to develop an awareness of standards and values required for significant managerial responsibility in areas where accounting concepts and practices are controlling.

FINANCE: Specialization in this area broadens and deepens the student's understanding of the finance function in business, of financial instruments and institutions, and of the economic forces and relationships which affect financial and investment management. It also develops further the student's powers of analysis and decision-making with respect to financial problems and financial reports.

BEHAVIORAL SCIENCES: Work in this area is oriented toward the concept of the manager as a problem solver and involves the application of concepts, skills and methods from the behavioral sciences to the problems of people at work.

MARKETING: Those specializing in marketing will find emphasis on the use of resources to match demands and means of keeping our system of distribution adapted to expanded productive capacity and the over-all economy. Due in part to increasing production, the problems of distributing the goods and services being made available are increasing and are also becoming more complex. This has been evidenced by an increase in the number of people in distribution activities. The area of marketing provides opportunities for managers responsible for devising, improving and developing new techniques and policies for distribution.

PRODUCTION MANAGEMENT: Specialization in this area encourages an appreciation of a production executive's responsibilities and an understanding of the issues, concepts and practices within this field.

BACHELOR OF SCIENCE WITH A MAJOR IN ACCOUNTING

The degree program in Accounting is designed for students interested in careers in accounting and related areas for which a strong accounting background is preferred. Intensive professional study, combined with a core of other courses in Business Administration, builds upon a base of two or more years of study in the arts, sciences, and humanities.

Completion of this program also provides a desirable preparation for Public Accounting and meets the educational requirements for admission to the Uniform Certified Public Accounting examination used by all states. Experience requirements vary from state to state and interested students should write the appropriate board in their own states for specific requirements.

The Accounting curriculum has been registered with and unconditionally approved by the Division of Professional Education, New York State Education Department; accordingly, graduates may be certified to the New York Board of Examiners as having completed the Registered Curriculum necessary to admission to the examination. Students who wish only to establish equivalency with the College's Registered Accounting Curriculum and who have completed the basic degree in another institution, should obtain counselling from the College of Business Administration at the earliest opportunity and register with the Office of Admissions as special students.

A synopsis of the general distribution of requirements for the *degree Bachelor of Science with a major in Accounting* follows:

A. Minimum study in Business Administration:* 14 courses, including two pre-professional courses and 12 required core courses.
B. Minimum study in Economics: 4 courses.
C. Minimum study in Liberal Arts and Science: 13 courses.
D. General Electives: 3 courses**.
E. Physical Education.

Total minimum requirement is 34 courses. Specific courses required for the *degree Bachelor of Science with a major in Accounting* are listed on the typical program which follows.

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*See Admissions Requirements, page 159.

**Work in Air Science or Naval Science courses may be credited toward the fulfillment of the requirements of the B.S. degree to the maximum extent of *three* academic courses.

TYPICAL PROGRAM*
B.S. in Accounting

FIRST YEAR

1. English 101	1. English 102
2. Mathematics**	2. Mathematics**
3. Laboratory Science	3. Laboratory Science
4. History 101	4. History 102
or	
Political Science 101	Political Science 102

SECOND YEAR

1. English 103	1. Economics 101
2. Accounting 153	2. QNT 205
3. History & Pol. Sci. Elective	3. Humanities Elective
4. Liberal Arts & Science Elective	4. Liberal Arts & Science Elective

THIRD YEAR

1. Accounting 233	1. Accounting 221
2. BSI 205	2. Accounting 236
3. Law 203 (½ course)	3. Law 204 (½ course)
4. General Elective	4. Finance 205
5. Economics 211 or Business Economics 236	5. Marketing 203

FOURTH YEAR

1. Production 208	1. Accounting 261
2. Accounting 275	2. GBA 282
3. Law 223 (½ course)	3. Law 226 (½ course)
4. Economics Elective	4. Economics Elective
5. General Elective	4. General Elective

*Students participating in Officer Candidate programs should consult with the appropriate ROTC unit for program planning.

**The two-course mathematics requirement may be satisfied by Math 100 and 150, 100 and 161, or 161 and 162.

BACHELOR OF SCIENCE WITH A MAJOR IN INDUSTRIAL MANAGEMENT

The major in Industrial Management meets the growing need for managers with an interest in science and technology and with ability to use the quantitative methods of mathematics, statistics, accounting, and operations research to identify, analyze and interpret variables involved in management decisions. Approximately one-half of the required courses are in liberal arts and science.

The curriculum for a B.S. degree with a major in Industrial Management is broadly based; half of the required courses are in arts, science, humanities, economics, and basic mathematics. In addition to strong emphasis on industrial management and applied mathematics (including statistics and operations research methods), the remaining half of the required courses include marketing, accounting, finance, and behavioral science. Finally, four unrestricted electives assure the student of further development in either professional or liberal arts subjects.

A synopsis of the general distribution of requirements for the *degree Bachelor of Science with a major in Industrial Management* follows:

A. Minimum study in Business Administration:* 13 courses, including 2 pre-professional courses and 11 required core courses.
B. Minimum study in Economics: 3 courses.
C. Minimum study in Liberal Arts and Science: 14 courses.
D. General Electives: 4 courses.**†
E. Physical Education.

*See Admissions Requirements, page 159.

**See footnote, page 162, top.

†GBA 282, *Business Policy* and either QNT 234, *Data Processing Systems,* or Optics 209, *Computer Science,* are strongly recommended.

Total minimum requirement is 34 courses. Specific courses required for the *degree Bachelor of Science with a major in Industrial Management* are listed on the typical program which follows.

TYPICAL PROGRAM*

B.S. in Industrial Management

FIRST YEAR

1. English 101	1. English 102
2. Mathematics 100	2. Mathematics 161
3. Physics 101	3. Physics 102
4. History 101	4. History 102
or	
Political Science 101	Political Science 102

SECOND YEAR

1. English 103	1. Economics 101
2. Chemistry 121	2. Chemistry 122
3. Humanities or Social Sci. Elective	3. Humanities or Social Sci. Elective
4. Mathematics 162	4. QNT 205
5. Accounting 153	

THIRD YEAR

1. Accounting 209	1. Finance 205
2. Production 208	2. QNT 224
3. BSI 205	3. Production 220
4. General Elective	4. Economic Elective
	5. General Elective

FOURTH YEAR

1. BSI 251	1. Marketing 203
2. Production 225	2. Economics Elective
3. QNT 241	3. QNT 242
4. General Elective	4. General Elective

*Students participating in Officer Candidate programs should consult with the appropriate ROTC unit for program planning.

Completion of this program provides a solid background in the rapidly developing field of industrial management including the theory and application of conventional and mathematical methods to the analysis of business problems. In addition, it affords an ample basis for further specialization in this area through graduate study if the student so desires. Most important, however, is the fact that the inclusion of arts, science and related courses preclude the development of narrow specialists at the undergraduate level.

(A.I.E.S.E.C.)

INTERNATIONAL ASSOCIATION OF STUDENTS IN ECONOMICS AND COMMERCE

(Association Internationale des Etudiants en Sciences Economiques et Commerciales)

(A.I.E.S.E.C.), is an international exchange program for upperclass and graduate students who intend to pursue a career in business or economics. Participants have the opportunity of gaining practical business experience with a firm in one of fifty foreign countries, thus enabling the student to understand better foreign business methods and to further his world understanding. Exchanges are usually made in the summer of the junior or senior year. Freshmen are encouraged to participate in AIESEC's campus activities.

Students wishing further information should consult the Director of the Academic Office of College of Business Administration early in the Fall semester.

Courses of Instruction

EXPLANATION OF COURSE NUMBERING SYSTEM

1–99	Non-credit courses.
100–199	Introductory courses—usually at the freshman and sophomore level—no graduate credit.
200–289	Courses at the junior and senior level; may also carry graduate credit unless otherwise specified.
400–489	Graduate courses at the master's level or the first year of graduate study. Open to undergraduates only by special arrangement.
490–499	Master's level, reading or research courses.

ACCOUNTING

ACC63. Public Accounting Internship. Internship program of three to six weeks with a local or national public accounting firm. Opportunity to perform the general tasks of a junior under the supervision of a senior accountant. Students must be recommended by the instructor and duly accepted by the public accounting firm before any final arrangements can be made for their participation in the program. During senior year only.

Three to six weeks a semester.
No credit.

ACC153. Principles of Accounting. (*Fall and Spring*) An introduction to the principles and procedures employed in analyzing business transactions, recording their financial effects, summarizing them in financial statements, and interpreting these statements.

ACC209. Managerial Cost Accounting. (*Fall and Spring*) A study of the accounting problems involved in determining, analyzing and controlling production and distribution costs. Budgetary control, standard costs and other topics will be discussed from the viewpoint of their use by management in planning and control. Prerequisite: ACC153.

ACC221. Cost Accounting I. *(Fall and Spring)* Practices and procedures of recording and analyzing production and distribution costs for inventory valuation and income determination for financial statements. This treatment is more detailed and technical than that in ACC209. The managerial uses of cost information are explored. Prerequisite: ACC153.

ACC222. Cost Accounting II. *(Spring)* The use of cost information for managerial decision-making. Standard costs, budgeting and special cost studies are examined in depth. Prerequisite: ACC221, QNT205.

ACC233. Intermediate Accounting. *(Fall)* An analysis of the accounting theory underlying the preparation of financial statements. Topics include: the form and content of corporate financial statements; accounting for assets, liabilities and net worth; problems of income determination; and analysis of financial statements and flow of funds. Prerequisite: ACC153.

ACC236. Advanced Accounting. *(Spring)* Topics include: partnerships, consignments, installment sales, accounting for business in financial difficulty, trusts and estates, consolidated statements, foreign exchange and governmental accounting. Prerequisite: ACC-233.

ACC241. Budgetary Control. Principles and procedures of preparing and implementing business budgets for planning and control. Extensive use of problems and cases. Prerequisite: ACC221 or equivalent.

ACC261. Auditing I. *(Spring)* While emphasis is placed upon the work of the professional accountant, due consideration is given internal auditing procedure. Includes: purpose of audits, types of audits, methods of auditing procedure, the auditor's report and the legal and professional responsibility of the auditor. Prerequisite: ACC236 or corequisite.

ACC262. Auditing II. A continuation of ACC261.

ACC275. Income Tax Accounting I. *(Fall)* After brief attention to the development of the income tax law since 1913, a careful

study of the present Federal Income Tax law is made, supplemented by numerous problems in income tax accounting. Prerequisite: ACC236 or corequisite.

ACC276. Income Tax Accounting II. *(Spring)* A continuation of ACC275 with special emphasis on tax planning.

ACC281. Accounting Systems. An advanced course in the design and installation of accounting systems. Procedures used in systems work are illustrated including surveys of accounting procedures, account classifications, internal controls, and use of mechanical equipment. Prerequisites: ACC221, ACC-261, or the consent of the instructor.

ACC283. C.P.A. Problems. Advanced accounting problems are used as a basis for the review and application of accounting concepts and procedures. The materials for the course are drawn to a great extent from actual C.P.A. Examination questions and include analysis and revision of financial statements, partnerships, receiver's statements, consolidated statements, cost accounting, and other accounting problems. Prerequisites: ACC221, ACC236, and ACC261.

BEHAVIORAL SCIENCES IN INDUSTRY

BSI205. Behavioral Science in Management. *(Fall and Spring)* Survey course of those aspects of management which involve dealing with people. Behavioral science bases of the following topics are approached through lecture, case studies, class discussion, and original readings: Selection, Training, Human Engineering, Performance Evaluation, Supervision-Leadership, Motivation-Morale-Attitudes, Consumer Behavior, Labor Relations, and Organization Theory.

BSI231. Business and Corporate Public Relations. Principles and history of public relations as a key function of business management. Requirements for an executive and/or practitioner. Fundamentals of planning and programming, with analysis of typical blueprints for action. Demonstration and practice in publicity techniques for effectively communicating a company's story, through setting up a hypothetical corporation, emphasis on class participation in solving major public relation problems of business and industry.

BSI241. Fundamentals of Personnel Administration. (Fall) A study of organized approaches to employing, developing, compensating and servicing a workforce so as to assure optimum return to the employing organization, the cooperative effort of individuals and groups involved, and maximum satisfaction consistent with the need for coordination and control. Personnel Administration as a staff function is given special attention together with research bearing on the validity of personnel concepts, requirements, and practices. Emphasis is on administrative considerations rather than application of refined technique. Prerequisite: BSI205.

BSI251. Organization, Theory and Administration. *(Fall)* An analysis based on theoretical concepts and related research of the human factors in business and industrial organizations which influence administrative decision-making. Cases and lectures focus on mechanisms used in functioning organizations to influence and develop decisions, and to insure uniformity in interpretation, consistency in application, and compatibility with organization goals. The topics of authority, communication, and leadership are given special attention. Prerequisite: BSI205.

BSI262. Management-Union Relationships and Public Control. *(Spring)* Relationships between management, unions and government at the plant and industry level as they influence managerial decision-making. Topics include a comparative analysis of union-company philosophies, structures, and functions; issues and conditions leading to cooperation and conflict; sources of power; alternatives to force, the character and effect of agreements and settlements; administration of agreements; and conditions influencing governmental participation and control. Prerequisites: ECO101 and BSI205 or consent of instructor.

BUSINESS LAW

LAW203. Business Contracts I. *(Fall)* Basic principles of contract law, including the doctrines of offer and acceptance, consideration, effect of mistakes, fraud and undue influence, the necessity of a writing, and rights of enforcement where there has been failure of performance. Case material from factual situations faced in everyday business, with special reference to laws of New York State. Prerequisite to all other business law courses.

Half course.

LAW204. Business Contracts II. *(Spring)* A continuation of LAW203.

Half course.

LAW223. Law of Sales and Negotiable Instruments. *(Fall)* Law of sales under the Uniform Sales Act and the law of negotiable instruments, including promissory notes, drafts, bills of exchange, warehouse and trust receipts.

Half course.

LAW226. Agency, Partnerships, and Corporations. *(Spring)* Legal aspects of agencies, partnerships, and corporations as a means of carrying on business. Creation and incidents of the agency relationship; rights of partners as between themselves and third parties; formation and powers of corporations; rights of stockholders; and problems arising from business liquidation.

Half course.

LAW235. Fundamentals of Patents. Tests for invention, mechanics of protecting inventions, rights of inventors and employers, patent licensing, infringement, validity, patentability and inventorship discussed from the standpoint of business and technical personnel.

Half course.

FINANCE

FIN205. Financial Management. *(Fall and Spring)* Financial policies and practices essential to business administration. Major emphasis is on corporation finance. Topics include: corporation securities, capital budgeting, long-term financing, short-term financing, administration of funds, administration of income, expansion, and reorganization. Adaptation of financial principles to specific business situations. Prerequisite: ACC153.

FIN246. Investment Management. *(Spring)* General principles of successful investment, as applied to the management of individual and institutional investors' funds. Topics include: determining investment objectives, formulating general investment policies, classifying investment media, interpreting and forecasting general market trends, analyzing leading industries, and the developing criteria for the selection of individual security issues. Prerequisite: ECO101.

FIN256. Financial Analysis. Analysis of corporation and other financial reports, from the standpoints of investors, short-term creditors, and management. Primary emphasis is on the interpretation of balance sheets, income statements and other company and industry data for the purpose of analyzing investment bonds, investment and speculative stocks, and short-term credit risks. Prerequisites: FIN205 and ACC233 or consent of instructor.

ECS236. Financial Institutions and Markets. *(Fall)* Functions and theories of money and credit, principles of commercial banking and international finance, structure and operations of the Federal Reserve System. Description and functions of other financial institutions and their role in the economy. Structure of the market for short-term and long-term funds; description of money and capital market instruments. Monetary and credit policy. Prerequisites: ACC 153 and ECO 101.

GENERAL BUSINESS ADMINISTRATION

GBA157. Fundamentals of Business Administration. *(Fall and Spring)* An introduction to the principal activities, types of policy problems, and interrelationships of the main phases of business, including procurement, production, marketing and finance. Frequent use is made of business cases for illustrative purposes and to introduce the student to the methods of business problem analysis.

GBA282. Business Policy. *(Spring)* Integrates the student's previous studies and further develops his ability to deal more effectively with business problems. Series of cases on policy formulation and administration, involving the functions of purchasing, production, personnel marketing, finance and accounting. These deal with such problems as promotion, expansion, reorganization, and adjustment to changing economic conditions and social forces. During the term, business executives are invited to present and discuss cases developed from their own experience. Prerequisites: FIN205, MKT203, PRD208, and QNT 205.

GBA293. Reading Course. Independent study in some specific area of Business Administration, at a level advanced beyond that of regular course offerings. Prerequisite: Written approval of both the supervising faculty member and the Dean of the College of Business Administration.

MARKETING

MKT203. Marketing. *(Fall and Spring)* Problems involved in the movement of goods from producers to consumers and industrial users through the different channels of distribution. Analysis of the marketing functions performed by manufacturers, wholesalers, retailers, agent middlemen, and market exchanges. Critical analysis of major marketing policies. Evaluation of such topics as pricing, branding, choice of distribution channels, selective selling, and the planning and administration of sales programs.

MKT221. Advertising. *(Spring)* Understanding of and ability to appraise advertising as a part of the selling program. Survey of the social and economic aspects of advertising. Critical examination of the principles and techniques involved in developing good copy, making layouts and reproducing the advertisement. Topics include: stimulating pri-

mary and selective demand, determining basic promotional strategy, formulating and executing promotional programs, selecting advertising media, determining the appropriation, testing the advertising and maximizing the results. Prerequisite: MKT203.

MKT234. Principles of Retailing. Principles of management as applied to retail stores. The techniques of retail merchandising are examined and cases are used to provide the student with training in making decisions. Topics include: store location, layout and organization, analysis of consumer demand, buying, pricing, merchandise control, budgetary control, retail salesmanship, retail advertising and display, sales promotion planning, credits and collections, store personnel work, and general retail management. Prerequisite: MKT203.

MKT241. Marketing Research and Analysis. *(Fall)* An investigation and critical examination of facts as a basis for formulating marketing policies and planning sales and promotional strategy. Topics include: scientific method and research design, basic methods of collecting data, formulating the research problem and planning the research project, application of sampling methods to marketing problems, analysis of data collected, motivation research, advertising research, product research, and sales control research. Cases are used to familiarize the student with various types of research problems which confront marketing executives. A basic course in statistical methods is recommended before enrolling in MKT241. Prerequisite: MKT203 or permission of the instructor.

MKT244. Sales Management. Comprehensive cases and problems are utilized to develop the management principles involved in product merchandising, selecting wholesale and retail outlets, determining prices and terms of sale, utilizing marketing research in the solution of sales problems, planning sales programs and sales promotion, building a sales organization, managing the sales force, and controlling sales costs. Prerequisite: MKT203.

MKT271. Industrial Procurement. The development of a fundamental purchasing policy, with emphasis upon methods of determining the proper sources of supply, the proper quantity to buy, and the proper price to pay. Modern inventory control methods, departmental organization, and the preparation of reports to management. Selected case problems will deal with specific situations requiring decisions and recommended courses of action.

PRODUCTION

PRD208. Production Management. *(Fall and Spring)* Issues, concepts and practices encountered in effectively managing the production function. Topics include: analysis of facilities; research and product development; production planning; organizing and controlling characteristics of the manufacturing processes; control of quality, quantity and cost; and consideration of increased automation. Case analysis is emphasized, and field studies of industrial plants may be included. Prerequisite: QNT205.

PRD220. Production Facilities and Standards. *(Spring)* Analysis of characteristics and requirements of process, product and operations into a total production system. Work simplification, standardization, measurement and compensation. Prerequisite: PRD208 or permission of the instructor.

PRD225. Manufacturing Control. *(Fall)* Organization and techniques required, and the concepts involved in the control of production volume, rate, quality and cost. Emphasis is given to the integration of production, quality and cost control in manufacturing operations. Cases and visits to industrial plants may be used. Prerequisites: PRD208, 220 or permission of the instructor.

QUANTITATIVE METHODS

QNT205. Business Statistics. *(Fall and Spring)* Methods of collection, presentation, analysis, and interpretation of quantitative data commonly associated with business operations. Typical topics: sampling, probability, descriptive values, statistical inference, correlation and time series. Prerequisites: Two courses in college math.

QNT222. Advanced Business Statistics. *(Spring)* Development and application of the more advanced techniques of statistical analysis common to business research. Typical topics: multiple regression and correlation, analysis of variance, non-parametric methods, sequential analysis, and stochastic processes. Prerequisite: One course in basic statistics or the permission of the instructor.

QNT224. Decision Theory. *(Spring)* Foundations and theory of decision making under uncertainty. Basic principles of probability and distribution theory including the various probability distributions applicable to decision problems in business. Development of theories of classical statistical methods; comparison with Bayesian approach. Presentation of various decision criteria. Introduction to sequential decision theory. Emphasis is divided between theory and application to problems in business administration and

economics. Prerequisite: One year of calculus and a beginning course in business statistics.

QNT231. Electronic Data Processing. *(Fall)* Preparation of data and use of electronic machines to provide information needed for executive decision. Includes an introduction to the nature, programming and use of equipment with emphasis on that available at the University of Rochester Computing Center. Typical case studies concerned with current uses in business and government will be investigated with the equipment at the Computing Center.

QNT234. Data Processing Systems. *(Spring)* Analysis of the overall design of business systems for electronic data processing. Study of how a complete system relates to the equipment to be used. The last part of the course is devoted to the analysis, charting and solution of a realistic business system and individual assignments in the field of electronic data processing for business. Prerequisite: QNT231.

QNT241. Operations Research I. *(Fall)* Development and application of the principal techniques used in the mathematical analysis of business situations. Topics covered include: linear programming and inventory models. Prerequisites: Math. 100, 162; QNT 205, and QNT224; or the permission of the instructor.

QNT242. Operations Research II. *(Spring)* Continuation of the above. Topics covered include: equipment replacement models, queuing, and dynamic programming. Prerequisite: QNT241 or the permission of the instructor.

SPECIAL NON-CREDIT PROGRAMS

Courses Prerequisite to Certification or Licensing

With the exception of the certificate in public accounting, it is not necessary to graduate from a four-year degree program to qualify fully for licensing or certification in the fields listed. Accordingly the College of Business Administration and the University School of Liberal and Applied Studies cooperate in the offering of special, non-credit courses intended primarily to assist those who desire additional education in qualifying themselves for, or advancing themselves in their chosen careers. In each instance, the courses have been developed in cooperation with appropriate business and professional associations. For further information, consult the Director of the Academic Office, College of Business Administration or the Dean of the University School.

The courses listed do not include many others of non-credit character which are planned and conducted in cooperation with individuals, firms, trade and professional associations and governmental agencies. Attendance at these clinics, short-courses, institutes and seminars typically is sponsored by an employer concerned with keeping managers abreast of changing technological, economic, legal, social and political aspects of business. Courses may be either residential or non-residential and organized for varying lengths of time relative to the regular semester programs.

Certified Public Accountant (C.P.A.): Requirements and courses in this area are listed on pages 166 and 167 of this bulletin. To complete these courses a student need not be registered for a degree in this College. Students who wish only to establish equivalency with the College's Registered Accounting Curriculum and who have completed their basic degree in another institution, should obtain counselling from the College of Business Administration at the earliest opportunity and register with the Office of Admissions as special students. However, a non-degree candidate is strongly advised to obtain guidance either from the College or the Professional Education Division, The State Education Department (Albany, New York) prior to beginning study to qualify for admission to the Certified Public Accountant examination.

INSURANCE

Developed in cooperation with the Monroe County Association of Insurance Agents, these courses prepare the student to take the examination for both the agent's and broker's licenses under Sections 115 and 119 of the Insurance Law of New York State and the A, B, and C examinations given by the Insurance Institute of America.

FIN 34 General Insurance II **FIN 31 General Insurance I**

CREDITS AND FINANCIAL MANAGEMENT

Developed in cooperation with the National Institute of Credit and the Rochester Credit and Financial Management Association, the following courses are offered in the area of credits and financial management.

FIN 18 Credit and Collection Principles

FIN 19 Advanced Credits

FIN 28 Credit Management Problems

REAL ESTATE

Developed in conjunction with the Rochester Real Estate Board, this sequence of courses includes RE 21 and RE 23 which have been approved by the New York State Division of Licenses for fulfilling the education requirement for the New York State Real Estate Brokers License Examination.

RE 21 Fundamentals of Real Estate

RE 23 Real Estate Brokerage Law and Practice

RE 25 Property Management and Financing

RE 27 Real Estate Appraisal and Valuation

College of Education

William A. Fullagar, ED.D. (Columbia) ..... Dean

Robert B. Howsam, ED.D. (California) ..... Associate Dean for Graduate Studies

Edward E. Kennedy, ED.M. (Rochester) ..... Counselor of Students

Bettie B. Garland ..... Coordinator, Educational Placement Bureau

FACULTY

William A. Fullagar, ED.D. (Columbia) ..... Professor of Education
Thomas J. Hill, ED.D. (Florida) ..... Professor of Education
Frances L. Horler, PH.D. (Chicago) ..... Professor of Education
Robert B. Howsam, ED.D. (California) ..... Professor of Education
James V. Mitchell, PH.D. (Chicago) ..... Professor of Education
Byron B. Williams, PH.D. (Ohio State) ..... Professor of Education

Arthur L. Assum, A.M. (Ohio State) ..... Associate Professor of Education
Henry E. Butler, Jr., PH.D. (California) ..... Associate Professor of Education
William H. Clark, PH.D. (Columbia) ..... Associate Professor of Education and German
Joseph W. Cole, ED.D. (Harvard) ..... Associate Professor of Education
Dean Corrigan, ED.D. (Columbia) ..... Associate Professor of Education
Gerald A. Gladstein, PH.D. (Chicago) ..... Associate Professor of Education
Norman G. Gunderson, PH.D. (Cornell) ..... Associate Professor of Education and Mathematics
Glenn N. Hontz, ED.D. (Columbia) ..... Associate Professor of Education
Elizabeth Z. Howard, PH.D. (Chicago) ..... Associate Professor of Education
Glenn L. Immegart, PH.D. (Ohio State) ..... Associate Professor of Education
Clarence J. Karier, PH.D. (Wisconsin) ..... Associate Professor of Education
Thomas R. Knapp, ED.D. (Harvard) ..... Associate Professor of Education
John J. Montean, PH.D. (Syracuse) ..... Associate Professor of Education
Harold L. Munson, ED.D. (New York) ..... Associate Professor of Education
Milton V. Pullen, ED.M. (Rochester) ..... Associate Professor of Education
Catherine J. Sullivan, A.M. (Columbia) ..... Associate Professor of Education
Clarence M. Williams, ED.D. (Michigan State) ..... Associate Professor of Education
Ellsworth S. Woestehoff, PH.D. (Minnesota) ..... Associate Professor of Education

Barry Beyer, PH.D. (Rochester) ..... Assistant Professor of Education
Kenneth N. Fishell, ED.M. (Rochester) ..... Assistant Professor of Education
Hilliard Jason, ED.D., M.D. (Buffalo) ..... Assistant Professor of Education and Psychiatry
Jerome P. Lysaught, ED.D. (Rochester) ..... Assistant Professor of Education
Gene W. Moser, A.M. (Cornell) ..... Assistant Professor of Education
Robert L. Osborn, PH.D. (Indiana) ..... Assistant Professor of Education
John A. Schmitt, ED.D. (Cornell) ..... Assistant Professor of Education
Francis M. Trusty, ED.D (Stanford) ..... Assistant Professor of Education

Vivian T. Harway, PH.D. (Rochester).....Lecturer in Education
Katherine C. Neill, M.S. (Rochester).....Lecturer in Education and Public Health
Ruth Vann, D.D.S. (Toronto).....Lecturer in Education and Dental Hygiene

H. Hunter Fraser, ED.M. (Rochester).....Associate Lecturer in Education
Bernard Greenberger, A.M. (Syracuse).....Associate Lecturer in Education

Calvin Lauder, M.A. (Syracuse).....Assistant Lecturer in Education
Thomas Vetter, M.A. (Michigan).....Assistant Lecturer in Education

*Part-time.

THE COLLEGE OF EDUCATION offers study designed to prepare students for a wide range of careers in education. The programs available to undergraduates prepare students for positions as classroom teachers in elementary and secondary school.

The College of Education believes strongly that a good general education background is essential for a teacher at any level. A person, therefore, who wishes to become a teacher in the elementary or secondary school must first complete two years of study in the College of Arts and Science. During these two years of college the student should complete as many of the distribution requirements as possible.

A student planning to teach in the elementary school will do part of his course work in the College of Education during both his junior and his senior year. This professional preparation for teaching includes some course work on campus and some direct experience with children in elementary schools. The prospective elementary school teacher will receive the degree Bachelor of Science in Education.

A student planning to teach in the secondary school will begin his professional course work in the College of Education in either the junior or the senior year. He will follow the course of study outlined by his major department in the College of Arts and Science toward the Bachelor of Arts degree. Each of these departments will be able to recommend courses from its offerings appropriate for prospective secondary school teachers.

A student who is planning a career in teaching or who wishes to explore the prospect of any career in education is invited to make an appointment with the Counselor of Students in the College of Education as early as possible during the freshman year. The Counselor will discuss with the student the various career opportunities in education and the appropriate preparation. No student may enter the programs of the College of Education without having had such a conference with the Counselor. In addition, he must make application, as described below, for the program in which he is interested.

Students who wish to prepare themselves for public school teaching must remember that there are state certification or licensing requirements to be met, and these are not identical with degree requirements at this university. The Counselor in the College of Education has information concerning requirements for teaching in the various states. It is important that attention be given to these requirements early enough in one's college career so that appropriate planning of his course program may be arranged.

The following procedures are necessary for admission to undergraduate programs of the College of Education:

1. Student reports to the College Counselor's office for an interview usually during his freshman or sophomore year.
2. Student gets instruction and application forms for College of Education programs from the Counselor during the semester prior to the one in which he expects to enter the program of the College of Education.
3. When application has been submitted and records are complete, the Counselor directs the student to the appropriate faculty member for an interview and preliminary program planning.
4. The Undergraduate Committee of the College of Education considers the student's application, and he is notified whether or not he has been accepted.

5. Students who have been accepted then proceed, at the next regular registration, to sign up for the appropriate courses as they have been outlined in the conference with the faculty member of the College of Education.

A student from another institution wishing to be admitted to programs of the College of Education with advanced standing must first apply to the Office of Admissions of the University of Rochester River Campus. That office will confer with the Counselor in the College of Education to evaluate the student's previous courses and to provide necessary application forms.

The College of Education does accept a limited number of well-qualified part-time students who wish to pursue a degree in Education. Part-time students are accepted on the condition that the program selected will be pursued without interruption. This condition might mean, for example, that a part-time student would take at least one course a semester (including summers) until the degree is completed; or it might mean that a student would carry a full load for several consecutive summers until the degree is completed. The condition will be applied in the way that is most appropriate for the individual student, upon the recommendation of the Counselor and the judgment of the Undergraduate Committee.

PROGRAM IN ELEMENTARY EDUCATION

After the completion of the first two years, qualified students may follow a program of study which leads to the degree of Bachelor of Science in Education with a concentration in Elementary Education and New York State certification for teaching in the elementary school. This program prepares students to teach in grades 1 through 6. Students who plan to concentrate in elementary education should report to the College Counselor's Office for instructions and forms no later than March 1 of the sophomore year.

The requirements for admission to the elementary program are:

a. Completion of a minimum of 64 semester hours of selected course work.
b. A 2.0 honor point average based upon all course work taken prior to admission.
c. A satisfactory health record.
d. A satisfactory interview with the appropriate faculty member.
e. Satisfaction of any other admission standards and requirements established by the College of Education, and acceptance by the Undergraduate Committee of the College.

Following admission the student and his adviser plan a program in terms of the requirements outlined below which meet New York State certification requirements. Students who wish to prepare for certification in other states should consult the Counselor of Students in the College of Education.

BACHELOR OF SCIENCE IN EDUCATION (ELEMENTARY)

	Number of Course
I. General Requirements:	
A. English 101 (unless excused)	0–1
B. Foreign Language (proficiency required)	0–3
C. Physical Education (4 semesters—non-credit)	0
II. Distribution Requirements:	
A. Humanities	4
1. English (102 recommended)	
B. Social Sciences	5
1. Three courses in an approved combination of American History and Geography	
2. Two courses selected from other social sciences	
C. Natural Sciences	4
1. Psychology 101	
2. Two laboratory sciences	
3. One mathematics course	

III. Group Concentration:

A. A minimum of four courses in one group or related courses from more than one group beyond distribution requirements and including at least 2 courses at the upper division level.
B. In either event, courses taken must be approved by an adviser in the College of Education.

IV. Education Requirements:

A. Education 200	These courses are taken during the junior year	1
B. Education 210		1
C. Education 220–221		3
D. Education 229*		4

V. Additional Electives: 2–6

Total 32 courses

*Education 229, Student Teaching in the Elementary School, is offered both Fall and Spring semesters of the senior year. Students are assigned to one semester or the other by the Coordinator of Student Teaching.

PROGRAM IN SECONDARY EDUCATION

Undergraduate students preparing to teach an academic subject in the secondary schools, grades 7 through 12, pursue one of two degree programs. The normal avenue for preparation to teach in the secondary school is to complete an A.B. program, with a departmental concentration in the College of Arts and Science, as well as the Teacher Education Sequence[1] (Education 200, Ed. 210, Ed. 231–2, 4, 5 or 6 and Ed. 239) in the College of Education. Education 200 is usually completed during the junior year.

Students completing degree requirements in the College of Arts and Science follow the programs described in the department of their interest. Since degree and certification requirements vary, students will find it necessary to take certain courses not required in their departmental concentration. Certification requirements for the State of New York and other States are available at the Counselor's Office in the College of Education.

The Bachelor of Science, in the College of Education, is available for those students who, in consultation with the College, find it inadvisable to pursue the A.B. degree. The admission requirements for the student entering this program at the end of the sophomore year are the same as the requirements for the concentration in elementary education. Students accepted into the B.S. program are also expected to make application for the Teacher Education Sequence.

Those preparing for secondary school teaching should apply for admission to the Teacher Education Sequence no later than the end of the first semester of their junior year. Applications and instructions should be obtained from the Counselor's Office.

The requirements for admission to the Teacher Education Sequence are:

a. Normal academic progress that will permit classification as a senior during the academic year the sequence is completed and that will permit completion of certification requirements in a subject field by the end of that year.
b. An accumulative point ratio of 2.5 or higher in the subject field selected for student teaching.
c. A satisfactory health record.
d. A satisfactory interview with the appropriate faculty member.
e. Acceptance by the Undergraduate Committee of the College.

[1]The Fall semester of the senior year will be reserved for courses required in the sequence. Students should not register for additional course work during this semester.

INTER-UNIVERSITY EXPERIMENTAL INTERNSHIP PROGRAM IN SECONDARY EDUCATION

An experimental teacher education program at the University of Rochester is part of a five-year project supported by the Ford Foundation in four universities for the preparation of selected students for secondary school teaching.

Juniors with an interest in and potential for secondary school training will be selected to commence the program in their senior year. A fifth-year internship at half-teacher load and half-salary and a summer session preceding and following the internship year, will also be included in the program. At the completion of the senior year, upon fulfilling course requirements, participants will graduate from the College of Arts and Science with a bachelor's degree in their subject field. Teacher Certification and a master's degree from the College of Education will be awarded upon satisfactory completion of the graduate phase of the program. In addition to the salary paid by the teaching center during the fifth-year internship, financial awards will be provided for part of each student's program.

Courses of Instruction

EXPLANATION OF COURSE NUMBERING SYSTEM

1–99	Non-credit courses.
100–199	Introductory courses—usually at the freshman and sophomore level—no graduate credit.
200–289	Courses at the junior and senior level; may also carry graduate credit unless otherwise specified.
400–489	Graduate courses at the master's level or the first year of graduate study. Open to undergraduates only by special arrangement.
490–499	Master's level, reading or research courses.
500–589	Advanced or specialized graduate courses.
590–599	Advanced reading or research courses, usually at the doctoral level.

The ordinary unit of undergraduate instruction is the *course*. Each course requires one quarter of the student's working time for one term. Each course, unless otherwise stated, has the equivalent of four hours of credit.

EDUCATIONAL FOUNDATIONS

Education 200. Education in the American Social Order. A survey of the historical background of modern education: the purposes and organization of education in the United States, the status of contemporary educational problems and the proposals for their solution.

Education 210. Educational Psychology. A general survey of concepts and data covering growth, learning, psychological measurement, personality, and problems of adjustment as they relate to the school.

Education 212. Children's Behavior Problems. Analysis of children's behavior problems, preschool through secondary levels. Evaluation of classroom techniques for handling behavior problems. Prerequisite: Psychology 101 and Education 210.

CURRICULUM AND INSTRUCTION

Elementary Education

Education 220, 221. The Elementary School Curriculum I & II (three courses). Examines principles, methods and materials of teaching appropriate to the elementary school curriculum (reading and the language arts, arithmetic and science, social studies, arts and crafts, music, creative dramatics, health and recreation). Planning of instructional activities, the measurement and evaluation of pupil progress, and the use of audio-visual methods and materials of instruction. Observation and participation in classroom activities of area elementary schools.

Education 229. Student Teaching in the Elementary School (four courses). Each student is provided the opportunity to gradually assume increasing responsibility for the total instructional program in a classroom of an elementary school in the Rochester area. Through regular seminar meetings, the students critically analyze problems, principles, and techniques of teaching with special reference to their student teaching experiences and children's behavior problems. *Applications for student teaching must be received by the May 1st preceding the academic year during which assignment to student teaching will be made.*

Secondary Education

Education 230. Principles of Teaching in the Secondary School. Critical analyses of principles and techniques of teaching in secondary schools. Interpretation of the objectives of teaching and evaluation of typical procedures. Education 210 prerequisite, except by special permission of the instructor.

Education 231. The Teaching of English in the Secondary School. A study of recognized methods of teaching English in the Secondary Schools. The selection and examination of materials for the teaching of language, literature and composition; the means of providing for individual differences, interests and capacities; ways of developing proper habits of reading and study; lesson planning, the construction of objective tests, and evaluation of teaching materials.

Education 232. The Teaching of Social Studies in the Secondary School. The aims, present trends, and suggested programs in the social studies in relation to the general aims of instruction. Opportunities provided for the examination of textbooks, collateral readings, professional periodicals, visual aids, standard reference works, and other materials. Construction of lesson plans and objective tests.

Education 234. The Teaching of Science in the Secondary School. Content of the high school sciences, methods of selection and organization of curriculum materials and equipment, and procedures for teaching and evaluation.

Education 235. The Teaching of Modern Foreign Languages in the Secondary School. Provides experience in lesson planning and in the use of audio-visual materials and evaluation of instruction. Consideration of the methods of teaching and the content of high school courses.

Education 236. The Teaching of Mathematics in the Secondary School. Survey of desirable methods in the teaching of mathematics. The objectives, content, and methods of presenting the basic topics in arithmetic, algebra, geometry, and trigonometry. Some discussion of typical curriculum procedures for testing and evaluation.

Education 239. Student Teaching in the Secondary School (two courses). Observation, participation and classroom teaching are done in the public high schools of Rochester and vicinity. *Applications for student teaching must be received by the May 1st preceding the academic year during which the assignment to student teaching will be made.*

General Course

Education 248. Programming for Automated Teaching. The development, use and analysis of sequences of items designed for automated teaching devices. All participants will receive a portion of the course material from a programmed sequence and will engage in preparing programs in an area of their own interest. In addition, methods of analyzing programmed experiences of students will be developed.

College of Engineering and Applied Science

AIMS AND OBJECTIVES

SOCIETY IS DEMANDING more and more of its educated men and women; this is especially true of those educated in the engineering disciplines for it is they who will compress the time scale between scientific discovery—in physics, chemistry, biology, mathematics, psychology—and the practical application of this new knowledge. As the world of the engineer becomes more stimulating and more challenging, the College, in its objective of educating an increasing number of engineers equal to the challenge and opportunities ahead, is demanding more and more of its faculty and of its students. There can be no compromise in the pursuit of the College's four objectives in undergraduate education, graduate education, research, or service.

First, it is the aim of the College to prepare undergraduate students with the fundamental knowledge of engineering (and the related sciences) and to develop their ability to apply the principles of these sciences to ever-new situations. Such students will be able and even eager to accept the responsibilities of professional life because of their education here, and more important because they are aware of their duties and obligations to the complex society of which they, as educated engineers, are an important part.

Second, it is the aim of the College to educate especially qualified students at the graduate level to fill the continuing need in teaching, in research, and in advanced positions in industry. As a corollary, a strong graduate program adds vigor to the academic environment in which to educate undergraduate engineers and applied scientists.

Third, it is the aim of the College to foster active research programs designed to teach graduate students the aims and methods of research, to provide a stimulating and challenging environment for both students and faculty, and to add to the store of human knowledge.

Fourth, it is the aim of the College to be of service to its community—both local and national. To meet this objective, opportunity is provided the individual for part-time study in the College; the consulting and research resources of the College are available to help solve special problems which are appropriate to these resources.

THE ADMINISTRATIVE OFFICERS

John William Graham, Jr., D.SC. (Carnegie Institute of Technology).....Dean

Walter Lewis Hyde, PH.D. (Harvard).....Associate Dean

Oscar Edward Minor, B.S. (Rochester).....Assistant Dean

Shelby Alexander Miller, PH.D. (Minnesota)....
....Chairman of the Department of Chemical Engineering

Daniel Ward Healy, Jr., PH.D. (Harvard)....
....Chairman of the Department of Electrical Engineering

Martin Lessen, SC.D. (M. I. T.).....Chairman of the Department of Mechanical and Aerospace Sciences

Robert Earl Hopkins, PH.D. (Rochester).....Director of the Institute of Optics

James Arthur Eyer, PH.D. (Rochester).....Assistant Director of the Institute of Optics

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UNDERGRADUATE PROGRAMS

In Engineering and Optics

The undergraduate curricula in engineering and optics are described in the material which follows in this catalog. The graduate programs in engineering and optics, Master's and Doctoral, are described in the separate Bulletin of Graduate Studies of the University. Information about research activities and programs of service to industry may be obtained on request from the Dean of the College of Engineering and Applied Science.

Four-year courses are offered in Chemical Engineering, Electrical Engineering, Mechanical Engineering, and in Optics. These curricula, all of which lead to the Bachelor of Science degree, devote over one-fifth of the curriculum time to work in the humanities, social sciences, and subjects elected without restriction (free electives), and the remainder to the basic and applied sciences and to specialized studies in engineering and optics. In each curriculum the emphasis is placed upon a thorough understanding of the fundamental principles of science and engineering, rather than on a detailed knowledge of specific engineering and industrial practice. The aim is to motivate and prepare the graduate for continued learning—either in industrial employment or other professional engineering service, or in study beyond the Bachelor's degree. Full accreditation of the engineering programs in electrical, chemical, and mechanical engineering has been given by the Engineers' Council for Professional Development.

Enriched Programs

Although these undergraduate programs are normally completed in four academic years, a student may extend his undergraduate work over a five-year period. The additional time may be used to broaden his formal education by including courses in the liberal arts or in the sciences. A student wishing to follow such a program should consult with his Faculty Adviser toward the end of his freshman year. Approval is required from the Faculty Adviser and the cognizant Department Chairman, and the proposed program must meet, during each of five years, the normal minimum load requirements. (See also the next paragraph concerning five-year, two-degree courses.)

Combined Programs

Two-degree courses in engineering and liberal arts are being elected by an increasing number of students at Rochester. These courses, which lead to both the B.S. and A.B degrees, include the requirements for a B.S. degree in the College of Engineering and Applied Science and those of an A.B. program in a chosen field of concentration. By choosing his electives properly, a student can usually complete the requirements for both degrees in five years. These combined curricula provide a much broader and more liberal education than is possible in the regular four-year engineering course. The purpose is to give the engineer or applied scientist a fuller appreciation of the social and economic responsibilities of his profession and to enable him to combine his technical and nontechnical training in a wider field of effort. The choice between the four- and five-year courses should be made toward the end of the freshman year, and must have the approval of the Faculty Adviser as well as the cognizant Engineering and Liberal Arts Department Chairmen.

Flexibility is provided in each of the curricula, both four-year and five-year, so that a student may incorporate in his Bachelor's program certain specialized courses of particular interest to him. For instance, by planning his program early (before the end of the sophomore year) an engineering student may pursue a sequence of elective work in such fields as physical metallurgy, in physical optics, or in other selected areas in which the University has special competencies.

Degree Requirements

In addition to satisfactorily completing the specific courses stipulated in the degree programs listed by each of the four departments, the student must complete certain of the following:

1. *English 101:* A course of instruction in writing expository and argumentative prose. A student may be exempt from this requirement if proficiency in English is indicated in an entrance examination or by the high school record.

2. *Foreign Language:* There is no language requirement for the undergraduate programs in the College of Engineering and Applied Sciences.

3. *Physical Education:* All students are required to take physical education during each of their first four terms. Physically handicapped students may be excused or given modified programs on recommendation of the University health service.

4. *Distribution Requirement:* Students following the mechanical, electrical, or optics program must complete three humanities courses, and three social science courses. Classification of courses offered in the various Colleges of the University is listed on page 80 of this catalog; however, there are certain exceptions for engineering students:

For students enrolled in the College of Engineering and Applied Science, the first year courses in a foreign language will be considered as humanities courses. And similarly, Psychology 101 will be accepted as a social science subject.

Students in chemical engineering programs must complete at least 20 credits (5 courses) in the humanities and social sciences with these stipulations: at least two courses must be in the humanities; Economics 101 and at least one other course must be in the social sciences.

Work-Study Program

Understanding the nature of engineering and the distinction between engineering and science has important implications for the motivation and education of the student of engineering. Science is concerned with the ordering and extension of knowledge; engineering is concerned with the application of knowledge to the solution of technical and professional problems. With the above thoughts in mind, and recognizing that engineers and applied scientists in the fields emphasized at Rochester make their contributions, for the most part, in industrial situations, the Faculty of the College of Engineering and Applied Science has established a work-study program for students of the College. This plan, which has been worked up in consultation with leading industries, gives the engineering student an opportunity to earn while he learns. The engineering student spends two semesters (the normal academic year) in residence as a full time student at the University and his summer period of three months working as an engineer-in-training in industry. If a student will spend his college years in this way, he will have an "ideal" preparation to begin to learn as a practicing embryo engineer. The Assistant Dean of the College, working with the University Placement Officer, is responsible for coordinating the activities of students engaged in the work-study program.

Admission Policy

Two avenues of study lead to admission to the College of Engineering and Applied Science: by intramural transfer; by extramural transfer. Students enrolled in the College of Arts and Science of the University of Rochester file an application for intramural transfer upon satisfactory completion of the first two years' work prescribed in one of the engineering departmental synopses. Students from outside the University who desire to transfer to the College of Engineering

and Applied Science should apply to the University Admission Office. To be admitted to the College, a student must:

a) have completed the freshman and sophomore courses of the appropriate Departmental synopsis or equivalent work satisfactory to the College
b) have a point-hour ratio of at least 2.00 in the work specified in (a)
c) satisfy the appropriate Department with regard to his professional promise, interest, and character.

Under certain circumstances, applicants not meeting all of the above requirements may be admitted as special or probationary students. The status of such students is subject to review at the end of each semester.

Common Freshman Year

Students following the Bachelor of Science programs in chemistry, physics, optics, and all branches of engineering take substantially the same courses during their freshman year, and may change among these curricula with relative ease until the end of the first year. ROTC students majoring in engineering or optics must take the appropriate Air Science or Naval Science courses in addition to the regular courses listed.

EXPLANATION OF COURSE NUMBERING SYSTEM

1–99	Non-credit courses.
100–199	Introductory courses—usually at the freshman and sophomore level—no graduate credit.
200–289	Courses at the junior and senior level carrying graduate credit unless otherwise specified.
290–299	Undergraduate reading or research courses.
300–399	Courses in the Honors Division.
400–489	Graduate courses at the master's level or the first-year of graduate study. Open to undergraduates only by special arrangement.
490–499	Master's level, reading or research courses.

Each course carries credit for *one* course unless otherwise specified.

Titles of 400-level courses which are open to undergraduate students by special arrangement are listed with the undergraduate course descriptions; these advanced courses are described in the Graduate Studies Bulletin.

Chemical Engineering

THE DEPARTMENT OF CHEMICAL ENGINEERING offers an accredited undergraduate curriculum that provides thorough and vigorous preparation for entrance to the profession directly or through subsequent graduate programs. The major mission of the Department is the development of competent chemical engineers who will be adequately prepared to contribute effectively in all phases of chemical engineering from process industry to research. The curriculum is designed to provide a balanced experience of education and training in the humanities and social sciences, in science and mathematics, and in applied science and engineering. Chemical engineering involves at once applications of rigorous theory, and methods that are largely empirical. Both require sound engineering judgment and professional standards in their successful practice, and both are dealt with in the curriculum. In its pursuit, the Department faculty endeavors to induce in its students attitudes of scientific curiosity, engineering objectivity, and professional dedication.

FACULTY

Shelby Alexander Miller, PH.D. (Minnesota)....
....Professor and *Chairman of the Department of Chemical Engineering*

Robert Howard Perry, PH.D. (Delaware).....Professor of Chemical Engineering

Gouq-Jen Su, SC.D. (M.I.T.).....Professor of Chemical Engineering

Richard Frederick Eisenberg, M.S. (Rochester).....Associate Professor of Metallurgy

Richard Reist Kraybill, PH.D. (Michigan).....Associate Professor of Chemical Engineering

Rubens Sette Ramalho, PH.D. (Vanderbilt).....Associate Professor of Chemical Engineering

John Wesley Bartlett, PH.D. (Rensselaer).....Assistant Professor of Chemical Engineering

Stanley Middleman, DR. ENG. (Johns Hopkins)....Assistant Professor of Chemical Engineering

William David Smith, Jr., D.ENG. (Yale).....Assistant Professor of Chemical Engineering

****Burton Cosden Gibbons,*** B.S. CH.E. (Carnegie Institute of Technology)....
....Assistant Lecturer in Chemical Engineering

*Part-time.

DEGREE PROGRAM
Freshman Year

1st Term		*Hours*
Math. 161[1]	Analysis I	4
Phys. 115[2]	Physics I	4
Chem. 123	General Inorganic Chemistry	4
Engl. 101	English Composition	4
Ph. Ed. 11 or 12	Physical Education I	0
		16

2nd Term		
Math. 162[1]	Analysis II	4
Phys. 116[2]	Physics I	4
Chem. 124	General Inorganic Chemistry and Qual. Anal.	4
Elective[4]	Humanities or Social Sciences	4
Ph. Ed. 13 or 14	Physical Education II	0
		16

Sophomore Year

1st Term

Chem. 163	Organic Chemistry	4
Phys. 125[2,3]	Physics II	3
*Math. 163[1]	Analysis III	4
*Ch. E. 100	Introduction to Chemical Engineering	4
Elective[4]		4
Ph. Ed. 21 or 22	Physical Education I	0
		19

2nd Term

Chem. 164[3]	Organic Chemistry	3
Phys. 126[2,3]	Physics II	3
*Math. 164[1]	Analysis IV	4
*Ch. E. 102	Material & Energy Balances	4
MAS 101	Engineering Graphics	3
MAS 105	Shop Practice	1
Ph. Ed. 23 or 24	Physical Education II	0
		18

Junior Year

1st Term

Chem. 251	Physical Chemistry I	4
Chem. 213	Quantitative Analysis I	4
Ch. E. 223	Applied Thermodynamics I	2
Ch. E. 243	Transport Phenomena I	4
Elective[4]		4
		18

2nd Term

Chem. 252	Physical Chemistry II	4
Ch. E. 224	Applied Thermodynamics II	2
Ch. E. 244	Transport Phenomena II	4
Ch. E. 280	Engineering Metallurgy & Materials	4
Ch. E. 294	Plant Visits	0
Elective[4]		4
		18

Intersession

Ch. E. 245[6]	Chemical Engineering Laboratory	3

Senior Year

1st Term

Ch. E. 231	Applied Kinetics & Reactor Design	4
Ch. E. 250	Unit Operations	4
Ch. E. Elective[5]		2 to 4
Ch. E. 271	Chemical Engineering Process Design I	1
MAS 112	Statics & Strength of Materials	3
Elective[4]		4
		18 to 20

2nd Term

Ch. E. 212	Analysis of Chemical Engineering Data	3
E. E. 157	Elementary Electrical Engineering	4
Ch. E. 272	Chemical Engineering Process Design II	2
Elective[4]		8
Ch. E. 294	Plant Visits	0
		17

NOTE: Students enrolled in Naval and Air Force ROTC programs may apply two ROTC courses (eight hours) toward their degree as electives in their Chemical Engineering curriculum. The other ROTC courses required must be taken as an over-load. In order to minimize the overload, ROTC students take certain junior and senior engineering courses in a slightly different order from that shown in the standard synopsis. Faculty and Departmental Advisers or the Dean of Students may be consulted for copies of a synopsis specifically applicable to ROTC students.

The student who wishes to complete both his Chemical Engineering degree and his commission in four years may find it expedient to take at least one summer session course. A more reasonable work load will result if the ROTC (particularly NROTC) student plans his degree-commission program for nine or ten semesters.

THE METALLURGICAL AND MATERIALS CONCENTRATION in Chemical Engineering consists of the use of the two free electives and the chemical engineering elective for courses in metallurgy or materials which, when properly selected, form with ChE 280 a four-course composite that is tantamount to a "minor" in materials engineering. Examples of courses that might be selected as part of the option are:

ChE 281, 282	Physical Metallurgy (in lieu of ChE 280)
ChE 283	The Structure and Property of Solids
ChE 284	Applied Physical Metallurgy
ChE 285	Contemporary Problems in Material Engineering
ChE 295	Metallurgical Engineering Projects
ChE 481	Corrosion
Opt 221	Introduction to Quantum Mechanics and Atomic Structure
Opt 222	Introduction to the Theory of the Solid State
ChE 263	The Chemistry of Plastic Materials
ChE 482	Colloidal and Amorphous Materials
ChE 483	Physics and Chemistry of Vitreous Materials
Geol. 227	Intermediate Mineralogy
Geol. 241	Introductory Petrology

Students interested in the Metallurgical and Materials Option should plan their sequence of courses by the beginning of their junior year. They are invited to discuss the option with their adviser or with Professor R. F. Eisenberg, director of the option program.

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*Students with a passing grade less than C may be required to repeat the course.

[1]An alternate approved sequence is Mathematics 171, 172, 173, 174 for those considered eligible by the Mathematics Department.

[2]An alternate approved sequence is Physics 117–118, 127–128 for those considered eligible by the Physics Department.

[3]Chemical engineering students are not required to take the laboratory.

[4]The Chemical Engineering curriculum contains eight electives, including one in the freshman year. Of these, one is a chemical engineering elective. Of the remaining seven, at least 20 credits (five courses) must be selected from among the Humanities and Social Sciences in the College of Arts and Science with the following stipulations and exceptions: at least two Humanities courses; Economics 101 and at least one additional Social Science course; Psychology 101 may be considered as a Social Science subject. The remaining 8 credits (two courses) may be satisfied by any courses offered by the University of Rochester for which the student is eligible, provided that their content is not already included in the chemical engineering curriculum. Students planning graduate study in chemical engineering or chemistry are encouraged to include one or more years of German or Russian among their Humanities or free electives.

[5]Chemical engineering electives are to be chosen from among the following: Ch.E. 200, 211, 260, 263, 265, 268, 278, 290, 292, and 295; or from selected courses in such disciplines as electrical engineering, mechanical and aerospace sciences, optics, chemistry, physics, and mathematics. Certain chemical engineering courses in the 400 series may be open to students of exceptional ability who are approved for their choice by the Department. The student who elects Ch.E. 292 will be expected to distribute his work in the course over the entire senior year, registering for at least one credit each semester and receiving his mark at the end of the final semester. A student who elects more than two credits of chemical engineering elective must have the approval of the Department Chairman and the Assistant Dean of Engineering.

[6]Conducted during a period of 18 consecutive full working days, usually in the first three weeks of June.

Courses of Instruction

100. Introduction to Chemical Engineering. An introduction to the profession of chemical engineering; techniques and fundamental methods of problem formulation and solution.

Credit—four hours.
Three lectures and one recitation or laboratory a week.

102. Material and Energy Balances. First law of thermodynamics and the principles of equilibrium. Combined with the principle of conservation of matter, they are used to solve a variety of chemical engineering problems involving physical and chemical changes of material and accompanying heat effects.

Credit—four hours.
Three lectures and one recitation or laboratory a week.

145, 146. Elements of Chemical Engineering. Analysis of chemical engineering problems and techniques for their solution. The principles of conservation, equilibrium, transport behaviour, and economics applied to problems of stoichiometry, unit operations, and reactor design. Intended as an engineering supplement for chemists and a theoretical background for technicians employed in the process industries. Prerequisites: general chemistry, general physics, and calculus.

Credit—three hours each term.
Three lectures a week.

200. Process Control and Instrumentation. Review of the principles of measurement, followed by a survey of established techniques for measuring and controlling process variables. Selection and engineering of instruments for the chemical process industries.

Credit—three hours.
Two lectures and one recitation or laboratory a week.

211. Chemical Engineering Computer Calculations. An introduction to digital and analog computers with emphasis on programming techniques and their application in the solution of chemical engineering problems.

Credit—three hours.
Two lectures and one recitation or laboratory a week.

212. Analysis of Chemical Engineering Data. Graphical and statistical methods of analyzing, correlating, and interpreting both laboratory and industrial data are developed. A brief study of the important economic and statistical factors underlying the optimum design of experimental programs.

Credit—three hours.
Three lectures-recitations a week.

223. Applied Thermodynamics I. First and second laws of thermodynamics, and quantitative treatment of the relationships existing among the several thermodynamic properties of matter. Applications of the first law are made, particularly to systems of real gases and vapors. Math. 164 and Phys. 126 or 128 prerequisite and Chem. 251 corequisite.

Credit—two hours.
Two lecture-recitations a week.

224. Applied Thermodynamics II. A continuation of ChE 223, with particular reference to the second law and to chemical processes.

Credit—two hours.
Two lecture-recitations a week.

231. Applied Kinetics and Reactor Design. Review of chemical kinetics, followed by a study of the methods of kinetic data collection, analysis, and interpretation. Simple reactor designs are calculated. Emphasis is on homogeneous uncatalyzed reactions, but heterogeneous and catalyzed reactions are considered. Chem. 252 and ChE 244 prerequisite. Illustration of principles in the laboratory and by means of an analog computer.

Credit—four hours.
Three lectures and one or two laboratories a week.

243. Transport Phenomena I. A rigorous treatment of the theory of fluid flow is presented. The theory is applied to problems of laminar and turbulent flow through pipes, flow through particulate masses, and separation and mixing processes.

Credit—four hours.
Three lectures and one recitation or laboratory a week.

244. Transport Phenomena II. The theory of heat and mass transfer is presented, with application to problems of transfer

to and from static and flowing systems by molecular and convective mechanisms.

Credit—four hours.
Three lectures and one recitation or laboratory a week.

245. Chemical Engineering Laboratory. Demonstration of certain of the unit operations and of the physical principles of chemical engineering. Data taking, equipment operation, and methods of data calculation and correlation. Experience in writing effective technical reports is an important part of the course. Chem. 213 and ChE 244 are prerequisite.

Credit—three to four hours.
Equivalent of nine to twelve hours a week.

250. Unit Operations. Selected problems for such basic unit operations as distillation, absorption, extraction, drying, humidification, filtration, sedimentation and evaporation.

Credit—four hours.
Three lectures and one laboratory a week.

260. Introduction to Nuclear Engineering. An introductory course dealing briefly with a number of problems in the nuclear field. Draws extensively on the engineering student's earlier educational background. Topics studied: introduction to nuclear physics; reactor components and analysis; materials of construction; power systems and controls; waste disposal and safety.

Credit—three hours.
Three lectures a week.

263. The Chemistry of Plastic Materials. Discussion of sources of chemical raw materials and conversion of these materials to resins. General principles of polymer formation. Description of each important class of plastic materials, with reference to methods of manufacture, compounding and molding. Emphasis will be placed on the physical properties of materials and the variation of these properties with plastic composition.

Credit—two hours.
Two lectures a week.

265. Process Laboratory. Simple process development campaigns in which kinetic data are obtained and process conditions are investigated and established. Each campaign culminates in a reactor design. The approach to the multi-variable experiment is demonstrated.

Credit—one or two hours.
One or two three-hour laboratories a week.

268. Analysis of Industrial Chemical Processes. Critical examination of selected industrial chemical processes that illustrate the successful applications of mass and energy balances, thermodynamics, reaction kinetics, and engineering economics.

Credit—two hours.
Two lectures a week.

271, 272. Chemical Engineering Process Design. Opportunities for the chemical engineering senior to integrate the material he has mastered in his previous science and engineering courses. Problems related to the design of chemical plants, including economic as well as technical considerations. The student's effort culminates in one or more projects that present rough but complete estimates of a process plant layout, with marked-up flow sheets and cost of production.

Credits: ChE 271, one or two hours (usually one); ChE 272, one or two hours (usually two).
Usually one lecture and one or two three-hour design periods per week.

278. The Chemical Industry and Its Operation. Review of the history of chemical technology and the emergence of the modern chemical industry. Study of the organization, financing, and economic profile of the process industries. Interplay between technical and economic factors. Exercise of the managerial function with respect to them, particularly in the organization and management of research and development. The current status of patent practice.

Credit—two hours.
Two lectures a week.

280. Engineering Metallurgy and Materials. Structure and properties of the metallic state, equilibrium phase diagrams, non-equilibrium phase transformation, corrosion and high temperature behavior of metals. For chemical engineers. Prerequisites: Chemistry 252, Physics 125–126, M.E. 112.

Credit—four hours.
Three lectures and one laboratory a week.

281, 282. Physical Metallurgy. Fundamentals of physical metallurgy. Emphasis is placed on the structure of metals, phase diagrams, physical and mechanical properties, and heat treatment. The first-term laboratory emphasizes experimental techniques and equipment; the second-term laboratory deals with metallurgical operations and application of the principles of physical metallurgy to specific metals and alloys.

Credit—four hours each term.
Three lectures and a laboratory a week.

283. The Structure and Properties of Solids. A treatment of the principles underlying the behavior and use of engineering materials. Topics covered: structure of matter, X-ray diffraction, phase diagrams, rate processes, mechanical and other physical properties of solids. Prerequisites: ChE 280, sophomore physics and math.

Credit—four hours.
Three lectures and one three-hour laboratory a week.

284. Applied Physical Metallurgy. A study of alloy systems, relating phase diagrams, heat treatments, and microstructure to mechanical and other physical properties.

Credit—four hours.
Three lectures and one three-hour laboratory a week.

285. Contemporary Problems in Materials Engineering. A study of current literature relating to materials research and development. Class periods will be devoted to discussion and critiques of the assigned reading. Prerequisites: ChE 283 or Optics 222.

Credit—one course.
Three lectures a week.

290. Special Topics. A senior seminar course. Current practices and current research developments in chemical engineering. Students of particular technical aptitude concentrate on advanced topics of theoretical character; others concentrate on design practice, engineering economics and cost considerations, and plant practice. ChE 244 prerequisite.

Credit—three hours.
Two 75-minute meetings a week.

292. Chemical Engineering Projects. The student is placed on his own initiative in the pursuit of an original problem related to chemical engineering. The work may be experimental, theoretical, or computational. Only highly qualified students may enroll. ChE 244 is prerequisite and consent of the Department is required.

Credit—one to four hours.

294. Plant Visits. Appropriate industrial plants that illustrate chemical engineering in practice are visited. The visits are preceded by explanation and followed by discussion.

No credit.

295. Metallurgical Engineering Projects. The student will be placed on his own initiative and responsibility in the study of an original problem in some field of metallurgical engineering, involving library or laboratory work. A complete engineering report required. Permission of instructor and the department required.

Credit—two to four hours.

411, 412. Analysis of Chemical Engineering Problems.

Credit—three hours each.

421. Advanced Chemical Engineering Thermodynamics.

Credit—three hours.

431. Chemical Engineering Kinetics and Catalysis.

Credit—three hours.

441, 442. Advanced Transport Phenomena.

Credit—three hours each.

450. Advanced Unit Operations.

Credit—three hours.

451. Filtration.

Credit—two hours.

452. Agitation.

Credit—two hours.

460. Nuclear Laboratory.

Credit—three hours.

481. Corrosion.

Credit—two hours.

482. Amorphous and Colloidal Materials.

Credit—three hours.

483. Vitreous Materials.

Credit—three hours.

Electrical Engineering

THE DEPARTMENT OF ELECTRICAL ENGINEERING seeks to give students the background for entrance into the profession of engineering directly from the completion of their baccalaureate degree as well as to prepare students for further study at the graduate level. To meet these requirements the electrical engineering faculty believes it is most essential that the curriculum be based upon a firm foundation of fundamental sciences, particularly physics and mathematics. Students study these subjects during the first three years of their program at Rochester.

Courses in electrical engineering "proper," which are given from the sophomore year on, are selected from a large number of possible alternatives on the basis of their

potential for broad application to electrical engineering. The normal academic load of four courses per term reduces the time spent in formal instruction compared to many engineering curricula. This reduction in class time permits a correspondingly greater amount of time to be spent on individual assignments and projects, and stresses the responsibility of the student to learn on his own. The engineering profession demands continuous self study and these habits are best inculcated early in one's career.

While the primary objective of the curriculum is to prepare the student for the practice of electrical engineering, the University's responsibility to the student transcends the professional. For this reason a course in one of the humanities or social sciences is required in each term of the student's program.

In summary the electrical engineering program at Rochester is fundamental, sophisticated, individualistic, broad, and carefully designed to help the student prepare himself for a lifetime of continued learning and professional service as both an engineer and a citizen.

FACULTY

Daniel Ward Healy, Jr., PH.D. (Harvard).....Professor and *Chairman of the Department of Electrical Engineering*

Gerald Howard Cohen, PH.D. (Wisconsin).....Professor of Electrical Engineering

Lloyd Philip Hunter, D.SC. (Carnegie Institute of Technology).....Professor of Electrical Engineering

Hideya Gamo, D.SC. (Tokyo).....Professor of Electrical Engineering

David Theobald Blackstock, PH.D. (Harvard).....Associate Professor of Electrical Engineering

Edwin Lorenz Carstensen, PH.D. (Pennsylvania)....Associate Professor of Electrical Engineering

Hugh Guthrie Flynn, PH.D. (Harvard).....Associate Professor of Electrical Engineering

Edwin Kinnen, PH.D. (Purdue).....Associate Professor of Electrical Engineering

Herbert Bernhardt Voelcker, Jr., PH.D. (London)...Associate Professor of Electrical Engineering

Hing-Cheong So, PH.D. (Illinois).....Assistant Professor of Electrical Engineering

William Streifer, PH.D. (Brown).....Assistant Professor of Eletcrical Engineering

John Blake S. Waugh, M.SC. (New South Wales).....Senior Research Associate in Electrical Engineering

DEGREE PROGRAM

Freshman Year

1st Term

Math. 161[1]	Analysis I
Phys. 115[2]	Physics A
Chem. 121[3]	General Chemistry I
Engl. 101	English Composition
Ph. Ed. 11, or 12	Physical Education I

2nd Term

Math. 162[1]	Analysis II
Phys. 116[2]	Physics A
Chem. 122[3]	General Chemistry II
Elective	Humanities or Social Science
Ph. Ed. 13, or 14	Physical Education II

†Sophomore Year

1st Term

Math. 163[1]	Analysis III
Phys. 125[2]	Physics B
E. E. 110	Network Analysis I
**Elective	Humanities or Social Science
Ph. Ed. 21, or 22	Physical Education I

2nd Term

Math. 164[1]	Analysis IV
Phys. 126[2]	Physics B
E. E. 111	Network Analysis II
**Elective	Humanities or Social Science
Ph. Ed. 23, or 24	Physical Education II

†Junior Year

1st Term

E. E. 202	Engineering Analysis II
E. E. 221	Electronics
Opt. 221	Introduction to Quantum Mechanics and Atomic Structure
**Elective	Humanities or Social Science

2nd Term

E. E. 201	Engineering Analysis I
E. E. 222	Feedback Systems Analysis
Opt. 222	Introduction to the Theory of the Solid State
**Elective	Humanities or Social Science

†Senior Year

1st Term

E. E. 231	Electricity and Magnetism
E. E. 241	Communications Systems I
Elective[4]	Technical
**Elective	Humanities or Social Science

2nd Term

E. E. 232	Wave Motion
Elective[4]	Technical
Elective[4]	Technical
Elective	Open

NOTE: Students enrolled in Naval and Air Force ROTC programs may use one ROTC course (four hours) as an allowable elective in their electrical engineering curriculum. The other ROTC courses required must be taken as an overload. Detailed programs combining ROTC with engineering are available from the department counselors.

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[1]An alternate approved sequence in Mathematics 171, 172, 173, 174 for those considered eligible by the Mathematics Department.

[2]An alternate approved sequence is Physics 117–118, 127–128 for those considered eligible by the Physics Department.

[3]An alternate course is Chemistry 123, 124 for students considered eligible by the Chemistry Department.

**To satisfy the distribution requirements, a student must elect three Humanities courses and three Social Science courses.

[4]Technical Electives available to Electrical Engineering students include:

E.E. 205 Semiconductor Phenomena and Devices
E.E. 243 Communication Systems II
E.E. 206 Transistor Characteristics and Circuits
E.E. 264 Electronic Circuit Analysis II

and, upon the approval of the department, courses selected from the 400–numbered series. In addition, students are invited to consider, with the guidance of their adviser, suitable courses in Mathematics, Physics, and the other Engineering Sciences. Students interested in the Biomedical Engineering field are urged to choose as electives courses in Biology, as well as Organic Chemistry.

†Especially selected students may be permitted to carry one additional elective during each term for a maximum of 36 courses total.

Courses of Instruction

110, 111. Network Analysis I, II. An introductory circuit analysis course including the analysis of networks with both passive LRC elements and active elements as defined by their terminal characteristics. Topics include steady state and transient analysis of networks, piecewise linear analysis of nonlinear devices, and the techniques of solving problems by means of Laplace Transforms.

157. Elementary Electrical Engineering. A basic course for chemical engineers covering elements of circuit theory, an introduction to electrical measurements, electronic devices or rotating machinery. Physics 125–126 and Math. 164 prerequisite.
Credit—three hours.

201. Engineering Analysis I. A course divided between topics in statistics and probability and the theory and application of vectors and tensors.

202. Engineering Analysis II. An introduction to the theory of functions of a complex variable with emphasis on the background leading to an understanding of Fourier analysis and Laplace Transform Theory.

205. Semiconductor Phenomena and Devices. An introduction to semiconductor physics followed by a study and analysis of the operation of semiconductor electronic devices. Topics include the energy band concept, electronic conduction in solids, semiconductor

contacts and junctions, the diffusion and lumped model analysis of diode and transistor structures. Prerequisite: a knowledge of differential equations and modern physics, such as Math. 163 and Opt. 221 or Phy. 203.

206. **Transistor Characteristics and Circuits.** A study of the physical characteristics of semiconductor devices, particularly junction transistors, and the analysis and design of transistor circuits emphasizing those illustrating the unique properties of the transistor. EE 221 prerequisite.

221. **Electronics.** An analysis of the basic circuits which are the building blocks of electronic devices, i.e., rectifiers, amplifiers, oscillators, and trigger or pulse circuits.

222. **Feedback Systems Analysis.** Theory of linear feedback systems and their analysis and synthesis. Use is made of the techniques available from the theory of functions of a complex variable as developed in a companion course EE 202. EE 111 prerequisite.

231. **Electricity and Magnetism.** Foundations of electromagnetic field theory: boundary value problems of static and magnetic fields, multipole description of stationary distributions, quasi stationary fields and solution of Maxwell's equations for special cases.

232. **Wave Motion.** A general treatment of wave phenomena. Topics studied include characteristics of partial differential equations, progressive waves, standing waves, reflection, refraction, diffraction, ray theory, absorption and dispersion, and nonlinear effects. Examples will be drawn from a variety of fields, such as electromagnetic theory, acoustics, hydrodynamics, elasticity, etc. Laboratory instruction is included.

241. **Principles of Communication I.** Statistical methods in systems analysis, modulation and coding, measures of information, system models, comparison of communication systems.

242. **Electromechanical Energy Conversion.** An introduction to theory of electromechanical energy conversion with applications to rotating machines and incremental motion devices.

243. **Principles of Communication II.** A continuation of EE 241 offered as a senior elective or preparatory course for new graduate students. After a review of elementary probability and statistics, topics such as quantization, noise vulnerability of analog modulation systems, P.C.M., etc., will be discussed as the background and interests of the class warrant.

263. **Electronic Circuit Analysis I.** A study of electronic circuits including power supplies, ac amplifiers, dc amplifiers, sinusodial wave form generators, modulators and demodulators. A course primarily offered for other than electrical engineers and not normally acceptable for credit in Electrical Engineering.

264. **Electronic Circuit Analysis II.** A continuation of EE 263. Pulse circuitry and transient analysis are emphasized. This course may, with permission, be taken for credit in Electrical Engineering.

290. **Special Problems in Electrical Engineering.** A reading or research course open to electrical engineering seniors by special permission.

401. **Computer Electronics.**

402. **Analog and Digital Computers.**

409. **Acoustics of Liquids and Solids I.**

431. **Advanced Network Analysis.**

484. **Magnetic Phenomena and Devices.**

Mechanical and Aerospace Sciences

A Bachelor of Science degree in Mechanical Engineering has been offered for more than fifty years at the University of Rochester. In accordance with recently re-oriented and broadened objectives and graduate programs, the department name was recently changed to Department of Mechanical and Aerospace Sciences. The change also reflects the desire of the University to participate more effectively in meeting the nation's growing need for well-prepared, creative engineers capable of assuming leadership roles in their profession. It is to be noted however, that the undergraduate program continues to be a program in Mechanical Engineering.

The program of the Department of Mechanical and Aerospace Sciences might best be described as a program in the applied sciences with emphasis in the direction of energetics. It is felt very strongly that the principal interest of mechanical engineering remains as it always has been in the broad field of energy conversion. Recent developments have indicated possibilities of converting energy in new and exotic ways such as magnetohydrodynamic energy conversion, thermionic and thermoelectric direct energy conversion, fuel cell energy conversion, and fusion and fission nuclear energy conversion. Along with these specific applications, of course, comes the necessary preparation in the basic engineering sciences for students deciding to work in this area. Hence, great emphasis in the mechanical engineering program is laid upon mechanics and physics of plasmas, fluids and solids as pertaining to the field of energetics.

Although the mechanical and aerospace sciences program provides a particularly good foundation for moving into graduate work, it is at the same time equally effective for providing the basic preparation needed by the graduate who plans to enter industry immediately upon graduation where he must have an adequate background to keep abreast of the rapid advances in science and technology.

FACULTY

Martin Lessen, SC.D. (M. I. T.).....Professor and *Chairman of the Department of Mechanical and Aerospace Sciences*

Lewis Dalcin Conta, PH.D. (Cornell).....Professor of Mechanical and Aerospace Sciences

John Arthur Fox, PH.D. (Pennsylvania State).....Associate Professor of Mechanical and Aerospace Sciences

Robert Gustav Loewy, PH.D. (Pennsylvania).....Associate Professor of Mechanical and Aerospace Sciences

Oscar Edward Minor, B.S. (Rochester).....Associate Professor of Mechanical and Aerospace Sciences

Helmut Dietrich Weymann, DR.SC. (Aachen).....Associate Professor of Mechanical and Aerospace Sciences

Alfred Clark, Jr., PH.D. (M. I. T.).....Assistant Professor of Mechanical and Aerospace Sciences

Gary Hamilton Conners, PH.D. (Michigan State).....Assistant Professor of Mechanical and Aerospace Sciences

Harold Searl Dunn, PH.D. (Brown).....Assistant Professor of Mechanical and Aerospace Sciences

Horace William Leet, M.E. (Cornell).....Professor Emeritus of Mechanical Engineering

DEGREE PROGRAM

Freshman Year

1st Term

Math. 161[1]	Analysis I
Phys. 115[2]	Physics I
Chem. 121[3]	General Chemistry I
Engl. 101	English Composition
Ph. Ed. 11 or 12	Physical Education I

2nd Term

Math. 162[1]	Analysis II
Phys. 116[2]	Physics I
Chem. 122[3]	General Chemistry II
**Elective	Humanities or Social Science
Ph. Ed. 13 or 14	Physical Education II

†Sophomore Year

1st Term

Math. 163[1]	Analysis III
Phys. 125[2]	Physics II
M.A.S. 120	Introduction to Mechanical Engineering
**Elective	Humanities or Social Science
Ph. Ed. 21 or 22	Physical Education I

2nd Term

Math. 164[1]	Analysis IV
Phys. 126[2]	Physics II
M.A.S. 121	Introduction to Mechanical Engineering
**Elective	Humanities or Social Science
Ph. Ed. 23 or 24	Physical Education II

†Junior Year

1st Term

M.A.S. 201	Engineering Analysis I
M.A.S. 221	Analytical Mechanics
Opt. 221	Introduction to Quantum Mechanics and Atomic Structure
**Elective	Humanities or Social Science

2nd Term

M.A.S. 202	Engineering Analysis II
M.A.S. 222	Continuum Mechanics
Opt. 222	Introduction to the Theory of the Solid State
**Elective	Humanities or Social Science

†Senior Year

1st Term

M.A.S. 223	Thermodynamics and Statistical Mechanics
M.A.S. 203	Mechanical Engineering Systems Design I
Elective	Technical
**Elective	Humanities or Social Science

2nd Term

M.A.S. 224	Transport Phenomena
M.A.S. 204	Mechanical Engineering Systems Design II
Elective	Technical
Elective	Open

NOTE: Students enrolled in Naval and Air Force ROTC programs may use one ROTC course (four hours) as an allowable elective in their mechanical engineering curriculum. The other ROTC courses required must be taken as an overload. Detailed programs combining ROTC with engineering are available from the departmental counselors.

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[1]An alternate approved sequence is Mathematics 171, 172, 173, 174 for those considered eligible by the Mathematics Department. Students so approved are encouraged to elect this sequence.

[2]An alternate approved sequence is Physics 117–118, 127–128 for those considered eligible by the Physics Department. Students so approved are encouraged to elect this sequence.

[3]An alternate course is Chemistry 123, 124 for students considered eligible by the Chemistry Department.

**To satisfy the distribution requirements, a student must elect three Humanities courses and three Social Science courses.

†Especially selected students may be permitted to carry one additional elective during each term to a maximum of 36 courses.

Courses of Instruction

101. Engineering Graphics. For chemical engineers. Orthographic projection as a tool in solving problems in space, and also as the basis of communication among technically trained persons. Topics include: graphs, sectioning, conventions, dimensions, pictorials, assemblies, intersections, developments, along with "double auxiliary" methods of graphic solutions.

Credit—three hours.

105. Shop Practice. For chemical engineers. Simple machine tool operations, with demonstrations and practice in sheet metal working, soldering, welding, and pipe fitting, and lecture and plant visits in pattern making and foundry practice.

Credit—one hour.

112. Statics and Strength of Materials. For chemical engineers. Review of principles of statics and application to problems of engineering interest. The basic theories of strength of materials are covered—including properties of materials, axial loading, flexure, torsion, buckling, and combined stresses. Prerequisite: Math. 163, Physics 115–116.

Credit—three hours.

120, 121. Introduction to Mechanical Engineering. Introduction to engineering systems; applications of analytical and graphic methods to statics and dynamics, one-dimensional elasticity and hydrodynamics, engineering thermodynamics including heat transfer, one-dimensional gasdynamics and propulsion.

201, 202. Engineering Analysis I, II. The development and application of analysis to engineering problems. Tools of analysis developed and used include: Matrix algebra, vector algebra, vector calculus, Green-Gauss theorem, Stokes theorem, tensor calculus, metric tensor, covariant derivative, curvature tensor. Infinite series, power series and convergence, foundations of theory of functions of a complex variable, calculus of residues, conformal mapping, special functions.

203. Mechanical Engineering Systems Design I. Development and application of integral transform techniques to solution of transients in lumped and distributed mechanical, electrical, thermal and mixed linear systems.

204. Mechanical Engineering Systems Design II. Analysis, synthesis and design of closed loop control systems, including steady state and transient operation, stability criteria and performance design factors. Illustrations from various fields with emphasis on electromechanical and hydraulic systems.

221. Analytical Mechanics. Statics of a particle and rigid body, motion of a particle, kinematics, Euler's dynamical equations, work and energy, relative motion, Lagrange's equations, Hamilton's canonical equations, D'Alembert's principle, Hamilton's principle and principle of least action.

222. Continuum Mechanics. Stresses and strains in a continuum, principal stresses and strains, stress-strain and stress-rate of strain relations for elastic solids and fluids, Kelvin's theorem, potential flow, Bernoulli's theorem, parallel viscous flow, compressible flow, velocity of sound, introduction to rheology.

223. Thermodynamics and Statistical Mechanics. Elementary kinetic theory, the first law, the second law, thermodynamic potentials, perfect gas, Van der Waals gas, Liouville's theorem, Boltzmann's principle, Maxwell-Boltzmann velocity distribution, specific heat, Maxwell-Boltzmann equation, collision integral, H-theorem.

224. Transport Phenomena. Non-equilibrium properties of gases and liquids such as diffusion, heat conduction, viscosity, and cross effects like thermal diffusion and electrical effects are treated on the basis of the kinetic theory of gases and/or irreversible thermodynamics. Solutions of the differential equations for heat transfer and diffusion.

238, 239. Mechanical Design I, II. Fundamentals underlying modern mechanical design. Topics include translational and torsional vibrations (including multiple degrees of freedom); advanced mechanics of materials, including analysis of curved beams, disks, thick cylinders, etc.; mechanical properties of materials and theories of failure; model studies using photoelastic and other techniques.

252, 253. Modern Energy Conversion. A study of the conversion of chemical and nu-

clear energy into mechanical or electrical energy. The course will range from steam and gas turbine plants through fuel cell thermoelectric and magnetohydrodynamic conversion methods. Subjects such as combustion, heat transfer, and gas dynamics covered as needed.

290. Project Course for Mechanical Engineers. A project course for qualified seniors in which a specific investigation is carried out under the supervision of a member of the faculty. The work may involve the analysis, adaptation or modification of equipment or it may be the development of equipment for a specific function.

430. Introduction to Elasticity and Plasticity I.

431. Introduction to Elasticity and Plasticity II.

436. Foundations of Fluid Mechanics I —Inviscid Flow.

437. Foundations of Fluid Mechanics II —Viscous Flows.

Optics

THE INSTITUTE OF OPTICS prepares students for industrial and research positions in optical physics or applied optics. In this, the Institute has the cooperation and interest of the optical and related industries. The course of study offers extensive training in geometrical, physical and physiological optics with an opportunity for specialization in such subjects as photography, spectroscopy, polarized light, optical and mechanical design of instruments, including lasers, colorimetry, spectrophotometry and optical properties of thin films. The curriculum includes basic courses in mathematics, chemistry and physics and electives in other fields. By suitable choices of electives in his senior year, the student may prepare himself to go directly into industry or to enter research through graduate work in optics and related areas of physics and engineering. Graduate programs leading to the M.S. and Ph.D. degrees in Optics are available at Rochester.

FACULTY

Robert Earl Hopkins, PH.D. (Rochester).....Professor of Optics and *Director of the Institute*
Robert Merrill Boynton, PH.D. (Brown)....
....Professor of Optics, Professor of Psychology (College of Arts and Science)
Miles Parker Givens, PH.D. (Cornell).....Professor of Optics
Walter Lewis Hyde, PH.D. (Harvard).....Professor of Optics
****Rudolph Kingslake,*** D.SC. (London).....Professor of Geometrical Optics

Robert Marsh Blakney, PH.D. (Rochester).....Associate Professor of Optics
†Gordon Gladstone Milne, PH.D. (Rochester).....Associate Professor of Optics
James Charles Peskin, PH.D. (Illinois).....Associate Professor of Optics
Kenneth James Teegarden, PH.D. (Illinois).....Associate Professor of Optics

Philip Werner Baumeister, PH.D. (California).....Assistant Professor of Optics
Francis A. Collins, PH.D. (Harvard).....Assistant Professor of Optics
James Arthur Eyer, PH.D. (Rochester).....Assistant Professor of Optics
and *Assistant Director of the Institute*
Albert Gold, PH.D. (Rochester).....Assistant Professor of Optics
Frank J. J. Clarke, PH.D. (London).....Visiting Assistant Professor of Optics

*Part-time.
†On leave 1964–65.

Claude De Lisle, PH.D. (Laval) ..... Research Associate in Optics
Patrick George Harrison, PH.D. (Alfred) ..... Research Associate in Optics

**John Cushing Evans,* M.S. (Rochester) ..... Lecturer in Optics
**William P. Ewald,* B.S. (Rochester) ..... Lecturer in Optics

*Part-time.

DEGREE PROGRAM

Freshman Year

1st Term

Math. 161[1]	Analysis I
Phys. 115[2]	Physics I
Chem. 121[3]	General Chemistry I
Engl. 101	English Composition
Ph. Ed. 11 or 12	Physical Education I

2nd Term

Math. 162[1]	Analysis II
Phys. 116[2]	Physics I
Chem. 122[3]	General Chemistry II
Elective	Humanities or Social Science
Ph. Ed. 13 or 14	Physical Education II

†Sophomore Year

1st Term

Math. 163[1]	Analysis III
Phys. 125[2]	Physics II
Opt. 121	Fundamentals of Optics I
**Elective	Humanities or Social Science
Ph. Ed. 21 or 22	Physical Education I

2nd Term

Math. 164[1]	Analysis IV
Phys. 126[2]	Physics II
Opt. 122	Fundamentals of Optics II
**Elective	Humanities or Social Science
Ph. Ed. 23 or 24	Physical Education II

†Junior Year

1st Term

Opt. 221	Introduction to Quantum Mechanics and Atomic Structure
E. E. 221	Electronics
M.A.S. 201	Engineering Analysis I
**Elective	Humanities or Social Science

2nd Term

Opt. 222[3]	Introduction to the Theory of the Solid State
M.A.S. 202	Engineering Analysis II
Opt. 224	Atomic and Molecular Spectroscopy
**Elective	Humanities or Social Science

[1]An alternate approved sequence is Mathematics 171, 172, 173, 174 for those considered eligible by the Mathematics Department.

[2]An alternate approved sequence is Physics 117–118, 127–128 for those considered eligible by the Physics Department.

[3]A student may substitute a technical elective with approval of his faculty adviser.

**To satisfy the distribution requirements, a student must elect three Humanities courses and three Social Science courses.

†Especially selected students may be permitted to carry one additional elective during each term for a maximum of 36 courses.

†Senior Year

1st Term

One of the following two courses

Opt. 253	Radiometry & Spectrophotometry
Opt. 241	Testing of Optical Units and Lens Systems I
and	
Opt. 261	Physical Optics II
Opt. 231	Fundamentals of Electromagnetic Theory
Elective	Open

2nd Term

One of the following two courses

Opt. 254	Radiometry & Spectrophotometry
Opt. 242	Testing of Optical Units and Lens Systems II
and	
Opt. 262	Physical Optics III
Elective	Humanities or Social Science
Elective	Open

NOTE: Students enrolled in Naval and Air Force ROTC programs may use one ROTC course (four hours) as an allowable elective in their optics curriculum. The other ROTC courses required must be taken as an overload. Detailed programs combining ROTC with Optics are available from the departmental counselors.

Courses of Instruction

121. **Fundamentals of Optics I.** An introductory course in geometrical optics covering the principles underlying reflection, refraction, image translation and rotation by systems of lenses and prisms; Gaussian optics of lens systems will be treated in detail, and a survey of important optical instruments will be given. The imaging properties of lens systems and their aberrations will be demonstrated using the coherent radiation from a gas laser.

122. **Fundamentals of Optics II.** An introductory course in physical optics covering wave motion, super position of waves, interference and diffraction of light, and polarization. The principles of lasers will be discussed; the gas laser will be employed to demonstrate interference and diffraction phenomena and applied to the measurement of the velocity of light, Doppler shift, etc.

152. **Physiological Optics.** A survey of the fundamentals of the visual process, including light as the visual stimulus, the eye as the optical system, photoreception, transmission of information through the visual system, visual sensation and resulting behavior. The characteristics of the total visual system as a light-sensing device will be stressed. Prerequisites: Physics 115–116 and Mathematics 161, 162.

209. **Computer Science.** The programming of the digital computer is studied. Programs are written in compiler languages for the solution of problems in logic, statistics, mathematics, business. Prerequisites: One or more college-level mathematics courses are required.

221. **Introduction to Quantum Mechanics and Atomic Structure.** The course will include the special theory of relativity, an introduction to quantum theory and solutions to the Schroedinger equation for simple atomic systems, quantum statistics, and atomic spectroscopy. Prerequisites: Math 164 and Physics 126. Laboratory.

222. **Introduction to the Theory of the Solid State.** The course will include a study of the energy band theory of solids, conduction in solids, thermionic and photoelectric emission, semiconductors, dielectrics, crystalline imperfections, mechanical properties of solids, luminescence, and photoconductivity. Prerequisite: Optics 221. Laboratory.

224. **Atomic and Molecular Spectroscopy.** The course will cover topics in semiclassical radiation theory, electric dipole selection rules for one electron atom, Russell-Saunders coupling, J-J coupling, vector model of the atom, energy level diagrams of complex atoms and simple molecules. Optical pumping and stimulated emission will be discussed and applied to the theory of laser. Prerequisite: Optics 221.

231. **Fundamentals of Electromagnetic Theory.** Boundary value problems for electrostatic and magnetic fields; Maxwell's equations and the solution for special cases; the wave equation and boundary value problems; application to selected optical phenomena; introduction to wave guides and cavities. Prerequisites: Physics 125–126; Mathematics 163; EE 201–202 (concurrently). (See EE 231)

241, 242. **Testing of Optical Units and Lens Systems I, II.** Laboratory course, intended to complement the course on Optical Design. Standard methods of testing optical units and measuring their properties. Experiments include: testing of surfaces, plates and prisms by Hardinger, Foucault, and interferometer methods; the lens-testing bench for the measurement of aberrations; Hartmann and other tests on telescope objectives and concave mirrors; Star tests on microscope objectives; the resolving power, sine-wave response, and energy distribution of photographic objectives; the use of a high-quality spectrometer, and complete tests on a prism binocular. Light transmission measurements are made on photographic and telescopic systems.

251. **Advanced Physiological Optics.** A detailed discussion of selected topics pertaining to the visual process. Prerequisite: Optics 152 or permission of the instructor.

252. **Colorimetry.** A course dealing with the chromatic sensations, color theory, the

measurement and specification of color, and the quantitative consideration of color vision. Physics 125–126 is prerequisite. Laboratory.

253. **Radiometry and Spectrophotometry I.** A course dealing with the nature of radiation and techniques of radiative measurement. Topics include: Kirchoff's Laws; black body radiation laws; line, band and continuous sources of radiation; techniques of photometry and radiometry; dispersing systems; introduction to spectrophotometry. Prerequisite: Physics 203 or Optics 221 or equivalent. Laboratory.

254. **Radiometry and Spectrometry II.** A continuation of Optics 253. Topics covered in this course include: design of absorption and emission spectrophotometers; detailed descriptions of radiation detectors for use in the UV, visible and IR; studies of noise mechanisms limiting the performance of radiation detectors; introductory description of the theory and use of lasers. Prerequisite: Optics 253. Laboratory.

257. **Technical Photography.** An introductory course in the technical and scientific aspects of photography; photographic equipment and materials; photographic sensitometry; exposure and exposure devices; light sources; characteristics of developers and other processing solutions; tone reproduction, methods of color photography. (Two years college physics prerequisite.) Laboratory.

258. **Physics of Photography.** Latent image theory; mechanism of development; special exposure and development phenomena; image structure; photographic photometry; photography with ultraviolet, infrared, X-ray, radiation; special topics in modern photographic theory. Prerequisite: Optics 257. There is no formal laboratory, but a term paper or term project is required.

261. **Physical Optics I.** The following subjects are treated by classical electromagnetic theory; propagation, reflection and refraction of light, optical properties of metals, and optical dispersion.

262. **Physical Optics II.** The course covers the Kirchoff treatment of diffraction and the application of the Fourier transform to practical diffraction problems. The propagation of waves in anisotropic (i.e., crystalline) media is also treated. Prerequisite: Optics 261. Laboratory.

263. **Polarized Light.** The theory of the propagation of light in doubly refracting media; detection and measurement of plane and elliptical polarization; applications to petrography, photoelasticity, and polarimetry.

265. **Applied Spectroscopy and Interferometry.** Origin of spectra; classification and intensities of special lines; methods of exciting spectra of various types. The design, calibration and use of grating and prism spectrographs and interference spectroscopes. Spectrochemical analysis. Prerequisite: Physics 125–126.

283, 284. **Mechanical Design of Optical Instruments I, II.** A study of components and applications of optical instruments. Engineering of optical systems such as condensers, relays, visual and photoelectric instruments, timing, projection, and range finding systems. Principles of mechanical design including instrument engineering, kinematics, precision mechanisms, tolerances and materials. Laboratory experiments and analysis of finished instruments. Prerequisite: Physics 125–126.

293. **Special Problems in Optics.** A reading or research course open to seniors in optics by special permission.

471, 472. **The Design of Lenses and Optical Systems.**

474. **Methods of Image Evaluation and Optical Systems Analysis.**

Department of Nursing

of the School of Medicine and Dentistry

Donald E. Anderson, M.D. ..... Dean of the School of Medicine and Dentistry and Director of the Medical Center

Eleanor A. Hall, R.N., M.A. ..... Chairman

Ruby Hendryx, R.N., ED.M. ..... Assistant Chairman

Esther Thompson, R.N., M.A. ..... Director of Graduate Studies

Edna Muntz, B.A. ..... Registrar

FACULTY

Eleanor A. Hall, R.N., M.A. (Columbia) ..... Professor of Nursing
Esther M. Thompson, R.N., M.A. (Columbia) ..... Professor of Nursing Education

Ruby Hendryx, R.N., ED.M. (Rochester) ..... Associate Professor of Nursing
Florence E. Dunn, R.N., M.A. (Columbia) ..... Associate Professor of Nursing Education
Madeline Kennedy, R.N., M.A. (Columbia) ..... Associate Professor of Nursing (Med.-Surg.)
Mary Norma O'Hara, R.N., M.A. (Columbia) ..... Associate Professor of Nursing (Maternal-Child)
Winifred Smith, R.N., M.A. (Boston) ..... Associate Professor of Nursing (Psychiatric)

Rita Chisholm, R.N., M.A. (Columbia) ..... Assistant Professor of Nursing (Public Health)
Josephine Craytor, R.N., M.S. (Rochester) ..... Assistant Professor of Nursing (Med.-Surg.)
Marion Mason, M.S. (Ohio State) ..... Assistant Professor of Nursing (Nutrition)
Marjorie Pfaudler, R.N., M.A. (Columbia) ..... Assistant Professor of Nursing (Rehabilitation)
Mary Wemett, R.N., M.S. (Rochester) ..... Assistant Professor of Nursing (Fundamentals; Med.-Surg.)

Alice Wightman, R.N., M.A. (New York) ..... Assistant Professor of Nursing (Public Health)

Sylvia Ajemian, R.N., M.S. (Colorado) ..... Instructor in Nursing (Medical-Surgical)
Barbara Backer, B.S., M.S. (Rochester) ..... Instructor in Nursing (Medical-Surgical)
Mary Mabie, R.N., M.A. (Columbia) ..... Instructor in Nursing (Medical-Surgical)
Marilyn Sjevda, R.N., M.S. (Indiana) ..... Instructor in Nursing (Maternal-Child)
Virginia Wandover, R.N., M.S. (Western Reserve) ..... Instructor in Nursing (Med.-Surg.)
Janet Wharton, B.S., M.S. (Boston) ..... Instructor in Nursing (Maternal-Child)

UNDERGRADUATE PROGRAM

In Nursing

The undergraduate curriculum leading to the degree, Bachelor of Science with a Major in Nursing, is described in the material which follows in this bulletin. More detailed information about the undergraduate and graduate offerings of the Department of Nursing is included in the official bulletin of the Department. Requests for this bulletin should be addressed to:

Registrar
Department of Nursing
School of Medicine and Dentistry
260 Crittenden Blvd.
Rochester, N. Y. 14620

The University of Rochester offers a course of study which extends over a four year period and which includes two summers of required work.

The curriculum is so arranged as to provide a sound foundation in the humanities, social sciences and natural sciences. Upon this base are built the educational experiences in the nursing major designed to help the student acquire the knowledge, skills and understanding necessary to give care to individuals according to their physical, emotional and social needs, aiming at the greatest possible independence and self-direction for the persons served; to work with the physician and other members of the health team to carry out the total plan of care, to counsel and teach individuals and groups in the promotion and maintenance of health as well as in the nursing care of the sick; to approach the practice of nursing responsibility with a determination to improve its quality and to raise the standards of the profession in general.

This program leading to the degree, Bachelor of Science with a Major in Nursing, is designed to prepare for professional nursing practice in hospitals and public health nursing agencies and to provide a sound educational base on which graduates may build careers in the care of patients, in teaching, administration, and research, depending on their interests and capabilities.

Students enroll in the College of Arts and Science for two years and are formally admitted to the Department of Nursing at the beginning of the junior year. Qualified transfer students from other accredited colleges may be admitted to the Department of Nursing.

The Department of Nursing is ideally situated for the development of sound professional education in nursing. The hospitals and clinics of the University of Rochester Medical Center afford complete experiences in the nursing care of adults and children with physical and emotional illnesses. Official and voluntary agencies in Rochester and Monroe County provide public health nursing instructional opportunities. The students' total program is directed by members of the University faculty.

Graduates are eligible to take the state licensing examination (R.N.).*

Accreditation

The undergraduate program leading to the degree of Bachelor of Science with a Major in Nursing is accredited by the National League for Nursing for the preparation of professional practitioners of nursing.

The hospitals at the University Medical Center are approved by the Joint Commission on Accreditation of Hospitals.

Admission

Students who plan to major in nursing should file application for transfer from the College of Arts and Science to the Department of Nursing during the last semester of the sophomore year. Students from other colleges applying for junior standing in the Department of Nursing may secure application forms and information concerning admission from the Office of Registrar, Department of Nursing.

To qualify for unconditional admission, a student must have satisfactorily completed 16 courses at the University of Rochester or a minimum of 60 semester hours at another accredited institution. To meet distribution requirements the program of study should include:

a. introductory courses in:

English Composition
Biology
Psychology
Chemistry (2 semesters)
Sociology (2 semesters)
Microbiology (effective for Fall, 1965)

and additional courses from the humanities, social sciences, and natural sciences.

Vocational courses and courses in physical education required in the college attended are NOT accepted as fulfilling admission requirements.

b. A 2.0 honor-point average (Grade of C) based upon all course work taken prior to admission. (Transfer credit is not given for a grade below C.)

c. A satisfactory health record.

d. A strong desire to make nursing a career, together with evidence of aptitude for such a career.

e. Acceptance by the Committee on Admissions of the Department of Nursing.

RESIDENCE

Undergraduate students live at Helen Wood Hall, women's residence at the Medical Center, during the junior and senior years of the basic baccalaureate program.

*If a graduate wishes to be registered in a state other than New York, she should secure information on requirements for eligibility in the particular state in which she intends to practice.

TUITION AND FEES

NURSING

Junior Year	*1st Term*	*2nd Term*	*Summer*
Tuition	$300.00	$300.00	$200.00
Room	150.00	150.00	85.00
Meals	247.50	247.50	100.00
Health Fee	17.50	17.50	5.00
Student Activity Fee	12.50	12.50	——
	$727.50	$727.50	$390.00

Senior Year			
Tuition	$300.00	$300.00	$200.00
Room	150.00	150.00	100.00
Meals	247.50	247.50	100.00
Health Fee	17.50	17.50	5.00
Student Activity Fee	12.50	12.50	——
	$727.50	$727.50	$405.00

Other Expenses

Application fee (if transferring from another University) $10. Uniforms—approximately $100 at beginning of junior year. Books, field trips and miscellaneous expenses associated with public health experience—approximately $100 a year. Insurance premium—Extended Medical Care—$17.00 per year.

Admission Deposit

Students transferring from another University who receive notification of admission are required to post an admission deposit of $50 by the date stated in the letter of admission. *The deposit is not refundable. It is not an additional fee.* It will be credited to the first term bill.

Scholarships and Loans

A number of scholarships and loans are available to undergraduate students. Secure applications from the Office of the Registrar.

COURSE OF STUDY

*Freshman Year**

First Term Course	Hours	*Second Term* Course	Hours
English 101 English Composition	4	Elective	4
Chemistry 121 General Chemistry I	4	Chemistry 122 General Chemistry II	4
Anthropology 101 Introduction	4	Sociology 102 Introduction	4
Elective**	4	Elective	4

Sophomore Year

First Term		*Second Term*	
Biology 101 General Biology	4	Psychology 101 Introduction	4
Elective	4	Elective	4
Elective	4	Elective	4
Elective	4	Elective	4

*Students in other colleges should plan a similar course of study for the freshman and sophomore years.

**To satisfy the distribution requirements, a student should elect three courses in humanities and two in social sciences.

Sept 1965
Bio-Crse

In the Department of Nursing

Junior Year

First Term

NUR200 Fundamentals of Nursing Practice 6
NUR212 Anatomy and Physiology 5
NUR217 Microbiology 3
NUR210 Nutrition 3
17

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Second Term

NUR218 Medical-Surgical Nursing I 11
NUR214 Pharmacology 3
14

Summer Session (9 Weeks)

NUR220 Medical-Surgical Nursing II 7

Senior Year

First Term

NUR222 Maternal and Child Nursing ...14
14

Summer Session (12 weeks)

NUR232 Public Health Nursing 6
NUR236 Management of Nursing Care .. 2
8

Second Term

NUR226 Psychiatric Nursing 10
NUR230 Public Health 3
NUR240 Senior Seminar 3
16

The degree will be granted on recommendation of the faculty in nursing and upon fulfillment of the following requirements:

1. The candidate shall have completed a minimum of 136 semester hours of course work and shall have satisfied the general University requirements.

2. The candidate shall have maintained at least a 2.0 honor point average (Grade of C) in all work taken.

Graduating students participate in the University Commencement in June and complete their studies in August.

Courses of Instruction

200. **Fundamentals of Nursing Practice.** An introduction to the functions and responsibilities of the professional nurse. Application of theory and skills to the identification and solution of patient care problems under direct supervision of faculty members.

210. **Nutrition.** A study of the science of nutrition including biochemical aspects. The focus is on food in health and in disease as part of the total plan in preventive, therapeutic and rehabilitative nursing.

212. **Anatomy and Physiology.** A study of the gross and microscopic structure and functions of the human organism with appropriate applications to nursing.

214. **Pharmacology.** The origin, preparation, dosage, action, therapeutic use and toxic effects of drugs commonly used with emphasis on the nurse's responsibilities in relation to drugs.

217. **Microbiology.** A course in which bacteria, fungi and viruses are studied from the point of view of their biological characteristics in public health, industry and agriculture.

218. **Medical-Surgical Nursing I.** In the classroom and at the patient's bedside students learn to identify and meet nursing needs of adults undergoing medical therapy or surgical intervention for pathological conditions. Care in emergencies, in the operating room and in clinics is incorporated. Experience in long-term illness is provided.

220. **Medical-Surgical Nursing II.** A continuation of Medical-Surgical Nursing I dealing with more complex nursing problems. Emphasis is placed on the nurse's role as a member of the health team.

222. **Maternal and Child Nursing.** The developmental approach is utilized in the study of physiological, psychological and cultural factors affecting maternal and child health. Clinical practice is provided in the care of mothers throughout the maternity cycle and in the care of their infants as well as nursing of sick children including the adolescent.

226. **Psychiatric Nursing.** In the psychiatric setting, skills and understandings pertinent to the nursing care of patients are developed with emphasis on the relationship of the nurse both to the individual patient and to groups of patients. Care of the patient is discussed in the larger context of family and community.

230. **Public Health.** History, organization, purposes and activities of public health agencies; their relationship to other governmental and voluntary health and social agencies. Major public health problems, epidemiology and the control of disease, and the use and interpretation of biostatistics are included.

232. **Public Health Nursing.** Concurrent theory and supervised practice in selected public health nursing activities are provided to assist the student to develop understanding of the principles, functions and scope of public health nursing in a community health program.

236. **Management of Nursing Care.** Students assess, plan and provide nursing care for a group of patients. Concepts of management are investigated.

240. **Senior Seminar.** The identification and exploration of problems within or related to the nursing profession. A substantial paper is required.

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OF THE UNIVERSITY OF ROCHESTER

The following issues of the Bulletins of the University of Rochester are available upon request:	*Address requests to:*
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Eastman School of Music *(Regular and Summer Sessions)*	Director of Admissions Eastman School of Music 26 Gibbs Street Rochester, New York 14604
School of Medicine & Dentistry	Dean, School of Medicine & Dentistry Medical Center, The University of Rochester 260 Crittenden Blvd. Rochester, New York 14620
Department of Nursing	Chairman, Department of Nursing Helen Wood Hall The University of Rochester 260 Crittenden Blvd. Rochester, New York 14620
Graduate Studies	The Secretary of Graduate Admissions Office of Admissions Administration Building University of Rochester Rochester, New York 14627
University School	Dean, University School The University of Rochester Rochester, New York 14627


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