State University of New York

at Stony Brook

The Undergraduate Bulletin

1963-1964

State University of New York

THE STATE UNIVERSITY OF NEW YORK was established by the State Legislature in 1948. It comprises 56 units: three university centers, two medical centers, a Graduate School of Public Affairs, twenty-four State colleges (18 four-year and 6 two-year), and 26 locally-sponsored community colleges. Although separated geographically, all are united in the purpose to improve and extend opportunities for youth to continue their education beyond high school.

State University offers programs in the liberal arts and sciences; engineering; home economics; industrial and labor relations; veterinary medicine; ceramics; agriculture; forestry; maritime service; teacher education; law; pharmacy; medicine; dentistry; social work and business administration. The University's two-year programs also include liberal arts study and a wide variety of technical courses in such areas as agriculture, business, and the industrial and medical technologies.

Advanced graduate study at the doctoral level is offered by the University at 12 of its units, including the university centers and the Graduate School of Public Affairs. While graduate work can be pursued at 23 of the colleges, the programs at the majority of these units are now limited to the master's level. The University, however, is continuing to broaden and expand overall opportunities for advanced degree study.

Governed by a Board of Trustees appointed by the Governor, State University of New York plans for the total development of State-supported higher education. Each college of State University is locally administered. Students should write directly to the institution in which they are interested for admission forms.

Although State University of New York is one of the largest state universities in the country, its students have the additional advantages of attending relatively small colleges.

The State University motto is: *"Let Each Become All He Is Capable of Being."*

STATE UNIVERSITY OF NEW YORK AT STONY BROOK

College of Arts and Sciences

College of Engineering

The Undergraduate Bulletin

1963-1964

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Calendar

Fall Semester 1963

Freshman Orientation	September 21
Registration	September 24-25
Classes Begin	September 26
Thanksgiving Holidays	November 28-Dec. 1
Classes Resume	December 2
Christmas Holidays	December 22-January 5
Classes Resume	January 6
Semester Examinations Begin	January 23
Last Day of Semester	January 31

Spring Semester 1964

Registration	February 6-7
Classes Begin	February 10
Washington's Birthday (Holiday)	February 22 (Saturday)
Spring Holiday	March 23-31
Classes Resume	April 1
Final Examinations Begin	May 27
Memorial Day (Holiday)	May 30 (Saturday)
Last Day of Semester	June 6
Commencement	June 7

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The State University at Stony Brook, a publicly supported institution, provides the young people of New York with exceptional educational opportunities at low cost. As a university center it combines the traditional function of the production of knowledge through research and other creative activity with the conservation and dissemination of knowledge through teaching.

Stony Brook has undergraduate programs covering the full range of the liberal arts, science and engineering, and provides opportunity for the intellectual development of students who have the preparation and character to become responsible and contributing members of society. It offers the Bachelor of Arts, Bachelor of Science and Bachelor of Engineering Science degrees, the M.A., M.S., and Ph.D. degrees in physics, chemistry, and thermal sciences and engineering analysis in engineering, and is authorized to develop graduate programs in all of the principal fields of knowledge as soon as staff and facilities warrant.

Today our national need is broadly educated leadership, — the talents of America's sons and daughters at the highest level of capacity in every field of endeavor. This need is growing each decade with the increasing technical and social complexity of our national and international institutions. Only those who fully understand these institutions and have the capacity and the will to work through them will keep them free.

Universities train intelligence, kindle imagination and inculcate wisdom. Their primary responsibility is to develop America's greatest natonal resource, human intelligence, orient it culturally, and dedicate it spiritually, that it may make its fullest contribution and realize its highest significance in the solution of human problems.

Stony Brook can discharge its obligations to the people of New York State only if its students respond to the challenge and stimulus of learning. It therefore welcomes those who are grateful for the privilege of earning a college education, those who have faith in themselves and in their talents, and who have a desire to use fully and wisely the opportunities presented for self-development so that they may discharge with honor the responsibilities which must fall on their shoulders.

Paul D. Hartwell

Introductory

The State University of New York at Stony Brook, in the first half decade of its institutional life, experienced phenomenal growth, the pace of which will not be simply continued but greatly accelerated in the years immediately ahead. This process of development, the planned as well as the accomplished, must be stressed as the sailent fact in any account of the University.

In September, 1957, the State University College on Long Island was founded — at Oyster Bay, in temporary quarters on a handsome arboretum-estate donated by the late William R. Coe and called, significantly enough, Planting Fields — with fourteen members of the teaching faculty presenting six courses to approximately 145 freshmen, and with a mandate restricted to the training of teachers of mathematics and the natural sciences for secondary schools. Such were the modest beginnings, but evolution was rapid. Each of the first four years witnessed an increase in the number of students and faculty, an expansion of course offerings, and a steady advance in the curriculum to full undergraduate programs. A series of additions to the original mandate included inauguration of a program for non-teaching majors in mathematics and the sciences, and a program for engineering students, and finally the authorization to award further degrees, including the Bachelor of Arts, the Bachelor of Science and Bachelor of Engineering Science, the Master's Degree, and the Ph.D. This expansion of actual and potential functions, all mandated before the beginning of the fifth year, resulted in the organization of the College of Arts and Sciences with its fourteen departments, and the College of Engineering with four departments, and in the prompt initiation of planning for graduate work. The widening responsibilities of the institution required another and more adequate designation, and the school became known as the State University's Long Island Center.

The full measure of growth will become apparent if one compares the University's situation in September, 1962, with that of its founding five years earlier. In the fall of 1962 it had moved most of its operations to its permanent campus, on a 480-acre tract of land, the gift of Mr. Ward Melville. This new site is located in the Stony Brook - Setauket area, a region of woods and hills and small historic

villages on the North Shore of Long Island. Construction work had begun in 1960, and at the opening of the academic year 1962-1963 the Humanities and Chemistry buildings had been completed, as well as a residence hall to accommodate 616 students, a dining hall capable of serving 1,000, and a group of service buildings. The University had 750 students, a faculty of 122 members, undergraduate degree programs in eighteen disciplines in the two Colleges, and graduate students in three fields. It then received its present name — the State University of New York at Stony Brook. The swift succession of names sums up three significant stages of development, the original college, the expansion of the mandate in 1961, and the move to Stony Brook in 1962.

But this story of speedy advancement has significance less as a record of accomplishment than as revealing the momentum of growth inherent in the life of the University. More noteworthy than its humble origins and brief past are its great expectations. Only a partial notion of these expectations can be conveyed by the citing of plans and projected statistics, impressive as these may be. The buildings under construction and scheduled for completion before September, 1963, are the Library and the Biology, Engineering, and Physics buildings; present plans call for completion of the Health and Physical Education building by January 1964; of the Infirmary and Student Union buildings by December, 1964; of the Social Science, Graduate Engineering, and Administration buildings and the Fine Arts Center in 1965; and of the Earth Science building, and the Communications and Lecture Hall Center in 1966. By that year approximately $60,000,000 will have been invested in construction, equipment, and landscaping, and a student body of 3,000 is expected; residence halls to house over 6,500 students will be built by 1970, and an enrollment of 10,000 or more is envisioned for that year. A student entering as a freshman in 1963, then, will find himself in a burgeoning community and one that will present him with an ever expanding set of educational opportunities.

The University's confidence in an illustrious future does not rest simply on costly facilities and an exploding enrollment. Past progress has been qualitative as well as quantitative, and the faculty and administration are continuously pushing toward goals of institutional greatness as measured by the highest standards of scholarly and professional attainment. Such an effort is not a localized one; it finds impressive support in the Master Plan of the State University and the Report of the Heald Commission. The Master Plan, recog-

nizing that "in the twenty years ahead society will need trained intelligence of the highest quality," and recommending the establishment of a "comprehensive graduate center" at Stony Brook that "should offer graduate programs, through the doctorate degree, in a wide variety of subject areas," calls for a "highly qualified graduate faculty." The Heald Report recommends a public university at Stony Brook that "should be designed to stand with the finest in the country, and to attract and hold able men and women from all over the world." Such statements as these indicate why the State Univsity at Stony Brook has set its standards high, and takes pride in the leading role it has been assigned in New York's current efforts to develop publicly supported institutions of higher learning worthy of her preeminence in other aspects of the national life.

Moreover, with the relatively low tuition fees that tax support makes possible to a public institution, with the richness and variety of present programs to be increased as graduate work is introduced in each of the departments, with a faculty the present distinction of which is only partially revealed in the listing elsewhere of degrees earned and the institutions that have awarded them, and with an advantageous location — near the important scientific research facilities of the Brookhaven National Laboratory, and within easy accessibility to New York City — the State University of New York at Stony Brook can look ahead, without complacency but with optimism, to a future of proud service and high achievement.

Library

The library collections, which for the first six years were housed in temporary quarters, are now in their permanent home. In all they total more than 70,000 catalogued volumes. During the academic year 1962-63, well over 20,000 new books were acquired. And even this rate of growth will be accelerated to 35,000 volumes this year and later to more than 50,000 per annum.

The library has concentrated on the acquisition of primary source materials, monographs, and journal files that will furnish the materials needed in undergraduate and graduate programs. The library also purchases rare books and collections and has been the recipient of significant gifts. It is also a federal depository for government documents and publications.

In addition, it subscribes to more than 1,500 periodicals. Facilities for microfilm and microprint reading are available; the microfilm collection runs to more than 5,000 reels. For making reproductions the library has thermocopying machines and a microfilm reader-printer. There are approximately 2,000 long-playing phonograph records in the music collection.

The new library building seats 750 readers, houses 350,000 volumes and there are plans for an annex that will provide space for an additional 650,000 volumes. The new building is equipped as an open-stack library, with carrels, study rooms, projection and music rooms, and areas for special materials. It offers a maximum of free access to the collections, together with a maximum of privacy, by scattering small seating areas throughout the stacks. With its accelerating growth and attractive new quarters the library is the intellectual as well as the physical center of the new campus.

Admissions

Admissions to Undergraduate Study

The State University of New York at Stony Brook is open to men and women who have demonstrated academic competence in their prior schooling and who are prepared to continue their studies on a full-time basis.

An applicant is admitted after a careful analysis of data provided by high school or other scholastic records, standardized tests, and school recommendations. In many cases an interview will be held to assess his ability to perform the intellectual tasks required by the curriculum he has selected. Since a student may develop academic competence and intellectual qualities in various ways, both within and outside the context of formal instruction, no particular pattern of secondary school preparation is demanded, and no single criterion for admission based upon academic average or rank in class has been adopted. The degree requirements listed elsewhere in this Bulletin will enable a candidate to judge his own preparation in terms of the performance that will be expected of him at the University.

Final acceptance will depend in part upon receipt of an acceptable medical report.

Application Procedure for New Freshman

An application for admission may be obtained by writing the Admissions Office, State University of New York at Stony Brook, Stony Brook, New York.

A pamphlet, *How to Apply for Admission,* giving complete application instructions, is included with each set of application forms. The candidate is responsible for following the procedure outlined in this pamphlet.

Personal interviews will be required of some but not all applicants. Candidates may themselves request interviews for purposes of information or clarification. Interviews are of greater usefulness after the applicants academic record has been filed in the Admissions Office.

Appointments for interviews may be made by mail or by telephone to the Admissions Office, Telephone 246-5126 (Area Code 516). *Appointments may be made between 10:00 a.m. and 4:00 p.m. Monday through Friday.*

Advanced Standing

Advanced standing may be granted to transfer students who have completed acceptable courses in recognized institutions with a grade of C or its equivalent. Appropriate advanced standing will be given, however, wherever possible. Final evaluation of credit earned elsewhere will be made only upon the completion of one year of study in the State University at Stony Brook.

Advanced Placement

Advanced placement may be extended to new freshmen who have completed advanced courses in secondary school or who have in other ways developed academic competencies which entitle them to special consideration. However, all students will be expected to complete the required credit hours. Candidates undertaking advanced placement courses in secondary school are expected to take the appropriate examinations and to request that their scores be forwarded to this institution. Others desiring advanced placement should submit a written request for a review of their qualifications. In most cases a special examination or examinations will be required.

Special Students

No programs are offered at present for part-time students or non-degree candidates.

Notification of Admission

Notices of admission to the State University of New York at Stony Brook normally are mailed during the month of April. In some cases earlier notification may be made. Some negative decisions may also be made prior to the usual notification period.

Acceptance is conditional upon the successful completion of academic work in progress.

Entrance Examination

Applicants for admission must take the entrance examination described in *How to Apply for Admission.* Candidates are urged to complete this requirement as early in the application process as possible.

Although the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board is not required for admission, all applicants who sit for this examination are urged to have the results forwarded to the Admissions Office.

Candidates who reside out of state and are unable to take the regularly scheduled State University Entrance Examination may request permission to substitute the Scholastic Aptitude Test, the test of the American College Testing Program, or other recognized entrance examination. Such requests must be made in writing to the Director of Admissions at the earliest date possible.

Transfer Students

Any applicant who has been previously registered at a degree-granting institution must apply as a transfer student. Each transfer student, in addition to completing the application procedure outlined for new freshmen, must submit the following:

An official transcript of record from each collegiate institution attended. (If no grades were earned, a statement of attendance and honorable dismissal is required.)

A Course Evaluation Request (forms may be obtained from the Office of Admissions) for each course the applicant wishes considered for advanced standing.

Additional Information

Additional information may be obtained by writing to the Office of Admissions, State University of New York at Stony Brook, Stony Brook, New York.

Academic Programs

The State University of New York at Stony Brook has been authorized to award the degrees of Bachelor of Arts, Bachelor of Science, Bachelor of Engineering Science, Master of Arts, Master of Science, and Doctor of Philosophy.

In the College of Arts and Sciences, the degree of *Bachelor of Arts* is offered with a major in Economics, English, the Fine Arts (Music or Art), Foreign Languages, History, Philosophy, Political Science, Psychology, or Sociology-Anthropology; the degree of *Bachelor of Science* is offered with a major in the Biological Sciences, Chemistry, Mathematics, Physical Sciences or Physics. The College of Engineering offers a program leading to the degree of *Bachelor of Engineering Science* (the requirements for which are listed below, page 97).

The University requires each candidate for an undergraduate degree to earn a minimum of 120 credits in the College of Arts and Sciences and 128 in the College of Engineering in courses approved for his program by a faculty advisor.

Students in Bachelor of Arts or Bachelor of Science degree programs may also earn temporary certification for teaching in the academic fields in secondary schools. (See "Department of Education" for further information.)

Graduate programs are offered in the fields of engineering (engineering analysis, thermal sciences), chemistry, and physics. Departments throughout the University will, at varying dates, introduce graduate work leading to advanced degrees. For further information see the separate *Graduate School Bulletin.* (Inquiry should be addressed to the Graduate School Office of the State University of New York at Stony Brook.)

College of Arts and Sciences

Requirements for the Bachelor of Arts and Bachelor of Science Degrees

All candidates for the Bachelor of Arts and Bachelor of Science degrees must satisfy the following requirements, normally by attaining a passing grade in appropriate courses and exceptionally by being granted an exemption:

a. English 101, 102 — 6 credits

b. Humanities 101, 102 and 151, 152 — 12 credits

c. Social Science — 12 credits
(This requirement may be satisfied by the successful completion of courses from 3 of the 5 Social Science departments.)

d. Two one-year sequences of course work in the areas of mathematics and science (biology, chemistry, physics), with one of the years in a course that includes a laboratory; in meeting this requirement no more than one year of course work may be taken in a single department. — 14-16 credits

Students are to complete the above requirements at the earliest possible time.

Each candidate is required before graduation to demonstrate a two-year level of achievement in the foreign language approved for his program. This achievement may be demonstrated either by (a) passing a proficiency examination upon admission to this institution or (b) satisfactorily completing a second-year course in the foreign language approved for his program. Proficiency is thus the level of achievement normally attained after approximately two years of college study of the foreign language.

For graduation a student must have earned at least 120 credits and a cumulative grade-point average in all his courses of 2.00.

The undergraduate must meet the requirements of one of the departmental programs of concentration.

Any student admitted without advanced standing will in his first year take two semesters of English composition; one year of

mathematics or natural sciences; two semesters of Humanities (Humanities 101, 102, 151, 152) *or* two semesters of Social Science. Courses to meet the Social Science requirements are to be chosen from the following: Economics 101, 102; History 101, 102; Political Science 101, 102; Psychology 101, and any Psychology course listed in the Bulletin with the exception of Psychology 330, 340, 391, 392; and Sociology-Anthropology 101, 102. (Students selecting one semester of Political Science must take Political Science 101.)

Students majoring in the Departments of English, Fine Arts, Foreign Languages and Literatures, and Philosophy must select two semesters from the above Humanities courses in the freshman year.

Students majoring in the Departments of Economics, History, Political Science, Psychology, and Sociology-Anthropolgy must select two semesters in the above Social Science courses in the freshman year.

It is strongly recommended that a foreign language be elected in the freshman year.

A student may be exempted from any of the course requirements on the recommendation of the agency supervising the course.

Subjects of Instruction

Courses are numbered in accordance with the following general pattern:

101-199, freshman-sophomore courses

201-399, junior-senior courses

401-499, graduate courses

Courses the titles of which are bracketed will not be offered in 1963-64.

The designation of courses in the official transcripts of academic records will employ the following symbols: BIO, Biological Sciences; CHE, Chemistry; ECO, Economics; EDU, Education; EGL, English; FAS, Fine Arts (and FAA, Art; FAM, Music; FTH, Theatre) ; FLA, Foreign Languages and Literatures (and FLC, Comparative Literature; FLF, French; FLG, German; FLR, Russian; FLS, Spanish, etc.); HIS, History; HUM, Humanities; MAT, Mathematics; POL, Political Science; PHI, Philosophy; PHS, Physical Science; PHY, Physics; PSY, Psychology; SAN, Sociology-Anthropology; SSC, Social Science.

Department of Biological Sciences

Professor: Frank C. Erk (Chairman)
Associate Professors: Edwin H. Battley, Sol Kramer, Robert W. Merriam, Robert E. Smolker, Bernard D. Tunik, George C. Williams
Assistant Professors: Albert D. Carlson, James A. Fowler, Edward E. Gilbert, Marvin J. Rosenberg
Research Associate: David Wallace
Instructors: Howard C. Howland, Joy D. Talsma

The undergraduate program in biology is designed to prepare students for advanced study in the biological sciences, for secondary school teaching, and for certain positions in industry and research. The core of the program consists of three one-year courses and a summer field course in ecology. In addition certain courses in mathematics, chemistry, and physics are required; these courses contribute to an adequate understanding of the content of the program, and are essential for advanced work in the biological sciences.

Requirements for the Major in Biological Sciences

In addition to the general University requirements for the Bachelor of Science degree, the following courses are required for the major in Biological Sciences:

A. Study within the area of the major
Biology 101, 102 (*Introduction to Biological Science*)
Biology 151, 152 (*Cytology, Genetics and Evolution*)
Biology 201, 202 (*General Physiology*)
Biology 235 (*Field and Theoretical Ecology*)

B. Courses in related fields
Chemistry 101, 102 (*General Chemistry*)
Physics 161, 162 (*General Physics*)
Mathematics 111, 112 (*Introduction to Mathematical Science*)
Mathematics 151, 152 (*Calculus*)
Foreign Language (*Proficiency in French, German, or Russian*)

Courses of Instruction

Biology 101, 102. Introduction to Biological Science

An introductory course in biological science which acquaints the student with the nature of living organisms in terms of their structure and function; their reproduction, heredity, and development; their interrelationships with the environment; and their evolution. Closely correlated with class discussions on the assigned readings are laboratory exercises which encourage the student, through independent work, to develop skill in the design, performance, and critical analysis of experiments.

Mr. Williams and Staff — Fall and Spring, 4 credits each semester

Biology 151, 152. Cytology, Genetics and Evolution

The emphasis is on the cytological and genetic mechanisms which underlie and provide the theoretical bases of our modern understanding of the origin, development, and modification of the individual, the population, the race, and the species.

Prerequisite: Biology 101, 102 with grade of C.

Messrs. Erk, Merriam — Fall and Spring, 4 credits each semester

Biology 201, 202. General Physiology

This course considers the cell as a unit of function and attempts to relate cellular function to problems of tissue and organ function and interaction within organisms. Emphasis is placed on the delineation of the broad problem areas which current and future research may enlighten. Both single-celled and multi-cellular organisms are used, representing both plants and animals.

Prerequisites: Biology 101, 102 with a grade of C; Chemistry 101, 102; and Physics 161, 162.

Mr. Tunik — Fall and Spring, 4 credits each semester

Biology 235. Field and Theoretical Ecology

An examination of living organisms from the point of view of the environment, with attention to application of single and holocentric approaches to evolutionary processes, to the structure and function as a response to physical and biotic factors, and to the methods used in classifying organisms, environments, and ecosystems. The class meets six hours each day for six weeks in the summer.

Prerequisite: Biology 101, 102 with grade of C.

Mr. Gilbert — Summer, 6 credits

Biology 239. Materials and Methods in Teaching Biology

This course, designed for prospective secondary school teachers of biology, emphasizes methods and materials appropriate to the teaching of an experimental science at that level.

Prerequisite: Biology 101, 102 with grade of C; attainment of Junior status.

Mr. Smolker — Spring, 3 credits

[Biology 241. Microbiology]

An introduction to the study of microorganisms through a series of problems which include considerations of taxonomy, development, structure, physiology, reproduction, and ecology.

Prerequisite: Biology 101, 102 with grade of C.

Mr. Battley — Spring, 4 credits

To be offered 1964-65.

[Biology 245. Form and Function in Higher Plants]

This course emphasizes the developmental pathways in examining the relationships between form and function in green plants. The laboratory consists of an analysis of the development, physiology, and morphology of a variety of living plants.

Prerequisite: Biology 101, 102 with grade of C.

Spring, 4 credits

To be offered in 1964-65.

Biology 248. Invertebrate Zoology

An examination of the invertebrate phyla from the viewpoint of increasing levels of structural and functional organization. Living materials are used whenever possible to emphasize the dynamic aspects of invertebrate life.

Prerequisite: Biology 101, 102 with grade of C.

Mr. Williams — Fall, 4 credits

Biology 249. Vertebrate Zoology

This course emphasizes the structural and developmental aspects of vertebrate animals in an evolutionary context. Extensive experience with these forms is gained by detailed dissection of several key representatives of the group.

Prerequisite: Biology 101, 102 with grade of C.

Mr. Fowler — Spring, 4 credits

Biology 255. Current Topics in Biology

The participants in this informal seminar course present brief talks based on selected readings from the current literature of some area of biological investigation. The work of each semester concentrates on a different area of biology, and the course may be repeated for credit.

Prerequisite: Open to juniors and seniors with the permission of the instructor.

Fall and Spring, 1 credit each semester

Biology 341. Integrative Mechanisms

This course, which considers muscular physiology, neurophysiology, endocrinology, and sensory physiology, focuses upon the physiological mech-

anisms involved in animal behavior and the roles they play in coordinating and integrating the activities of organisms.
Prerequisite: Biology 201, 202.

Mr. Kramer — Fall, 4 credits

Biology 342. Ethology

A sequel to Biology 341, this course examines the behavioral activities of diverse groups of animals from the ethological, or comparative, standpoint. The evolution of inherited motor patterns which adapt organisms to their particular environments, and the relationships of such motor behavior to concepts in taxonomy, genetics, and ecology, are emphasized.
Prerequisites: Biology 201, 202, 341.

Mr. Kramer — Spring, 4 credits

Biology 351, 352. Physical and Chemical Bases of Biological Systems

This course treats fundamental biological concepts, with emphasis on the contributions of the physical sciences to the understanding of biological problems. It utilizes lectures, discussions, and laboratory work to acquaint the student with biology as a whole, but especially with the experimental framework underlying our present concepts of dynamic life processes. This course is especially suitable for students doing their major study in chemistry or physics. Three hours of lectures or discussion, and three hours of laboratory per week.
Prerequisites: One year of physics, one year of chemistry, and Mathematics 113, 114 or 151, 152.

Fall and Spring, 4 credits each semester

Biology 391-392. Senior Project

In this course the more capable senior biology major may work under the supervision of a member of the staff in developing an individual project making use of the knowledge and techniques acquired in previous courses. He is expected to prepare an appropriate report on his project and to present a student seminar. Credit is determined on the basis of the adequacy of the project presented.
Prerequisite: Open to qualifying biology majors, after the completion of their junior year, with the consent of the chairman and the staff member who will supervise the work.

Staff — Fall and Spring, 2 to 4 credits

Department of Chemistry

Professors: Francis T. Bonner (Chairman), Fausto Ramirez, Sei Sujishi

Associate Professors: John M. Alexander, Edward M. Kosower, Paul C. Lauterbur

Assistant Professors: Robert S. Boikese, Theodore D. Goldfarb, William J. LeNoble, Arthur R. Lepley, Robert Schneider, Richard Solo

The Undergraduate program in chemistry is designed to prepare the student for graduate study in chemistry, or for industrial or other employment. The Department of Chemistry is accredited by the Committee on Professional Training of the American Chemical Society, and its program meets the certification standards of that Committee.

In general, students intending to teach chemistry in secondary schools are advised to register for the program leading to the Bachelor of Science in Physical Science (see page 75). A student who plans to complete the requirements for the B.S. degree with a major in chemistry and intends simultaneously to acquire certification for secondary school teaching must have the approval of the Chair man of the Department of Chemistry and the Director of Teacher Preparation.

The chemistry program comprises required course work of one year each in general chemistry, quantitative chemistry, organic chemistry, organic chemistry laboratory, and physical chemistry, and one semester each in physical chemistry laboratory, in experimental methods of chemistry, and in advanced inorganic chemistry. In addition, the student is required to complete two years of mathematics and at least three semesters of physics.

Requirements for the Major in Chemistry

In addition to the general University requirements for the Bachelor of Science degree, the following courses are required for the major in Chemistry:

A. Study within the area of the major

Chemistry 101, 102. *General Chemistry*
Chemistry 151, 152. *Quantitative Chemistry*

Chemistry 201, 202.	*Organic Chemistry*
Chemistry 203, 204.	*Organic Chemistry Laboratory*
Chemistry 235, 236.	*Physical Chemistry*
Chemistry 251.	*Physical Chemistry Laboratory*
Chemistry 301.	*Experimental Methods of Chemistry*
Chemistry 305.	*Intermediate Inorganic Chemistry*

B. Courses in related areas

Mathematics 113, 114 (*Analysis*) and 155, 156 (*Intermediate Analysis*)

Physics: at least three semesters

Foreign Language: the proficiency requirement must be met in German

Courses in Chemistry

Chemistry 101, 102. General Chemistry

The first year of a two-year sequence preparatory to advanced study in chemistry, designed at the same time to meet the general chemistry requirements of students who do not plan to specialize in the subject. Emphasis is placed on chemical principles, presented in terms of modern theory and in a context of sufficient descriptive subject matter to lend them interpretive value. The historical development of current chemical theory is treated to the extent that it adds meaningful perspective to the discussion. The descriptive facts of chemistry are discussed in terms of and as examples of the principles as they are developed. Carefully selected laboratory experiments are used to illustrate the principles presented and to provide the student with experience in chemistry. Principal topics covered are the states of matter, gas laws, kinetic theory, chemical combination and the atomic theory, chemical equations and stoichiometry, properties of the elements and the periodic table, atomic structure, chemical bonding, oxidation-reduction reactions, solutions, electrolytes, ideal systems at equilibrium, and selected topics in descriptive chemistry. Two lecture hours, one recitation hour, and four laboratory hours per week.

Staff — Fall and Spring, 4 credits each semester

Chemistry 151, 152. Quantitative Chemistry

In the first semester, ideal chemical equilibrium systems, particularly aqueous solutions, are discussed. Equilibria involving solubility products, acid-base ionization constants, and electrode potentials are treated in detail. The laboratory work is designed to develop techniques which are essential for precise and accurate chemical analysis. Experiments involving calibration of equipment, gravimetric and volumetric analyses are included.

In the second semester, non-ideal chemical equilibrium systems and chemical kinetics are included. The objective of the laboratory work is to obtain significant physico-chemical data, such as equilibrium and rate constants, with reliance upon the techniques developed in the first semester. Two lecture hours and six laboratory hours per week.

Prerequisite: Grade of C or better in Chemistry 102 or permission of the Chairman; Corequisite: Mathematics 155, 156.

Messrs. Schneider, Sujishi Fall and Spring, 4 credits each semester

Chemistry 201, 202. Organic Chemistry

A systematic discussion of the structure, physical properties, and chemical reactions of the main classes of carbon compounds. A treatment of electronic, stereochemical, and kinetic theory precedes a discussion of reactions. Mechanistic aspects of organic reactions are emphasized as well as the use of these reactions in synthesis. Carbohydrates, proteins, liquids, vitamins, polymers and dyes are briefly examined. Three lecture hours per week.

Prerequisite: Grade of C or better in Chemistry 152, or permission of the Chairman.

Messrs. Ramirez, Kosower, LeNoble, Lepley

Fall and Spring, 3 credits each semester

Chemistry 203, 204. Organic Chemistry Laboratory

An introduction to the techniques of preparing and purifying organic compounds. The emphasis in the second semester is on the use of modern instrumentation as an aid to organic synthesis and qualitative organic analysis. Eight laboratory hours per week.

Prerequisite: Concurrent or previous registration in Chemistry 201 or its equivalent.

Messrs. Ramirez, Kosower, LeNoble, Lepley

Fall and Spring, 2 credits each semester

Chemistry 235, 236. Physical Chemistry

A continuation and amplification of the physical interpretation and mathematical analysis of chemical phenomena begun in Chemistry 152. Emphasis is given to the theoretical explanation of empirical laws. Considerable time is spent in the development and application of the laws of thermodynamics to ideal and real systems. Statistical thermodynamics and wave mechanics are given sufficient introductory treatment to serve as a basis for studies of chemical kinetics, the states of matter, and molecular structure. Three lecture hours each week.

Prerequisite: Mathematics 155-156, Physics 101, 102, or 161, 162, and a grade of C or better in Chemistry 152; or permission of the Chairman.

Messrs. Bonner, Goldfarb

Fall and Spring, 3 credits each semester

Chemistry 251. Physical Chemistry Laboratory

An introduction to the modern techniques of physicochemical experimentation. The student is given a choice of experiments in such areas as thermochemistry, electro-chemistry, crystallography, molecular spectroscopy, and chemical kinetics. Independent investigation is stressed. Use of the chemical literature, including reference works and journals, is required in preparation of formal laboratory reports. Seven hours of laboratory and one hour of lecture per week.

Corequisites: Chemistry 236, or permission of the Chairman.

Mr. Solo — Spring, 3 credits

Chemistry 301. Experimental Methods of Chemistry, I

Training in the use of various instrumental methods commonly employed in the chemical laboratory, such as spectroscopy, chromatagraphy, stable and radioactive tracer analysis, polarography, etc. Lectures deal with the theoretical as well as the practical aspects of instruments and instrumental methods. In the laboratory, the principal stress is on the analytical aspects of instrumental techniques. Two lecture hours and six laboratory hours per week.

Prerequisites: Grades of C or better in Chemistry 202, Chemistry 204, Chemistry 236, and Chemistry 251, or permission of the Chairman.

Messrs. Lauterbur, LeNoble — Fall, 4 credits

Chemistry 302. Experimental Methods of Chemistry, II

A continuation of Chemistry 301. Lectures deal with theory of purification and with a number of other selected topics. Laboratory work includes qualitative organic analysis based on both chemical and instrumental techniques. Project assignments involving a broad cross section of experimental methods will be given to specially qualified students. Two lecture hours and six laboratory hours per week.

Prerequsite: Grade of C or better in Chemistry 301, or permission of the Chairman.

Mr. LeNoble — Spring, 4 credits

Chemistry 305. Intermediate Inorganic Chemistry

A survey of inorganic chemistry, covering various classes of inorganic compounds and reactions, with emphasis on the structural aspects. Wherever possible, the subject is treated on the basis of modern concepts of chemical bonding. Thermodynamic and kinetic aspects of inorganic reactions are included. Prerequisites: Grades of C or better in Chemistry 202, 204, 236 and 251, or permission of the Chairman.

Mr. Sujishi — Spring, 3 credits

Chemistry 315. Intermediate Organic Chemistry

An extension of the material introduced in Chemistry 201, 202. Electronic and stereochemical theory are utilized to discuss selected organic reactions, syntheses, and natural products.

Prerequisite: Grade of C or better in Chemistry 202, or permission of the Chairman. Three lecture hours per week.

Mr. Ramirez — Fall, 3 credits

Chemistry 325. Intermediate Physical Chemistry

An introduction to the methods and theory currently used to investigate and describe atomic and molecular structure. Topics to be covered include introductory wave mechanics, exact and approximate solutions to the Schroedinger equation, applications to the problems of chemical bonding, and atomic and molecular spectroscopy. Three lecture hours per week.

Prerequisite: Grade of C or better in Chemistry 236, or permission of the Chairman.

Mr. Lauterbur — Spring, 3 credits

Chemistry 391, 392. Senior Research

Research to be carried out under the supervision of a staff member of the Department, on a research problem to be selected by the student after consultation with his staff supervisor. The results of this work are to be submitted to the Department in the form of a senior research report.

Students who have achieved a cumulative grade point average of 3.00 or higher through their first five semesters and are interested in registering for this course should first apply to a staff member for tentative acceptance as a research student and then file a written petition with the Chairman of the Department no later than the second Monday in May preceding the student's senior year.

Prerequisites: A cumulative grade point average of 3.00 or higher, acceptance as a research student by a member of the departmental staff, and permission of the Chairman.

Fall and Spring, 2 credits each semester

Note: Senior students having high academic standing in chemistry may petition the Department for permission to register in certain first-year graduate courses. See Graduate School Bulletin.

Department of Economics

Associate Professors: Charles Hoffmann (Acting Chairman), Marvin Kristein

Assistant Professor: Eliyahu Kanovsky

Requirements for the Major in Economics

In addition to the general University requirements for the Bachelor of Arts degree, the following courses are required for the major in Economics:

A. Study within the area of the major

Economics 101, 102 *(Economic Principles and Problems)*
Economics 201 *(Money, Banking and Monetary Theory)*
Economics 202 *(Business Fluctuation and Fiscal Policy)*
Economics 211 *(Principles of Economic Analysis)*
Economics 221 *(Economic Statistics)*
Economics 233 *(Monopoly and the American Economy)*

B. Recommended courses

Economics 222 *(Economic Statistics, 2nd semester)*
Economics 391, 392 *(Senior Seminar in Economics)*
One year of college calculus.

C. Study in related fields

Twelve hours of work in courses in related areas in the Social Sciences approved for the student's program.

Courses in Economics

Economics 101. Economic Principles and Problems

A basic introduction to Economic Analysis on the "macro" and "micro" levels, with an emphasis on economic policy. Among other significant issues, the course emphasizes the fundamental thinking basic to understanding policies dealing with the business fluctuations, anti-trust problems, foreign trade and the farm problem. The first semester emphasizes "macro" economics.

Mr. Kristein — Fall and Spring, 3 credits each semester

Economics 102. Economic Principles and Problems

This course deals with "micro" economics.

Prerequisite: Economics 101 or permission of instructor.

Mr. Kristein — Spring, 3 credits

Economics 201. Money, Banking and Monetary Theory

An introduction to modern monetary institutions, their relationship to the economy, and governmental policies in this area. Particular emphasis will be placed on monetary theory and national income analysis, and their applications to past and present problems.

Mr. Kanovsky — Fall, 3 credits

Economics 202. Business Fluctuations and Fiscal Policy

The measurement and analysis of prosperity and depression. The statistical evidence for the existence of "cycles" is examined. Theories of "cycles" and fluctuations are historically studied and "tested".

Prerequisite: Economics 201.

Staff — Spring, 3 credits

Economics 206. Economics of Industrial and Labor Relations

A study of the evolution of labor unions; of collective bargaining, with an emphasis on current labor problems, union and non-union; and of the changing composition of the labor force, wage differentials, the theory of wage determination, labor legislation and unemployment.

Prerequisite: Economics 101, 102 or permission of instructor.

Mr. Kanovsky — Spring, 3 credits

Economics 210. Introduction to International Economics

The course covers the theory of international trade, protection, commercial policy, customs unions, capital movements, and international finance.

Prerequisite: Economics 101, 102 or permission of instructor.

Mr. Kristein — Spring, 3 credits

Economics 211. Principles of Economic Analysis

Economic theory of cost, demand, price and markets. The application of theory to familiar problems is emphasized. International trade theory is presented as an application.

Mr. Kanovsky — Fall, 3 credits

Economics 221. Economic Statistics

The purpose of this course in Economic Statistics is to prepare the student to deal with a variety of statistical studies basic to Economics and related Social Sciences. The course will emphasize the collection, presentation, analysis and interpretation of various statistics. The first semester emphasizes collection, presentation, central tendency, measures of significance and correlation. Two hours of laboratory work, additional.

Mr. Kanovsky — Fall, 4 credits

Economics 222. Economic Statistics

A continuation of Economics 221, which is a prerequisite.

Mr. Kanovsky — Spring, 4 credits

Economics 233. Monopoly and the American Economy

The significance of the variety of lapses from competition in the modern American economy is related to the problems of public policy in this area. Prerequisite: Economics 211.

Staff — Spring, 3 credits

Economics 391, 392. Senior Seminar in Economics

The senior seminar will emphasize an examination of current research in the various areas of specialization in economics. In addition to the areas of the core courses, these may include econometrics, economic statistics, international trade, economic development, public finance, labor economics, economic history, and the history of economic thought. The student will be required to prepare a paper demonstrating his acquaintance with, and command of, basic literature and research techniques. Prerequisite: senior standing.

Mr. Kristein — Fall and Spring, 3 credits each semester

Department of Education

Professors: Leonard Gardner (Chairman and Director of Teacher Preparation), Frank R. Peters
Assistant Professor: Sidney I. Love
Instructor: Herbert S. Strean

The Department offers those courses in education required for the provisional certificate for secondary school teachers and advises prospective teachers with regard to the fulfillment of certification requirements.

The Center offers programs leading to the provisional certificate in the following fields: biology, chemistry, English, foreign languages, mathematics, physics, and social studies. There is no undergraduate major in education.

Teacher Certification

Students wishing to teach in secondary schools may take Bachelor of Arts or Bachelor of Science degree programs which include New York State requirements for teacher certification. These requirements include at least 18 credits in Education, including Human Growth and Behavior, 3 credits; Methods and Materials of Teaching, 3 credits; Practice Teaching, 6 credits; History and Philosophy of Education, 6 credits. Departmental advisors and the Director of Teacher Preparation will inform the student of the courses designed to satisfy these requirements in his major field.

At present the following courses in Materials and Methods of Instruction are being offered:

Biology 239. Materials and Methods in Teaching Biology
English 239. Methods of Instruction in Literature and Composition
Foreign Languages and Literatures 239. Methods and Materials in the Teaching of Foreign Languages
Mathematics 239. The Number System
Physics 239. Materials and Methods in Teaching Physical Science (for those preparing to teach either physics or chemistry)
Social Science 239. Materials and Methods in Teaching Social Studies

Courses in Education

Education 201. Adolescent Behavior and Development in the Classroom

The classroom is used as a laboratory situation in which the group interactions constitute an object for study and analysis. This experience is supplemented with reading assignments made from the literature of education, adolescent growth and development, and the psychology and sociology of personality and behavior.

Messrs. Gardner, Love, Strean

Fall and Spring, 3 credits each semester

Education 345, 346. History and Philosophy of Education

An investigation of educational theories and institutions designed to help the student integrate his educational experience. The investigation centers on the purposes of knowledge and education, the relations among the sciences and their organization into curricula, and the ways in which knowledge is acquired and transmitted. The first semester considers the history of educational institutions in their relations to social aims and to the development of the sciences. The second semester examines the fundamental presuppositions of educational theories. This course is identical with Philosophy 345, 346 (History and Philosophy of Education). Prerequisite: Senior standing.

Messrs. Rodin, Sternfeld

Fall and Spring, 3 credits each semester

Education 350. Practice Teaching

Prospective secondary school teachers receive supervised practice in teaching their subjects to high school classes, by arrangement with selected Long Island high schools. Frequent consultations with the supervising teacher and twice-weekly seminar meetings with a University faculty member help the student to interpret and evaluate his apprenticeship experience.

Prerequisite: Senior standing and approval of Director of Teacher Preparation.

Messrs. Gardner, Love, Peters, Strean Fall and Spring, 6 credits

Department of English

Professors: Jack Ludwig (Acting Chairman), Alfred Kazin, Richard Levin

Associate Professors: Edward Fiess, Homer B. Goldberg, Robert M. Jordan, Robert Marsh, Thomas Rogers, Judah L. Stampfer

Assistant Professors: Ruth Blackburn, Joseph Pequigney

Instructors: Elizabeth Coleman, Richard F. Dunlavey, Carolyn Faulk, Howard J. Harvey, Norman R. Leer, Ruth Miller, William F. Walsh

Requirements for the Major in English

In addition to the general University requirements for the Bachelor of Arts degree, the following courses are the requirements for the major in English:

A. Study within the area of the major

English 250 *(English Language)*
English 281, 282 *(Literary Criticism)*
English 374 *(Shakespeare)*

A minimum of six approved electives in English and American literature, chosen with the approval of the departmental adviser to secure a proper distribution among the major historical periods and literary genres. At least four of these courses must be at the 300 level.

B. Study in related areas

Two years of course work in approved foreign languages, which must include at least six hours of third-year college level study of literature in a foreign language.

Two semesters of course work in English or American history.

Two semesters of course work in philosophy and/or comparative literature.*

C. Departmental examination

Each student must pass a departmental examination on a prescribed list of books covering the range of English and American literature. This examination is normally taken at the beginning of the senior year.

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* "Comparative literature" includes such courses as *English* 392 (Satire) or *Humanities* 221 (Tragedy).

Courses in English

English 101, 102 and *Humanities* 101, 102 are prerequisites to all other courses in the department.

English 101, 102. Composition

English 101, 102 is a first-year course in writing and reading, required of all students. It gives the student considerable practice in writing exposition and argument, and makes use of selections in prose and imaginative literature for analysis of form and style and improvement in reading proficiency.

Staff — Fall and Spring, 3 credits each semester

English 151. Interpretation of Poetry

Poems in English of various periods and types and varying complexity will be analyzed in order to develop the student's capacity as a reader of poetry.

Staff — Fall and Spring, 3 credits each semester

English 161. Techniques of Fiction

Short stories and novels will be used in the analysis of stylistic and structural modes employed by writers of prose fiction.

Staff — Fall and Spring, 3 credits each semester

English 239. Methods of Instruction in Literature and Composition

The intellectual grounds on which the teaching of literature and composition in secondary school rests will be examined, and the problems involved in communicating genuine literary values to high school students will be explored.

Prerequisite: Junior standing.

Mr. Rogers — Fall, 3 credits

English 250. The English Language

The course seeks to improve the student's understanding and control of the English language, especially in its spoken form, through practice and through trained observation. The semantic, phonetic, and syntactical aspects of English are studied from the point of view of past history and present usage.

Spring, 3 credits

English 281, 282. Literary Criticism

Logical analysis and practical illustration of the problems, methods, and doctrines of selected major literary critics from ancient to modern times.

Prerequisite: Junior standing.

Staff — Fall and Spring, 3 credits each semester

English 310. English Novel

The English novel of the eighteenth and nineteenth centuries will be studied with emphasis upon comparative analysis of the form and style of novels of the major figures.

Mr. Goldberg — Fall, 3 credits

English 311. Contemporary British and American Novel

A study of the novels of such figures as Joyce, Lawrence, Fitzgerald, Faulkner, Hemingway, Forster.

Mr. Ludwig — Spring, 3 credits

[English 323. Poetry of the Early Seventeenth Century]

The poetry of Donne, Jonson, Herbert, Herrick, Crashaw, Vaughn, and Marvell will be discussed, and some attention given to the minor poets of the period.

Mr. Pequigney — 3 credits

To be offered 1964-65.

English 325. Prose and Poetry of the Neoclassical Period

Selected works of poetry and intellectual prose from the late seventeenth to the late eighteenth centuries.

Mr. Marsh — Spring, 3 credits

English 328. Poetry of the Nineteenth Century

Works of the major English poets from Wordsworth and Coleridge to Thomas Hardy.

Mr. Stampfer — Fall, 3 credits

English 330. Modern British and American Poetry

Twentieth-century British and American poetry, with concentration on such figures as William Butler Yeats, T. S. Eliot, W. H. Auden, Wallace Stevens, Dylan Thomas, and Robert Frost.

Mr. Ludwig or Mr. Stampfer — Spring, 3 credits

[English 341. Representative Figures in American Literature I]

The work of major American writers from the Colonial to the Civil War periods.

Mr. Fiess — Fall, 3 credits

To be offered 1964-65.

[English 342. Representative Figures in American Literature II]

This course, which is a continuation of English 341 but may be taken separately, will examine the work of major American writers from the Civil War period to the present.

Mr. Fiess — Spring, 3 credits

To be offered 1964-65.

English 343. Seminar in Major American Authors

The members of the seminar will make an intensive study of major American writers of the earlier nineteenth century.

Mr. Kazin — Fall, 3 credits

English 344. Seminar in Major American Authors

The members of the seminar will make an intensive study of major American writers of the later nineteenth and twentieth centuries.

Mr. Kazin — Spring, 3 credits

[English 350. Tudor and Stuart Drama]

The course covers the period from the beginnings of English secular drama to the closing of the theaters in 1642, studying representative plays from the major dramatists (except Shakespeare) and the major genres. Prerequisite: English 374, or consent of instructor.

Mr. Levin — 3 credits

To be offered 1964-65.

English 361. Renaissance Prose

Major prose writers of the sixteenth and earlier seventeenth centuries will be read, and their styles examined as well as the intellectual contents and contexts of their work.

Mr. Pequigney — Fall, 3 credits

English 371. Chaucer

The course consists mainly in a study of *The Canterbury Tales* and *Troilus and Criseyde* in Middle English. The minor poems and other works receive some attention.

Fall, 3 credits

[English 374. Shakespeare]

Shakespeare's achievement is examined by the analysis of about fifteen of his plays selected to represent the major types of drama that he wrote.

Mr. Levin or Mr. Stampfer — 3 credits

To be offered 1964-65.

[English 377. Milton]

All of Milton's English poetry and selections from his prose works will be studied, with *Paradise Lost* to receive the major emphasis.

Mr. Pequigney 3 credits

To be offered 1964-65.

[English 381. Joyce]

The poetry and fiction of James Joyce will be read, including passages from *Finnegan's Wake*. Selected works will be carefully analyzed, with *Ulysses* the major emphasis.

Prerequisite: English 310 or 311, or consent of instructor.

Mr. Ludwig 3 credits

To be offered 1964-65.

English 390. Independent Project

This advanced tutorial will culminate in a major essay that permits the student to apply in a rigorous and original manner the disciplines and knowledge he possesses to a restricted topic in English literature.

Prerequisites: senior standing and consent of the chairman of the department.

Staff Spring, 3 credits

[English 392. Satire and the Satiric Spirit]

A critical analysis of satire and the satiric spirit from Aristophanes through the Roman Formal Satirists—Horace, Juvenal, Persius—to writers such as Chaucer, Rabelais, Ben Jonson, Molière, Dryden, Swift, Voltaire, Pope, Byron, Stendhal, Flaubert.

Prerequisites: senior standing or consent of instructor.

Mr. Ludwig 3 credits

To be offered 1964-65.

English 395. The Bible as Literature

The course stresses the literary forms and themes in selected readings from the Old and New Testaments.

Miss Blackburn or Mr. Stampfer Spring, 3 credits

Department of Fine Arts

Professor: John Newfield (Drama), Chairman
Associate Professors: Marshall Bialosky (Music), Allan Kaprow (Art)
Assistant Professors: Edward J. Countey, Jr. (Art), Jacques Guilmain (Art History), Charles L. Holt (Drama), Isaac Nemiroff (Music)
Instructors: John Lessard (Music), Robert W. White (Art)

This Department includes the field of Music, Art, and Theatre Arts and offers programs leading to the Bachelor of Art degree in either Music or Art. In the field of Theatre Arts the Department offers at present a number of elective courses.

I. Requirements for the Major in Art

In addition to the general University requirements for the Bachelor of Arts degree, the following courses are required for the major in Art:

A. Study within the area of the major

1. Studio Courses: *Art* 121, 122, 221, 222 — 12-14 credits

Students may take 221 and 223 or 222 and 224 instead of 221 and 222, depending on their special interest in either Painting or Sculpture.

2. Theory and History — 24 credits

B. Courses in related areas

1. Electives in Music, Theatre Arts, and Aesthetics — 9 credits
2. Additional Foreign Language — 6 credits

(Art majors are required to show proficiency in Italian and German.)

C. Comprehensive examination

At the conclusion of the senior year all art majors must pass a departmental examination on certain aspects of the theory and history of art. The faculty will select a set list of books covering these fields.

Art

Art 110. Introduction to the Visual Arts

An elementary course in understanding painting, sculpture, and architecture designed for the non-art major. The intention is to train the eye to look into art and to interpret its images and ideas, and to reveal the visual arts as an expressive language in an aesthetic humanistic framework. Lectures, discussions, visits to museums.

Staff — Fall and Spring, 3 credits each semester

Art 120. A Study in the Traditions of Art

An introductory course for those students who have some prior knowledge of or interest in art. Through studio exercises of the simplest kind, as well as lectures, class discussions, and visits to museums, the student considers such basic themes as elements of form, expression, art and history, etc. The studio work is not designed for future artists and requires no special talent; it is, instead, a participation in some of the rudiments of the language of the visual arts.

Prerequisite: Permission of instructor and required of all art majors.

Staff — Fall and Spring, 3 credits each semester

Art 121. Studio I (Drawing and Painting)

Comprehension of simple two-dimensional forms toward the development of expressive structure; drawing from the model, still life and nature; painting in various media (oil, water color, tempera, and mixed-media). 2 weekly meetings of studio work.

Prerequisite: Art Course of Humanities 102 or permission of instructor.

Mr. Kaprow — Fall, 3 credits

Art 122. Studio II (Sculpture)

The investigation of formal relationships in three-dimensional problems, using established and experimental techniques: viz., clay, plaster (direct and clay), wood, stone, metal, etc. 2 weekly meetings of studio work.

Prerequisite: Art 121 or permission of instructor.

Mr. White — Spring, 3 credits

Art 221. Advanced Studio Art I (Painting)

An extension of Art 121, with greater concentration on more complex technical and aesthetic problems. 2 weekly meetings of studio work.

Prerequisite: Art 121 and 122.

Mr. Kaprow — Fall, 3 credits

Art 222. Advanced Studio Art II (Painting)

Continuation of Advanced Studio Art I (Painting). For those students who do not wish to take Art 223 (Sculpture).

Prerequisite: Art 221.

Spring, 3 credits

Art 223. Advanced Studio Art III (Sculpture)

An extension of the principles studied in Art 122, with greater concentration on more complex technical and aesthetic problems. 2 weekly meetings of studio work.

Prerequisite: Art 122.

Mr. White — Fall, 3 credits

Art 224. Advanced Studio Art IV (Sculpture)

Continuation of Advanced Studio Art III (Sculpture). For those students who do not wish to take Art 221 (Painting).

Prerequisite: Art 223.

Mr. White — Spring, 3 credits

Art 232. Ancient Art

The history of art in the Ancient World from earliest times through the Roman period.

Prerequisite: Permission of instructor.

Mr. Guilmain — Fall, 3 credits

Art 233. Medieval Art

European Art from the Early Christian through the Gothic period.

Prerequisite: Art 232 or permission of instructor.

Mr. Guilmain — Fall, 3 credits

Art 235. Modern Painting

The course is introductory for those with an interest in modern painting, but with no previous experience. Emphasis is placed on looking at and understanding an art which is not based on natural appearances, but which has a human and expressive basis. The logical evolution of its varied forms is traced to realistic beginnings.

Prerequisites: None.

Mr. Kaprow — Spring, 3 credits

II. Requirements for the Major in Music

In addition to the general University requirements for the Bachelor of Arts degree, the following courses are required for the major in Music.

A. Study within the area of the major

1. Music Theory — 18 credits
2. Music History — 9 credits
3. Applied Music — 6 credits

B. Study in related areas

1. Electives in Art History, Theatre Arts, Aesthetics
9 credits

2. Additional Foreign Language 6 credits
(Music majors are required to show proficiency in French and German.)

C. Departmental examinations

1. Piano Proficiency: Students whose declared major is music must, prior to their junior year, pass a proficiency examination in piano. They will be required to play simple piano pieces (chosen by the Department), and demonstrate a sufficient acquaintance with the keyboard to be able to play theory examples as these occur in the course of study.

2. Entrance Examination for Music Majors: Before entering *Music* 121 and 122 all prospective music majors will be asked to take an examination in identifying the sounds they hear, in reproducing the sounds represented by notes on paper, and in harmonizing simple melodies at the keyboard.

3. Comprehensive Examination: At the conclusion of the senior year all music majors must pass a departmental examination on certain aspects of music selected by the faculty and appropriate to the student's field of interest.

Music

Music 101. University-Community Choir

Study and performance of a repertory from the Middle Ages to the present. Meeting twice weekly. Attendance at rehearsals and performances obligatory.
Open to students, faculty, staff, and outsiders.
Prerequisite: Auditions.

Mr. Lessard Fall and Spring, no credit

Music 102. Instrumental Instruction

Half-hour individual lesson each week, with 5 hours practice required. End-of-semester examination on material assigned determines credit.
Prerequisite: Permission of instructor.

Mr. Nemiroff Fall and Spring, 1 credit each semester

Music 103. Instrumental Ensemble

One three-hour weekly session devoted to readings and rehearsals of works drawn from the repertory of music for appropriate instruments. Prerequisite: Permission of instructor.

Mr. Lessard (Piano), Mr. Nemiroff (Strings)

Fall and Spring, ½ credit each semester

Music 110. Introduction to Music

This course seeks to develop a basic listening technique for the non-music major. It concerns itself with the elements of music, their relations, and various principles of continuity as exemplified in the more familiar forms and structures of music.

Staff — Fall and Spring, 3 credits each semester

Music 112. University Chorus

Open to all students. Study and performance of a repertory from the Middle Ages to the present. Credit is optional and begins in the second year, with up to two credits allowed. More than three unexcused absences from rehearsals eliminates credit. Meetings three hours per week. Prerequisite: Auditions.

Mr. Bialosky — Fall, Spring, no credit or 1 credit per year

Music 120. A Study of Larger Musical Forms (Symphony, Opera, Concerto)

Discussion of the elements of melody, harmony, counterpoint, rhythm, and form with emphasis on their function in the larger works of great composers music will be interpreted within a humanistic and musical framework. Selected works from the repertory of symphony, opera, and the concerto will be studied.

Prerequisite: Ability to read music and/or consent of instructor. Required of all music majors.

Staff — Fall and Spring, 3 credits each semester

Music 121. Harmony and Counterpoint I

A study of the traditional use of triads and seventh chords; the creation of melodic phrases expressing harmonic progressions by means of simple non-chord tones; altered chords and modulation; elementary ear training and dictation; principles of polyphone involved in the writing of two-part exercises, original rounds, and inventions.

Prerequisite: Music Course of Humanities 102 or permission of instructor.

Mr. Nemiroff — Fall, 3 credits

Music 122. Harmony and Counterpoint II

Continuation of Harmony and Counterpoint I.

Prerequisite: Music 121.

Mr. Nemiroff — Spring, 3 credits

Music 221. Harmony and Counterpoint III

Harmonic theory as a logical development from the contrapuntal conception. Original examples with extended linear considerations and more complex chords. Advanced ear training including combined basic chordal and melodic dictation with use of appropriate clefs.

Prerequisite: Music 122.

Messrs. Nemiroff, Lessard — Fall, 3 credits

Music 222. Harmony and Counterpoint IV

Continuation of Harmony and Counterpoint III.

Prerequisite: Music 221.

Messrs. Nemiroff, Lessard — Spring, 3 credits

Music 233. Introduction to Opera

This course will seek to examine single works from the most significant operatic composers and will attempt to define the changing relationships between words and music, between voice and orchestra, and between one concept of drama and another. Representative works from Monteverdi to Stravinsky will be heard and sections of them will be analyzed as carefully as time permits. General operatic conventions, as well as each composer's individual realization of them, will be discussed.

Prerequisite: Music Course of Humanities 102 or permission of instructor.

Mr. Bialosky — Fall, 3 credits

Music 235. Contemporary Music

The music of Schoenberg, Weber, Berg, Stravinsky, Varese will be analyzed. Emphasis will be placed on the 20th century as part of the unbroken historical continuum including changing concepts and practices, with a pertinent consideration of "Dissonance", and the rapproachement of "Jazz" and "Serious Music."

Prerequisite: Permission of instructor.

Mr. Nemiroff — Spring, 3 credits

Theater

Theater 231. Drama on Stage

An introductory course for those interested in the theater, especially the contemporary theater. Lectures, readings, and discussion deal with the relationship of drama and theater, and with the actor, director, and designer in their relationship to the play as performed. Stress is put on the great play as performed in various historical styles.

Prerequisite: Permission of instructor.

Mr. Newfield — Fall, 3 credits

Theater 232. Fundamentals of Acting

Principles of acting, including voice and diction. Theory and practice in creation of character. A four hour weekly workshop.

Mr. Holt — Fall and Spring, 3 credits each semester

Theater 342. Drama and Theater in the Twentieth Century

A survey of the stylistic development of the theater arts (including opera, ballet, and the musical) in the twentieth century with special emphasis on the work of the leading theoreticians and practitioners of the international theater.

Mr. Newfield — Spring, 3 credits

Fine Arts in the Humanities Program

During the academic year 1963-64 the requirement of *Humanities* 102 must be met by one of the following four courses: *Art* 110 and *Art* 120. *Music* 110, *Music* 120. The student thus has the option of choosing either music or art and of selecting a course suitable to his level of preparation.

Art 110. Introduction to the Visual Arts

An elementary course in understanding painting, sculpure, and architecture designed for the non-art major. The intention is to train the eye to look into art and to interpret its images and ideas, and to reveal the visual arts as an expressive language in an aesthetic humanistic framework. Lectures, discussions, visits to museums.

Staff — Fall and Spring, 3 credits each semester

Art 120. A Study in the Traditions of Art

An introductory course for those students who have some prior knowledge of or interest in art. Through studio exercises of the simplest kind, as well as lectures, class discussions, and visits to museums, the student considers such basic themes as elements of form, expression, art and history, etc. The studio work is not designed for future artists and requires no special talent; it is, instead, a participation in some of the rudiments of the language of the visual arts.

Prerequisite: Permission of instructor and required of all Art majors.

Staff — Fall and Spring, 3 credits each semester

Music 110. Introduction to Music

This course seeks to develop a basic listening technique for the non-music major. It concerns itself with the elements of music, their relations, and various principles of continuity as exemplified in the more familiar forms and structures of music.

Staff — Fall and Spring, 3 credits each semester

Music 120. A Study of Larger Musical Forms (Symphony, Opera, Concerto)

Discussion of the elements of melody, harmony, counterpoint, rhythm, and form with emphasis on their function in the larger works of great composers music will be interpreted within a humanistic and musical framework. Selected works from the repertory of symphony, opera, and the concerto will be studied.

Prerequisite: Ability to read music and/or consent of instructor. Required of all music majors.

Staff — Fall and Spring, 3 credits each semester

Department of Foreign Languages and Literatures

Professor: Seymour L. Flaxman (Chairman)

Associate Professor: Seymour S. Weiner

Assistant Professor: Benkt Wennberg

Instructors: Leonard R. Mills, Carol K. O'Brien, Daniel C. O'Neil, George W. Rose, Barry J. Rubin, Ferdinand A. Rublin, Robert D. Sloan, Jr.

Requirements for the Major in Foreign Languages and Literatures

In addition to the general requirements for the Bachelor of Arts degree, the following courses are required for the major in Foreign Languages and Literatures:

A. Study within the area of the major

1. 18 semester hours in one foreign language in courses numbered 300 or above.

2. All students who major in a foreign language will be required to achieve proficiency in a second foreign language.

B. Courses in related areas

18 semester hours in related courses with the approval of the departmental advisor.

C. Teaching certification

Students who wish to prepare for certification as secondary school teachers must take the courses in education required for certification in addition to Sections A and B. They will also be required to earn 6 credits in a conversation and composition course in the language they intend to teach. The 3 credits of the Methods and Materials in the Teaching of Foreign Languages and the 12 credits of a second foreign language may, at the discretion of the Department, be counted toward the fulfillment of the related field requirements.

French

French 111, 112. Elementary French

An introduction to spoken and written French, stressing pronunciation, speaking, comprehension, reading, and writing. Selected texts will be read. Practice in the language laboratory supplements class work.

Prerequisite: None.

Staff — Fall and Spring, 3 credits each semester

French 211, 212. Intermediate French

An intermediate course in the reading and interpretation of French texts, with a review of French grammar, composition, and conversation. The student gains an acquaintance with the various literary genres through examples drawn from representative French authors. Work in the language laboratory will further develop audiolingual skills.

Prerequisite: French 111, 112, or equivalent.

Staff — Fall and Spring, 3 credits each semester

French 221, 222. French Conversation and Composition

This is a course in the active use of spoken and written French. At least one additional hour per week of work in the language laboratory is required. This course may be taken concurrently with or following French 211, 212.

Prerequisite: French 111, 112, or equivalent.

Mr. Mills — Fall and Spring, 3 credits each semester

French 331, 332. Major Writers in French

Reading and interpretation of selected works by great French writers from the Middle Ages to the present day. These works are treated in the context of the history of French literature, so that the student is prepared for further literary study. This course is conducted partly in French.

Prerequisite: French 211, 212, or equivalent.

Mr. Wennberg — Fall and Spring, 3 credits each semester

French 335, 336. French Literature in the 17th Century

Reading of selected masterpieces from *Le Grand Siècle*. The study of classicism and of the main literary genres of the period will be included.

Prerequisite: French 331, 332, or equivalent.

Mr. Weiner — Fall and Spring, 3 credits each semester

French 345, 346. Modern French Fiction

Critical reading and interpretation of French fiction in the twentieth century, with emphasis on the work of such masters of French prose as Proust, Gide, Malraux, Sartre, Camus.

Prerequisite: French 331, 332, or equivalent.

Mr. Weiner — Fall and Spring, 3 credits each semester

German

German 111, 112. Elementary German

An introduction to spoken and written German, stressing pronunciation, speaking, comprehension, reading, and writing. Selected texts will be read. Practice in the language laboratory supplements class work.
Prerequisite: None.

Staff — Fall and Spring, 3 credits each semester

German 211, 212. Intermediate German

The reading and interpretation of German texts, with a review of German grammar, composition, and conversation. The student gains an acquaintance with the various literary genres through examples drawn from representative German authors. Work in the language laboratory will further develop audiolingual skills.
Prerequisite: German 111, 112, or equivalent.

Staff — Fall and Spring, 3 credits each semester

German 221, 222. German Conversation and Composition

This course consists of the active use of spoken and written German. At least one additional hour per week of work in the language laboratory is required. May be taken concurrently with or following German 211, 212.
Prerequisite: German 111, 112, or equivalent.

Mr. O'Neil — Fall and Spring, 3 credits each semester

German 331, 332. Major Writers in German

Reading and interpretation of selected works by great German writers from the Middle Ages to the present day. These works are treated in the context of the history of German literature, so that the student is prepared for further literary study. This course is conducted partly in German.
Prerequisite: German 211, 212, or equivalent.

Mr. O'Neil — Fall and Spring, 3 credits each semester

German 335, 336. Goethe

Reading and interpretation of the most important works by Goethe, including poems, plays, and novels. These will be studied against the background of Goethe's life and times.
Prerequisite: German 331, 332, or equivalent.

Mr. O'Neil — Fall and Spring, 3 credits each semester

German 345, 346. The German Drama from Kleist to Brecht

Critical reading an analysis of the great German dramas from the beginning of the nineteenth century to the present, with attention to the development of such literary movements as Realism, Naturalism, and Expressionism.

Prerequisite: German 331, 332, or equivalent.

Mr. Flaxman — Fall and Spring, 3 credits each semester

Italian

Italian 111, 112. Elementary Italian

An introduction to spoken and written Italian, stressing pronunciation, speaking, comprehension, reading, and writing. Selected texts will be read. Practice in the language laboratory supplements class work.

Prerequisite: None.

Mr. Mills — Fall and Spring, 3 credits each semester

Russian

Russian 111, 112. Elementary Russian

An introduction to spoken and written Russian, stressing pronunciation, speaking, comprehension, reading, and writing. Reading of selected texts will be included. Practice in the language laboratory supplements class work.

Prerequisites: None.

Mr. Rubin — Fall and Spring, 3 credits each semester

Russian 211, 212. Intermediate Russian

An intermediate course in the reading and interpretation of Russian texts, including a review of Russian grammar, composition, and conversation. The student gains an acquaintance with the various literary genres through examples drawn from representative Russian authors. Work in the language laboratory will further develop audiolingual skills.

Prerequisite: Russian 111, 112, or equivalent.

Mr. Rubin — Fall and Spring, 3 credits each semester

[Russian 221, 222. Russian Conversation and Composition]

A course in the active use of spoken and written Russian. At least one additional hour per week of work in the language laboratory is required. May be taken concurrently with or following Russian 211, 212.

Prerequisite: Russian 111, 112 or equivalent.

To be offered in 1964-65.

3 credits each semester

Russian 331, 332. Major Writers in Russian

Reading and interpretation of selected works by great Russian writers. These works are treated in the context of Russian literature in the nineteenth century, so that the student is prepared for further literary study. This course is conducted partly in Russian.

Prerequisite: Russian 211, 212, or equivalent.

Mr. Rubin — Fall and Spring, 3 credits each semester

Russian 335. The Russian Short Story

Reading of selected short stories from Pushkin to the present. While the emphasis will be on literary values, linguistic problems will also be considered. This course is conducted partly in Russian.

Prerequisite: Russian 331, 332, or equivalent.

Fall, 3 credits

Russian 336. Pushkin

The reading and analysis of selected works by Pushkin, with emphasis on his poetry. This course is conducted partly in Russian.

Prerequisite: Russian 331, 332, or equivalent.

Spring, 3 credits

Spanish

Spanish 111, 112. Elementary Spanish

An introduction to spoken and written Spanish, stressing pronunciation, speaking, comprehension, reading, and writing. Selected texts will be read. Practice in the language laboratory supplements class work.

Prerequisite: None.

Mr. Rose — Fall and Spring, 3 credits each semester

Spanish 211, 212. Intermediate Spanish

An intermediate course in the reading and interpretation of Spanish texts, with a review of Spanish grammar, composition, and conversation. The student gains an acquaintance with the various literay genres through examples drawn from representative Spanish authors. Work in the language laboratory will further develop audiolingual skills.

Prerequisite: Spanish 111, 112, or equivalent.

Mr. Rose — Fall and Spring, 3 credits each semester

[Spanish 221, 222. Spanish Conversation and Composition]

This is a course in the active use of spoken and written Spanish. At least one additional hour per week of work in the language laboratory is required. This course may be taken concurrently with or following Spanish 211, 212.

Prerequisite: Spanish 111, 112, or equivalent.

To be offered 1964-65. — 3 credits each semester

Spanish 331, 332. Major Writers in Spanish

The reading and interpretation of selected works by great Spanish writers from the Middle Ages to the present day. These are treated in the context of the history of Spanish literature, so that the student is prepared for further study. This course is conducted partly in Spanish.

Prerequisite: Spanish 211, 212, or equivalent.

Mr. Rose — Fall and Spring, 3 credits each semester

[Spanish 333, 334. Major Writers in Spanish America]

The reading and interpretation of selected works by representative writers of Spanish America. This course is conducted partly in Spanish.

Prerequisite: Spanish 211, 212, or equivalent.

To be offered 1964-65. — 3 credits each semester

Other Courses

Foreign Languages 239. Methods and Materials in the Teaching of Foreign Languages

A review of methods and materials for the teaching of foreign languages and literatures in the secondary schools, including a survey of audiolingual techniques and other recent developments. Special attention will be given to the problems and purposes of the teaching of foreign languages at the high school level.

Prerequisite: Junior Standing.

Mr. Flaxman — Fall, 3 credits

Comparative Literature 346. The Modern European Drama

This course consists of a critical examination of the development of dramatic literature in Europe from Ibsen to Anouilh, including a comparative study of such movements as Naturalism, Neo-Romanticism, and Expressionism.

Prerequisite: The completion of at least two full courses in English literature, the third year of a course in a foreign language, or its equivalent, and senior standing.

Mr. Flaxman — Spring, 3 credits

Department of History

Professor: Stanley R. Ross (Chairman)
Associate Professors: Werner T. Angress, Bernard Semmel
Assistant Professors: Hugh G. Cleland, John W. Pratt, Allan K. Wildman
Instructor: Daniel Gasman

Requirements for the Major in History

In addition to the general University requirements for the Bachelor of Arts degree, the following courses are required for the major in History:

A. Study within the area of the major

Completion of History 101, 102 and 24 additional credit hours of history, including the following:

1) A one-year course in American History, to be taken when possible in the sophomore year.
2) A one-year senior departmental seminar.
3) Advanced courses, chosen in consultation with the adviser. It is recommended that all majors include some course work outside of the American and European fields.

B. Courses in related areas

Completion of 18 credit hours of advanced courses outside the department, selected with the approval of the adviser and related to the student's field of interest in History. They will generally be in the social sciences and/or humanities.

Courses in History

History 101, 102. History of Western Civilization

A beginning course in the study of western society and ideas, emphasizing the structure and development of major political, social, and economic institutions, and presenting the variety of ways in which modern historical scholarship approaches its problems.

Staff — Fall and Spring, 3 credits each semester

[History 201. The Ancient World]

The civilizations of the Orient, Greece and Rome are surveyed by this course, with particular emphasis on the development of the polis (notably Periclean Athens), its decline and the development of the Alexandrian and Roman empires.

To be offered 1964-65. 3 credits

[History 201. The Medieval World]

The institutions, mentality, and culture of medieval Europe, with special attention to England and France, are the subjects of study.

To be offered 1964-65. 3 credits

[History 203. Early Modern Europe]

The course surveys the "waning of the Middle Ages," the Renaissance and Reformation, the emergence of the institutions of the modern state, the political organization of Europe, the secularization of attitudes, and the influence of early modern science.

To be offered 1964-65. 3 credits

History 207. Europe 1815-1914

European History from the Congress of Vienna to the outbreak of the First World War, with emphasis on political and social developments, but also including economic and cultural trends.

Mr. Angress Fall, 3 credits

History 208. Europe 1914—present

European History from the outbreak of the First World War to the post-World War II period, with emphasis on political and social developments, but also including economic and cultural trends.

Mr. Angress Spring, 3 credits

History 211. American History to 1877

The United States from the Age of Discovery to the end of the Reconstruction period, with discussions of such subjects as the transplantation of European culture to America, the rise of American nationalism, the democratization of American society, the clash between the industrial North and the planting South, and the triumph of industrialism.

Staff Fall, 3 credits

History 212. United States Since 1877

The history of the United States from the end of Reconstruction to the present day, with discussion of the growth of industrialism and its impact upon economic, social, cultural, and political life; the emergence of America as a world power; and American responses to the continuing crisis of contemporary civilization.

Staff Spring, 3 credits

History 213. American Colonial Society

The discovery and exploration of the New World, English overseas expansion and settlement in North America, problems of trade and imperial control (1660-1714), and the evolution of American provincial society to the Revolution.

Mr. Pratt — Fall, 3 credits

History 214. Age of the American Revolution, 1760-1789

The course surveys the old British Empire at the close of the French Wars; imperial reorganization and colonial resistance; the War of Independence; and the trials of the new nation and the framing of the Constitution.

Mr. Pratt — Spring, 3 credits

[History 217. Recent U. S. History, 1877-1929]

The growth of industrialism in the United States, and its impact on political, economic, and intellectual life, and on American relations with the outside world. Emphasis will be placed on the relation of the United States to the world economy and on the roots of the Great Depression.

Mr. Cleland — 3 credits

To be offered 1964-65.

[History 218. Recent U. S. History, 1929-1962]

The Great Depression and the impact of Keynsian thought, the New Deal, the rise of industrial unionism, World War II and its aftermath, the Cold War, and technological and social change are among the subjects discussed.

Mr. Cleland — 3 credits

To be offered 1964-65.

History 221. Latin America to 1825

The Spanish and Portuguese colonies in the New World, with emphasis on the European background, exploration, settlement, institutions and the struggle for independence.

Mr. Ross — Fall, 3 credits

History 222. Latin America Since 1825

The evolution of the Latin American nations since independence, with emphasis on political, economic and social problems.

Mr. Ross — Spring, 3 credits

[History 223. Latin America and the Outside World]

An analysis of the role of the Latin American nations in world affairs during the 19th and 20th Centuries is undertaken, with emphasis on intellectual, economic, and diplomatic relations with the United States and Europe.

Mr. Ross — 3 credits

To be offered 1964-65.

[History 224. Modern Mexico]

The social, economic and political history of Mexico from 1876 to the present, with emphasis on the background, development and aftermath of the Revolution of 1910.

Mr. Ross — 3 credits

To be offered 1964-65.

History 235. England from 1485 to 1760

This analysis of the socio-economic, political and intellectual history of England from the establishment of the Tudor monarchy until the accession of George III, will survey such subjects as the Reformation, the Age of Elizabeth I, the struggle between the Stuarts and the Parliament, the Civil Wars, the 'Glorious Revolution' and the Whig parliamentary ascendancy.

Mr. Semmel — Fall, 3 credits

History 236. British History Since 1760

The transformation of English society by the Industrial Revolution, the coming of democracy, imperialism and the Pax Britannica, and the decline of British power in the twentieth century.

Mr. Semmel — Spring, 3 credits

History 241. Imperial Russia

The political, social and cultural developments from Peter the Great to the Russian Revolution, with emphasis on the unique institutional structure of Tsarist Russia and the problems of its relations with the West.

Mr. Wildman — Fall, 3 credits

History 242. Soviet Russia

The ideological and social background of the Russian Revolution and the evolution of Soviet rule, the problems of industrialization, the relations with the capitalist West and totalitarian control over society are the subjects of analysis.

Mr. Wildman — Spring, 3 credits

[History 251. The Expansion of Europe 1415-1815]

A study of the expansion of Europe from the age of the great discoveries until the Congress of Vienna, including a survey of the diffusion of European civilization, the formation of empires and the rivalries among the colonial powers, and the processes of empire building during the age of mercantilism.

Mr. Semmel 3 credits

To be offered 1964-65.

History 391, 392. Senior Seminar in History

Special topics, projects, and research papers are undertaken.

Fall and Spring, 3 credits each semester

Interdepartmental Courses in the Humanities

Humanities 101, 102. Introduction to the Arts

A basic course in music, the visual arts, and imaginative literature. Each of the three arts is studied by analysis of media, formal principles, and styles. The analysis concentrates on individual works and is directed to the discovery and understanding of their qualities as works of art.

Humanities 101 is an intensive course in the reading of literary texts. It is offered in both semesters. During the academic year 1963-64 the requirement of Humanities 102 will be met by one of the four options in music or art, as listed with the courses of the Department of Fine Arts.

Staff — Fall and Spring, 3 credits each semester

Humanities 151, 152. Analysis of Literary Forms

History, philosophy, and literature are studied. Exemplary works in each area are analyzed from the point of view of their assumptions, methods, and purposes. Authors studied include Thucydides, Herodotus, Sophocles, Shakespeare, Tolstoi, Dostoevski, Hume, Kant. A required course for all students.

Staff — Fall and Spring, 3 credits each semester

Humanities 201. Principles of Criticism

Study of the nature of esthetic judgment in selected theories of art, e.g., those of Plato and Hegel. Individual works of art are studied to illustrate the theories.

Prerequisite: Humanities 151-152.

3 credits

Humanities 203. Varieties of Romanticism

Study of the concept and phenomenon of Romanticism revealed from a variety of sources and perspectives. Readings are drawn from such figures as Diderot, Hegel, Kierkegaard, Nietzsche, Yeats, Stendhal, Byron, Wordsworth, Kafka, Mann, and Freud.

Prerequisite: Humanities 101, 102.

3 credits

Humanities 221. Concepts of Tragedy

Comparative analysis of selected historical, literary, religious, and philosophic texts as embodying various concepts of the tragic. Examples are *The Book of Job* and works of Aeschylus, Plutarch, Shakespeare, Racine, Camus, Unamuno, Toynbee.

Prerequisite: Humanities 101, 102.

3 credits

Humanities 231. Concepts of the Comic

Comparative analysis of selected historical, literary, rhetorical, and philosophical texts as embodying various concepts of the comic. Examples are Plato's *Symposium*, Dante's *Divine Comedy*, and works of Aristophanes, Moliere, Jonson, Chekhov, Fielding, Swift, Twain and Trotsky.

Prerequisite: Humanities 101, 102.

3 credits

Department of Mathematics

Professors: William G. Lister, Leslie G. Peck

Associate Professors: William Barcus (Acting Chairman), Ernest S. Elyash, William C. Fox, Norman Stein, Stanley Tennenbaum, Eugene Zaustinsky

Instructors: Morris E. Bram, Cyril L. Gape, Richard W. Glasheen, Mark W. Mandelker

The undergraduate program in mathematics is designed to serve as a general terminal program, as preparation for the secondary school teacher of mathematics, and as a basis for graduate study in either mathematics or applied mathematics. The required courses provide a common core of instruction in the principal branches of mathematics, a review of their evolution, and independent study in a special topic. The additional required work and any elective courses taken in mathematics will allow the student to improve his preparation for more specialized objectives.

A student intending to qualify for the degree in mathematics should complete either *Mathematics* 111, 112 and 151, 152 or *Mathematics* 113, 114 and 155, 156 by the end of his second year. Entering students will be placed in *Mathematics* 111, 112 or 113, 114 or in some cases 151, 152 according to their interests and training.

Prospective secondary school teachers of mathematics should elect *Mathematics* 239 and 321. A program including these courses satisfies the mathematics requirements for temporary teaching certification in New York State.

Students who intend to enter graduate study in applied mathematics should elect *Mathematics* 301, 302.

Prospective graduate students in mathematics should elect *Mathematics* 161, 162, 235 and 320.

Requirements for the Major in Mathematics

In addition to the general University requirements for the Bachelor of Science degree, the following courses are required for the major in Mathematics:

Mathematics 111, 112, 151, 152, and 161, 162 (*Calculus*) or 113, 114, 155, 156, and 301, 302 (*Analysis*)

Mathematics 234 (*Linear Algebra*)
Mathematics 235 (*Algebraic Structures*)
or 239 (*The Number System*)
Mathematics 311 (*Introduction to Topology*)
Mathematics 320 (*Topology*)
or 321 (*Geometry*)
Mathematics 349 (*History and Foundations*)
Mathematics 348 (*Independent Study*)
Physics 101, 102 or 161, 162 (*General Physics*)
Three additional credit hours in Mathematics courses numbered above 160.
Foreign Language: The proficiency requirement must be met in French, German or Russian.

Courses in Mathematics

Mathematics 111, 112. Introduction to Mathematical Science

An introduction to the discipline of mathematics emphasizing the role of logic and the use of language. Main subject of the course is the study of number relations, principally of algebraic and trigonometric relations. Analytic geometry is used to picture these relations as sets of points in a plane. The concepts of the derivative and the integral are used to study certain properties of number relations. The real number system is reviewed in the process of showing that it can be described in terms of a few properties from which other properties derive. When time permits, a brief introduction to probability theory is presented to illustrate the contrasts and common elements among mathematical systems with different bases.

Staff — Fall and Spring, 3 credits each semester

Mathematics 113, 114. Introduction to Analysis

An alternative course to Mathematics 111-112, giving more emphasis to the use of mathematics in the physical sciences. The full year is spent on an intensive introduction to the central ideas and techniques of the calculus.

Staff — Fall and Spring, 3 credits each semester

Mathematics 151, 152. Calculus

A systematic study of the calculus based on the beginning made in Mathematics 111, 112. The main theme of the course is the study of functions, using the limit derivative and integral. Topics include: definition and analysis of exponential functions; inverses; computational theorems for integrals; polynomial approximation of functions as in Taylor's theorem;

transformations of the plane and polar coordinate methods; first and second order linear differential equations; and an analytic introduction to surfaces in space. Some experience will be provided throughout in the application of these properties to physical problems.

Prerequisite: Grade of C or better in Mathematics 111, 112.

Staff — Fall and Spring, 3 credits each semester

Mathematics 155, 156. Intermediate Analysis

A continuing development of the ideas used in Mathematics 113, 114, emphasizing those useful in physical problems. Topics include the calculus of functions of several variables; infinite series and expansion of functions; vector calculus; systems of linear equations; special functions; and ordinary and partial differential equations.

Prerequisite: Grade of C or better in Mathematics 113, 114.

Staff — Fall and Spring, 3 credits each semester

Mathematics 161, 162. Advanced Calculus

Deals with proof of the fundamental theorems of the calculus from the properties of the real number system, and with an extension of the methods of the calculus. The latter includes surface and curves in space, multiple and line integrals, vector analysis and the expansion of functions in series.

Prerequisite: Mathematics 151, 152 and Mathematics 234 concurrently.

Fall and Spring, 3 credits each semester

Mathematics 203, 204. Advanced Analysis

A course in analysis emphasizing some of the more complex techniques used in applied mathematics. Topics will be chosen from: line and Stieltjes integrals, vectors algebra and analysis, series expansions, Fourier analysis, ordinary and partial differential equations, complex function theory.

Prerequisites: Mathematics 155, 156 or 161, 162.

Fall and Spring, 3 credits each semester

Mathematics 234. Linear Algebra

A study of vector spaces; principally of real vector spaces as a means of formulating and generalizing affine and Euclidean geometry. Topics will include basic relations, subspaces, general linear transformations, inner products and orthogonal transformations.

Prerequisite: Mathematics 151 or 155 concurrently.

Fall, 3 credits

Mathematics 235. Algebraic Structures

A study of several of the important types of algebraic systems (groups, rings, fields, and vector spaces). The construction, structure, mappings, and representations of algebraic systems are all given attention.

Prerequisite: Mathematics 234.

Fall, 3 credits

Mathematics 237. Probability and Statistics

A course in probability theory emphasizing the testing of hypotheses and attempting to reach significant statistical applications. Topics include the binomial, Poisson and normal distributions; several limit theorems for random variables; the elements of linear bivariate analysis; and selected types of tests and estimates.

Prerequisite: Mathematics 151, 152 or 155, 156.

3 credits

Mathematics 239. The Number System

A study of the foundations of elementary mathematics by means of a constructive development of the number system. School instruction in mathematics is examined in the light of our present understanding of the number system. The rational basis for computational schemes in arithmetic is given particular attention.

Prerequisites: Mathematics 151, 152, and 234.

Spring, 3 credits

Mathematics 301, 302. Introduction to the Theory of Functions

An introduction to functional analysis followed by a study of differentials and differential forms and the elementary theory of complex-analytic functions.

Prerequisite: Basic Analysis (203, 204); Algebraic Structures (235) concurrently.

Mr. W. C. Fox — Fall and Spring, 3 credits each semester

Mathematics 311. Introduction to Topology

A development of topological structures proceeding from simple axiom systems to metric spaces. Particular emphasis will be put on such concepts as continuity, connectedness, and compactness, chiefly in the context of n-dimensional Euclidean space.

Prerequisite: Mathematics 161 or 301.

Fall, 3 credits

Mathematics 315. Elementary Theory of Numbers

A variety of topics including congruences, quadratic residues, quadratic forms, continued fractions, Diophantine equations, number-theoretical functions, properties of the prime numbers will be touched.

Prerequisite: Grade C or better in Mathematics 161 or 234.

3 credits

Mathematics 320. Topology

A continuation of the study of the most important concepts of point-set topology in general topological spaces, and an introduction to algebraic topology.

Prerequisite: Mathematics 311.

Spring, 3 credits

Mathematics 321. Geometry

A course in the foundations of geometry concerned with the development of a geometry from a set of axioms and with relations among finite, projective, affine, Euclidean, and non-Euclidean geometries.

Prerequisite: Mathematics 311.

Spring, 3 credits

Mathematics 323. Introduction to Differential Geometry

Local theory of curves and surfaces in ordinary space. Intrinsic geometry of surfaces. Introduction to global differential geometry and differentiable manifolds.

Prerequisites: Introduction to Topology (311) and Algebraic Structures (235).

Mr. Zaustinsky

Spring, 3 credits

Mathematics 348. Independent Study in Special Topics

A course of independent study in a topic individually selected from a short list of subjects not substantially treated in the curriculum. Achievement is tested by an examination set at the level of second or third year students. The topic is normally selected in the third year and the examination attempted in the fall of the fourth year.

Prerequisite: Junior standing in the mathematics degree program.

2 credits

Mathematics 349. History and Foundations

A seminar course with emphasis on mathematical substance viewed in historical sequence. Student talks and discussions based on extensive reading will be utilized. Topics will range from the significant achievements of Greek mathematics to recent notions about the foundations of mathematics and the present form of some of its classical branches.

Prerequisites: Mathematics 161, Mathematics 234, and Mathematics 311.

Spring, 3 credits

Department of Philosophy

Professors: Sidney Gelber (Chairman), Robert Sternfeld, Harold Zyskind
Associate Professor: Walter Watson
Assistant Professor: Merrill G. Rodin
Instructor: Donald F. Goodman

Requirements for the Major in Philosophy

In addition to the general University requirements for the Bachelor of Arts degree, the following courses are required for the major in Philosophy:

A. Study within the area of the major
Philosophy 151 (*Ethics*)
Philosophy 162 (*Logic*)
Philosophy 201, 202 (*Major Thinkers*)
Philosophy 341, 342 (*Analysis of Text*)
Philosophy 391, 392 (*Advanced Seminar*)

Three additional semesters of advanced work in Philosophy such as:
Philosophy 211 (*Esthetics*)
Philosophy 215 (*Political Philosophy*)
Philosophy 225 (*Philosophy of Religion*)
Philosophy 235 (*Philosophy of Science*)
Philosophy 245 (*Advanced Logic*)
Philosophy 345, 346 (*History and Philosophy of Education*)

B. Study in related areas
Approved electives outside Philosophy (three semesters)

Courses in Philosophy

Philosophy 151. Ethics

Designed to acquaint the student with the tradition of ethical inquiry and to provide him with some of the intellectual instrumentalities needed to make valid practical judgments. Representative classical works, such as those of Aristotle, Spinoza, Kant, and William James, are studied to make clear the character of ethical problems and the principles and methods available for their solution.

Mr. Watson — Spring, 3 credits

Philosophy 162. Logic

The first course in logic concentrates on the subject-matter of logic in the strict sense, i.e., names, propositions, and inferences, as these are treated by various logicians and used in various areas of knowledge.

Prerequisites: Humanities 101, 102 and one year of mathematics.

Mr. Sternfeld — Fall, 3 credits

Philosophy 201. Major Thinkers in the History of Philosophy: Ancient and Medieval

Study of the writings of major thinkers from Plato and Aristotle to such thinkers as Lucretius, Cicero, Augustine, and Aquinas on problems of metaphysics and epistemology. Related problems in other areas are treated when these are an extension or part of the central metaphysical issues.

Prerequisite: Humanities 151, 152 may be taken concurrently.

Mr. Rodin — Fall, 3 credits

Philosophy 202. Major Thinkers in the History of Philosophy: Modern

Study of the writings of the major thinkers from Descartes to Kant on the problems of metaphysics and espistemology.

Prerequisite: Humanities 151, 152 may be taken concurrently.

Mr. Gelber — Spring, 3 credits

Philosophy 211. Esthetics

An inquiry into the function of philosophic principles in theories of literature and the other arts. The course emphasizes modern theories, contrasting them with selected classical approaches. Typical of the concepts examined are empathy, significant form, and symbolic action. Readings are from Tolstoy, Freud, Croce, Santayana, Kenneth Burke, and others.

Prerequisite: Humanities 151, 152.

Mr. Zyskind — Fall, 3 credits

Philosophy 215, 216. Political Philosophy

An inquiry into the function of philosophic principles in political thought and action, with readings drawn from such authors as Plato, Aristotle, Machiavelli, Spinoza, Hobbes, Locke, Kant, Hegel, Mill, and Dewey. Either semester may be taken independent of the other.

Mr. Gelber — Fall and Spring, 3 credits each semester

Philosophy 235. Philosophy of Science

An inquiry into the function of philosophic principles in the natural sciences, with the focus on concepts such as space, time, casuality, and life as they are treated in important philosophic and scientific works.

Prerequisite: One year of natural science.

Messrs. Eisenbud, Sternfeld, Watson — Spring, 3 credits

Philosophy 245. Advanced Logic and Philosophy of Mathematics

This course concentrates on contemporary treatments of logical problems including concepts in the philosophy of science such as truth and proof, and further treats problems in the philosophy of mathematics as these have become merged with those of logic in contemporary philosophies.

Prerequisite: Philosophy 162.

Mr. Sternfeld — Spring, 3 credits

Philosophy 341, 342. Analysis of Philosophic Texts

Detailed analysis of a major text in philosophy. The course is designed to acquaint philosophy majors with the fundamental discipline of philosophy as a carefully wrought discursive argument which formulates, investigates, and resolves fundamental problems. Two semester, two credit hours per semester.

Prerequisite: Two courses in Philosophy.

Staff — Fall and Spring, 2 credits each semester

Philosophy 345, 346. History and Philosopy of Education

An inquiry into the function of philosophic principles in educational theories and institutions. The inquiry centers on the purposes of knowledge and education, the relations among the sciences and their organization into curricula, and the ways in which knowledge is acquired and transmitted. This course is identical with Education 345, 346 (History and Philosophy of Education).

Prerequisite: Senior standing.

Messrs. Rodin, Sternfeld, Watson

Fall and Spring, 3 credits each semester

Philosophy 391, 392. Advanced Seminar

This course acquaints majors in philosophy with the broad perspectives of philosophy, and they are given a major responsibility for contributing material and subject-matter for discussion. Emphasis is on independent examinations of broad scope covering a wide range of writings unified by a single theme or problem.

Prerequisite: Two courses in Philosophy.

Staff — Fall and Spring, 2 credits each semester

Interdepartmental Program in the Physical Sciences

The program leading to the Bachelor of Science in Physical Science is a joint undertaking of the Departments of Chemistry and Physics. It is designed primarily as proper preparation for a student intending to teach either chemistry or physics at the high school level. With the permission of the supervising committee, however, a student preparing for advanced work in certain other fields (e.g., medicine, patent law, technical administration, etc.) might also elect this program. The aim of the program is to provide a broader than usual, yet nonetheless substantial, introduction to the content, methods, and current directions of development of the physical sciences.

Requirements for the Major in Physical Science

In addition to the general University requirements for the Bachelor of Science degree, the following courses are required for the major in Physical Science:

Physics 101, 102 and *Physics* 151, 152

Chemistry 101, 102 and *Chemistry* 151, 152

Mathematics 113, 114 and *Mathematics* 155, 156

A grade of C or above in each of these courses is required unless the requirement is waived by the supervising committee.

Physics 351, 352, or an equivalent course in modern physics or chemistry approved by the committee.

One additional year of physics or chemistry, which may not be met by *Physics* 251, 252.

Certification Requirements

The following are New York State requirements for certification to teach a science at the secondary level:

Two years in the certified subject.

One year each in mathematics, biology, chemistry, physics, and earth science.

Eight hours in the theory and practice of education.

Eight hours in teaching methods and practice teaching

To satisfy these requirements for certification in both chemistry and physics, a student must take the following courses in addition to the University requirements and major requirements:

Biology 101, 102 or an eight-hour biology equivalent acceptable to the committee
Physics 251, 252 (Earth Physics)
Education 201 (Human Development and Behavior)
Education 345, 346 (History and Philosophy of Education)
Chemistry/Physics 239 (Materials and Methods in Teaching physical Science)
Education 350 (Practice Teaching)

Department of Physics

Professors: T. Alexander Pond (Chairman), Nandor Balazs, Leonard Eisenbud, Arnold M. Feingold, David Fox, Herbert Muether

Associate Professors: Edward D. Lambe, B. James Raz, Clifford E. Swartz

Assistant Professors: Robert L. deZafra, Peter B. Kahn, Yi-Han Kao, Juliet Lee, Richard A. Mould

The undergraduate major in physics is designed to serve either as preparation for graduate study in physics, or as a terminal program in preparation for employment in industry or research. While it is substantial preparation for teaching in physics at the secondary level, the more usual route to such certification is the specialty in physics of the Program in Physical Science.

A student intending to qualify for the Bachelor of Science in Phvsics should complete *Physics* 101, 102, 151, 152, and *Mathematics* 113, 114, 155, 156 by the end of his second year. These constitute necessary preparation for the more intensive and formal required courses of the upperclass major. The latter courses extend his mathematical and experimental competences, and lead serially through classical physics to a senior year in modern physics. Additional elective courses allow further substantial accomplishment in theoretical and experimental physics. Able students with extraordinary preparation may accelerate this program sufficiently to allow inclusion of courses from the Department's graduate offerings in the senior year. Descriptions of these courses may be found in the Graduate Bulletin.

Requirements for the Major in Physics

In addition to the general University requirements for graduation, the following courses are required for the major in Physics:

Physics 101, 102 and 151, 152 *(General Physics)*
One year of Chemistry (Commonly, General Chemistry)
Mathematics 113, 114 and 155, 156 *(Analysis)**

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* In special circumstances students who have taken *Mathematics* 111, 112 and 151, 152 instead of *Mathematics* 113, 114 and 155, 156, and *Physics* 161, 162 instead of *Physics* 101, 102 and 151, 152, will be allowed to work for the Bachelor of Science in Physics. Permission of the Chairman of the Department of Physics is necessary before entering the junior year, and evidence of special proficiency in mathematics may be required.

Physics 201, 202 (*Electromagnetic Theory*)

Physics 211 (*Thermodynamics, Kinetic Theory and Statistical Mechanics*)

Physics 212 (*Mechanics*)

Physics 235, 236 (*Junior Laboratory*)

Physics 341, 342 (*Modern Physics*)

Mathematics 301, 302 (*Advanced Analysis*)

Foreign Language: The proficiency requirement must be met in French, German, or Russian.

Courses in Physics

Physics 101, 102. General Physics

The first year of a two-year sequence designed to cover a broad range of topics in both classical and modern physics in a manner suited to the needs of students of the sciences and engineering. Basic theories in classical physics, including kinematics and dynamics of point particles and elastic continua, the interactions of charges and currents in vacuum, and geometrical and physical optics will be covered. Use is made of the differential and integral calculus, vector algebra, elementary vector calculus, and differential equations, which are studied in the corequisite courses in mathematics. The laboratory program introduces the student to elementary techniques and provides an opportunity for the observation of the phenomena on which theoretical conceptions have been built. Two lecture hours, one recitation hour, and one three-hour laboratory per week. Honors-section: One laboratory-recitation section of Physics 101, 102 will cover the lecture material with greater depth and will take up additional subjects. Admission to this honors-section will be by invitation of the Department.

Corequisite: Mathematics 113, 114.

Mr. Swartz and Staff — Fall and Spring, 4 credits each semester

Physics 151. General Physics

A continuation of the work of Physics 101, 102. Topics studied include dynamics of systems of particle and of rigid bodies, thermodynamics, kinetic theory, electrical and magnetic properties of matter, laws of electromagnetism. Two lecture hours, one recitation hour, and one three-hour laboratory per week.

Prerequisite: Grade of C or better in Physics 101, 102.

Corequisite: Mathematics 155.

Mr. Pond — Fall, 4 credits

Physics 152. Introduction to Modern Physics

An introduction to the phenomena and the associated theoretical considerations which have led to our present understanding of atomic and nuclear structure. The course also includes an elementary discussion of special relativity and some descriptive material on solid state and particle physics. Two lecture hours, one recitation hour, and one three-hour laboratory per week.

Prerequisite: Physics 151.

Corequisite: Mathematics 156.

Spring, 4 credits

Physics 161, 162. Introductory Physics

A survey of general physics designed primarily for students in the College of Arts and Sciences whose subsequent studies will not require extensive use or further development of physical principles. Emphasis is placed on classical dynamics, electricity and magnetism, and on modern developments in atomic structure. The laboratory is devoted to exhibition of phenomena closely related to important physical concepts. Use is made of differential and integral calculus and of vector algebra, but the mathematical development is not as intensive as is that of Physics 101, 102, 151, 152. Two hours of lecture, one recitation hour, and one three-hour laboratory per week.

Prerequisite: At least one term of a calculus course or concurrently a one year Mathematics course which includes calculus.

Staff — Fall and Spring, 4 credits each semester

Physics 201, 202. Electromagnetic Theory

Primarily for majors in physics. The unification of the elementary forms of the various electromagnetic equations into Maxwell's equations is reviewed, and the theory is then applied to the following topics: static electric and magnetic fields, interaction of the fields with bulk matter, circuit theory, fields in resonant cavities, optics, and interaction of charged particles with electromagnetic fields. The special theory of relativity is also discussed. Three class hours per week.

Prerequisites: Physics 151, 152 and Mathematics 155, 156, each with a grade of C or better. (With the permission of the Chairman of the Department of Physics, Mathematics 151, 152 and Physics 161, 162 may be substituted.)

Corequisite: Mathematics 301, 302.

Mr. Kahn — Fall and Spring, 3 credits each semester

Physics 211. Thermodynamics, Kinetic Theory, and Statistical Mechanics

Designed primarily for majors in physics, the course is in two parts. Those relations among the properties of systems at thermal equilibrium which are independent of a detailed microscopic understanding are developed by use of the first and second laws. The concept of temperature is carefully developed. The thermodynamic potentials are introduced. Applications to a wide variety of systems are made. The second portion of the course, be-

ginning with the kinetic theory of gases, develops elementary statistical mechanics, relates entropy and probability, and treats simple examples in classical and quantum statistics. Three class hours per week.

Prerequisite: Physics 151, 152 and Mathematics 155, 156, each with a grade of C or better. (With the permission of the Chairman of the Department of Physics, Mathematics 151, 152 may be substituted for Mathematics 155, 156 and Physics 161, 162 for Physics 151, 152.)

Corequisite: Mathematics 301.

Mr. Feingold — Fall, 3 credits

Physics 212. Mechanics

Primarily for majors in physics. The Newtonian formulation of classical mechanics is reviewed and applied to more advanced problems than those considered in Physics 101, 102. The Langrangian and Hamiltonian methods are then derived from the Newtonian treatment and applied to various problems.

Prerequisite: Physics 211, or permission of the Chairman.

Corequisite: Mathematics 302.

Spring, 3 credits

Physics 235, 236. Junior Laboratory

Primarily for majors in physics. The main emphasis is on electrical measurements, electronics and optics, supplementing the material presented in Physics 201, 202. Two three-hour laboratories per week.

Prerequisite: Junior standing.

Corequisite: Physics 201, 202.

Mr. Muether — Fall and Spring, 2 credits each semester

Physics 239. Materials and Methods in Teaching Physical Science

Designed for prospective secondary school teachers of physics and chemistry, the course emphasizes methods and materials appropriate to the teaching of a physical science at the high school level, and stresses recent curricular developments. Three class hours per week. This course is identical with Chemistry 239.

Prerequisites: Physics 161, 162 or equivalent, Chemistry 101, 102, Mathematics 151, 152 or equivalent, and concurrent study of an intermediate course in either chemistry or physics.

Spring, 3 credits

Physics 241, 242. Electricity and Magnetism

Designed primarily for students in the physical science program, this course treats the basic phenomena and concepts in electricity and magnetism, leading to the formulation of Maxwell's equations. The course emphasizes applications to electric circuits, motors, instruments, generators, and electronics. Some work in physical optics is included. Three lecture hours and one three-hour laboratory per week.

Prerequisites: Physics 161, 162 or Physics 151, 152; Mathematics 151, 152 with Mathematics 161 concurrently, or Mathematics 155-156.

Fall and Spring, 4 credits each semester

Physics 251, 252. Earth Physics

This course is designed primarily for students who plan to seek certification as teachers of science at the secondary level. One half of the course will be concerned with astronomy, astrophysics, and cosmology. The other half will be divided between the structure and geological history of the earth, and the nature and motions of the oceans and atmosphere. Laboratory work will cover practical problems in astronomy, geology, and meteorology. Three class hours and one three-hour laboratory per week.

Prerequisites: One year of college physics and one year of calculus, or approval of the instructor.

Mr. deZafra — Fall and Spring, 4 credits each semester

Physics 341, 342. Modern Physics

Designed primarily for majors in physics, this course covers topics in atomic and molecular structure, solid state physics, nuclear physics, and elementary-particle physics. The phenomena requiring quantum theoretical descriptions are studied, leading to an introduction to quantum mechanics, which is then used as a tool for the investigation of other topics. Three class hours per week.

Prerequisites: Physics 201, 202, 211 and 212, and Mathematics 301, 302.

Mr. Fox — Fall and Spring, 3 credits each semester

Physics 343, 344. Methods of Mathematical Physics.

This course, designed primarily for majors in physics, describes a selection of mathematical techniques useful for advanced work in physics. The methods will be illustrated by applications in mechanics, hydrodynamics, heat conduction, electromagnetic theory, and quantum mechanics. Topics will be selected from the following: linear vector spaces; tensor algebra and vector analysis; matrices; Green's functions; complex variables with application to conformal mapping and contour integration; eigenvalue problems and orthogonal functions; partial differential equations; calculus of variations; integral transforms; integral equations; special functions. Three class hours per week.

Prerequisites: Physics 201, 202, 211 and 212, and Mathematics 301, 302, or permission of the Chairman of the Department of Physics.

Mr. Eisenbud — Fall and Spring, 3 credits each semester

Physics 345, 346. Senior Laboratory

Primarily for majors in physics. A number of the historic experiments studied in Physics 341, 342 are duplicated, but with the aid of modern instrumentation. During the second term, a particular experiment receives sufficient concentration so that a professionally acceptable description and analysis of the results can be presented. Typical projects involve work in atomic and molecular spectroscopy, X-ray analysis of crystals, the photoelectric effect, measurement of short times and high velocities, particle detection, and radioactivity. The development of experimental technique in the areas of atomic and nuclear physics is emphasized. The student is ex-

pected to formulate plans for his own experiments, based on his reading in journals and reference works. Two three-hour laboratory sessions per week.

Prerequisite: Physics 235, 236 or permission of the Chairman.

Corequisite: Physics 341, 342.

Mr. deZafra — Fall and Spring, 2 credits each semester

Physics 351, 352. Modern Physics

Primarily for students in the physical science program. A survey of recent developments in physics, including introductions to theories of relativity and of quantum mechanics and consideration of the structure and properties of atomic, molecular, and nuclear systems. Other modern developments, such as the nature of solids, low temperature physics, and plasma physics, will be discussed briefly. Three lecture-recitation hours and one three-hour laboratory per week.

Prerequisites: Physics 241, 242 and Mathematics 155, 156 or Mathematics 161.

Fall and Spring, 4 credits each semester

Physics 391, 392. Senior Research

With the approval of the faculty, a senior in the Department may conduct research for academic credit. Research proposals must be prepared by the student and submitted for approval by the faculty before the beginning of the credit period. The work is performed under the supervision of a member of the faculty. An account of the work and the results achieved is submitted to the faculty before the end of the credit period.

Requisite: Permission of the Chairman of the Department of Physics.

Staff — Fall and Spring, 2 credits each semester

Physics 393, 394. Tutorial in Advanced Topics

For upperclass students of unusual ability and substantial accomplishments, reading courses in advanced topics may be arranged. Prior to the beginning of the semester, the topic to be studied is selected by the supervising member of the faculty and a reading assignment is planned. Weekly conferences with this member of the faculty are devoted to discussion of material, resolution of problems encountered, and assessment of the student's progress.

Requisite: Permission of the Chairman of the Department of Physics.

Staff — Fall and Spring, 2 credits each semester

Department of Political Science

Professors: Martin B. Travis (Acting Chairman), Jay C. Williams, Jr.
Associate Professor: Howard Scarrow
Instructors: Michael Parenti, Merton L. Reichler

Requirements for the Major in Political Science

In addition to the general University requirements for the Bachelor of Arts degree, the following courses are required for the major in Political Science:

A. Study within the area of the major
Completion of 21 credit hours in political science including:

1) Introduction to *Political Theory, Comparative Government, American Government;*

2) A course in research methods in political science (either *Political Science* 391 or 392) ;

3) Advanced work, with the consent of the adviser, in courses which emphasize diverse current approaches to political science.

B. Study in related areas
Completion of 9 credit hours in appropriate advanced courses in the social sciences and/or humanities, selected with the approval of the advisor. For Education majors *Social Science* 201, 202 and 211, 212 will most easily fulfill these requirements.

Courses in Political Science

Political Science 101. American Government
This course will cover what the informed citizen and specialist should know about the organization of American government, including the Constitution and what it means today, the Congress, political parties, pressure groups, growth of the Presidency, the Supreme Court, judicial review, federalism, separation of powers, the Bill of Rights.
Mr. Reichler **Fall, 3 credits**

Political Science 102. Comparative Government

An introduction to the analysis of political systems with major examples being drawn from British, Western European, and Soviet systems. Comparison of these systems with each other and with that of the U. S. Emphasis upon the formal institutions of government as well as the dynamics of politics.

Mr. Scarrow — Fall and Spring, 3 credits each semester

Political Science 156. Introduction to Political Theory

The course will examine the treatment given perennial theoretical problems in political theory from Plato to Dewey and McIver. The main emphasis will be placed on such problems as (1) definition of the political community, (2) relation of political institutions to each other, to cultural states, to parts of the community, to varieties and aspects of human nature and to ethical norms, (3) the effect which methods of inquiry have on the definition of problems and relevant data.

Mr. Williams — Spring, 3 credits

Political Science 201. American Political Thought

An analysis of the major policy problems from the Revolution to the present, with the aim of discovering the pervading concerns, methods, and spirit of American thought in civic matters.

Mr. Williams — Fall, 3 credits

Political Science 202. Problems of Marxism

The problem posed for Marxism by certain competing schools of political thought, by institutional and social developments in the West, in Russia and in backward areas, and by deviationist tendencies as in China and Yugoslavia. Particular attention will be given to the problems posed for social organization by (1) technology and its demands, (2) the ideal of high mass consumption, (3) the concept of individual development. Responses given to those problems by Marxism, Leninism, Mill, Weber, and Dewey will be surveyed. The course will relate doctrines to institutions.

Mr. Williams — Spring, 3 credits

Political Science 210. Politics in the Developing Areas

Survey of developmental politics in selected emerging nations. Emphasis upon colonial policies prior to independence, nationalistic movements, constitution building, and the emergence of leadership, parties, and interest groups. Comparison of the Western and non-Western political process.

Mr. Scarrow — Spring, 3 credits

Political Science 211. Comparative Political Parties and Pressure Groups

Analysis of the nature and function of political parties and pressure groups, with emphasis upon non-American political systems, both Western and non-Western, and upon party history, electoral behavior, elections campaigns, and pressure group activity.

Mr. Scarrow — Fall, 3 credits

Political Science 214. British Parliamentary Democracy

Examination of the workings of parliamentary democracy in Britain and in selected Dominions, with emphasis upon the nature of the societies in question, and the relationship of society to the working of political institutions, ideologies, and governmental policies.

Mr. Scarrow — Spring, 3 credits

Political Science 220. International Relations

Introductory survey of the nation-state system, its characteristic forms and the principal forces making for conflict and adjustment. Application of various approaches to the study of international relations (decision making, capability analysis, game theory, field theory) to contemporary problems.

Mr. Travis — Spring, 3 credits

Political Science 221. American Foreign Policy

Survey of problems involved in formulation of United States foreign policy. Whenever appropriate the American system is compared with procedures in other countries. Components of policy are analyzed: conditions abroad, traditional policy, public opinion, international law. Major constitutional provisions as they relate to foreign policy are reviewed. Executive and legislative institutions are studied from standpoints of role and personality, with emphasis given to contemporary situations.

Mr. Travis — Fall, 3 credits

Political Science 223. Latin America and the United States

Survey of the international relations of the Latin America republics; formulation of Latin American policy; relations with the United States and Europe; relations with international organizations (U.N. and O.A.S.); international trade; economic and financial development.

Mr. Travis — Fall, 3 credits

Political Science 224. Introduction to International Law

Case book approach to standard introductory course in international law, including the following topics: state jurisdiction and responsibility, individuals, international organization, use of force.

Mr. Travis — Spring, 3 credits

Political Science 230. American Constitutional Law

A study of the role of the modern Supreme Court within the political and governmental process; its relations with Congress, the Presidency, state and local governments, parties, and interest groups; and the Court's contemporary policy-making role in several areas — economic regulation, representation, race relations, censorship, religion in government, defendants' rights.

Mr. Reichler — Spring, 3 credits

Political Science 241. Political Attitudes and Propaganda

A treatment of the problems of public opinion and factors creating it. The course investigates: (1) the content and style of expressions of political attitudes; (2) the political other determinants of interest and participation levels, and political loyalities; (3) the nature, varieties, and actual effects of propaganda. Some attention will also be given to attitude research methods.

Mr. Parenti — Fall, 3 credits

Political Science 242. American Political Parties and Pressure Groups

This course examines: (1) political party organization, political leadership, finance, campaign techniques and legal controls over parties; (2) the functions and methods of pressure groups and their interaction with policy makers; (3) the historical origins and development of the American party system; (4) the significance of parties and pressure groups for democratic ideology and the problems of political leadership in a democracy.

Mr. Parenti — Spring, 3 credits

Political Science 391. Research Methods in Political Science: Comparative Politics

Approaches to the study of political systems with emphasis upon comparative analytical schemes, and upon comparison of specific institutions and patterns of behavior. Attention will also be devoted to the development of the study of comparative politics, including methods and problems of cross-governmental (international and intranational) and cross-cultural comparison.

Mr. Scarrow — Fall, 3 credits

Political Science 392. Research Methods in Political Science: American Political Institutions

Contributions and limitations of several approaches to and methods of the study of American politics and government, e.g., those emphasizing historical and institutional development, those focusing on interest and power conflicts, those analyzing political decision-making, and those concentrating on behavioral and interdisciplinary data; and the values of each approach in the quest for valid generalizations and predictions.

Mr. Reichler — Spring, 3 credits

Department of Psychology

Professor: Harry I. Kalish (Chairman)
Associate Professors: Lewis Petrinovich, Robert D. Singer
Assistant Professor: Bernhardt Lieberman

Requirements for the Major in Psychology

In addition to the general University requirements for the Bachelor of Arts degree, the following courses are required for the major in Psychology:

A. Study within the area of the major

Completion of 25 units in Psychology

Psychology 101. (*General Psychology*)
Psychology 152. (*Advanced General Psychology*)
Psychology 162. (*Statistical Methods in Psychology*)
Psychology 205. (*Experimental Psychology*)
Psychology 215. (*Abnormal Psychology*)
Psychology 340. (*Physiology Psychology*)
Psychology 391, 392. (*Special Topics in Psychological Research and Theory*)

B. Courses in related areas

Sociology-Anthropology 101, 102 (*American Dilemmas: Problems of Present Day Society and Culture; Culture, Person, Social Systems, Community*)
Philosophy 235 (*Philosophy of Science*)
Mathematics 113, 114 (*Introduction to Analysis*)
(It is possible for the student to substitute other courses with the approval of the departmental adviser.)

Courses in Psychology

Psychology 101. General Psychology

An introduction to psychology as the science of behavior, this course familiarizes the student with the major areas of behavior: conditioning, learning, perception, motivation, psychological development, personality, and measurement. Stress is placed on contemporary research. Prerequisite to all other courses in psychology.

Staff — Fall, 3 credits

Psychology 152. Advanced General Psychology

A more intensive treatment of the basic psychological processes covered in Psychology 101. It is recommended that majors enroll in this course immediately following Psychology 101. Laboratory demonstrations illustrating several classical experiments will be presented in class. The student will also be afforded an opportunity to participate in the presentation of the demonstrations.

Prerequisite: Psychology 101.

Staff — Fall, 3 credits

Psychology 162. Statistical Methods in Psychology

Designed to provide the student with a knowledge of the use and interpretation of elementary statistical techniques in research. Emphasis is placed on descriptive statistics, correlational analysis, and inferential statistics, including chi-square, critical ratio, t, F, and certain selected non-parametric techniques. Two lecture sections and a one-hour laboratory each week.

Prerequisites: Psychology 101, 152.

(Psychology 152 may be waived in certain cases.)

Mr. Lieberman — Fall, 3 credits

Psychology 205. Experimental Psychology

Application of the experimental method to the analysis of behavioral phenomena in human beings and animals. Design and execution of experiments, in conditioning, learning, perception, motivation, conflict, and certain selected personality problems. One lecture, one seminar and one two-hour laboratory period per week.

Prerequisites: Psychology 101, 152 and permission of the instructor.

Messrs. Lieberman, Petrinovich — Spring, 4 credits

Psychology 208. Theories of Personality

Contemporary theories of personality will be studied with emphasis on the experimental literature pertaining to personality development. Current methods of personality assessment in the applied areas will also be considered.

Prerequisite: Psychology 101.

Messrs. Kalish, Singer — Fall, 3 credits

Psychology 210. Empirical and Theoretical Studies of Social Conflict

The classical and current views of social conflict will be considered. Analyses of social conflict from Plato and Machiavelli to the recent work of von Neumann and Morgenstern will be considered. Emphasis will be placed on recent empirical and mathematical studies and a limited number of laboratory exercises will illustrate contemporary methods in the study of social conflict. Prerequisite: Psychology 101.

Mr. Lieberman — Spring, 3 credits

Psychology 211. Developmental Psychology

A study of the development of the human organism from conception to adolescence, with emphasis placed on the research literature pertaining to human development as well as those theories and value systems concerning human development which have emerged from studies of maturation and the learning process.

Prerequisite: Psychology 101.

Mr. Singer — Fall, 3 credits

Psychology 212. Psychology of Adolescence

In this course, which is a continuation of developmental psychology, the period of adolescence is emphasized. Cross-cultural analysis of adolescent behavior will be presented in addition to current investigations in adolescent attitudes and mores.

Prerequisite: Psychology 101.

Mr. Singer — Spring, 3 credits

Psychology 215. Abnormal Psychology

The major categories of psychopathology, including the neuroses and functional and organic phychoses, will be examined. Emphasis will be placed on an analysis of current research in psychopathology and its relationship to the theories of abnormal behavior.

Prerequisite: Psychology 101.

Mr. Kalish — Spring, 3 credits

Psychology 330, 331. Research in Psychology

Selected senior majors in Psychology will be offered a laboratory apprenticeship. The work consists of laboratory or field work by the student under the direct supervision of a faculty member in the Department of Psychology.

Prerequisite: Advanced standing in Psychology and written permission of the faculty supervisor.

Staff — Fall and Spring, 3 credits each semester

Psychology 340. Physiological Psychology

An examination of the physiological correlates of behavior, with emphasis on the relationship of the internal environment to external behavior. Experiments dealing with the various sense modalities, motor functions, learning, memory, and motivation will be presented.

Prerequisites: Psychology 101, 152.

Mr. Petrinovich — Spring, 3 credits

Psychology 391, 392. Special Topics in Psychological Research and Theory

A seminar to be offered to advanced students only, and to be organized by the faculty member who will deal with current research and theory in areas of special interest to him. Topics will be announced prior to the beginning of each semester.

Prerequisites: Psychology 101, 152, 162 and 205, and permission of the instructor.

Staff — Fall and Spring, 3 credits each semester

Interdepartmental Courses in Social Science

Social Science 201, 202. Topics in the Policy Sciences: Economic Development Programs and the World Struggle for Power

The themes to be treated include the spreading industrial revolution in the underdeveloped areas of the world and cultural tradition and social-political conflict in the modernization of the new nations. The political relations of the United States and the U. S. S. R. will provide the background of the readings and discussions. Either semester may be taken separately.

Messrs. Kristein, Williams Fall and Spring, 3 credits each semester

Social Science 211, 212. Topics in the Cultural-Behavioral Sciences

An analysis of selected cultural institutions of modern complex societies with particular emphasis upon the wide-spread search for cultural and individual identity. The principal themes to be studied in the methods of contemporary socio-cultural analysis will be: (1) value-orientations in an era of scientific revolution, economic affluence, and political uncertainty; (2) the social organization of the "image industries" and other cultural enterprises.

Fall and Spring, 3 credits each semester

Social Science 239. Materials and Methods in Teaching Social Studies

This course emphasizes the methods and materials appropriate to the teaching of a broad range of subject matter in the social sciences at the high school level. It is designed for prospective secondary school teachers of social studies.

Prerequisite: Permission of the Chairman of the student's major department.

Staff Fall, 3 credits

Social Science 381, 382. Problems and Methods in Social Theory and Social Science

Social Science 381 will emphasize problems in the scope and method of the policy sciences. Social Science 382 will emphasize problems in the scope and method of the cultural-behavioral sciences.

Prerequisite: Either semester may be taken concurrently with Social Science 201, 202, or 211, 212, or subsequently. Social Science 382 may be taken prior to 381.

Staff Fall and Spring, 3 credits each semester

Department of Sociology-Anthropology

Professor: Benjamin Nelson (Chairman)
Assistant Professors: Rolf Meyersohn, Guenther Roth

Requirements for the Major in Sociology-Anthropology

In addition to the general University requirements for the Bachelor of Arts degree, and the successful completion of Sociology-Anthropology 101, 102, the following courses are required for the major in Sociology-Anthropology:

A. Study within the area of the major

Six courses listed below under Groups A, B, and C. *Sociology-Anthropology* 391-392 *(Senior Seminar);* one year of interdisciplinary course work in Social Science.

Group A: Elements of Societies and Cultures

Sociology-Anthropology 151 or 152 *or permission of Department Chairman (Systematic Sociology, Principles, Methods and Perspectives)*

Group B: Social-Cultural Systems and Contemporary Social Trends

Sociology-Anthropology 203 *(Social Systems and Community Patterns)*

Sociology-Anthropology 205 *(Social Problems, Conflicts and Movements)*

Sociology-Anthropology 236 *(Technology, Industrialization and Social Change)*

Sociology-Anthropology 238 *(Self, Society, Culture, and Mental Health)*

Sociology-Anthropology 250, 299 *(Reading and Research Tutorials)*

Group C: Theoretical and Research Methods in Sociology-Anthropology

Sociology-Anthropology 201 *(Research Methods in Sociology-Anthropology)*

Sociology-Anthropology 361 *(Development of Sociology-Anthropology to the Year* 1900*)*

Sociology-Anthropology 362 (Sociology and Anthropology Today)

Sociology-Anthropology 151 or 152 or permission of the Department Chairman is a prerequisite for advanced work in the department. Majors are encouraged to complete this requirement at their earliest opportunity. A selection of two of the three courses in Group C is strongly recommended. Students expecting to complete requirements for certification as secondary school teachers in the Social Studies are urged to consult the departmental and education advisers at an early date.

The department recommends that the language proficiency requirement be ordinarily met in French or German, unless exception is granted by the Chairman or advisor.

Courses in Sociology-Anthropology

Sociology-Anthropology 101. American Dilemmas: Problems of Present Day Society and Culture

This course will explore with the aid of a wide variety of sources and methods the main value dilemmas and problems of the present day as they have been influenced by the contemporary revolutions in science, technology, communication, transport, organization, expectations, and cultural attitudes. Themes to be considered include: pressures in the direction of mass society, automation, the missile and space races, cultural homogenization, collectivistic controls, elites of experts, individual identity.

Mr. Meyersohn or Mr. Roth — Fall, 3 credits

Sociology-Anthropology 102. Culture, Person, Social System, Community

The topics to be explored from a structural-functional point of view include: patterns of culture; determinants of clan, caste, status, role, meaning, and social action systems; the social factors in the production and distribution of desired social values; the promise and paradoxes or collective effort and bureaucratic organization; the life-cycle of individual and group in industrial and non-industrial societies; cultural processes; the effects upon the sense of community of changes in the religious, scientific, and educational spheres.

Staff — Spring, 3 credits

Sociology-Anthropology 151, 152. Systematic Sociology: Principles, Methods and Perspectives

This course will direct the attention of students to the central frames of reference, the productive techniques, and the unsolved problems of the scientific study of behavioral and cultural institutions, which has made giant strides in the last two decades.

Prerequisites: Sociology-Anthropology 101 or 102.

Staff — Fall and Spring, 3 credits each semester

Sociology-Anthropology 153, 154. Introduction to Anthropology

An examination of the main problems of anthropology: man and culture; human evolution, racial variation, distribution of physical varieties of mankind; material and non-material; cultural systems as adaptive, symbolic, defensive, directive, and dramatic designs; multiple patterns for coping with the problems of survival, scarcity, order, meaning and integration.

Staff — Fall and Spring, 3 credits each semester

Sociology-Anthropology 201. Research Methods in Sociology

An introduction to modern methods of social-cultural research, emphasizing the development of skills in the design and interpretation of a wide variety of research procedures.

Mr. Meyersohn — Fall, 3 credits

Sociology-Anthropology 203. Social Systems and Community Patterns

A comparative analysis of stratification systems and community structures, with an examination of patterns of differentiation based on income, status, power, prestige, class; class consciousness and class conflict; influence and elite structures.

Mr. Meyersohn — Fall, 3 credits

Sociology-Anthropology 205. Social Problems, Conflicts and Movements

An examination of aggregate phenomena: basic elements in social movements and conflict; conformity and deviant behavior in mass society; "revolutionary" and "counter-revolutionary" programs and organizations. Historical and cross-cultural illustrations will be stressed.

Mr. Roth — Fall, 3 credits

Sociology-Anthropology 236. Technology, Industrialization and Social Change

A comparative analysis of the interrelations between technological and social change, of technological and organizational preconditions of economic development, and of the social implications of automation in highly industrialized countries.

Mr. Roth — Spring, 3 credits

Sociology-Anthropology 238. Self, Society, Culture and Mental Health

A critical survey interpretation of the self, and its predicaments and powers in contemporary society and social science. On going sociological and anthropological research on community mental health profiles and programs will be reviewed.

Mr. Nelson — Spring, 3 credits

Reading and Research Tutorials: Sociology-Anthropology 250-299

Courses listed below as reading and research tutorials are open to selected juniors and seniors with the permission of the instructor and the Department Chairman. In each case, the course will emphasize critical source reading and research in selected areas of current interest to the staff.

Sociology-Anthropology 251. Work and the Professions

The world of work and the professions is examined with particular reference to inter-organizational conflict and accommodation.

Prerequisite: Sociology-Anthropology 151 or permission of instructor.

Mr. Roth — Fall, 3 credits

Sociology-Anthropology 256. Political Sociology

Stress will be placed on current research and unresolved problems in the spheres of power, authority, and legitimacy.

Prerequisite: Sociology-Anthropology 151 or permission of instructor.

Mr. Roth — Spring, 3 credits

Sociology-Anthropology 262. Mass Communications

Particular attention is directed to the sociological patterns affecting recruitment of personnel, organization of services, and public functions of mass communication facilities.

Prerequisite: Sociology-Anthropology 151 or permission of instructor.

Mr. Meyersohn — Spring, 3 credits

Sociology-Anthropology 281, 282. Sociology of Organizations

This course will focus on structural features of organizational systems: chains of command, line-staff conflicts, organizational goals and performances, patternings of cooperation and conflict, status symbols, legal guarantees and grievance procedures.

Prerequisite: Sociology-Anthropology 151 or permission of instructor.

Mr. Nelson and/or Mr. Roth

Fall and Spring, 3 credits each semester

Sociology-Anthropology 283, 284. Social Roles and Role-Systems

Following a review of the extensive current sociological research on role, attention will be directed to alternative arrangements and functions of roles in historical, contemporary, and cross-cultural contexts.

Prerequisite: Sociology-Anthropology 151 or permission of instructor.

Mr. Nelson and/or Mr. Meyersohn

Fall and Spring, 3 credits each semester

Sociology-Anthropology 361. Development of Sociology-Anthropology to Year 1900

A survey of the main currents in the development of theories and empirical investigation of society, culture, personality. The authors studied include Adam Smith, Saint-Simon, Comte, Marx, Maine, Burckhardt, Tylor, Frazer, Durkheim, Dilthey, Simmel, Pareto, Freud, Weber.

Mr. Nelson — Fall, 3 credits

Sociology-Anthropology 362. Sociology and Anthropology Today

A review of the recent and contemporary advances in research, theory, and method in the fields of sociology and anthropology, especially in Great Britain and the United States. Authors studied include C. H. Cooley, G. H. Mead, B. Malinowski, R. Linton, T. Parsons, R. K. Merton, and others.

Mr. Nelson — Spring, 3 credits

Sociology-Anthropology 391-392. Senior Seminar in Sociology and Anthropology

Special topics, projects, and research papers.

Mr. Nelson and Staff — Fall and Spring, 6 credits

College of Engineering

Program in Engineering Science

The undergraduate program in engineering science consists of intensive study in the basic sciences of mathematics, physics and chemistry as well as comprehensive work in the engineering sciences of fluid mechanics, solid mechanics, thermodynamics, electrical theory, engineering analysis and properties of matter. In addition, the curriculum embraces broad training in the humanities, social sciences, and communications.

Traditional engineering departments are not represented at the State University at Stony Brook since engineering science is concerned with areas of knowledge which are fundamental to all of the conventional engineering fields and by its nature seeks to avoid overtraining in existing engineering techniques and applications. A degree of specialization in particular engineering areas is provided in the senior year through elective courses and senior projects.

Engineering experiences in the last decade have indicated that engineers today must have a new depth and breadth of scientific knowledge to cope with the problems of a rapidly changing technology. The undergraduate engineering program is designed to provide this fundamental scientific background and to develop engineers who can creatively translate the knowledge of basic science into engineering results.

Programs of graduate work in the Departments of Engineering Analysis and Thermal Sciences are offered. (For further information see the *Graduate School Bulletin.*)

Requirements for the Bachelor of Engineering Science Degree

A student will be recommended by the Faculty for the degree upon completion of the requirements listed in sections 1 through 5 below.

1. Required courses: Credit for, or exemption from, each of the following is required of all candidates:
   English 101, 102 — 6 credits

Humanities 101, 102	6 credits
Humanities 151, 152	6 credits
Social Science (This requirement may be satisfied by the successful completion of courses from 3 of the 5 Social Science Departments.)	12 credits
Physics 101, 102, 151, 152	16 credits
Chemistry 101, 102	8 credits
Mathematics 113, 114, 155, 156	16 credits

2. Quantity requirement: Every student is required to earn at least 128 credits.

3. Quality requirement: A cumulative grade point average of 2.0 for all courses taken at the State University at Stony Brook is required of every student.

4. Elective requirement: 6 credits are required in the junior year in the areas of the humanities, including foreign languages, the social sciences, or the biological sciences.

5. Concentration requirement. Every student must meet the requirements of a program of concentration in Engineering Science approved by the Curriculum Committee of the College of Engineering.

6. Required freshman program: Every student admitted without advanced standing is required to register for English 101, 102, Humanities 101, 102, 151, 152, Mathematics 113, Physics 101 and two semesters of Social Science. Courses to meet the Social Science requirements are to be chosen from the following: Economics 101, 102; History 101, 102; Political Science 101, 102; Psychology 101, and any Psychology course listed in the Bulletin with the exception of Psychology 330, 340, 391, 392; and Sociology-Anthropology 101, 102. (Students selecting one semester of Political Science must take Political Science 101.)

7. Exemptions: On the recommendation of the Chairman of the course, a student is exempted without credit from any of the course requirements specified in Sections 1 or 6 above.

Undergraduate Sequence

First Year

1st Semester	*Credits*	*2nd Semester*	*Credits*
Humanities	3	Humanities	3
English 101	3	English 102	3
Social Science	3	Social Science	3
Mathematics 113	3	Mathematics 114	3
Physics 101	4	Physics 102	4
	16		16

Second Year

1st Semester	*Credits*	*2nd Semester*	*Credits*
Humanities	3	Humanities	3
Social Science	3	Social Science	3
Mathematics 155	3	Mathematics 156	3
Physics 151	4	Physics 152	4
Chemistry 101	4	Chemistry 102	4
Graphic Art (ESG 151)	1	Introduction to Digital Computers (ESG 162)	2
	18		19

Third Year

1st Semester	*Credits*	*2nd Semester*	*Credits*
ESG 201 Thermodynamics I	3	ESG 202 Thermodynamics II	3
ESE 251 Electrical Sciences I	3	ESG 252 Electrical Science II	3
ESG 221 Engineering Analysis I	3	ESG 222 Engineering Analysis II	3
ESG 211 Engineering Laboratory I	3	ESG 212 Engineering Laboratory II	3
ESG 261 Mechanics I	3	ESG 232 Material Sciences I	3
Elective (Non Tech)	3	Elective (Non Tech)	3
	18		18

Fourth Year

1st Semester	*Credits*
ESE 353 Electrical Science III	3
ESG 363 Mechanics II	3
ESG 333 Material Sciences II	3
ESG 340 Systems Synthesis	3
ESG 313 Engineering Laboratory III	3
Elective (Technical)	3
	18

2nd Semester	*Credits*
ESG 323 Engineering Analysis III	3
ESG 334 Material Sciences III	3
ESG 305 Heat Transfer	3
ESG 364 Mechanics III	3
Elective (Technical)	3
Elective (Technical)	3
	18

Courses of Instruction

Course designations are abbreviated according to the following scheme:

ESG: Required Undergraduate Courses
ESA: Courses offered by the Department of Engineering Analysis
ESE: Courses offered by the Department of Electrical Sciences
ESM: Courses offered by the Department of Material Sciences
EST: Courses offered by the Department of Thermal Sciences

The numbering of courses will indicate the year in which they are normally taken:

101-150: freshman courses
151-199: sophomore courses
201-299: junior courses
301-399: senior courses
401-499: graduate courses

Required Undergraduate Courses

ESG 151. Graphic Art I

A broad introduction to the principles of graphic art. Attention is paid to the perspective and projection problems connected with architectural and mechanical subjects, to rendering techniques, to drawing in mixed media, and to the achievement of speed and accuracy. At each stage the student studies and discusses the work of such artists and scientists as Giotto, Da Vinci, Dürer, Fulton, and Morse.
Prerequisite: None.
Three laboratory hours.
To be offered both semesters.

1 credit

ESG 162. Introduction to Digital Computers

An introduction to concepts of problem solving on a digital computer with emphasis on analyzing the problem, determining the solution process and coding the problem for solution on the digital computer. Fundamental concepts of computer logic are also introduced, with emphasis on computer organization, number representation, arithmetic operations, and the fundamental postulates of Boolean algebra.
Prerequisite: Sophomore standing and Mathematics 111, 112 or Mathematics 113, 114.
Two lecture hours, one laboratory hour.
To be offered both semesters.

2 credits

ESG 201. Thermodynamics I

An introduction to the concepts of energy, information, and states of matter with engineering applications is presented. The elementary concepts of information theory are considered as primitive and basic. The formalism of equilibrium statistical thermodynamics based on maximum uncertainty is developed from Shannon's equation for uncertainty. The classical, macroscopic equations of thermostatics (Zeroth, First, Second, and Third Laws) are derived from the formalism. The ideal monatomic gas, temperature, equations of state, and generalized thermodynamic property relationships by the method of Jacobians are considered.

Prerequisites: Mathematics 156, Physics 152, Chemistry 102.

3 credits

ESG 202. Thermodynamics II

The formalism developed in ESG 201 is applied to the open system, equilibrium and the grand potential function, chemically reactive systems, cycles, and an introduction to the thermodynamics of irreversible processes.

Prerequisite: Thermodynamics I.

3 credits

ESG 211. Engineering Laboratory I: Theory and Measurement in Engineering

The following topics will be considered: interaction of theory and experimentation, formulation of the theory, theoretical planning of the experiment, uses of theory in design of experimental apparatus, methods of data analysis, experimental problems involving sensor readout systems, and electronic instrumentation in scientific research.

One lecture hour, six laboratory hours.

Prerequisite: Junior standing.

3 credits

ESG 212. Engineering Laboratory II: Engineering Experimentation

The study of electronic instrumentation in scientific research is continued. Additional considerations are: establishing the experimental environment, introduction to, and uses of, dimensional analysis, pure empiricism and its uses, details of methods of experimental analysis, including experimental planning, data analysis and interpretation of results, selected experimental examples and problems which supplement the lectures. Individual projects are encouraged.

One lecture hour, six laboratory hours.

Prerequisite: ESG 211.

3 credits

ESG 221. Engineering Analysis I

This is the first part of a two-course sequence dealing with the analysis of linear systems. Lumped parameter systems are considered during the first term. First and second order ordinary linear differential equations, and

systems of differential equations encountered in the various branches of engineering are derived and methods for their solution developed. Matrices are introduced in the course of the study of equilibrium and characteristic-value problems. Normalization, analog and modelling techniques are also discussed.
Prerequisites: Mathematics 155, 156.

3 credits

ESG 222. Engineering Analysis II

This continuation of Engineering Analysis I, concerned with distributed parameter systems, considers, in turn, the formulation and classification of the basic differential equations of such systems, equilibrium, characteristic-value, and propagation problems, boundary-value problems, the separation of variables technique, Green's function, conformal mapping, and operational techniques.
Prerequisite: Engineering Analysis I.

3 credits

ESG 232. Material Sciences I

A broad introduction to the scientific principles underlying knowledge of materials and their applications. The course begins with an introduction to modern atomic theory, the periodic table and chemical bonds, the perfect crystal, the space lattice, unit cell, X-ray crystal structure determination, specific crystal, structures, the imperfect crystal, dislocations, the basic concepts of phase transformation and phase diagrams. Mechanical properties are discussed classically and in terms of dislocations. The course then continues with principles of electrochemistry, corrosion, colloids and high polymers.
Prerequisite: Physics 152.

3 credits

ESG 251. Electrical Sciences I

Introduction to circuit theory including consideration of the following topics: network topology, Kirchoff's laws, network equilibrium equations, duality and reciprocity, transient analysis, impedance, steady state behavior and energy relations in simple circuits, mutual inductive coupling, polyphase circuits, and linear active elements.
Prerequisites: Mathematics 156, Physics 102.
Corequisite: Engineering Analysis I.

3 credits

ESG 252. Electrical Sciences II

The fundamentals of electromagnetic theory. The topics include: elements of vector analysis, Maxwell's equations, static fields, lumped circuit and field concepts, quasistatic fields and distributed constant, transmission lines, plane waves, guided waves, radiation, wave guides and antennas.
Prerequisite: Electrical Sciences I.
Corequisite: Engineering Analysis II.

3 credits

ESG 261. Mechanics I: Introduction to Mechanics

The fundamentals of particle and continuum mechanics. Topics include: Newton's laws, Lagrange's equations, statics of a system of particles and rigid bodies, kinematics of particles and rigid bodies, dynamics of a particle and system of particles, and the discontinuous character of matter, the continuum approximation, properties at a point, the state of stress at a point, tensor notation and Cartesian tensors, properties of the stress tensor, the state of deformation, the equations of continuity, motion, and energy.

Prerequisites: Mathematics 156, Physics 152.

3 credits

ESG 305. Heat Transfer

Fundamentals of steady-state and transient conduction heat transfer. Boundary layers in forced and free convection and convective heat transfer for flow through ducts are treated, as well as thermal radiation phenomena and energy exchange by thermal radiation.

Prerequisites: Thermodynamics II, Mechanics III.

3 credits

ESG 313. Engineering Laboratory III: Systems Laboratory

Simulation and control of a selected engineering system is undertaken. Individual students or small groups may investigate engineering problems (preferably of their own choosing) with endorsement of the staff. Emphasis is placed on investigation and synthesis rather than analysis, and the student is encouraged to pursue his own line of investigation.

One lecture hour, six laboratory hours.

Prerequisite: Engineering Laboratory II.

3 credits

ESG 323. Engineering Analysis III

Methods for obtaining numerical answers to a variety of problems arising in engineering theory and practice. Concepts of numerical analysis such as finite differences, interpolation, least-squares, best approximation, etc. are introduced as the need for them arises. Emphasis is placed upon iterative processes suitable for digital computation. Typical problems will be programmed and run on a digital computer.

Prerequisite: Engineering Analysis II.

3 credits

ESG 333. Material Sciences II: Physical Properties of Matter

This course builds on the background provided by Material Sciences I and provides an introduction to the physical properties of matter. Among the topics covered are: measurement of the physical properties of matter, hardening mechanisms, elastic behavior, plastic deformation, failure of materials, and dislocation theory.

Prerequisite: Material Sciences I.

3 credits

ESG 334. Material Sciences III: Electrical and Magnetic Properties of Matter

The course is designed primarily as an introduction to the modern theory of the electrical and magnetic properties of matter. Some of the topics discussed include the free electron theory of metals, the band theory of solids (Brillouin Zone theory and applications), the conductivity of metals, the physics of semiconductors, pn junction theory, photoelectric, thermoelectric, magnetic and dielectric properties of matter.
Prerequisite: Material Sciences II.

3 credits

ESG 340. Systems Synthesis

This course is intended to provide a broad interdisciplinary approach to the design of engineering systems. Design studies of a representative number of such systems are conducted by the student. Emphasis is placed on considerations which are common to all design areas such as optimization and analytical modeling techniques.
Prerequisite: Engineering Analysis I.

3 credits

ESG 353. Electrical Sciences III

Topics include: motion of charges in electric and magnetic fields, electrons in metals, thermionic emission, the vacuum diode, photoelectric devices, vacuum tube and transistor characteristics, gas discharges, gas diodes and triodes, single-phase rectifiers and filters, voltage and power amplifiers, non-linear electronic components, switching circuits, memories, multivibrators; amplitude and frequency modulation and detection, noise.
Prerequisite: Electrical Sciences II.

3 credits

ESG 363. Mechanics II: Structural Mechanics

An introduction to the mechanics of engineering structures and the techniques used in analyzing such structures. Topics include: stress resultants and stress intensities; equilibrium and stability analysis of beams and trusses; elastic deformations due to axial forces and bending moments with emphasis on the conjugate beam method; energy principles including virtual work, Castigliano's Theorems, Betti's Law and Maxwell's Law; and an introduction to statically indeterminate structures with emphasis on the method of superposition, Conjugate Beam, and Virtual Work.
Prerequisites: Mechanics I, Engineering Analysis I.

3 credits

ESG 364. Mechanics III: Fluid Mechanics

This course applies the practical aspects of continuum mechanics to the solution of problems of fluid motion. Topics include: the Navier-Stokes equations, dimensional analysis of the equations of fluid mechanics and dimensionless parameters, potential flow, subsonic and supersonic flow, one dimensional gas dynamics, flow with friction and heat transfer, the normal shock, nozzle flow.
Prerequisites: Mechanics II, Engineering Analysis II.

3 credits

Department of Electrical Sciences

Professor: Sheldon S. L. Chang (Chairman)
Assistant Professor: Peter M. Dollard

Departmental Elective

ESE 315. Introduction to Feedback Control Theory

The study of automatic control theory is initiated in this course. Primarily concerned with the analysis of linear feedback systems, the course deals with the transient response and stability of such systems. The techniques employed are the transfer function method and various methods of graphical analysis such as Nyquist diagrams, Bode plots and root locus procedure. The synthesis of feedback control systems is covered in an introductory manner.
Prerequisites: ESG 201, 251, 221, 261.

3 credits

Department of Engineering Analysis

Professors: Irving Gerst (Chairman), Aaron Finerman (Director of Computing Center), Armen H. Zemanian
Assistant Professor: Daniel Dicker

Departmental Electives

ESA 315. Random Processes in Engineering Systems

An introduction to the study of random phenomena in engineering. Pertinent concepts such as random variables, probability distributions, mean values, characteristic functions, spectral density and stochastic processes are developed and applied to problems in noise theory, propagation through linear systems, information theory and quality control.
Prerequisite: Engineering Analysis I.

3 credits

ESA 316. Special Functions of Engineering Analysis

A study of the more common higher mathematical functions which are required for the analytical solution of engineering problems. The Bessel, Legendre, hypergeometric and Mathieu functions are among those to be considered. Topics include: orthogonal sets of functions, recursion formulas, series solution of linear differential equations, Fourier-Bessel expansions, asymptotic expansions, functional equations, application to boundary value and initial value problems.
Prerequisite: Engineering Analysis II.

3 credits

Department of Material Sciences

Professor: Sumner N. Levine (Chairman)
Associate Professor: Joseph Jach
Assistant Professor: Robert Rosenberg

Departmental Electives

ESM 325. X-Ray Diffraction and Structure of Matter

An introduction to the application of X-ray diffraction techniques to the study of the structure of solids. In addition to lectures, opportunity will be provided for laboratory work in the use of X-ray diffraction techniques. Prerequisite: Material Sciences I.

3 credits

ESM 326. Quantum Theory of Matter

A detailed introduction into quantum mechanics with a survey of theory of metals, semiconductors, lasers, masers, and other relevant applications. Prerequisites: Mathematics 155, 156; Physics 152.

3 credits

ESM 327. Semiconductor Theory and Technology

A detailed discussion of the preparation and properties of semiconductors. The theory of thermal and electrical transport is developed in detail and applied to semiconductor electronic devices and thermalelectric devices. The photoelectric and Hall effects are then discussed and applied to measurement techniques as well as to devices.
Prerequisite: Quantum Theory of Matter.

3 credits

Department of Thermal Sciences

Professor: Walter S. Bradfield (Chairman)
Associate Professors: Robert D. Cess, William T. Snyder
Assistant Professor: Edward E. O'Brien
Instructor: Joseph T. Pearson
Lecturer: Joseph J. Sheppard, Jr.

Departmental Electives

EST 371. Compressible Fluid Mechanics

The general conservation equations of gas dynamics are derived from a differential and integral point of view. Hyperbolic compressible flow equations, unsteady one-dimensional flows, the non-linear problem of shock wave formation, isentropic plane flow, small perturbation theory, method of characteristics, and the hodograph method are considered as representative applications of the general equations.
Prerequisite: Thermodynamics II.

3 credits

EST 372. Boundary Layer Theory

The Navier-Stokes equations and their subsequent reduction to the boundary layer equations are discussed. General properties of the boundary layer equations, conditions for similarity, exact solutions, and approximate methods are treated. The fundamentals of turbulent flow are discussed with application of the mixing length theories to turbulent boundary layers.
Prerequisite: Mechanics III.

3 credits

EST 375. Viscous Fluids

The Navier-Stokes equations are derived and some exact solutions obtained. Topics include low Reynolds number behavior, lubrication theory, flow through porous media, asymptotic behavior at large Reynolds numbers, boundary layers, wakes and jets, and laminar flow instability.
Corequisite: Mechanics III.

3 credits

The Computing Center

The Computing Center serves the needs of the entire student body and faculty in the field of electronic computers. The objectives of the Center are many. It not only introduces students to modern electronic computers through course work and the integration of the computer-oriented approach in problem courses, but also makes the computing facilities freely available for such student activities as term papers, research projects, and theses. The Center also serves the faculty in both sponsored and unsponsored research activities and the administration in such areas as student records, registration studies, and accounting procedures.

The present equipment consists of an IBM 1620 Computer and associated peripheral units. It performs research investigations in the numerous areas of the computing sciences such as programming systems, numerical techniques, and new applications.

Academic Regulations

Courses are to be chosen in accordance with the regulations of an established degree program and are to be approved by the student's academic advisor. However, it is the student's responsibility to ascertain that he meets all the requirements for graduation.

A minimum registration of 15 semester hours is required of undergraduates. Students may register for less than 15 semester hours or more than the normal five-course load only upon receiving permission from the Committee on Academic Standards. All formal petitions for dropping or adding courses must originate with the Registrar's Office, and must be presented on prescribed forms obtainable there. Such changes may be requested only during the first two weeks of a semester. (If the dropping of courses reduces the student's load below 15 hours, permission of the Committee on Academic Standards must be obtained.)

A student who wishes to withdraw from a course may petition the Committee on Academic Standards for the grade of "W" (Withdrawal) at any time after the first two weeks of classes and prior to the last four weeks of a semester. The appropriate forms may be obtained at the Registrar's Office. The Committee may grant such a petition when the withdrawal does not reduce the student's program below fifteen credit hours for the semester, or when in the judgment of the Committee unusual circumstances, such as physical disability, make it impossible for the student to fulfill his academic obligations.

Registration after the close of the regular registration period requires permission of the Registrar as well as payment of a fee of $2.00. Registration is not permitted after the end of the second week of classes, and is not complete until financial arrangements regarding tuition and fees satisfactory to the Business Office have been made.

Students wishing to change a major must file a "change of major" form with the Registrar.

Any student who finds it necessary to withdraw from the University must file a formal request at the Registrar's Office. A grade of W will be recorded for all courses in which the student is currently registered, if he withdraws before the first day of the examination period at the end of the semester. Students who discontinue attendance during the semester without formal notification will be given a grade of F (Failure) in each course.

Requests for re-admission to the University should be addressed to the Registrar. If the student has attended an institution of higher learning since his last attendance at the State University at Stony Brook, an official transcript of grades must be forwarded before a request for re-admission can be considered.

A student who wishes to take courses during the summer at other institutions for transfer credit applicable to his degree should initiate his request with his advisor.

A student who wishes to attend a course as an auditor must obtain written permission of the instructor, and must file it with the Registrar. Only regularly registered students may audit courses, and no credit may be earned by auditing. However, attendance of a single session or brief period of a course for which the student is not registered requires only the informal approval of the instructor.

The University reserves the right to alter academic regulations as well as fees at any time, and to cancel any course offered if conditions warrant cancellation.

Assignment of Grades

A grade is assigned at the end of each semester's work. The examination given at the end of the semester contributes substantially to the grade. In semester courses which are interdependent in subject matter (such as *Chemistry* 101, 102) the satisfactory completion of the first semester is a prerequisite to enrollment in the second semester course.

Marks assigned upon completion of a course are: A (Superior); B (Good); C (Satisfactory); D (Minimum Passing); and F (Failure).

In addition to these grades, the following marks may also be awarded at the end of a semester:

Inc. (Incomplete) indicates failure to complete assigned work other than the final examination. This mark is given only on the request of the student and at the discretion of the instructor. The

period allowed for completion of the work and removal of the Inc. will be set by the instructor but may not extend beyond the four weeks following the last day of the semester in which the course was taken. In exceptional circumstances this period may be lengthened by the Dean of Students with the consent of the instructor. Work not completed in the prescribed time will be marked F in determining the final grade.

Abs. (Absence) indicates work incomplete because of absence from the final examination. This mark is automatically awarded by the instructor when the student fails to appear for the final examination. An absence from a final examination is excusable only by the Dean of Students with the concurrence of the instructor and ordinarily only for cogent reasons such as physical incapacity. If the absence is not excused, the instructor will count the student's performance on the final examination as an F.

W (Withdrawal) indicates withdrawal from the University, as explained in the previous section.

R (Registered) is given at the end of the first semester of a year course, e.g., *Biology 391-392* or *Sociology-Anthropology 391-392.*

J (Audit) indicates a student has attended a course as an auditor. No credit is given for auditing a course.

Academic Standing

The State University of New York at Stony Brook requires for graduation a scholarship average of C, which represents a cumulative grade-point average of 2.0.

For the purpose of determining scholarship averages the letter grades have been assigned the following values: A, 4 points; B, 3 points; C, 2 points; D, 1 point; F, no points. (Grades designated as *Incomplete* and *Withdrawal* are not included in the scholarship average.) To work out the cumulative grade-point average, the number of points equivalent to the letter grade earned in a given course is multiplied by the number of credit hours which the course carries; the total number of points earned in all courses is then divided by the total number of credit hours for which the student has been registered.

The minimal cumulative averages that will allow a student good academic standing are the following:

1.75 at the completion of the freshman year

1.90 at the completion of the sophomore year

2.00 at the completion of the junior year

Students with cumulative averages of at least 1.50 but less than 1.75 at the end of the freshman year normally will be admitted to the sophomore class on a probationary basis; similarly, the cumulative grade-point range for probationary admission to the junior class is 1.75 to 1.90 at the end of the sophomore year, and to the senior class, 1.90 to 2.00 at the end of the junior year.

A student normally will be suspended if his cumulative average is less than 1.50 at the end of the freshman year, 1.75 at the end of the sophomore year, or 1.90 at the end of the junior year.

Student Welfare and Activities

Advisory and Counseling Services

A faculty advisor is assigned to each student, who is encouraged to consult this advisor regarding educational planning and any academic problems arising during the school year. In addition, the Office of the Dean of Students consists of a staff of trained counselors experienced in helping students with personal, social, educational, and vocational problems. An orientation program is conducted for incoming undergraduates during a period immediately prior to their initial registration.

Placement and Financial Aid

Information on student employment, summer jobs, and assistance in securing full-time non-teaching positions is provided through the Office of the Dean of Students. This Office also administers financial aid programs and furnishes information regarding them. Information on teaching positions is available through the Department of Education. (Data on scholarships and loans will be found under "Financial Information".)

Student Health Service

Minor medical care is provided in the infirmary through the services of a full-time registered nursing staff and the availability of a physician. A compulsory health-insurance program (see "Financial Information") has been adopted to cover the costs of treating major illness, including those of hospitalization and surgery. Any student whose illness in the opinion of the physician requires attention or treatment beyond that available at the University will be referred to his family or guardians for care at home or in a hospital, and by a physician of their choice.

Athletics

A physical education program, at present on a voluntary and informal basis, has been designed to help students develop com-

petence in athletic activities which are recreational, and which may be engaged in by men and women during the years following those spent in college.

Intramural leagues have been organized in such sports as touch football, volleyball, basketball, tennis, table tennis, and softball.

The intercollegiate program for men consists of six sports: crew, cross-country, track, backetball, bowling, and soccer.

Student Organizations

The Student Polity, to which all students belong, allows them to govern themselves to a large extent in extra-curricular matters. The Executive Committee of Polity, composed of elected members, approves and coordinates the activities of campus organizations and publications. Publications include *The Statesman,* the newspaper; *Specula,* the yearbook; and *Soundings,* the literary magazine. The range of organizations will be suggested by the following partial listing: The Chemistry Society, the Astronomical Society, the Council for Political Inquiry; the Jewish Student Organization, the Newman Club, the Student Christian Association; Curtain and Canvas, the Instrumental Group, the University Chamber Singers. The Student Polity also sponsors art exhibits, lectures and films.

A more complete account of campus activities can be found in the *Student Handbook,* obtainable from the Office of the Dean of Students.

Housing

Unmarried students who will not live at home during the school year are required to live in university residence halls. In 1963-64 housing for approximately 800 men and women will be available. All rooms at present provide each student with a bed, mattress, bureau, study desk and chair, and closet. Lounges and public areas offer space for lectures, concerts, art exhibits, and social events. Board consisting of 21 meals a week is provided for resident students; non-resident students may purchase meals in the university dining hall. (See "Financial Information" for Residence charges.)

Life in the residence halls is organized under a system of student self-government. Full-time professional counselors are in residence.

Financial Information

Tuition and Fees

The tuition for residents of New York is $200.00 each semester, or $400.00 a year, and for out-of-state residents it is $300.00 each semester, or $600.00 a year. In addition, all students will pay the following fees:

	First Semester	Second Semester	Year
State University fee	$12.50	$12.50	$25.00
Student health insurance fee*	$22.50		$22.50
Student activity fee (maximum)	$25.00	$25.00	$50.00
Identification card	$2.00		$2.00

Students who register after the official registration period must pay a late registration fee.

Fees of up to $10.00 to cover breakage of laboratory equipment and musical instruments may be required by appropriate departments. Refunds of unused balances will be made upon graduation or withdrawal.

A graduation fee not in excess of $15.00 may be assessed by the senior class upon its members. This fee is normally collected at the time of final registration.

Two free transcripts of credits will be permitted each student who graduates; additional transcripts will cost $1.00 each.

Preadmission Deposits

An advance deposit of $50.00 from each new student is required. This deposit, payable upon tentative or conditional acceptance, is applied against charges incurred by the depositor at the start of his attendance. The deposit is required on or before April 30th for students notified of acceptance before April 1st. For those students notified of acceptance after April 1st or for admission in

* This fee will be waived if, prior to registration, satisfactory evidence of both hospital and medical insurance is presented.

other than the fall semester, deposits are payable within thirty days after acceptance or before registration, whichever is earlier. The deposit is refundable only in the case of those students who, having forwarded their deposits upon conditional acceptance, have later been refused admission.

Refunds

A student who withdraws after the first five days of a semester is entitled to only a partial refund of monies collected for tuition and State University fees. A schedule of refunds is available in the Business Office.

Book Cost

Each student should plan to spend between $75.00 and $100.00 each year on books and laboratory supplies; these may be purchased in the campus bookstore.

Residence Charges

Room charges of $315.00 for an academic year are payable at the rate of $90.00 for the first quarter, and $75.00 for the second, third, and fourth quarters. This rental will be higher for single-room accommodations. Once a student has registered and occupied a room, no refund of the payment for that quarter will be granted. An advance deposit of $25.00 is required prior to each fall semester, and this deposit will not be refunded unless an application for refund is made before July 1st.

Students living in residence halls must pay $500.00 a year for board. Payments, at the rate of $125.00 each quarter, are refundable on a percentage basis effective one week after official notification of withdrawal has been received by the Business Office. Twenty-one meals are provided each week. No refunds are made to students who leave the campus on weekends or for other reasons miss meals.

Students in the residence halls pay a non-refundable laundry fee of $12.50 each semester.

A deposit of $15.00 must be paid on the room telephone prior to taking up residence. If no telephone bills are outstanding upon graduation or withdrawal from the University, this deposit will be refunded.

Scholarships and Loans

Regents' College Scholarships are granted by New York State to high school graduates by counties on the basis of an annual written scholastic competition. Application should be made to the local high school principal.

Scholar Incentive Awards are available, for each semester of attendance, to anyone matriculated in a college in the State of New York in a full-time program leading to a degree, provided he has been a resident of the State for the preceding year and meets the prescribed academic requirements . (An undergraduate who is a legal resident but has not been a resident for a full year may qualify for an award if he was a resident during his last year of high school attendance. Similarly, a graduate student may qualify if he was a resident from the beginning of his last year of college attendance until the time he matriculated for graduate study.) The amount of the Award will be based on the net taxable balance of the income of the student and of those responsible for his support, as this income is reported on the State Income Tax Return for the calendar year. (If more than one child in the family is attending college, the net taxable balance is divided by the number of those attending college.) The maximum amount to be awarded for the two semesters of an academic year is as follows:

Net Taxable Balance	Undergraduate Study	First Year of Graduate or Professional Study	Graduate or Professional Study Beyond First Year
$1,800 or less	$150	$200	$400
Between $1,800 and $7,500	100	150	300
$7,500 or more	50	100	200

Scholar incentive holders and the university will receive, as soon as practicable, a notice of the maximum award to which the holder will be entitled solely on the basis of financial status. However, the amount of the award cannot exceed the amount by which the college tuition for the semester (not including fees) exceeds $100.00. Application for Scholar Incentive Awards should be made to the State Education Department, Albany, New York.

Scholarships for Children of Deceased or Disabled Veterans, of $1,800 each, are granted by New York State to eligible applicants on

the basis of an annual scholarship examination. Application should be made to the local high school principal or to the State Education Department, Albany, New York.

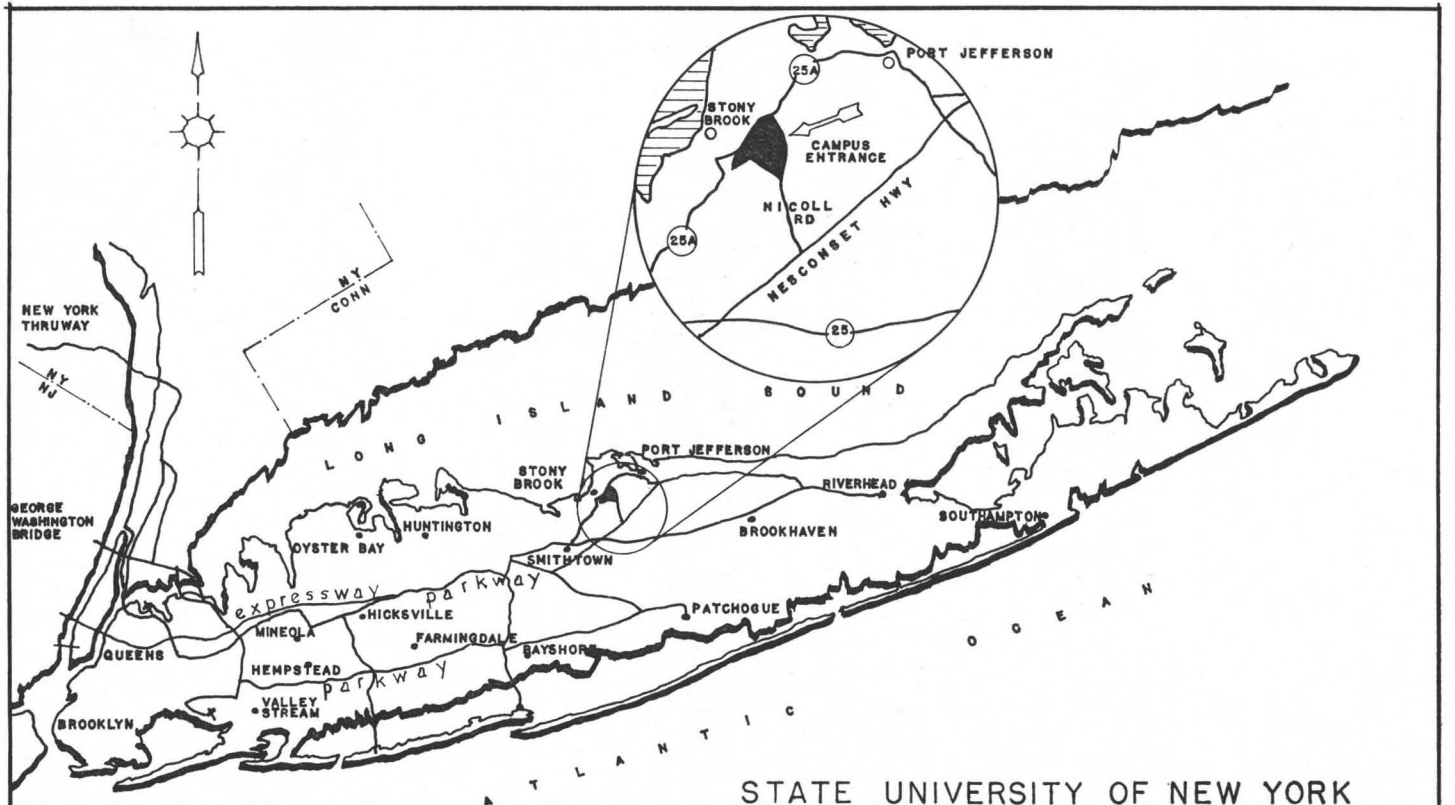
Veterans may attend the State University under the benefits of Public Law 894 (disability) or 550 (Korean War).

Eligible students also may receive financial assistance from the Division of Vocational Rehabilitation of the New York State Education Department.

The State of New York, through the New York Higher Education Assistance Corporation, enables needy students to borrow money to help finance their higher education. The maximum amount which may be borrowed in any one academic year is $1,000. The Corporation guarantees loans made by participating banks in New York State. Application forms for these loans may be obtained from the Dean of Students, from a local cooperating bank, or by writing directly to the New York Higher Education Assistance Corporation, State Education Building, Albany, New York.

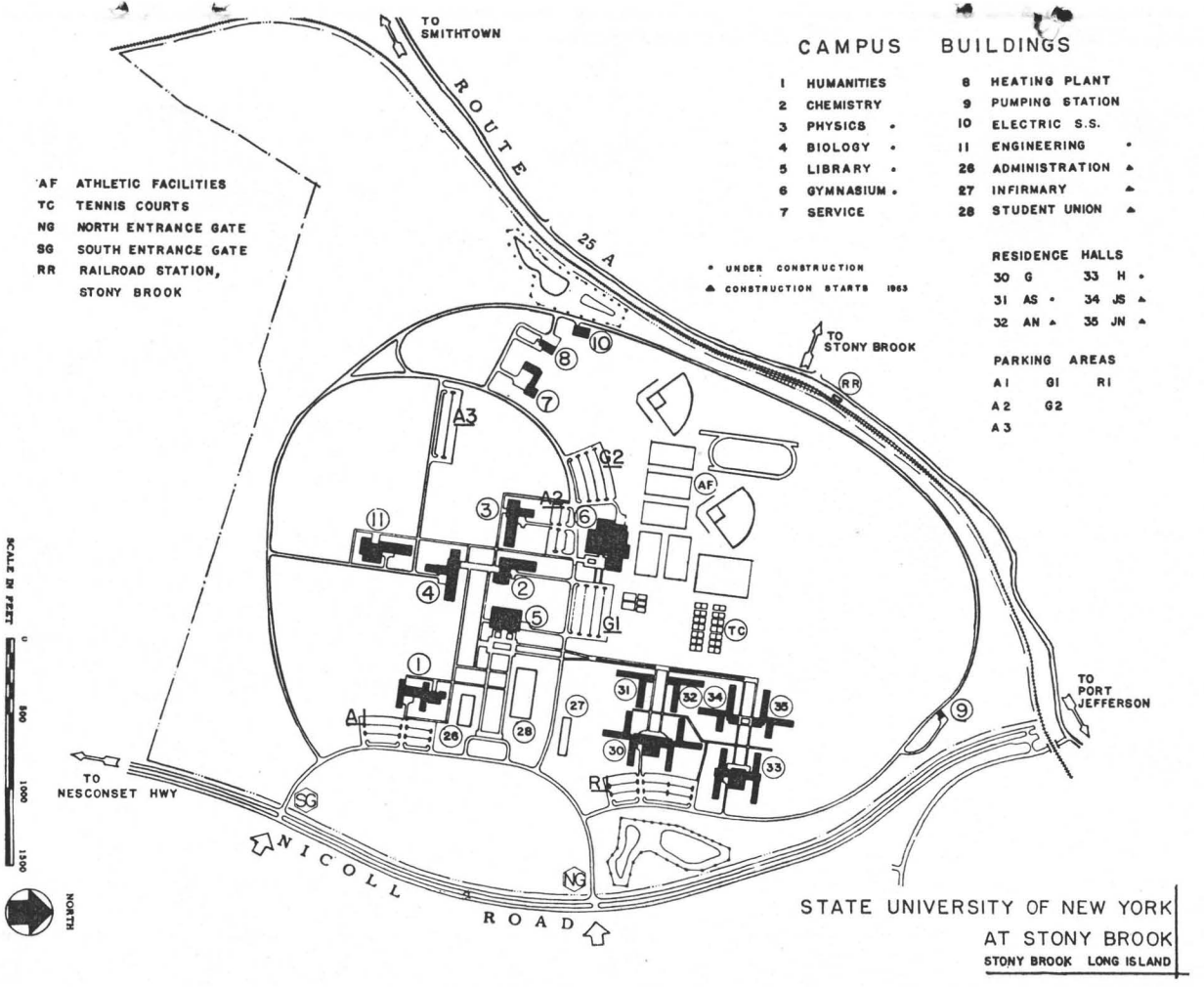
The United States Government also makes available student loan funds through the National Defense Education Act. Information on these loans and forms for application may be obtained from the Dean of Students.

When approved by the Business Officer of the University, scholarships held by State University students may be applied directly to University expenses such as room, board, fees, and books.



STATE UNIVERSITY OF NEW YORK
AT STONY BROOK

STONY BROOK, L.I. N.Y.



STATE UNIVERSITY OF NEW YORK
AT STONY BROOK
STONY BROOK LONG ISLAND

STATE UNIVERSITY OF NEW YORK

Central Administrative Office: Albany 1, New York

UNIVERSITY CENTERS

State University at Albany
State University at Buffalo
State University at Stony Brook

MEDICAL CENTERS

Downstate Medical Center at Brooklyn (New York City)
Upstate Medical Center at Syracuse

GRADUATE SCHOOL

Graduate School of Public Affairs at Albany

COLLEGES

College at Brockport
College at Buffalo
College at Cortland
College at Fredonia
College at Geneseo
College at New Paltz
College at Oneonta
College at Oswego
College at Plattsburgh
College at Potsdam
Harpur College
College of Forestry at Syracuse University
Maritime College at Fort Schuyler (New York City)
College of Ceramics at Alfred University
College of Agriculture at Cornell University
College of Home Economics at Cornell University
School of Industrial and Labor Relations at Cornell University
Veterinary College at Cornell University

TWO-YEAR COLLEGES

Agricultural and Technical Institute at Alfred
Agricultural and Technical Institute at Canton
Agricultural and Technical Institute at Cobleskill
Agricultural and Technical Institute at Delhi
Agricultural and Technical Institute at Farmingdale
Agricultural and Technical Institute at Morrisville

COMMUNITY COLLEGES

(Locally-sponsored two-year colleges under the program of State University)
Adirondack Community College at Hudson Falls
Auburn Community College at Auburn
Bronx Community College at New York City
Broome Technical Community College at Binghamton
Corning Community College at Corning
Dutchess Community College at Poughkeepsie
Erie County Technical Institute at Buffalo
Fashion Institute of Technology at New York City
Hudson Valley Community College at Troy
Jamestown Community College at Jamestown
Jefferson Community College at Watertown
Mohawk Valley Community College at Utica
Monroe Community College at Rochester
Nassau Community College at Garden City
New York City Community College of Applied Arts and Sciences at Brooklyn
Niagara Community College
Onondaga Community College at Syracuse
Orange County Community College at Middletown
Queensborough Community College at New York City
Rockland Community College at Suffern
Staten Island Community College at New York City
Suffolk County Community College at Selden
Sullivan County Community College
Ulster County Community College at Kingston
Westchester Community College at Valhalla