# 1970-71 UNDERGRADUATE BULLETIN STATE UNIVERSITY OF NEW YORK AT STONY BROOK

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# Contents

# ACADEMIC CALENDAR
## 1970-71

**Fall Semester 1970**

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|---|---|
| Wed., September 9 | Residence Halls Open |
| Wed. & Thurs., September 9-10 | Foreign Student Orientation |
| Thurs. & Fri., September 10-11 | Graduate Student Registration |
| Sat. & Sun., September 12-13 | New Student Orientation—Undergraduates |
| Mon. & Tues., September 14-15 | Final Registration—Undergraduates |
| Wed., September 16 | Classes Begin |
| Tues., September 29 | End of Changes of Registration Period—Undergraduates |
| Thurs. & Fri., October 1-2 | Two-day Recess (classes suspended) |
| Wed., October 14 | Last Day for Graduates to Add or Drop a Course Without Penalty |
| Mon., November 2 | Last Day for Removal of Incompletes from Spring Semester for Graduates and Undergraduates |
| Fri., November 6 | Advisory Grade Reports Due |
| Mon. & Fri., November 9-13 | Advance Registration for Spring Semester for Graduates and Undergraduates |
| Wed., November 25 | Thanksgiving Recess Begins at Close of Classes |
| Mon., November 30 | Classes Resume |
| Sat., December 19 | Winter Recess Begins at Close of Classes |
| Mon., January 4 | Classes Resume |
| Sat., January 9 | Last Day of Classes |
| Mon. & Tues., January 11-12 | Reading and Review Days |
| Wed., January 13 | Final Examinations Begin |
| Sat., January 23 | Final Examinations End—Fall Semester Ends |
| Tues., January 26 | Final Grades Due in Office of Records—12 Noon |

## Spring Semester 1971

| | |
|---|---|
| Mon. & Tues., February 1-2 | Final Registration for Graduates and Undergraduates |
| Wed., February 3 | Classes Begin |
| Tues., February 16 | End of Change of Registration Period for Undergraduates |
| Wed., March 3 | Last Day for Graduates to Add or Drop a Course Without Penalty |
| Mon., March 15 | Last Day for Removal of Incompletes from Fall Semester for Graduates and Undergraduates |
| Fri., March 26 | Advisory Grade Reports Due |
| Sat., April 3 | Spring Recess Begins at Close of Classes |
| Mon., April 12 | Classes Resume |
| Mon. & Fri., April 19-23 | Advance Registration for Fall Semester and Summer Session for Graduates and Undergraduates |
| Sat., May 1 | Last Day for Graduates to Submit Theses and Dissertations |
| Sat., May 15 | Last Day of Classes |
| Mon. & Tues., May 17-18 | Reading and Review Days |
| Wed., May 19 | Final Examinations Begin |
| Sat., May 29 | Final Examinations End—Spring Semester Ends |
| Tues., June 1 | Final Grades Due in Office of Records—12 Noon |
| Sun., June 6 | Commencement |

## Summer Session 1971

| | |
|---|---|
| Mon., June 21 | Final Registration |
| Tues., June 22 | Classes Begin |
| Fri., July 30 | Classes End |
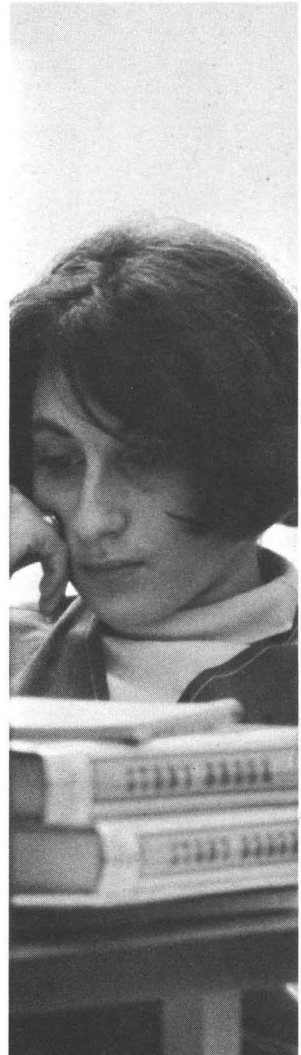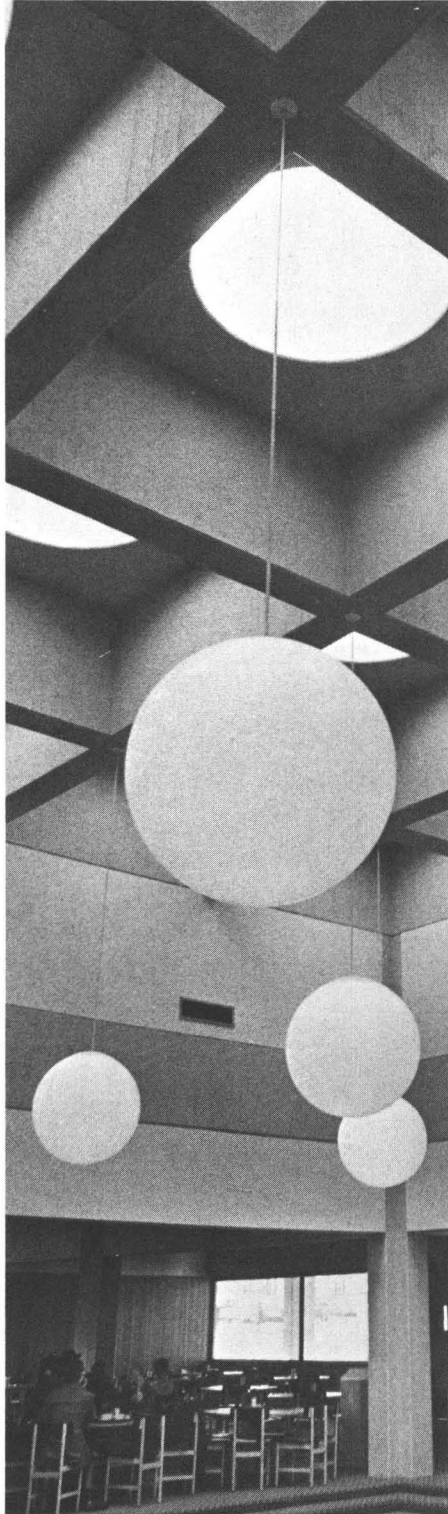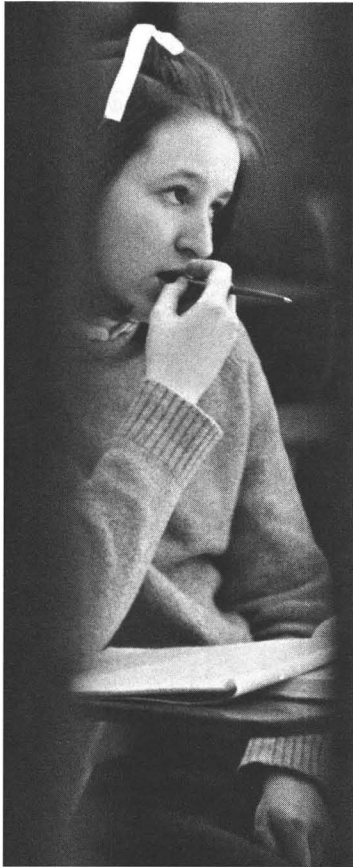
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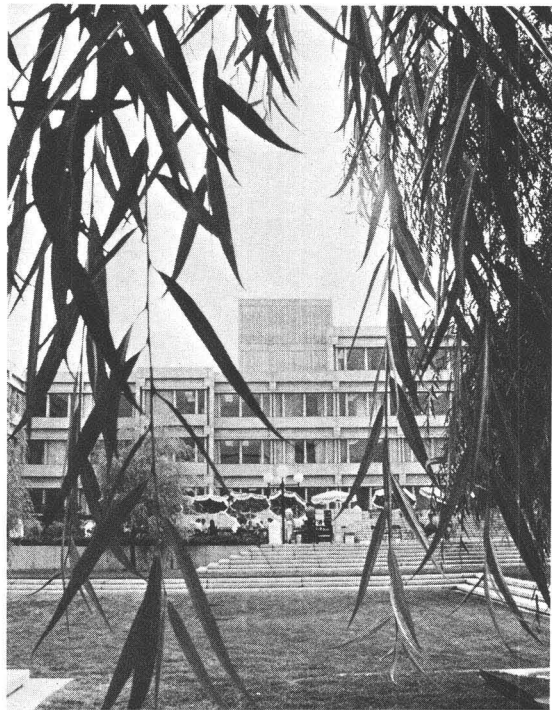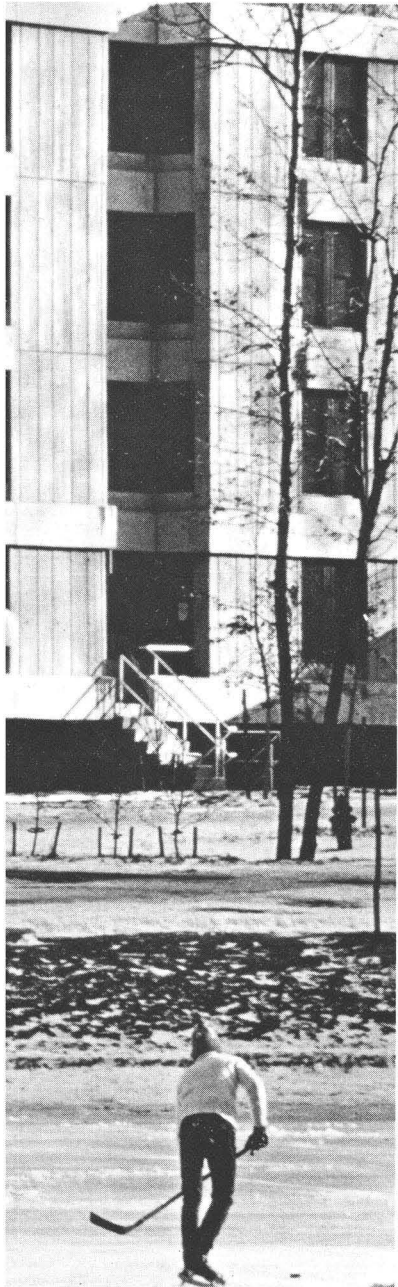
# AN INTRODUCTION TO STONY BROOK

### The Stony Brook Campus

The Stony Brook campus is situated on the north shore of Long Island some 50 miles northeast of New York City, minutes away from the coves and beaches of Long Island Sound. The Atlantic shore is about 20 miles to the south. The campus consists of more than 1000 acres of rolling, wooded terrain, with the central core area largely cleared for buildings now in use.

The University was founded in 1957 at Oyster Bay, Long Island. Its original mandate was to become a center for educating secondary school teachers of mathematics and science. In 1960, however, within the context of a fast-growing state university, it was designated a university center and given the mandate to develop undergraduate and graduate programs through the Ph.D. in the humanities, sciences, social sciences and engineering.

In order to realize its larger goals, the University moved in 1962 to a new and larger campus at Stony Brook, originally consisting of a 480-acre tract given to the state for this purpose by Ward Melville. There are now 61 buildings on the campus which has more than doubled its original acreage.

Large academic structures providing classroom, lecture hall, laboratory and office space include the Humanities Building, Social Sciences Center, Lecture Center and buildings for the earth and space sciences, chemistry, biology and engineering. The Physics Building houses the Departments of Physics and Mathematics. Eleven academic buildings, the Administration Building and the Stony Brook Union, a comprehensive campus center for students, faculty and staff, opened in 1970.

Five residential quadrangles, including several lounges and dining halls, provide space for 5000 students. The Gymnasium, with its swimming pool, basketball and squash courts and rooms for gymnastics and ballet, serves curricular, intramural and intercollegiate athletic programs. It also provides space for the Office of Physical Education and the University Theater.

Stony Brook's Frank C. Melville Jr. Memorial Library is one of the fastest growing facilities on campus. New books are being added to its collection at the rate of 100,000 a year with the present total about 500,000 volumes. A million-volume collection is anticipated by 1975 after completion of a library expansion program now underway. There is also a microfilm library consisting of 20,000 reels and 600,000 flat sheets. An additional 4000 reels and 100,000 flat sheets are being added each year. Reading areas for 700 students are interspersed with book stacks in the main library to provide easy access to materials. During the regular semester, the library is open until midnight except on Saturdays. Specialized libraries are also maintained on campus. These include the chemistry, earth and space sciences, health sciences, physics-mathematics and engineering libraries.
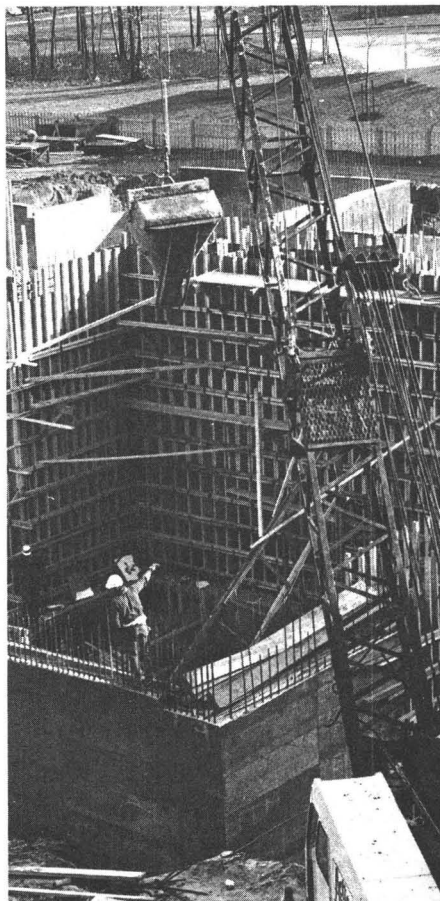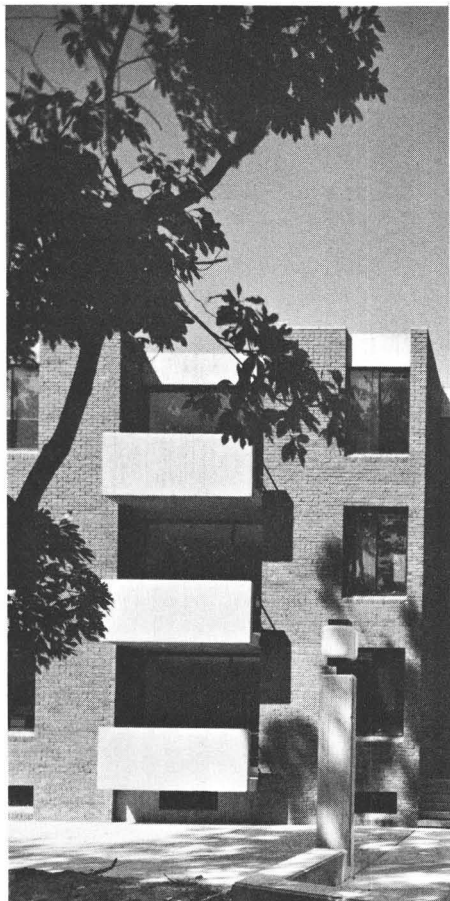
## Expansion

A host of new facilities will be constructed over the next several years. Currently under construction are the Instructional Resources Center, a laboratory-office-classroom building to accommodate the Health Sciences Center during its initial stages of growth, a 3½-fold expansion of the present library building and an additional residential college complex to house 1000 students.

Other structures will include a physical science complex, a fine arts center, a biology building, the permanent Health Sciences Center, additional dormitories and enginering facilities, all of which are in the design stage.

The academic program continues to expand on both the undergraduate and graduate levels as the University proceeds toward its goal of being a balanced institution with strength in all areas of the arts and sciences and engineering.
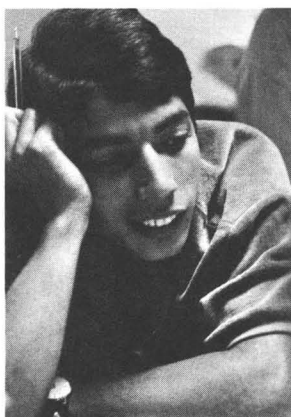
## Students

Stony Brook's total enrollment surpassed the 8800 mark in 1969, and was approximately 10,000 in the fall of 1970.

The undergraduate student body in 1969-70 was composed of 6505 matriculated students and 230 special and non-matriculated students for a total undergraduate enrollment of 6735. Of these, 3935 were male and 2570 female.

The graduate student body consisted of 1336 matriculated students including 429 in the continuing education program and a number of postdoctoral fellows. There were also 754 special and non-matriculated students including 707 in the continuing education program. The total graduate enrollment was 2090 with males outnumbering females, 1213 to 877.

More than 88% of Stony Brook's student body in 1969-70 came from the greater New York metropolitan area: 42.7% from Nassau and Suffolk counties, 41.2% from the five boroughs of New York City, and 4.5% from Rockland and Westchester counties. International students numbered 364: 272 from Asian and Pacific countries, 34 from the Americas, 26 from Europe, 25 from the Near East and seven from Africa.

## Faculty

Currently more than 700 faculty members, including some of the nation's best-known scholars, work at Stony Brook. Faculty size has been increasing by more than 100 a year with a high—80%—level of the faculty holding earned doctorates. The American Association of University Professors rates the university's faculty salary scale among the highest in the nation.

Since 1966, Nobel Prize-winning physicist Dr. C. N. Yang has been the Albert Einstein Professor of Physics at Stony Brook. The Einstein Professorship is one of ten such positions authorized by the New York State Legislature to attract scholars of international prominence to the state.
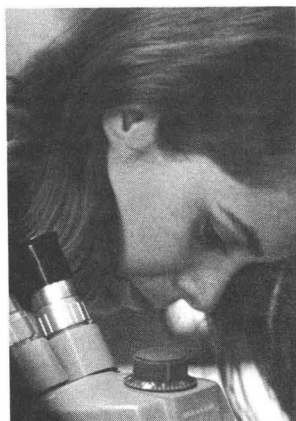
Three of the university's faculty members hold the academic rank of Distinguished Professor. Dr. Bentley Glass, Distinguished Professor of Biology, is the university's Academic Vice President. Dr. Glass, a noted geneticist, served simultaneously during the past year as national president of both Phi Beta Kappa and the American Association for the Advancement of Science, the key professional associations for the humanities and the sciences. Alfred Kazin, prominent author and literary critic, has been Distinguished Professor of English since 1963. Dr. Lewis Coser, Distinguished Professor of Sociology, has written books on the theory of sociology and the American Communist Party in addition to founding and editing the scholarly magazine, *Dissent*.

Five Stony Brook scientists worked on the NASA moon samples; one scientist has pioneered in optics and 3-D lensless photography; another scholar won a Pulitzer Prize for poetry. One of the first scientists to oppose the indiscriminate use of DDT teaches at Stony Brook. Stony Brook has two Shakespearian scholars of international repute. The Music Department has ten artists-in-residence who have performed on concert stages throughout the world.

The presence of such outstanding faculty members and their availability to undergraduates influences the educational environment and counters the stereotype of a university as being impersonal and research oriented.

As all Stony Brook's academic departments began as fledgling operations less than 15 years ago and experienced growth together, so have various disciplines succeeded in maintaining close communication rather than traditional boundaries. Thus, the College of Engineering and the Departments of Economics and Political Science have recently combined resources to create a new masters program in urban studies and engineering, designed to provide a combined focus of the three disciplines on problems of the day such as pollution and waste disposal. The Department of Earth and Space Sciences includes the related but formerly separate disciplines of astronomy, petrology, oceanography and geology. Similar interrelating arrangements mark the operation of other departments on campus.
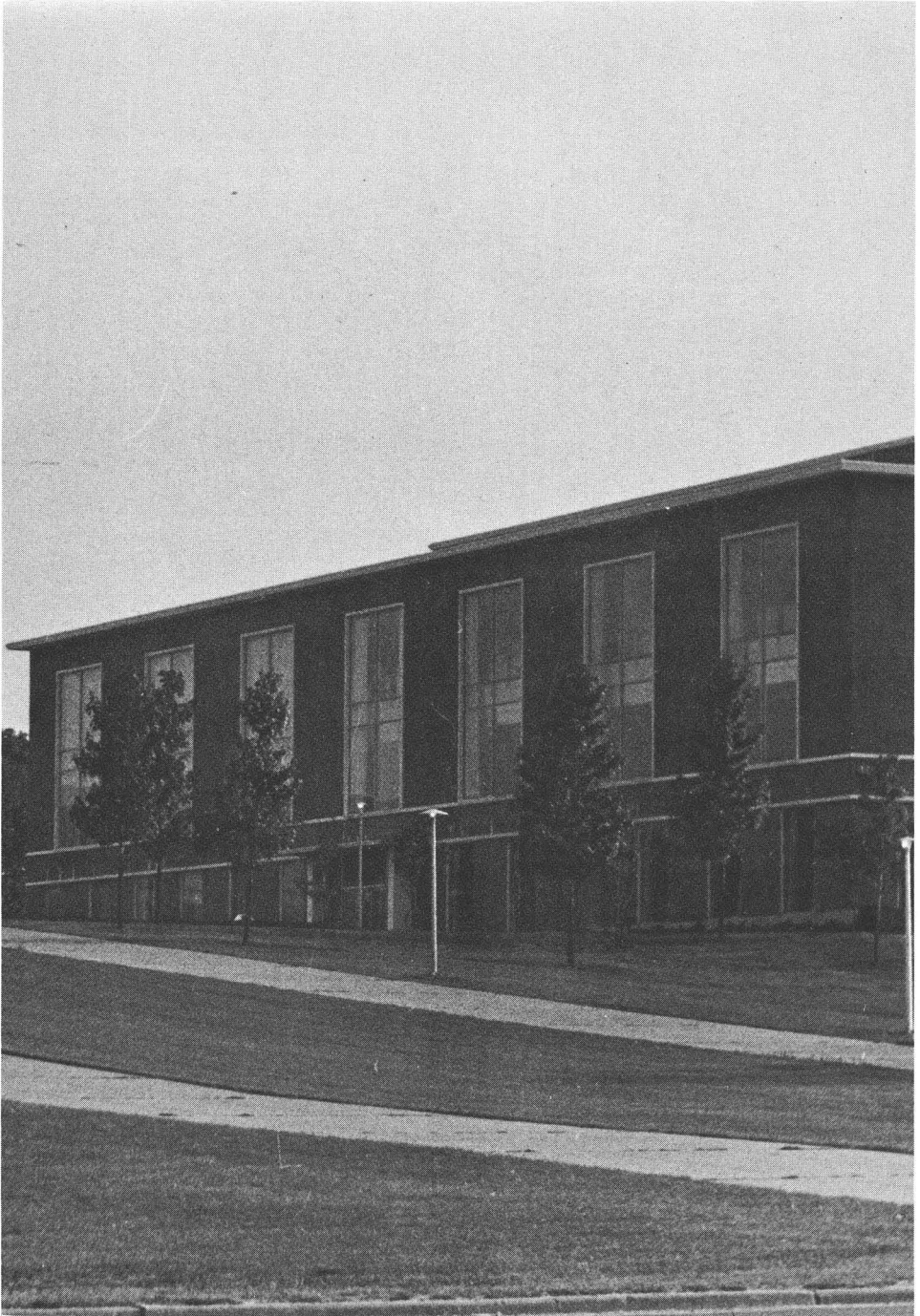
## Special Centers and Institutes

### Computing Center

The Computing Center building in the engineering quadrangle provides the campus with an IBM System/360 Model 67 computer complex. Its time-sharing system—the most sophisticated in existence—permits simultaneous simulation of many virtual systems. As a result, each time-sharing user has the equivalent of his own computer available instantly. The computing facilities are used for such student activities as term papers, research projects and theses. The Computing Center serves the faculty in both sponsored and unsponsored research activities and is used by the administration in such areas as institutional research and administrative data-processing. Short courses in programming are held periodically for all users of the Center.

### Economic Research Bureau

The Economic Research Bureau conducts research, training and service activities in applied economic analysis that go beyond normal instructional and research functions of an academic department. This work is carried out by faculty members, students, visiting scholars and consultants. Although closely related to the Department of Economics, the Bureau is a separately organized entity, expected to serve as a link between the needs and resources of the academic community and those of public and private agencies.

### Institute for Colonial Studies

The Institute for Colonial Studies, founded in 1967, stimulates comparative research into the institutions, customs and history of colonies, especially those of the Western Hemisphere before 1800. The Institute has assembled a library of source material, books, manuscrips and microfilms, from the archives of the governments of Mexico and Spain and from the various states and counties of colonial America. A special section of the library is devoted to microfilms of documents from colonial Long Island. The Institute works closely with the Department of History at Stony Brook. It plans to sponsor doctoral and postdoctoral research into subjects pertaining to the colonies in cooperation with the History Department.

### Institute for Theoretical Physics

Organized in the summer of 1966, the Institute for Theoretical Physics now has 20 faculty members carrying out research in various aspects of theoretical physics. Main topics of investigation presently include the structure of atomic nuclei and and sub nuclei particles. Other research activities include work with accelerator design, liquid gas and magnetic substances. Director of the Institute is Nobel Laureate C. N. Yang, who holds the State University's Einstein Chair in Physics.

*Instructional Resources Center*

The Instructional Resources Center (IRC) is charged with development of more effective and efficient instructional procedures through close cooperation with faculty members of the various departments.

IRC operations include one of the most extensive Computer-Assisted Instruction (CAI) programs in the country. Twenty-four sophisticated IBM terminals, consisting of TV display screens, typewriter keyboards and light-sensing pencils are hooked into a 1500 IBM computer. The program aids students in physics, political science, statistics, data processing, French and German.

A new 44,000-square-foot IRC building is scheduled for completion in spring 1971 at an estimated cost of $2.1 million. Television and radio studios, moving picture and other film-making facilities, audio-visual equipment and offices will be located in the two-story structure.

*Marine Sciences Research Center*

The Marine Sciences Research Center, offering research facilities for faculty members and students from all State University campuses, serves as a focal point for marine studies involving many different disciplines.

The Center's proximity to Long Island Sound and its complex of wetlands provides an ideal setting for integrated studies of an impacted environment and environmental management.

Laboratory facilities presently are housed in the Earth and Space Sciences Building on campus. A new laboratory building now in the planning stages will include running seawater facilities for full-salinity range experimentation.

Dock facilities for the Center's 40-foot research vessel are within ten minutes of the campus. Flax Pond, a tidal salt marsh acquired jointly by the State University and the State Conservation Department, is used by the Marine Sciences Research Center for shallow-water controlled experiments. A laboratory in Discovery Bay, Jamaica, West Indies is run jointly by the Center and the University of the West Indies.
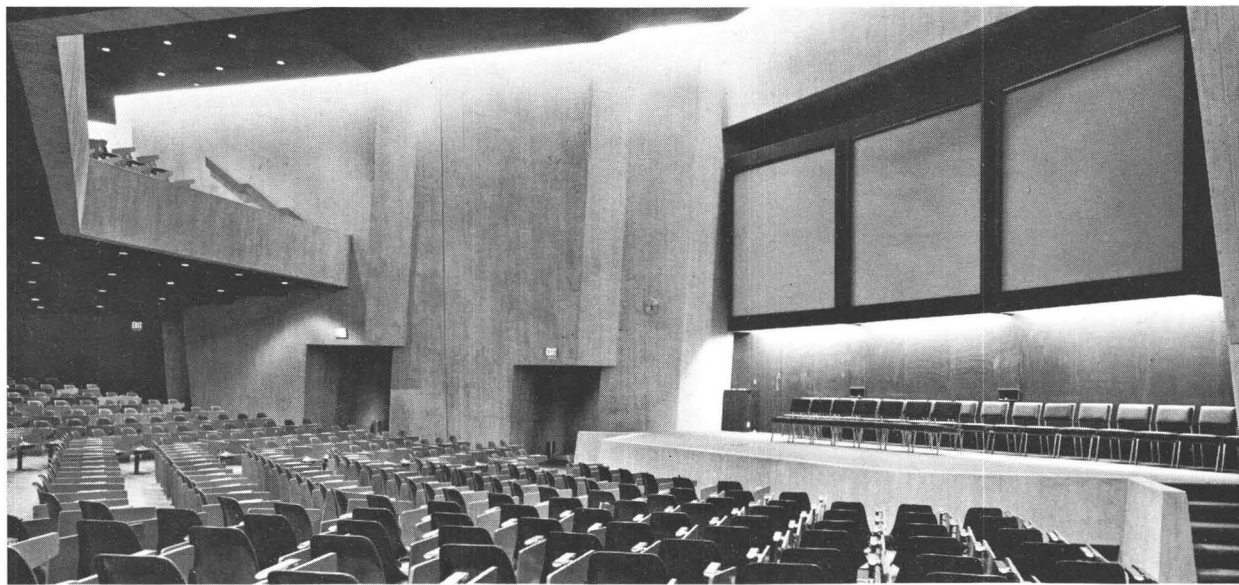
# Academ

## Undergraduate Programs

The undergraduate curriculum at Stony Brook is marked by simplified course requirements and new degree programs that offer students greater flexibility in tailoring academic work to their individual requirements. There is a six-week summer session which offers undergraduate courses and undergraduate correspondence courses are available through the State University of New York at Albany.

Three different degree programs leading to the bachelor of arts or bachelor of science degree are open to students in the College of Arts and Sciences—the departmental major, interdisciplinary or interdepartmental major, and liberal arts major. Freshmen postpone formal choice of a degree program until at least the end of the first year, which is used to explore a variety of fields of study and to complete as many as possible of the university requirements.

Programs leading to provisional certification in elementary and secondary education are also available.

Within the College of Arts and Sciences, the student may select a departmental major in anthropology, art, biological sciences, chemistry, earth and space sciences, economics, English, Germanic and Slavic languages, history, mathematics, music, philosophy, physics, political science, psychology, Romance languages, sociology or theatre arts.

In addition to the traditional departmental degree programs, the University offers interdisciplinary and interdepartmental major degree programs which allow the student to investigate an area of concern which transcends the limits of individual academic departments by combining appropriate courses from two or more departments to create a program of study directed toward a special goal. Seven interdisciplinary programs have been approved: Asian Studies, Black Studies, Comparative Literature, Elementary Education, Linguistics, Religious Studies and Social Sciences. Additional interdisciplinary programs are currently being considered.

The liberal arts major is designed to lead to the baccalaureate degree by means of a plan of study developed by the student to meet his individual interests. A faculty board of advisors will help the student in planning his program. The sole requirement of this program, after the general university requirements have been satisfied, is that 60 course credits of work in approved courses beyond the introductory level be completed.

Within each of the three degree programs a student may wish to undertake independent study projects. This option is designed to allow the student, in consultation with appropriate faculty members, to develop an individual course of academic investigation and study.

The College of Engineering with four departments—applied analysis, electrical sciences, materials science and mechanics—grants the bachelor of engineering degree.

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 applied mathematics, mechanics, thermodynamics, electrical systems, properties of matter and engineering design. In addition, the curriculum embraces broad training in the arts and humanities, social and behavioral sciences, and communications.

Traditional engineering departments are not represented at Stony Brook since engineering science is concerned with areas of knowledge which are fundamental to all of the conventional engineering fields. Some specialization in particular engineering areas is provided in the senior year through elective courses and senior projects. In addition to elective courses for specialization, there are also sequences of courses of an interdepartmental nature, such as bioengineering and computing science.

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, which generally are influenced by economic and social considerations.

As part of the State University of New York, the University at Stony Brook is accredited by the Middle States Association of Colleges and Secondary Schools. The College of Engineering is accredited by the Engineers' Council for Professional Development. The Department of Chemistry is accredited by the American Chemical Society.

**Graduate Programs**

At present, graduate programs leading to the masters and doctorate degrees are offered by the Departments of Anthropology, Biological Sciences, Chemistry, Earth and Space Sciences, Economics, English, Germanic Languages, History, Mathematics, Physics, Psychology and Sociology in the College of Arts and Sciences and by the Departments of Applied Analysis, Electrical Sciences, Materials Science and Mechanics in the College of Engineering. Masters degree programs are offered in Marine Environmental Studies, Music, Romance Languages (French) and Urban Sciences and Engineering.



**Continuing Education Program**

The Center for Continuing Education is one of Stony Brook's fastest growing units in this day when education must be a lifelong concern. The Center makes the resources of the University available to those who cannot study full-time. It offers a master of arts in liberal studies, an interdisciplinary, non-thesis, 30-unit degree with a bachelors degree generally required for admission to the program. Prospective students without a degree may be granted special student status by applying to the Office of Admissions.

## Health Sciences Center

The Health Sciences Center is being developed as an integral part of the Stony Brook campus, and represents a unique concept of unity and cooperation among all the health sciences and professions in a university setting. Innovation in the educational process, experimentation to develop better ways of delivering health care, and service to the community—with emphasis on maintaining the human and compassionate aspects of health care—are among the commitments of the Center.

As now planned, the Health Sciences Center will encompass six schools: medicine, dental medicine, basic health sciences, nursing, social welfare, and allied health professions; a university hospital, and a veterans' administration hospital. The academic plan of the total Health Sciences Center has been developed in a way that will insure to students in all these schools opportunities to draw upon the expertise and resources of all parts of the Health Sciences Center and of the total campus.

Clinical resources, in addition to those planned at the campus itself, will include a number of "clinical campuses" being developed in cooperation with several outstanding patient care facilities on Long Island.

The School of Nursing will become operational in the fall of 1970 with the admission of students to the freshman and junior classes. In the first two years of the program, students will concentrate on completion of the general university requirements and selected courses in basic and social sciences. One course directed to the interests of students who expect to pursue a career in health will be given in spring 1971.

The School of Allied Health Professions also will open in the fall of 1970 with a program for cardiopulmonary/respiratory specialists for students entering at the freshman and junior levels. The School of Basic Health Sciences will open in 1970 with graduate level students. The Schools of Social Welfare and of Medicine will accept their first classes in 1971, and at the same time several additional programs will open in the School of Allied Health Professions. The School of Dental Medicine is scheduled to admit students in September 1972. Students wishing information should address their inquiries to the dean of the appropriate school in the Health Sciences Center, State University of New York at Stony Brook, Stony Brook, New York 11790.

## Summer Session Programs

The Summer Session at Stony Brook covers a six-week period from June 22, 1971 until July 30, 1971. Graduate and undergraduate courses are offered by the College of Arts and Sciences and the College of Engineering. Graduate courses are also available through the Center for Continuing Education.

Students in good standing at Stony Brook and other collegiate institutions are eligible to attend the Summer Session. Qualified high school students who have completed their junior year may enroll in foreign language, mathematics and physical education courses.

# Student Life
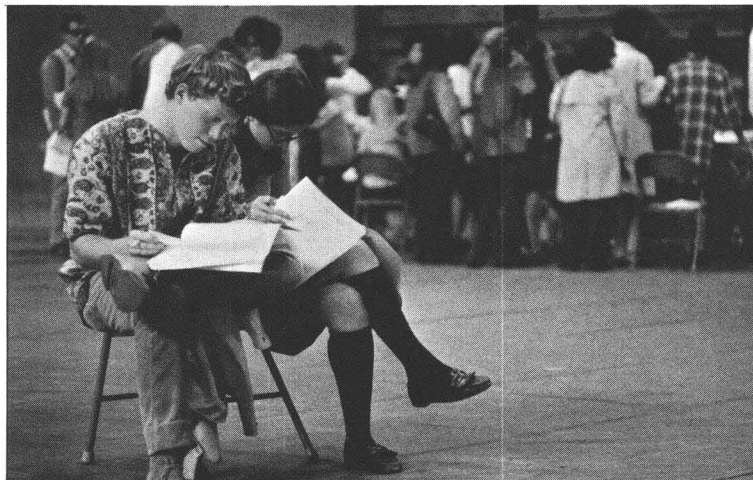
### Housing

Residence life at Stony Brook is considered to be an integral part of the student's educational experience, offering opportunities for social, intellectual and cultural development. Students live in residential colleges, in which faculty, staff and students work together in the development of programs and traditions. Each college houses students of different classes and varying academic interests. Both new and returning students have an opportunity to request assignment to a specific residential college. However, requests from returning students are honored on a priority basis. The colleges are organized under a system of student self-government. Student governing and planning organizations are advised by faculty and staff, some of whom live in the colleges. Each college has a faculty master. In addition, members of a professional residential staff function at the college level. Graduate and commuting students are invited to affiliate with a residential college.

The 23 colleges, each housing from 200-400 students, are arranged in complexes called quadrangles, which normally accommodate a total of approximately 1000 students of both sexes and all classes. Each college accommodates students in double rooms or suites. Provided for each student are a bed, mattress, bureau, study desk and chair, and closet. Each college contains public lounges, study areas, laundry, and recreation facilities. All residents of a quadrangle eat in a common dining hall. There are additional eating facilities in the Stony Brook Union.

The majority of Stony Brook students reside on campus in the residential colleges. Graduate students may live off-campus and undergraduates over 21, as well as those under 21 who have their parents written permission, may live off-campus in accommodations that meet the university's standards for off-campus student residences. An Off-Campus Housing service is available for students who need help in finding off-campus living facilities.

### Student Services

Student services—including health services, psychological services, financial aid and part-time employment, general and vocational counseling, job placement, international student advisement and the Stony Brook Union—are offered by several university offices. Students are encouraged to seek advice and assistance through these various services.

A staff of trained psychologists and counselors experienced in helping students with personal, social, educational and vocational problems is available through Psychological Services. This office is intended for students who have problems of a psychological nature or who are experiencing considerable difficulty in adjusting to university life and its demands.

The Guidance Services Bureau consists of the offices of Career Development (Placement), Commuter Services, Counseling and Testing. The basic function of the bureau is to assist the individual in the evaluation and exploration of his

academic, educational and vocational objectives and to help him arrive at meaningful plans and decisions. The bureau maintains a library of vocational information, graduate school bulletins and professional school information. In addition, information about testing for professional or graduate school admission may also be obtained.

The staff of the International Student Office is available to assist students from other countries with problems related to finances, housing, government regulations (including immigration and tax matters), cross-cultural differences and other general problems. Questions relating to academic problems are usually handled by academic advisors within the individual's school or department. The staff also works with community groups and student organizations to provide a varied program of activities during the year. Included are tours and trips, discussion groups, home hospitality, speaking engagements and other events.

The University Health Service provides emergency aid to the whole university community. A registered nurse is on duty 24 hours a day, seven days a week, and one or more physicians are on call at all times. The University Health Service has an allergy clinic, orthopedic clinic, gynecology clinic and mental health service. Dental care is available by referral to a local team of dentists. Planned Parenthood services are available. In-bed care can be provided for students with illnesses or injuries requiring short-term supervised bed rest.

All students must file a health form and doctor's certificate with the Health Office before they can register for graduate studies. If a student comes to the State University of New York at Stony Brook without submitting a form, he will be required to go to a private physician to obtain the necessary certificates before he will be allowed to register.

The Office of Special Projects coordinates student participation in community activities. Many students serve as counselors in Upward Bound and Wider Horizons, which are programs for low-income students in local schools. The office also coordinates a number of tutoring programs in neighboring schools and community centers. In addition, there are opportunities for volunteer work with youth organizations, mental hospitals, etc. Information and applications for the Peace Corps, VISTA and the Teacher Corps are also coordinated through this office.

The Office for New Student Affairs administers admissions, financial aid and orientation programs and works with other university agencies to promote sensitivity to and understanding of the special needs of new students. In any situations where new students develop problems, the Office for New Student Affairs represents a resource for working out solutions.

Almost 10% of Stony Brook undergraduates intend to enter medicine, dentistry and other health professions. The Premedical Office is prepared to advise these students on appropriate academic and nonacademic preparation. New students should register with the office if they ever intend to apply for admission to a professional school in medicine, dentistry, veterinary medicine,

nursing, podiatry, optometry or other health professions. The office will compile data on each student in order to prepare and distribute a letter of evaluation which will be sent, at the student's request, to support his applications to professional schools. These schools rely heavily on such letters. It is important that the Premedical Office have sufficient opportunity to gather information as well as to advise each student. Registration as a premedical student does not commit the registrant to any particular program or career.

The Stony Brook Union building provides facilities which include a cafeteria-ballroom, formal dining room and lounge, bookstore, little theatre, post office, meeting and conference rooms, barber shop, beauty parlor, recreation area, radio station, craft shops, photography lab, student activities offices, lounges, bowling alleys, and other special features and services to serve the university community. Commuting students have office and meeting areas as well as facilities for eating, study and recreation in the Stony Brook Union.

## Campus Activities

National and international leaders in government, science, education and the arts visit Stony Brook regularly for lectures and seminars. Recent visitors have included Arthur Goldberg, Stewart Udall, Julian Bond, W. H. Auden, Margaret Mead, Theodore Sorenson, Dr. Benjamin Spock, Dr. Linus Pauling, Allen Ginsberg and Igor Stravinsky.

Student theatrical productions range from traditional Shakespearian productions of "Twelfth Night" and "King Lear" to avant garde interpretations of "Hamlet" and experimental theater pieces such as "Abraham," an existential interpretation of the biblical hero presented recently with the use of song, dance and children's games.

A series of more than 20 professional music concerts throughout the year brings such famous groups and soloists to the campus as the Buffalo Philharmonic Orchestra, New York Woodwind Quintet, Soprano Camilla Williams and Guitarist Julian Bream.

A series of art exhibitions features the works of students and professionals.

The Student Activities Board sponsors a series of entertainment programs. Recent appearances have included: The Living Theatre, Odetta, Joe Cocker, Blood, Sweat and Tears, and the Jefferson Airplane.

The Committee on Cinematographic Arts presents a series of 27 foreign and domestic motion picture films each year. The films are shown twice nightly on Friday, Saturday and Sunday.

Almost every area of academic interest at Stony Brook has a student club to supplement coursework, and to arrange social gatherings, field trips and lectures. These groups include the Anthropology Club, Biology Society, Computer Society, Creative Arts Society, German Society, Earth and Space Science Society, Engineering Society, Foreign Relations Club, Marine Science Club, Mathematics
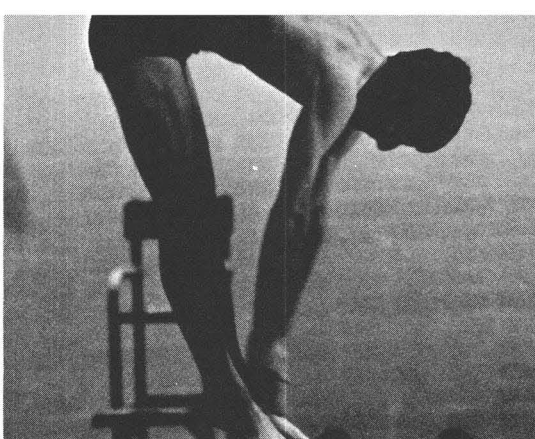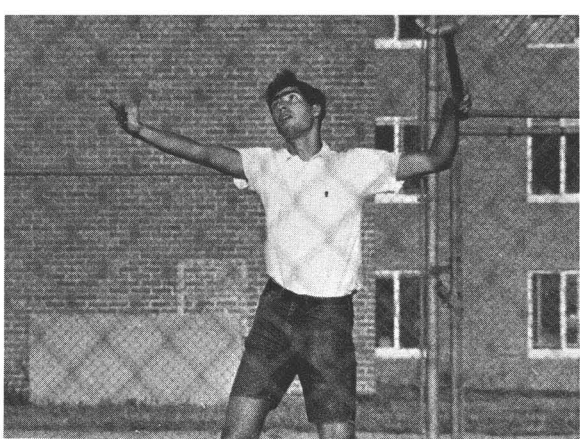
Society, Philosophy Club, Pre-Law Society, Premedical-Predental Society, Psychological Society, Russian Club, Science Fiction Club, Sociology Forum, Student Literary Society and many others.

Religious organizations like the B'nai B'rith Hillel Counselorship, Christian Science Organization, Inter-Faith Forum, Lutheran Students Group, Newman Community and Student Christian Association promote discussion and counseling for the student's spiritual, social and intellectual needs.

Black Students United, Oriental American Society and International Club provide organizations for the cultural development of students of various racial and geographic origins.

Politically active undergraduates can join organizations representing such widely divergent viewpoints as the Organization for Progressive Thought, Students for a Democratic Society, Young Democrat Club, Young Republican Club and Moderate Students Organization.

Athletic clubs offering opportunities to learn about karate, skiing, judo, gymnastics, water polo, squash and sports car rallies are available to all undergraduates.

Varied athletic programs are a part of student life at the State University of New York at Stony Brook. Varsity teams are fielded in 11 sports: soccer, cross country, crew, squash, basketball, baseball, track and field, swimming, judo, tennis and bowling. Teams are fielded on the junior varsity and freshman level with the exception of swimming, track, squash and tennis. Some 250 athletes participate on men's intercollegiate teams for Stony Brook.

Women's intercollegiate athletic teams at Stony Brook are in gymnastics, tennis, field hockey, basketball and softball. About 250 women participate in varsity and intramural programs.

Stony Brook competes in the Metropolitan Intercollegiate Soccer Conference, Eastern Collegiate Athletic Conference, Knickerbocker Basketball Conference, Metropolitan Squash Association, Metropolitan Swimming Association and National Intercollegiate Squash Association.
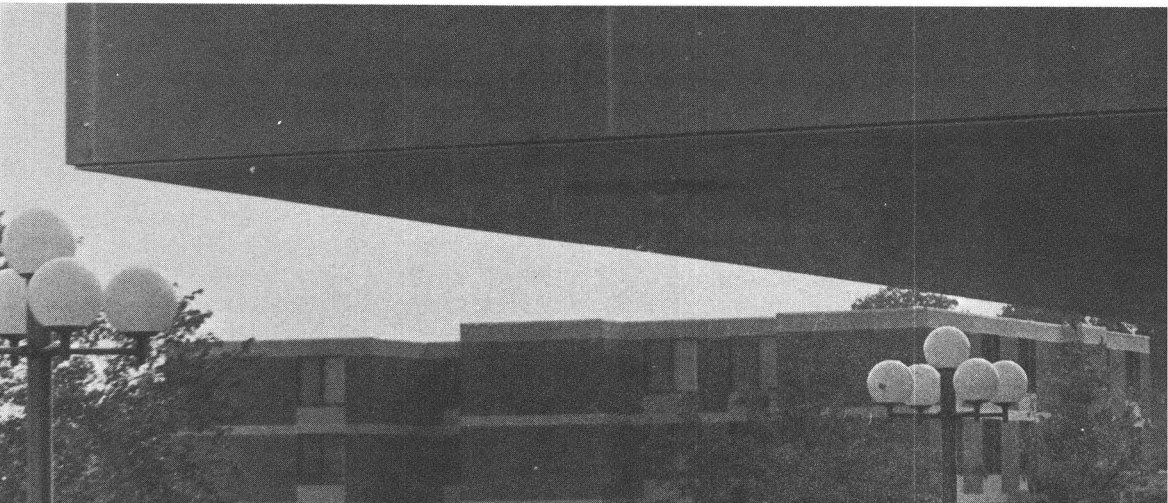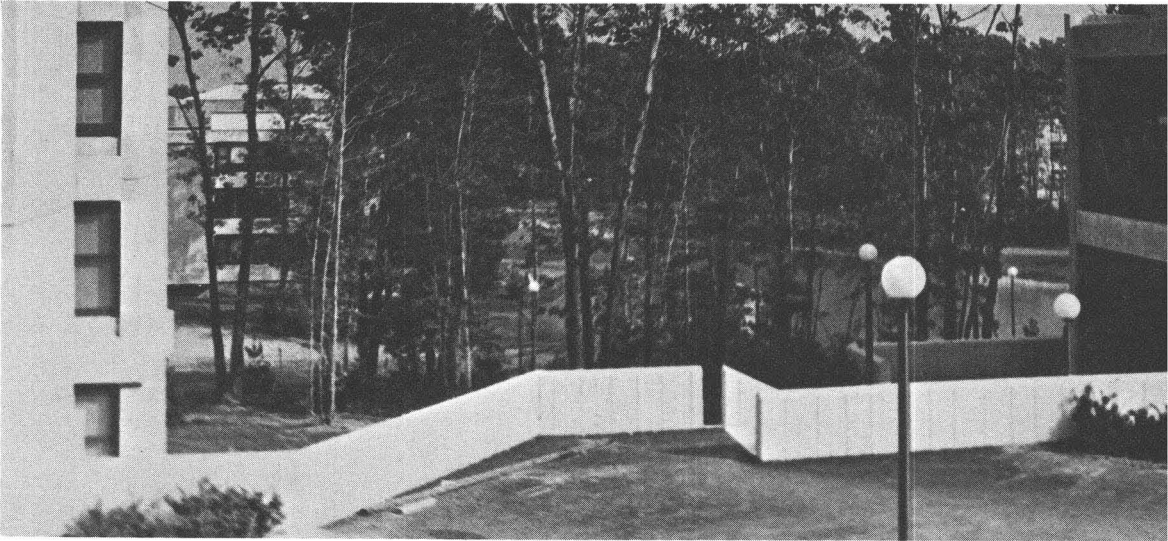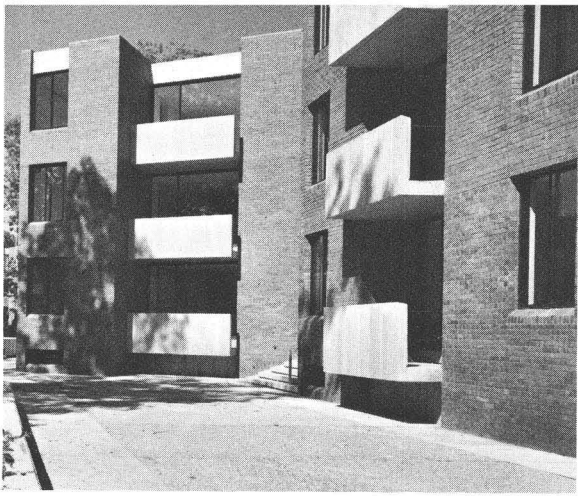
# Admissions

## ADMISSION TO THE UNIVERSITY

Stony Brook considers applications from all men and women who have demonstrated both academic competence and potential in their prior schooling.

An applicant is admitted only after a careful analysis of the information provided by the high school and other scholastic institutions attended, standardized tests and material supplied by the applicant. In some cases, an interview will be requested for the purpose of clarifying points raised during review of the application.

A strong, broadly-based academic preparatory program is advised for all applicants. A high school diploma (which would normally include four years of English and three years of mathematics) or high school equivalency certificate or an acceptable substitute is required. Since Stony Brook receives many more applications than it has places available for new students, those applicants presenting the strongest preparation in the academic areas (science, math, social studies, English, and foreign languages) normally will be more favorably considered. Students who intend to enter an engineering, mathematics or science program are urged to take four years of high school mathematics whenever possible. The foregoing secondary school programs are strongly recommended rather than required, since it is felt that a student may develop academic competence and intellectual facility in various ways, both within and outside the context of the classroom.

Recognizing the importance of student diversity, the University is prepared to admit up to 30% of entering undergraduates on the basis of high promise demonstrated by means other than the normal academic criteria. Such criteria as unusual creative ability in art, music, theatre, dance, writing, unusual academic achievement, leadership potential, athletic ability and exceptionally strong motivation will be taken into account. A supplementary admissions questionnaire is used to give candidates an opportunity to clarify their high school records—their strengths and weaknesses—for the Admissions Committee. Counselor, teacher and student recommendations are employed to add depth and dimension to statistical data. Additional information which might help to interpret or clarify an application is welcomed by the Admissions Committee.

Students whose backgrounds are characterized by severe environmental and financial limitations may apply for the Advancement on Individual Merit (AIM) Program which is designed to overcome deficiencies of preparation. Students admitted under AIM will be fully matriculated and will be provided supportive services designed to assist in overcoming specific weaknesses. Economic aid is available on the basis of need as determined by the university Financial Aid Office (see Financial Aid). Normally, aid will be in the form of a financial aid "package," (i.e., Economic Opportunity Grant, Scholar Incentive, State Univer-

sity Scholarships, etc.). In cases where the financial burden is less severe, loans and employment also may be utilized. A candidate should contact his school guidance office or the university Admissions Office if he wishes to apply for the AIM program.

### Application Procedures for New Freshmen

An application for admission may be obtained by writing to: Admissions Office, State University of New York at Stony Brook, Stony Brook, New York 11790. A pamphlet, *How to Apply for Admission,* giving complete instructions for applying is included with each set of application forms. The candidate is responsible for following the procedure outlined in this pamphlet and for completing the Stony Brook Supplementary Questionnaire; should he not receive all appropriate forms, the Admissions Office should be informed immediately. *The new Combined Form (D-1) should be completed by the high school and student and sent directly to Albany.* The Supplementary Questionnaire will be mailed by Stony Brook directly to the applicant upon request.

**Applicants are strongly urged to file completed applications during the fall and certainly by January 14 of their senior year.**

This means that the high school guidance office handling the Combined Form should have it completed and back to Stony Brook by January 14 at the latest, if the applicant is to be given early consideration. While there is no fixed closing date for fall admission, Stony Brook uses a modified rolling-decision system and all applications received by January 14 are read as a group and evaluated early. Those applications received after January 14 must compete for the remaining dormitory and classroom space, if any exists. It is the student's responsibility to see that the completed application arrives early.

Applications for admission in the spring semester should be filed by December 15. Because of limited residence facilities, it is uncertain if on-campus housing space will be available for mid-year entrants. Those students for whom campus housing is a determining factor should contact the Admissions Office before filing an application.

### Interviews

Although an interview is not required unless requested by the Admissions Office, candidates may request interviews for purposes of information or clarification at any time. Interviews are used by counselors in the decision-making process. These discussions tend to be of greater usefulness after the applicant's academic record has been filed in the Admission Office. Group discussions are also utilized, and have been as effective and well received as individual interviews. In addition, student groups meet regularly with parents of applicants to discuss mutual con-

cerns. Information regarding group and individual interviews, as well as campus tours, may be obtained by mail or telephone from the Admissions Office: (area code 516, 246-5126) from 9:00 a.m.—4:30 p.m., Monday through Friday. Although the Admissions Office is not open on weekends, student guides are usually available on schedule in the reception area on weekends during both the school year and summer session.

### Transfer Students

Any applicant who has been previously registered (summer and part-time study included) at a degree-granting institution following secondary school must apply as a transfer student. Each transfer student, in addition to completing the application procedure outlined for new freshmen, must submit the following from *Each* post-secondary institution attended:

    A. An official transcript of record.

    B. A personal inventory form.

(If no grades were earned, a statement of attendance and honorable dismissal is required.) An average of "C+" or 2.5 (A=4) is usually the lowest base considered for admission. Applicants for the spring semester should file by December 15. While there is no deadline for fall, applications will be considered on a rolling basis and students are urged to file as quickly as possible, certainly by April 1. The amount of advanced standing to be granted a transfer student will be determined by a complete evaluation of his record. Ordinarily, only those courses which have been completed at an accredited college or university with a grade of "C" or better will be considered for transfer credit. Award of either transfer credit from a non-accredited institution or credit earned *more than* 15 years ago will be deferred until the student has completed a satisfactory year (not placed on probation) of full-time study at Stony Brook. At the time of admission, course evaluation forms will be sent to the student to be completed for each course within his *intended major*. (International students, or any applicant who has completed college-level work at an institution outside of the United States or its possessions, should submit a form for each course taken.) Courses will be evaluated by the department concerned for applicability to major requirements. The Admissions Office evaluates all other courses to determine if general university requirements or elective credit is to be granted. Remedial work, high school equivalents and most technology courses generally will not receive university credit. The amount of transfer credit allowed will be entered on the student's official university transcript, with the understanding that neither actual letter grades nor previous cumulative averages earned are transferable and won't, therefore, appear on the Stony Brook permanent record. Transfer students will be classified according to the following schedule of semester hours accepted for transfer credit: freshman, 0-23; sophomore, 24-54; junior, 55-84; senior, 85 or more. Students in the

first or second year of college ordinarily will be expected to supply fall semester grades in January before a final decision is made.

The University is committed to accepting graduates of the transfer program (i.e., associate of arts, associate of science and associate of applied science in engineering science) from community and agricultural and technical colleges within the State University of New York. Such students will be given preference if the number of applicants necessitates establishment of priorities. Graduates of these programs must have a 2.0 or "C" average and the recommendation of the sending institution. Graduates of career-oriented, or terminal programs are advised to consult with the transfer counselor at their own institution to determine the amount of transferable credit applicable. This procedure should always precede formal application.

## Handicapped Students

The academic admissions requirements and procedures for disabled students are the same as for all other applicants. A disabled student, however, also must follow the following procedure.

1. Forward to the director of the Student Health Service a medical history sufficient to determine the functional capability of the applicant.
2. Come to the campus for an interview with the Admissions Counselor responsible for the admissions of disabled students.

It is recommended strongly that prospective students who are disabled identify themselves at least a year in advance of the proposed time of first enrollment. An early start will permit the evaluation of possible educational and physical problems and, wherever possible, provide the time to work out solutions.

## Examinations

New York State high school seniors are urged to take the Regents Scholarship Examination to fulfill the entrance examination requirement. Those seniors who miss this test and any other students, except out-of-state candidates, who are applying for admission as freshmen should take the State University Entrance Examination. Information on these examinations is available in the *How to Apply for Admission* booklet which accompanies each application for admission.

Although the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board is not an admission requirement for New York State residents, all applicants who sit for this examination are urged to have the results forwarded to the Admissions Office as a supplement to other scores. Candidates who reside out of state must submit College Entrance Examination Board

Scholastic Aptitude Test Scores. The December examination taken during the senior year is preferred for new freshmen. Transfer students may also substitute recent Scholastic Aptitude Tests of the CEEB for the State University Admissions Examination (or Regents Scholarship Examination).

## Notification of Admission

State University of New York at Stony Brook uses a modified "rolling decisions" admission system. (Applications received by December 31 are read and evaluated early). Notifications are made as soon as possible, in some cases as early as late December. Decisions for applications received after December 31 will be mailed in February and March. All offers of admission are conditional subject to receipt of official records showing successful completion of academic work in progress at a level commensurate with the work upon which acceptance was based. In all cases, it is the student's responsibility to see that the final record is sent to the Admissions Office. For new freshmen this includes certification of graduation from high school. Requirements for the certification of registration, including a medical report and payment of necessary deposits, are sent with the offer of admission.

To insure a maximum opportunity for resolving difficulties that may arise when an admitted *transfer* student's index for the semester immediately preceding registration falls below 2.5 (A=4), he is advised to contact an admissions officer as soon as possible.

## Advanced Placement

Advanced placement may be extended to freshman students who have completed specified advanced placement courses in secondary school, or who have demonstrated in other ways academic competencies which entitle them to a waiver of certain course requirements. This, however, does not confer semester hour credit toward graduation. Candidates undertaking advanced placement courses in secondary school must take the appropriate CEEB examination and request that their scores be forwarded to Stony Brook. Normally, a score of "4" on this test is the minimum considered for advanced placement credit. Others desiring advanced placement must submit written requests for reviews of their qualifications; in most cases, special examinations will be required.

## Preadmission Deposit and Refund Policy

Each new student is required to pay an advance tuition deposit of $50 and when housing is offered an additional $25 deposit. These deposits, payable upon tentative or conditional acceptance, are applied against charges incurred by the student in the first semester.

Refunds will be granted according to the following conditions; if a student is admitted prior to April 1, the written request must be received in the Admissions Office by May 1; if a student is admitted after April 1, the written request must be received in the Admissions Office within 30 days of the offer of admission.

## Special Undergraduate Students

A limited number of students may enroll each semester as part-time, non-matriculated undergraduates. Those who are accepted into this program are normally permitted to take up to two courses among the regularly scheduled courses offerings. There is no separate undergraduate evening division. High school students who have completed their junior year, as well as high school graduates, may submit applications. Campus housing facilities are not available to Special Students and priority in classroom space is given to matriculated students.

The following expense schedule applies to special undergraduate students.

*Expenses*

Tuition—N.Y. State residents ........................$13.50 per credit hour

Tuition—Out-of-State residents ...................... 20.00 per credit hour

State University Fee ................................. .85 per credit hour

University Deposit ................................. 20.00

Contact the Office of Admissions for the appropriate application papers and to arrange for an interview. Applications should be completed one month prior to the proposed date of registration.

## Summer Registration for Freshmen

Registration for the freshman year is conducted during June and July. This program provides the new student with opportunity for counseling in his program of study. Orientation sessions acquaint students with course selections, schedule load, grade requirements, housing facilities and student life. Students unable to attend the Summer Orientation and Registration Program will be registered just before classes begin in September.

# Financial Information

## FINANCIAL INFORMATION

Tuition and fee costs are based on the schedule printed below. All charges are due and payable on the first day of the semester.

| CHARGE OR FEE | FIRST SEMESTER | SECOND SEMESTER | YEAR |
|---|---|---|---|
| *Tuition* | | | |
| Undergraduate (N.Y. State Resident) | $200.00 | $200.00 | $400.00 |
| Undergraduate (Out-of-State Resident) | 300.00 | 300.00 | 600.00 |
| Graduate Student | 300.00 | 300.00 | 600.00 |
| Special Graduate Student Part Time per cr. | 20.00 | 20.00 | |
| Special Undergraduate Student (N.Y. State Resident) per cr. | 13.50 | 13.50 | |
| Special Undergraduate Student (Out-of-State Resident) per cr. | 20.00 | 20.00 | |
| *College Fee* | | | |
| Undergraduate and Graduate | 12.50 | 12.50 | 25.00 |
| Special Graduate Student Part Time per cr. | .85 | .85 | |
| Special Undergraduate Student per cr. | .85 | .85 | |

*Allied Health Professions*

**Tuition**

| | | |
|---|---|---|
| N.Y. State Resident (per quarter per cr. hr.) | $9.00 | |
| Out-of-State Resident (per quarter per cr. hr.) | 13.50 | |
| College Fee per quarter per cr. hr. | .55 | |

| | FIRST SEMESTER | SECOND SEMESTER | YEAR |
|---|---|---|---|
| *Student Health Insurance Fee* [a] | | | |
| Individual | $55.00 | | $55.00 |
| Student & Spouse | 100.00 | | 100.00 |
| Student, Spouse & Dependent Child or Children | 150.00 | | 150.00 |
| *Student Activity Fee* [b] | | | |
| (Undergraduate) | 70.00 | | 70.00 |
| *Identification Card* | | | |
| (On admission or re-admission) | 2.00 | | |
| *General University Deposit* [c] | | | |
| Commuting Student | 20.00 | | 20.00 |
| Resident Student | 35.00 | | 35.00 |
| *Orientation* [d] | | | |
| (Freshmen only) | 25.00 | | 25.00 |
| *Graduation* [e] | 15.00 | | 15.00 |
| *Room* (Includes basic telephone rental charge) | | | |
| Double Occupancy | 282.50 | 282.50 | 565.00 |
| *Board* [f] (*Optional*) | | | |
| 21 Meal Plan | 272.00 | 272.00 | 544.00 |

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[a] Student health insurance fee waived if proof of both hospital and medical insurance is presented prior to registration. Insurance period covers one year beginning September 17. In addition to the health insurance fee noted above, an alternate plan for individuals is available at the rate of $46.00. International students will be offered a special plan.

[b] To be collected by Student Polity.

[c] To be charged for any damages to property, unpaid telephone charges, unpaid library fines and other charges due.

[d] Includes orientation fees and charges for room and board.

[e] Required in the year that the candidate will receive his baccalaureate, masters or doctoral degree.

[f] This fee includes the food service contractor charge and a special allocation for maintenance and replacement costs. Fees are based on participation by at least 3500 students and will be adjusted upward if a lesser number elect the 21 Meal Plan. Students electing the meal plan must participate until the end of the academic year.

A statement of all charges will be sent to the student at the beginning of the academic year, or upon his admittance. This statement contains a complete schedule of all charges, along with due dates for payment. It will be the responsibility of the student to see that all obligations are paid promptly. Complete instructions accompany each schedule.

Students who register after the official registration period must pay a late registration fee of $15.

The above fees are subject to change without notice.

The University reserves the right to cancel the registration of any student who fails to meet his obligations at the University. It will be the responsibility of each student to arrange a meeting with the financial aid officer if circumstances preclude the paying of expenses when due.

## Refunds

Requests for refund must be made in writing to the Business Office. A student or special student who is given permission to cancel his registration shall be liable for payment of tuition in accordance with the following schedule:

### SCHEDULE OF TUITION LIABILITY

| LIABILITY DURING | SEMESTER | 6 WEEK TERM (SUMMER SESSION) |
| --- | --- | --- |
| 1st Week | 0 | 0 |
| 2nd Week | 30% | 70% |
| 3rd Week | 50% | 100% |
| 4th Week | 70% | |
| 5th Week | 100% | |

Note: It is interpreted that a student who does not attend any class sessions after Saturday of the first week and who notifies the college on his intent to cancel registration on or before the second Saturday following the first day of classes shall be deemed to have cancelled his registration during the first week.

## Exceptions

A.  There shall be no tuition or fee liability established for a student who withdraws to enter military service prior to the end of an academic term for those courses in which he does not receive academic credit. Proof must be submitted.

B. A student who is dismissed for academic or disciplinary reasons prior to the end of an academic term shall be liable for all tuition and fees due for that term.

*College fee is non-refundable.*

## Residence Charges

Room charges for an academic year are listed in the preceding schedule. Once a student has registered and occupied a room, no refund will be granted for payment made for that quarter. An advance room deposit of $25 is required of all resident students prior to each fall semester. This amount will be credited to the student's room account. The advance room deposit is refundable if application is made in writing before July 1.

Students living in the residence halls who select the meal plan must pay for board as stated in the schedule. Payments are refundable on a percentage basis, after official notification has been received by the Business Office. No refunds are made to students who leave the campus on weekends, nor are refunds made to any student who, for any other reason, misses meals.

Laundry service is provided at nominal cost. Coin operated washing machines and dryers are available in the residence halls.

Each room is provided with a private telephone. A general university deposit of $35 is required of resident students.

**Summer Session**

Expenses for the 1969 summer session are as follows:

*Tuition*

| | |
|---|---|
| Undergraduate level course (N.Y. State Resident) | $13.50 per credit hour |
| Undergraduate level course (Out-of-State Resident) | $20.00 per credit hour |
| Graduate level course | $20.00 per credit hour |

\* *General University Deposit*

| | |
|---|---|
| Commuting Student | $20.00 |
| Resident Student | $35.00 |

| | |
|---|---|
| *Student Services Fee* | $5.00 |
| \*\* *Student Health Insurance (Summer Session Only)* | $3.00 |

*Room (Includes basic telephone rental charge)*

| | |
|---|---|
| Double Occupancy | $15.00 per week |
| Single Occupancy | $20.00 per week |

*Board:* A la carte

**Financial Aids**

The Financial Aid Office provides information on programs available to all students and assists students whose summer earnings and family resources are inadequate to meet college expenses completely. Listed below, in general terms, are a number of financial aid possibilities. Often a "package" of aid can be created through consultation between the student and the financial aid officer which will employ one or more of these programs to meet one's individual needs.

Students who anticipate the need for financial aid should write to the Financial Aid Office for applications and further information. The office provides a booklet, *Financial Aid Programs for Undergraduate Students,* which describes all programs, eligibility criteria, and application procedures in greater detail. Stony Brook does not have an early decision plan. Applications will be available during the early spring and should be submitted prior to June 1 for first consideration Most financial aid awards are made during the summer months.

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\*Applies to all students except those registered in the previous spring semester who have an outstanding deposit.

\*\*Student health insurance fee waived if proof of both hospital and medical insurance is presented prior to registration. Not required of students already enrolled in regular health insurance plan at Stony Brook.

### Regents College Scholarship and Scholar Incentive Awards

These awards are sponsored by the State of New York for state residents only. Eligibility is determined on the basis of the Regents Scholarship Examination, given to high school seniors and administered by the schools. Persons achieving top scores on the examination receive Regents Scholarships. Persons achieving a certain minimum score, but not enough for a scholarship, receive Scholar Incentive Awards. Regents Scholarships theoretically range from $250 to $1000, but in fact will not exceed the tuition charge at the college attended. Scholar Incentive Awards range from $100 to $200 per year at Stony Brook where yearly tuition is $400. Applications must be obtained directly from the State Education Department, Regents Examination and Scholarship Center, 800 North Pearl Street, Albany, New York 12204.

### State University Scholarship

Due to certain technicalities in the Scholar Incentive program mentioned above, many needy students do not receive full benefits of the award. Therefore, the State University of New York has established a program to supplement Scholar Incentive Awards. For students whose combined family taxable income is less than $1800 per year, the State University Scholarship makes up the difference between Scholar Incentive Award and tuition charges. Contrary to what the name implies, SUS is based strictly on need, not on academic performance. Applications and further information may be obtained from the Financial Aid Office at the University.

### Educational Opportunity Grants

The Educational Opportunity Grant program was established by the federal government in 1965 to provide assistance for students "of exceptional financial need." Under this program, administered by the local colleges, awards of $200 to $1000 per school year are made in conjunction with a "package" of financial aid (scholarship, scholar incentive, loan, part-time work) which is tailored to the individual student's needs and capabilities. Applications are available at the Financial Aid Office.

### National Defense Student Loans

Under this, another federal program administered by individual colleges, a needy student may borrow up to $1000 during each year of undergraduate study and $2500 per year during graduate years. No interest accumulates and repayment of a loan does not begin until nine months after graduation. From that time the student has up to ten years to repay at 3% interest per year.

Payment may be deferred during service in the Armed Forces or Peace Corps. For persons entering the field of education, cancellation of the loan obligation is possible at the rate of 10% per year for a maximum of five years. Teachers of the underprivileged may obtain cancellation at the rate of 15% per year. Thus a person may cancel 50% or more of his total loan liability by teaching.

### NYHEAC/Federal Guaranteed Loan Program

This program permits a student to borrow money from his local bank to meet college expenses. The government will pay the interest on a loan until the student graduates, at which time he must repay his obligation to the bank at 3% interest. The word "guaranteed" means that in the event of death or disability of the borrower, his obligation is paid in full by the government.

Terms of repayment are essentially the same as the National Defense Student Loan program above, with the exception of the teacher cancellation provision. Applications may be obtained from local banks or from the Financial Aid Office at the University.

### Part-Time Work and the College Work-Study Program

These possibilities are mentioned last because the University recommends that, if possible, the student not work during his first year of college. It is generally a good idea to become accustomed to the academic and social pressures of college life without the additional burden of a job. In future years, however, depending on his capabilities, a student may wish to meet part of his expenses or reduce his loan obligation by taking a part-time job. The University has a limited number of positions available as part-time secretaries, laboratory assistants, cafeteria workers, etc. This area has been broadened considerably by the College Work-Study Program. Under this program the federal government pays a portion of the salaries of students having demonstrated financial need. They may be employed up to 15 hours per week in on-campus jobs or off-campus community service projects. Provision can also be made for students to work full-time during vacation and summer periods. Theses positions are intended to be educationally meaningful. Often, but not always, a student can obtain a position close to his major field of interest.

### Other State and Federal Aids

Scholarships for children of deceased or disabled veterans are granted by New York State on the basis of an annual scholarship examination. Application should be made through the local high school principal or to the State Education Department, 800 North Pearl Street, Albany, New York 12204. Eligible students

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

Students whose parents receive Social Security benefits should be aware that payments for dependent children may be extended from age 18 to age 22 if the child is a full-time student and remains unmarried.

Veterans may receive assistance under the provisions of Public Law 894 (disability), 550 (Korean War) or 89-358, the cold war GI Bill, which provides payments of $130 per month to single veterans who are in full-time study. Veterans with one dependent may receive $155 per month. Further information may be obtained from local Veterans Administration offices.

When approved by the business officer of the University, scholarships held by State University students may be applied directly to such expenses as tuition, room, board and fees. In the case of Regents or university-administered financial aids, deferred payment can often be arranged, but only when an award has been approved and cash or check is pending. Students are advised to have their notices of award from all programs with them when registering at the University.

## Private Scholarship Programs

As Stony Brook becomes established and its reputation grows, an increasing number of scholarships are expected to become available through the generosity of private donors or foundations. Several are listed below:

A. *The Kaltenborn Foundation* offers two $1000 scholarships annually, one each to outstanding juniors in the fields of music and art. These scholarships are awarded without regard to school expenses or financial need and are intended to provide the student with additional resources for pursuit of his or her field of interest. Additional information is available through the Departments of Music and Art.

B. *Republic Aviation Scholarships,* as a result of a grant by the Republic Assistance Fund, Inc., will be awarded, in the amount of $400 each, to five Stony Brook students during the 1970-71 academic year. First consideration for these awards will be given to students who are children of former employees of Republic Aviation Corporation, regardless of present place of residence. Students residing in Nassau and Suffolk Counties will be eligible for consideration if no child of a former Republic employee applies and qualifies in any academic year. Other factors in determination of the award winners will be academic performance in secondary school, participation in extracurricular activities, evidence of leadership potential, and relative financial need. Scholarship winners' progress will be reviewed annually and the award may continue during succeeding undergraduate years. Appli-

cations for the Republic Aviation Scholarships will be available from the Financial Aid Office at the University.

C. A scholarship of $500 has been made available by Miss Helen Strauss for an outstanding student in theatre arts.

D. The residents of Langmuir College will offer four scholarships during the 1970-71 academic year:

  (1) The Replacement Coffee House will sponsor two scholarships, one for $50, one for $200.

  (2) Langmuir Straphanger, the College's notions store, will offer one scholarship for $100.

  (3) The College Legislature will sponsor one $300 scholarship. Inquiries about Langmuir scholarships should be directed to the Financial Aid Office. Langmuir Legislature has directed that applicants for these scholarships be solicited by the Financial Aid Officer on the basis of exceptional need or exclusion from other aid programs.

E. *Ashley L. Schiff Memorial Alumni Scholarship* was established in memory of Associate Professor Ashley Schiff of the political science department by the Stony Brook Alumni Association. The cash award is given annually to an outstanding freshman.

F. *Class of 1970 Scholarship* is awarded annually to the student making the most outstanding contribution to the University during his or her freshman year.

## Foreign Student Tuition Scholarships

State University of New York is able to award a limited number of tuition scholarships to students from other countries who are in the United States for a temporary period of study. The scholarships are awarded primarily on the basis of financial need. Non-citizens who hold permanent resident visas are normally not eligible for consideration. The tuition scholarship is equivalent to $600 per academic year and may be renewed by making a new application each year the student continues full-time enrollment at Stony Brook.
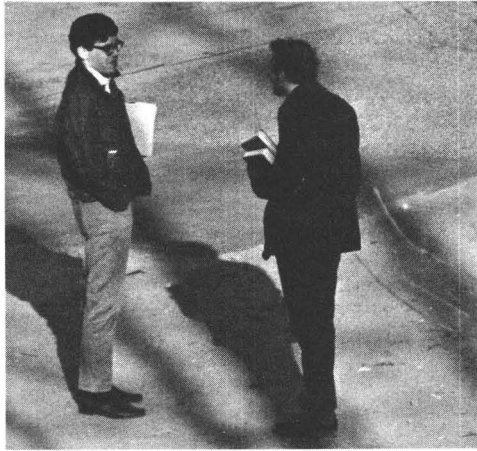
# ACADEMIC REGULATIONS AND PROCEDURES

### Registration

Completion of registration each semester in accordance with instructions issued by the registrar is a prerequisite to class attendance. Although the registrar will attempt to send individual instructions to every eligible student in advance of each registration period, changes in status and addresses make it impossible for him to guarantee that every student will automatically receive these instructions. Eligible students who fail to receive final registration information by September 10 for the fall semester, or January 20 for the spring semester should contact the Office of the Registrar without delay.

Registration after the close of the announced final registration period in the academic calendar requires the payment of a service charge of $15. Registration is not permitted after the end of the second week of classes. A student is not considered registered until the appropriate forms have been filed with the registrar and arrangements regarding tuition and fees have been made with the Business Office.

### Course Selection

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. It is the student's responsibility, however, to plan his program so that all degree requirements are met.

### Course Load

A student may register for 12-19 hours of credit each semester with the approval of his academic advisor. Normally a student will register for a course load of 15-18 credit hours.

A student who wishes to register for less than 12 or more than 19 hours must petition the Committee on Academic Standing on forms provided by the registrar. Petitions to take course work in excess of 19 semester hours will normally be approved only if the student has achieved a grade-point average of 3.00 or better during each of the previous two semesters. Petitions to take less than 12 hours of work will normally be approved only when, in the judgment of the committee, unusual circumstances, such as physical disability, exist. Such petitions should be accompanied by appropriate documentation.

## Pass-Fail Option

In September 1967 an experimental pass-fail grading system was introduced on a limited basis to permit sophomores, juniors and seniors to explore various areas of the curriculum with less immediate pressure for grades. Within the limitations given below students are free to elect courses on a pass-fail basis as they see fit. Questions about the applicability of the pass-fail option to individual situations should be discussed with the student's faculty advisor.

A. No courses may be taken on a pass-fail basis during the freshman year.

B. No more than four courses may be taken on a pass-fail basis during a student's university residence.

C. No more than one such course may be taken in any semester.

D. All such courses must be taken outside the student's departmental major requirements.

E. In calculating grade-point averages, "pass" shall not be used in the calculation and "fail" shall be used.

F. A student must designate a course for the pass-fail option at registration or during the first two weeks of the semester, and he may not thereafter change this designation.

G. In the event that a student's change of major or a department's alteration of its major requirements should affect a pass-fail course already taken, the department shall accept the student's "pass" but may require an additional examination.

## Change of Registration

A student may change his registration only during the first two weeks of the semester. To do so he must first complete the appropriate request form and then obtain the approval of his advisor for the proposed change. Forms for this purpose are available from the registrar. No record is made of courses dropped during this period.

After the second week of classes, no course may be added. A student may, however, drop a course through the ninth week of the semester provided he has the approval of his academic advisor and the change does not reduce his course load below 12 semester hours. Students will be assigned the grade of WP (withdrawn passing) or WF (withdrawn failing) for each course dropped. After the ninth week, no course may be dropped.

## Auditing

Auditing refers to the practice of attending a course for informational instruction only. No credit is granted for such work nor does the University keep any

record of the student's participation in the course. The privilege of auditing courses is reserved to regularly enrolled students.

A student who wishes to audit a course must first obtain the permission of the instructor. No petitions to change from audit to credit status will be allowed after the second week of classes.

## Assignment of Grades

In each course final grades are given at the end of the semester, except in year-long courses designated by a dash. In such courses an R grade is given at the end of the first semester and a final letter grade only after both semesters have been completed.

Grades assigned at the completion of a course are as follows: A (superior), B (good), C (satisfactory), D (minimum passing), F (failure). In addition, the following marks may be awarded at the end of the semester.

I    (incomplete) indicates that part of the work for the course has not been completed and is not a permanent grade.

WP (withdrawn passing) indicates withdrawal from a course while the student is doing passing work or before evaluation is possible.

WF (withdrawn failing) indicates withdrawal from a course while the student is doing failing work.

R    (registered) indicates attendance during the first semester in a year-long course, the final grade for which will be assigned only after the completion of two semesters.

P    (pass) indicates passing work in a course where the evaluation standard is either pass or fail.

S    (satisfactory), U (unsatisfactory) and H (honors) indicate evaluation of academic performance in a tutorial or other kinds of special courses.

## Incompletes

I (incomplete) may be given at the discretion of the instructor when a student fails to complete all course requirements *because of circumstances beyond his control*. The date set for the completion of such requirements will ordinarily be no later than November 1 for courses taken in the prior spring semester and March 15 for courses taken in the prior fall semester. If a final letter grade of A, B, C or D is not reported to the registrar by these specified dates, the grade of I will automatically be changed to F. No student will be permitted to graduate with the grade of I on his record. Under *unusual* circumstances an instructor may extend the period for completing the course requirements. In such cases, the instructor must notify the registrar in writing before the I grade expires and specify the date upon which a final grade will be reported. If a grade of A, B, C or D is not reported to the registrar by that date, the I grade will automatically become an F.

## Grade-Point Average

For the purpose of determining grade-point averages, letter grades have the following values: A-4 points, B-3 points, C-2 points, D-1 point and F-no points. Grades of I, WP, WF, R, P, H, S and U are not included in the grade-point average. To compute 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 semester hours for that course; the total number of points earned in all courses is then divided by the total number of semester hours for which the student has been registered. Only courses taken at Stony Brook are included in a student's grade-point average.

## Repeating Courses

With the approval of his advisor, a student may repeat a course in which he has received a grade of D or F. All grades and semester hours will be computed in the grade-point average, but a course which has been passed may be counted only once in satisfying credit hour requirements.

## Academic Standing

During the freshman and sophomore years (or the first four semesters of registration) a student must earn a grade-point average of at least 1.75 each semester to remain in good standing. Students earning a grade-point average below 1.75 during any semester will be placed on academic probation for the following semester.

During the junior and senior years (or after four semesters of registration) students must earn a grade-point average of at least 2.00 each semester to remain in good standing. A cumulative grade-point average of 2.00 for all work undertaken after entrance into the junior year (or begun after four semesters of registration) is required for graduation. Upperclassmen earning a grade-point average of under 2.00 during any semester will be placed on academic probation for the following semester.

Students on probation whose grade-point average for the probationary semester is less than 1.75 for a freshman or sophomore, or less than 2.00 for an upperclassman, will be suspended. Students who are placed on probation for a third time or those who in any semester receive more failing than passing grades will be eligible for suspension, as will those already registered if during the semester the change of an I to a letter grade places them below the level required for good standing.

## Classification of Students

For the purpose of interpreting academic regulations, students will be placed in

class according to the following schedule of semester hours completed for degree credit: freshman 0-23, sophomore 24-54, junior 55-84, senior 85 or more.

## Grade Reports

Grade reports are prepared as quickly as possible after the conclusion of each semester. Consistent with the university's efforts to encourage mature and responsible behavior in all aspects of a student's development, it is felt appropriate to place upon the student the responsibility for communicating information regarding his academic program and progress to his parents. Accordingly, grade reports are mailed directly to the student's local address at the end of the fall semester and to his home address at the end of the spring semester and the summer session as soon as possible after the end of the final examination period.

## Dean's List

Students who have registered for 12 or more semester hours, exclusive of any pass-fail courses, who achieve a grade-point average of 3.00 or higher during the semester (calculated after any grades of I have been made up), and who have not failed a course, will be placed on the Dean's List.

## Graduation with Honors

A candidate for the bachelors degree who maintains a high level of scholarship (3.25) throughout his course of study is graduated with the honors designation, *cum laude*; if a student attains a higher scholastic rank of 3.50, he is graduated *magna cum laude*; and if he attains the highest rank in scholarship of 3.75 or higher, he is graduated *summa cum laude*. Such honors are indicated on the student's diploma.

## Departmental Honors Program

Some departments of the University offer departmental honors programs. Specific requirements must be met in order for a student to be eligible to participate in the programs. Such programs are described in the departmental section of the *Undergraduate Bulletin*. For those students who qualify, this fact is indicated on their diplomas.

## Application for Graduation

In order to become a candidate for graduation, a student must file an application at the time of advance registration in the spring preceding his senior year.

Students expecting to graduate in January or June *must* file an application no later than the first of the preceding October, and those expecting to graduate in August *must* file no later than the first of the preceding May or by June 20 in the case of students not enrolled in the preceding spring semester. The graduation fee is $15.

A student who applies for graduation and then fails to qualify for his degree must reapply, indicating the revised date of his proposed graduation.

## Selection of Major

In general, before the end of his sophomore year each student is expected to select an academic major in order to plan his program more effectively with an academic advisor in the department of his major. The academic advisor is usually assigned for the last two years of university work.

## Change of Major or Change to a Double Major

In order to change from one academic major to another, a student must obtain a Change of Major Card from the Office of Records. He must then obtain the approval of his present advisor, the chairman of the department of his present major, and the chairman of the department in which he wishes his new major. The card is then returned to the Office of Records where the student's records are changed accordingly.

In order to be cleared for a *double major,* a student must first obtain the approval of the Office of the Vice President for Liberal Studies.

## Physical Education Requirement

Each undergraduate student is required to complete satisfactorily one year (two semesters) of physical education courses unless he is officially exempted. This requirement can be fulfilled during any two semesters chosen by the student. The physical education requirement can also be fulfilled, in whole or in part, by a student's participation in intercollegiate athletics.

## Transcripts

Students who desire transcripts of their academic record at Stony Brook, either for their own use or for forwarding to some other institution or agency, are asked to submit their request in writing to the Office of the Registrar at least ten days before the transcript is needed except at the end-of-semester peak period when additional time should be allowed. The charge for transcripts is $1 per copy. Payment should be made directly to the Business Office and the receipt submitted to the registrar along with the transcript request. Partial transcripts of

a student's record are not issued. Students who have *graduated* will be provided with two free transcripts upon request to the registrar.

Official transcripts of work taken at other institutions which have been presented for admission or evaluation of credit become the property of the University and cannot be copied or reissued. If a transcript of this work is needed it should be obtained directly from the institution concerned.

The University reserves the right to withhold issuance of a transcript for any student who has failed to meet his financial obligations at the University.

## Residence

For a student to be certified for a degree, he must have been registered as a full-time student at the University for the two semesters immediately preceding his graduation.

## Study at Other Institutions

Students currently enrolled at Stony Brook have several options for study at other institutions with the intention of transferring academic credit.

### Summer Study Elsewhere

To insure that projected courses will be fully acceptable for transfer credit, a student planning to take summer courses elsewhere should discuss his plans in advance with both his academic advisor and the Stony Brook Admissions Office where he can obtain assistance in filling out a form listing his intended courses and their Stony Brook equivalents. After receipt by the Admissions Office of an official transcript indicating that the student has completed the courses with a grade of C or better, appropriate transfer credit will be granted.

### Visiting Student Program

A recently inaugurated state-wide program enables interested Stony Brook students to study for a semester or a year at one of more than 50 participating colleges and universities in New York State. The Visiting Student Program is approved by the State Education Department and full transferability of Regents Scholarships and Scholar Incentive Awards is assured. The unique purpose of the program is to allow students to explore possibilities of academic life in a variety of settings ranging from small and possibly specialized institutions to the large academic communities such as Stony Brook.

To qualify for the program a student must have the advance approval of his academic advisor or department chairman and an official statement from the Registrar's Office that he is in good academic standing; the student must

also accept full responsibility for tuition fees and any similar charges in effect at the school he chooses.

Application forms and additional information about the Visiting Student Program may be obtained in the Office of New Student Affairs.

## Study Abroad

The State University of New York is currently expanding its sponsorship of academic programs abroad to provide qualified students with a variety of opportunities to spend a summer, a semester or a full academic year studying at a university in a foreign country. Among present SUNY offerings is, for example, a full-year program at the University of Nice, France, which Stony Brook co-sponsors with other university centers. Other programs already exist or are being developed to allow study in Canada, Great Britain and other European countries, Latin America, Africa, Asia and Israel.

In addition to the SUNY-sponsored programs, individual academic programs may be designed independently by the student to fit his special interests and abilities.

Whether the student wishes to take part in a SUNY-sponsored program or in some other form of study abroad, he should discuss his plans with his academic advisor or department chairman to make sure that his courses are suitable for transfer credit. Information about SUNY-sponsored programs and other opportunities for study abroad can be obtained in the Office of the Director of International Education.

## Withdrawal from the University

Withdrawal from the University, for any reason, will be recorded only when the form entitled "Withdrawal from the University" has been completed and submitted to the registrar. These forms may be obtained from the Office of the Registrar. The date upon which this form is filed, and not the date of the last class attendance, is considered the official date of withdrawal. Non-attendance or notification to the instructors does not constitute formal withdrawal.

Students who officially withdraw on or before the day of the last class meeting prior to final examinations will receive the grade of WP or WF for each course in which they are registered. Students who terminate their attendance at the University without filing formal notification of withdrawal on the appropriate form will be automatically assigned the grade of I in each course for which they are registered.

## Readmission to the University

Students who have withdrawn or been suspended and who wish to be readmitted must apply for readmission through the Office of Admissions. In view of the

increasing enrollment pressures, applications for readmission should be filed at least one month prior to the semester for which readmission is desired. If the student has attended another institution since leaving Stony Brook, an official transcript must be submitted before his application will be considered. In the case of students who have been suspended, at least one semester must elapse before they will be considered for readmission. A student who has been suspended twice is not eligible for readmission.

## Changes in Regulations and Course Offerings

The University reserves the right to change academic regulations or to cancel any course for whatever reasons it may deem appropriate.

# COLLEGE OF ARTS AND SCIENCES

### Degree Requirements

All candidates for the bachelor of arts or bachelor of science degree must satisfy the following general university requirements, normally by attaining a passing grade in appropriate courses and exceptionally by being granted exemption, in which case no course credits are given:

A.  Proficiency in English Composition

    All entering students are expected to demonstrate competence in the clear and logical expression of ideas in written English. This requirement may be met by passing the English proficiency examination or by completing EGL 101, English Composition .......... 3 credits

B.  Natural Sciences

    Two semester courses, to be chosen from among the offerings of the following departments: biological sciences, chemistry, earth and space sciences, mathematics and physics ................... 6-8 credits

C.  Social and Behavioral Sciences

    Two semester courses, to be chosen from among the offerings of the following departments or interdisciplinary programs: anthropology, appropriate courses in Asian studies, black studies, economics, education, history, political science, psychology, social sciences interdisciplinary program (SSC) and sociology. (Student teaching courses may not be used to meet this requirement.) ............... 6-8 credits

D.  Arts and Humanities

    Two semester courses, to be chosen from among the offerings of the following departments or interdisciplinary programs: art, appropriate courses in black studies, Chinese, classics and classical languages, comparative literature, English, Germanic and Slavic languages, Hebrew, linguistics, music, philosophy, Romance languages, theatre arts and world literature ................................. 6-8 credits

Note:  Not acceptable to satisfy the arts and humanities requirement are the following courses:

1.  Art: the first two semesters of the studio courses ART 120, 121, 122, 123, 124.

2.  Music: performance or studio courses MUS 114, 115, 116, 151 and the first two semesters of MUS 161-199 and MUS 261-299.

3.  English courses in composition EGL 101, 102, 105; and theatre arts courses in diction: THR 130, 133.

4.  Foreign language courses below the intermediate, i.e., second year, level.

E. Physical Education

Two semester courses, which may be taken at any time prior to graduation, or participation in intercollegiate athletics. No academic credit is given.

F. For graduation at least 120 credit hours of passing work must have been completed, with a cumulative grade-point average during the last four semesters of at least 2.00, i.e., C-level.

Students should complete the above requirements A through D as early in their programs as possible, ordinarily within the freshman year, and *must* complete EGL 101 during that period. Exemption from any of the course requirements under A through E may be granted upon recommendation of the department or other agency supervising the course.

## DEGREE PROGRAMS AND INDEPENDENT STUDY PROJECTS

Three different degree programs leading to the bachelor of arts or bachelor of science degree are open to students in the College of Arts and Sciences. (For information about degree programs in the College of Engineering, see that section of this *Bulletin*.) Freshmen should postpone formal choice of a degree program until at least the end of the first year, which should be used to explore a variety of fields of study and to complete as many as possible of the university requirements. The three choices of degree programs are:

### I. The Departmental Major

This program consists of study concentrated in one of the academic departments of the College of Arts and Sciences and allows the student to explore in some depth the content, methods and achievements of a given academic discipline. Departmental requirements and course offerings are listed in detail, and in alphabetical order by department, in this section of the *Bulletin*. They should be carefully considered and discussed with the student's academic advisor or a member of the department.

### II. The Interdisciplinary or Interdepartmental Major

This newly authorized choice of degree program allows the student to investigate an area of concern which transcends the limits of individual academic departments by combining appropriate courses from two or more disciplines to create an integrated core of study directed toward a special goal. As of September 1970, seven interdisciplinary programs have been approved: Asian Studies, Black Studies, Comparative Literature, Elementary Education, Linguistics, Religious Studies and Social Sciences. They are described in more detail in this section of the *Bulletin* under individual headings alphabetically arranged. Additional inter-

disciplinary programs are currently being considered, as well as additional courses within the already established programs. For further information consult the office of the vice president for liberal studies.

## III. The Liberal Arts Major

This is a new program designed to lead to the baccalaureate degree by means of a plan of study developed by the student to meet his individual interests. A faculty board of advisors will help the student in planning his program. The sole requirement of this program, after the general university requirements have been met, is that 60 course credits of work in courses beyond the introductory level must be completed. For further information consult the office of the vice president for liberal studies.

## IV. Independent Study Projects

Within each of the three degree programs described above, a student may wish to undertake independent study. This option is designed to allow the student, in consultation with appropriate faculty members, to develop an individual course of academic investigation and study. The procedure for obtaining approval of an independent study project is as follows: the student prepares a brief written outline of his study project, indicating its scope and purpose and the methods which will be used to conduct it. He must then obtain from two faculty members written approval of the project and agreement to supervise it and to recommend appropriate academic credit. If independent study is undertaken as part of a departmental or interdisciplinary major, one of the faculty signers must be the chairman of the department or program. The completed dossier—project outline and endorsements—is then submitted by the sponsoring faculty member to the appropriate college curriculum committee for review. Independent study projects may be distributed throughout the undergraduate years, although in most cases freshmen should complete the general university requirements before proposing independent study. A total of 30 credits of independent work may be offered toward the degree requirement of 120 hours and as many as 18 credits may be earned in one semester.

## TWO BACCALAUREATE DEGREES

Qualified students whose special interests and career plans make such study appropriate may be granted permission to earn two degrees at the undergraduate level by planning a program which leads to a bachelor of engineering degree from the College of Engineering and a bachelor of arts or a bachelor of science

degree from the College of Arts and Sciences. The program requires five years for completion. Written approval to undertake this curriculum must be obtained from the dean of the College of Engineering and the vice president for liberal studies, subject to review and final authorization by the academic vice president. In addition to meeting all general university requirements, the candidate for two degrees must fulfill the requirements of the undergraduate program in engineering science in the College of Engineering and the requirements of an established degree program in the College of Arts and Sciences.

## ELEMENTARY AND SECONDARY TEACHER PREPARATION

To prepare students to become teachers in either the elementary or secondary schools, the University offers programs which are guided by the University Committee on Teacher Preparation and administered by Dr. Mortimer Kreuter, director of teacher preparation. Students who complete Stony Brook's approved sequences are eligible for provisional teacher certification by New York State.

Students interested in preparing to teach in the elementary schools should plan to fulfill the requirements of the Interdisciplinary Major in Elementary Education (EED), which is outlined on page 124 of this *Bulletin*.

Students planning to teach at the secondary school level should complete the requirements of either a departmental major or an interdisciplinary major. A special brochure describing the various teacher preparation programs is available through the office of teacher preparation.

# DEPARTMENT OF ANTHROPOLOGY

*Professors:* PEDRO ARMILLAS, PAULA BROWN *(Acting Chairman)*, PEDRO CAR-
RASCO *(Director of Graduate Studies)*, [a] LOUIS C. FARON

*Associate Professor:* ROBERT STEVENSON *(Director of Undergraduate Studies)*

*Assistant Professors:* WILLIAM ARENS, DAVID HICKS, STANLEY REGELSON, JUNE
STARR, PHIL C. WEIGAND, MARGARET C. WHEELER

*Instructor:* DOLORES NEWTON

The undergraduate program in anthropology is designed to provide the student
with an introduction to the general field of anthropology, its branches, its
theories and methods, and its relation to the other social sciences and the
humanities. It is also intended to provide the anthropology major with an
academic background suitable to specialization in a graduate program in anthro-
pology. The curriculum emphasizes the fields of cultural and social anthropology.

## Requirements for the Major in Anthropology

In addition to the general university requirements for the bachelor of arts degree,
the following requirements must be met for the major in anthropology:
  A. Study within the area of the major for a total of 24 credits:
    1. ANT 102 and 150 Introduction to Social and Cultural Anthro-
       pology and Elementary Social Structures
    *2. Two ethnographic area courses, such as Peoples of Africa, Peoples
       of South America, North American Indians, etc.
    *3. Two topical courses, such as Comparative Religious Systems, Polit-
       ical Anthropology, Social and Cultural Change, etc.
    4. One 300-level course
    5. Three elective credits to be taken from categories 2, 3 or 4 above
  B. A selection of six additional credits, either among listed departmental
     course alternatives or appropriate courses in other departments with
     the approval of advisor.

## COURSES IN ANTHROPOLOGY

### ANT 102 Introduction to Social and Cultural Anthropology

An analysis of the principles of social struc-
ture among simpler societies through an
examination of various forms of kinship,
marriage, family, age group, voluntary asso-
ciations and various levels of political, jurid-
ical or religious and economic organization.
Mr. D. Hicks, Mrs. J. Starr
*Fall and Spring, 3 credits*

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[a] On leave academic year 1970-71.
* Consult advisor if in doubt about the difference between ethnographic area and topical courses.

## ANT 120 Fundamentals of Physical Anthropology

A consideration of man's biological and cultural heritage through the study of: (1) physical characteristics and behavior of selected primates, (2) physical and cultural characteristics of the Pleistocene hominids, with the relevant pre-historic archaeology, (3) a brief survey of a group of living hunters, e.g., Eskimos, Australian Bushmen. Current research on human origins, genetics, evolution, race and primate and human ethnology will be discussed.
Mr. S. Regelson, Mrs. M. Wheeler
*Fall and Spring, 3 credits*

## ANT 150 Elementary Social Structures

Detailed structural-functional analysis of basic organizing principles and institutions among a selected range of simpler societies of the world.
Prerequisite: ANT 102 or permission of instructor.
Mr. W. Arens, Mrs. J. Starr
*Fall and Spring, 3 credits*

## ANT 201 Peoples of South America

The course begins with a detailed coverage of problems of cultural and social evolution in South America during pre-Spanish times and continues this descriptive analysis into the colonial and contemporary periods wherever possible. Major or representative types of sociocultural systems are discussed from a structural-functional point of view. Consideration is given to problems of cultural and social stability and change in the areas of kinship and marriage, politics, economics, religion, law, etc.
Prerequisite: ANT 150 or permission of instructor.
Mr. D. Hicks
*Fall, 3 credits*

## ANT 202 Cultures and Cultural History of Tropical Lowland South America

This course will survey the cultures of the Amazon-Orinoco drainages with emphasis on those of Brazil. The comparative method will be employed as the principal means of elucidating the cultural history of particular groups as well as general regions where documentation is lacking. Along with ethnological analysis, certain aspects and problems in lowland prehistory will be considered from an archaeological perspective.
Prerequisite: ANT 201 or permission of instructor.
Miss D. Newton
*Spring, 3 credits*

## ANT 203 North American Indians

The various peoples and cultures of North America will be studied with respect to their political, educational, linguistic, social and cultural patterns. Selected societies will be studied in depth.
Prerequisite: ANT 150 or permission of instructor.
Miss D. Newton
*Fall, 3 credits*

## ANT 204 Peoples of Africa

The range and distribution of African populations, languages and sociocultural systems are surveyed in both full historic perspective and environmental context. Special attention is paid to the implications of anthropological theory. The general survey is supplemented by intensive analysis of select sociocultural systems. The course concludes with an assessment of the problems of the emerging African nation-states and of current research problems, programs and goals in Africa.
Prerequisite: ANT 150 or permission of instructor.
Mr. R. Stevenson
*Spring, 3 credits*

## ANT 206 Peoples of Asia

A survey of cultures and societies of Asia, with emphasis on the contemporary simpler societies and their integration into the complex civilizations of India and China.
Prerequisite: ANT 150 or permission of instructor.
Mr. R. Stevenson
*Spring, 3 credits*

## ANT 207 Indians of Middle America

The transformation of Indian societies after the Spanish conquest. Culture and social institutions of the modern Indian: economic organizations, village government, religion, etc. The place of the Indian in the social structure of Mexico and Guatemala.
Prerequisite: ANT 150 or permission of instructor.
Mr. P. Carrasco
*Spring (every other year), 3 credits*

## ANT 209 Ancient Civilizations of Middle America

The civilizations of Mexico and Central America at the time of the Spanish conquest. Ecological adaptation, economic systems, social and political institutions, religious and intellectual achievements.
Prerequisite: ANT 150 or permission of instructor.
Mr. P. Carrasco
*Spring (every other year), 3 credits*

## ANT 211 Peoples of Southeast Asia

Ethnographic, ethnological and structural-functional analysis of selected tribal and peasant societies of mainland Southeast Asia and Indonesia-Malaysia. An attempt will be made to arrange the societies along a scale of progressive sociocultural complexity, presenting societies representative of each level, and showing some of their important inter-relationships.
Prerequisite: ANT 150 or permission of instructor.
*Fall, 3 credits. Not offered 1970-71.*

## ANT 212 Peoples of Oceania

The study of the environment and cultures of Pacific island communities of Melanesia, Micronesia and Polynesia. Economic, kinship, political and religious institutions will be considered as they have been and are now changing.
Prerequisite: ANT 150 or permission of instructor.
Mrs. P. Brown
*Spring, 3 credits*

## ANT 213 China: The Social and Cultural Background

The development of Chinese culture from prehistoric times through the present is analyzed from the standpoint of anthropological theories of cultural evolution, diffusion, functionalism and human ecology. Special attention is directed to critical formative and transitional periods. Distribution of physical types, languages and ethnicities both within and without the Chinese frontiers is surveyed. Interpretations of Chinese development generated by sister disciplines are discussed with a sympathetic but critical point of view.
Prerequisite: ANT 150 or permission of instructor.
Mr. R. Stevenson
*Fall, 3 credits*

## ANT 215 Social Structure in Lowland South America

Modes of social and symbolic classification in selected tribal societies of lowland South America with particular reference to the Ge speaking peoples of Brazil. Varying theoretical interpretations of particular social structures will be discussed and evaluated within an ethnographic framework.
Prerequisite: ANT 150 or permission of instructor.
Mr. D. Hicks
*Spring, 3 credits*

## ANT 250 Economic Anthropology

Economic life of primitive peoples and pre-capitalistic civilizations with emphasis on the integration of the economy with technology and with social and political institutions.
Prerequisite: ANT 150 or permission of instructor.
Mr. P. Carrasco
*Fall, 3 credits. Not offered 1970-71.*

## ANT 251 Comparative Religious Systems

A survey of the religious beliefs and practices of primitive peoples with special reference to symbols and value systems. The effects of culture contact on religious be-

havior and the basic religious beliefs of more complex societies will be discussed.
Prerequisite: ANT 150 or permission of instructor.
Mrs. M. Wheeler
*Fall, 3 credits*

### ANT 252 Culture and Personality

Culture as a factor in personality and character formation: anthropological theory and constructs will be considered in relation to such concepts as "self," "personality" and "character." The interrelationships of anthropology with its sister disciplines in the behavioral sciences will also be considered, as well as its importance for cross-cultural studies of socialization, change and ethnopsychiatry.
Prerequisite: ANT 150 or permission of instructor.
Staff
*Fall (every other year), 3 credits. Not offered 1970-71.*

### ANT 253 Political Anthropology

Description and analysis of political institutions among the simpler societies. Selected examples will be taken from many areas of the world to show government, internal regulations and external relations in small bands, villages, tribes and states. Political development in contemporary societies will also be considered.
Prerequisite: ANT 150 or permission of instructor.
Mrs. J. Starr
*Spring, 3 credits*

### ANT 255 Material Culture, Technology and Primitive Art

This course will explore various approaches to the study of material culture in its technological and artistic aspects. Special consideration will be given to the relation between the material and nonmaterial cultural forms and the value of such study to anthropological problems. Use will be made of the museum facilities in planning and designing exhibits which would express the anthropological approach and provide certain practical experience in the study of material culture.
Prerequisite: ANT 150 or permission of instructor.
Miss D. Newton
*Fall, 3 credits*

### ANT 256 Urban Anthropology

A review of current anthropological research on family and kinship behavior, status and role, personality, social stratification, mobility and assimilation patterns in contemporary urban societies.
Prerequisite: ANT 150 or permission of instructor.
Mrs. M. Wheeler
*Spring, 3 credits*

### ANT 257 The Past of the New World

The peopling of the New World and the processes of development of aboriginal American cultures from the beginning to the era of European expansion. An interpretative summary of archaeological evidence in terms of culture history showing how it relates to (1) the general theory of cultural evolution and (2) the post-Columbian history of the Americas.
Prerequisite: ANT 150 or permission of instructor.
Mr. P. Armillas
*Spring, 3 credits*

### ANT 258 Ways to Civilization

A comparative study of processes of cultural evolution from the beginnings of farming to the achievement of civilization in different parts of the world.
Prerequisite: ANT 150 or permission of instructor.
Mr. P. Weigand
*Fall, 3 credits*

### ANT 259 Archaeology of Mexico and Central America

An introduction to concepts and methods of archaeological research applied to the study of the origins and development of pre-Columbian civilizations of Middle America, with emphasis on the reciprocal relations between culture and environment. General

trends in the areas of culture history and illustrative regional sequences from the establishment of sedentary farming communities to the eve of the Spanish conquest.
Prerequisite: ANT 150 or permission of instructor.
Mr. P. Armillas
*Fall, 3 credits*

## ANT 260 Archaeological Studies in Society and Culture

Basic concepts and methods of archaeological research applied to the study of sociocultural processes and to historical interpretation.
Prerequisite: ANT 150 or permission of instructor.
Mr. P. Weigand
*Fall, 3 credits*

## ANT 261 Peasant Societies and Cultures

The concept of peasantry will be examined from political, religious and social class angles as well as from the more traditional economic view. These agricultural peoples, who are essentially preliterate and pre-industrial, are described and analyzed especially in relation to the national societies of which they form a part. Special attention is given peasant societies in Latin America, Africa and Asia.
Prerequisite: ANT 150 or permission of instructor.
Mrs. J. Starr
*Fall, 3 credits*

## ANT 262 Prescriptive Alliance Systems

A comparative analysis of social and symbolic forms associated with prescriptive alliance, together with a survey of the various institutional and symbolic expressions of the principle of binary opposition.
Prerequisite: ANT 150 or permission of instructor.
Mr. D. Hicks
*Spring, 3 credits*

## ANT 263 Language and Culture

The study of language as an aspect of culture; the relation of habitual thought and behavior to language; the problem of meaning. This course is identical with LIN 263.
Prerequisite: ANT 150 or permission of instructor.
Mr. S. Regelson
*Fall, 3 credits*

## ANT 271 Social and Cultural Change

An examination of the forms and processes of change which have been and now are taking place throughout the world, transforming isolated peoples of simple economy and social organization into participating members of modern states.
Prerequisite: ANT 150 or permission of instructor.
Mr. W. Arens
*Fall, 3 credits*

## ANT 301 Development of Anthropological Theory and Method

An evaluation of the central ideas of several schools of anthropology since the latter 19th century, with an appraisal of their effect on contemporary anthropological theory and methodology.
Prerequisites: ANT 150 and advanced standing or permission of instructor.
Mr. P. Carrasco
*Fall, 3 credits*

## ANT 303 Evolution of the State

The theories of a number of seminal thinkers in social history, political theory, economics, sociology and anthropology are tested against the empirical results of contemporary anthropological research, both archaeological and ethnographic. Emphasis is upon Asia and Africa but New World materials are also introduced for purposes of comparison.
Prerequisites: ANT 150 and advanced standing or permission of instructor.
Mr. R. Stevenson
*Fall, 3 credits*

## ANT 304 Problems in Political and Economic Development

The study of the political and economic problems faced by undeveloped peoples as

they become modern nations, and a discussion of some of their successes and failures in political and economic development. Each student carries out independent research on a nation, people, or problem, presents his material in a seminar, and writes a paper on his research.
Prerequisites: ANT 150 and advanced standing or permission of instructor.
Mrs. P. Brown
*Fall, 3 credits*

## ANT 308 Seminar in Latin American Cultures

Research and discussion about selected topics in the culture and social structure of Indian and peasant communities in Latin America.
Prerequisites: ANT 150 and advanced standing or permission of instructor.
Mr. P. Carrasco
*Spring, 3 credits*

## ANT 310 Readings in Social Anthropology

A colloquium in social anthropology.
Prerequisites: ANT 150 and advanced standing or permission of instructor.
Mrs. P. Brown
*Fall and Spring, 3 credits*

# DEPARTMENT OF ART

*Professors:* LAWRENCE ALLOWAY, LEOPOLDO CASTEDO

*Associate Professors:* [a] ALBERT BOIME, EDWARD COUNTEY, JACQUES GUILMAIN (*Chairman*), JAMES H. KLEEGE, GEORGE KORAS, MALCOLM MORLEY (*Visiting*)

*Assistant Professors:* RONALD LUSKER, NINA A. MALLORY, ROBERT WHITE

*Instructor:* GRETA BERMAN

*Lecturers:* JACQUELINE BARNITZ, CLAIRE LINDGREN

The undergraduate program in art is designed to provide the student with a general background in the theories and history of art, as well as training in basic studio techniques. The plan of study allows the student great freedom in choosing his courses, enabling him to move in the direction in which he is most interested.

Students who are interested in commercial art, or who wish to undertake a fine arts program in graduate school, are urged to concentrate their art electives in the studio area.

Those intending to do graduate work in art history, in preparation for museum work or college level teaching, are advised to concentrate on art history and theory. The department also strongly recommends that these students acquire a reading knowledge of German and/or French as part of their undergraduate program.

## 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:

> Completion of ART 101, 102, and 36 additional credits to be distributed in the following manner:
>
> | | |
> |---|---:|
> | Art theory, criticism and history | 12 credits |
> | Studio courses (ART 121, 122, 123, 124) | 12 credits |
> | Electives in art (may be history, studio or both) | 6 credits |
> | Electives in related areas (courses outside the Department of Art, related to the student's particular interest, and meeting the approval of his departmental advisor) | 6 credits |

## Honors Program in Art

The honors program is open to seniors majoring in art who have maintained a grade point average of at least 3.0 in their major field and related disciplines. Students should apply for the honors program before the beginning of their senior year. The student must find a member of the faculty of the department to act as sponsor. The student, with the approval of the sponsor, must submit a pro-

[a] On leave academic year 1970-71.

posal of his project, in writing, to the department. Acceptance into the honors program is dependent upon the approval of the proposal by the department.

In the art history area, the student's research project will be supervised by his honors advisor. In the practice of art area, the student will be expected to prepare a small one-man show or similar project (i.e., one large, more ambitious work) in lieu of a thesis, under the supervision of his honors advisor.

The student's project will be judged by a jury composed of at least two members of the art department and a faculty member from another department, recommended to the vice president for liberal studies by the chairman of the Department of Art. This pertains to students in both the art history and practice of art areas.

When the honors program has been carried out with distinction, conferral of honors will be contingent upon the student achieving a 3.4 grade average in all art courses taken in the senior year.

## COURSES IN ART

### ART 101 History of Art and Architecture from Earliest Times to ca. 1400

A survey of the history of art and architecture in the western world from its earliest beginnings to the end of the Middle Ages.
Mrs. N. Mallory
*Fall and Spring, 3 credits*

### ART 102 History of Art and Architecture from ca. 1400 to the Present

A survey of the history of art and architecture in the western world from the end of the Middle Ages to the present.
Staff
*Fall and Spring, 3 credits*

### ART 120 Fundamentals of Drawing, Composition and Design

An introductory course intended for non-art majors. Emphasis will be on drawing techniques. Six hours studio work.
Prerequisite: Permission of instructor.
Staff
*Fall and Spring, 3 credits*

### ART 121 Studio I (Drawing)

A course in drawing, the basis of pictorial art. Intended for art majors. Emphasis will be on life drawing. Six hours studio work.
Prerequisite: Permission of instructor.
Staff
*Fall and Spring, 3 credits*

### ART 122 Studio II (Introduction to the Techniques of Sculpture)

A beginning course designed to introduce the student to the techniques and formal principles of sculpture. Studio exercises in the uses of sculptors' tools and simple problems in three-dimensional design are supplemented by some lectures and recitations on the formal principles of sculpture as a medium. Six hours studio work.
Prerequisite: ART 121 or permission of instructor.
Staff
*Fall and Spring, 3 credits*

### ART 123 Studio III (Introduction to the Techniques of Painting)

A beginning course designed to introduce the student to the techniques and formal principles of painting. Studio exercises in various media: watercolor, oil, tempera. Pure color theory and its relation to the various media. Six hours studio work.
Prerequisite: ART 121 or permission of instructor.
Staff
*Fall and Spring, 3 credits*

## ART 124 Studio IV (Design)

A studio course in the techniques of perspective drawing, isometric projection, multiphase drawings, motion studies, graphs, and analytical drawings, and their application to a selected project. Six hours studio work.
Prerequisite: ART 121 or permission of instructor.
Mr. J. Kleege
*Fall and Spring, 3 credits*

## ART 221 Studio V (Advanced Painting I)

A course designed to develop the student's skills in composition and the applications of color theory. Watercolor and tempera will be used primarily as media in this course. Six hours studio work.
Prerequisite: ART 123 or permission of instructor.
Mr. M. Morley
*Fall, 3 credits*

## ART 222 Studio VI (Modeling, Casting, Direct Plaster Techniques)

A studio course designed to develop the student's technical and compositional skills in the making of sculpture created out of malleable materials through additive techniques. Portrait and figure modeling in clay, plastilene and direct plaster. The study and practice of plaster casting techniques, and the study of metal casting techniques. Six hours studio work.
Prerequisite: Art 122 or permission of instructor.
Mr. G. Koras
*Fall, 3 credits*

## ART 223 Studio VII (Graphics I)

A graphics course devoted to the techniques of engraving, etching, aquatint, messotint, and dry point, supplemented by lectures and recitations on the history of these techniques. Six hours studio work.
Prerequisite: ART 121 or permission of instructor.
Mr. J. Kleege
*Fall, 3 credits*

## ART 231 Ancient Art

The history of art in the ancient world from earliest times through the Roman period.
Prerequisite: ART 101 or permission of instructor.
Mr. J. Guilmain
*Fall, 3 credits*

## ART 233 The Art and Architecture of the Early Middle Ages, 300-1100

The history of early Christian and Byzantine art, and the Germanic and Anglo-Irish traditions, the Carolingian "Renaissance," the Ottonian, Mozarabic and Anglo-Saxon schools.
Prerequisite: ART 101 or permission of instructor.
Mr. J. Guilmain
*Fall, 3 credits*

## ART 234 The Art and Architecture of the High Middle Ages, 1100-1400

The study of Romanesque and Gothic sculpture, architecture, painting (including stained glass and manuscript illumination), metalwork and ivory carving from ca. 1100 to the crystallization of the "International Style," ca. 1400.
Prerequisite: ART 101 or permission of instructor.
Mr. J. Guilmain
*Spring, 3 credits*

## ART 235 The Arts of African, Oceanic, and North American Indian Cultures

A survey of some typical examples of the arts of so-called "Primitive" peoples, with special emphasis on cultural context and aesthetic analysis.
Prerequisite: ART 101 or 102 or permission of instructor.
Staff
*Spring, 3 credits*

## ART 236 Major Artists

A single major artist or architect will be selected (Giotto, Michelangelo, Rembrandt, Rubens, Bernini, Picasso, Brunelleschi or Wright). His development, his works and his influence on others will be carefully analyzed through lectures and class discussions.
Prerequisite: ART 102 or permission of instructor.
Miss G. Berman
*Fall, 3 credits*

## ART 237 Latin American Art

A survey of the art and architecture of Ibero-America from the pre-Columbian civilizations to the present time, emphasizing the Creole or *mestizo* expressions.
Prerequisite: ART 101 or 102 or permission of instructor.
Miss J. Barnitz
*Fall, 3 credits*

## ART 238 Modern Latin American Art

A course in the art of Latin America from Independence to the present with emphasis on the important trends and groups formed since World War II.
Prerequisite: ART 237 or permission of instructor.
Miss J. Barnitz
*Fall, 3 credits*

## ART 321 Studio VIII (Advanced Painting II)

A course designed to develop the student's skill in oil painting and introduce him to the wide variety of modern painting media such as plastics and enamels; painting in mixed media. Six hours studio work.
Prerequisite: ART 221 or permission of instructor.
Mr. M. Morley
*Fall, 3 credits*

## ART 322 Studio IX (Stone and Wood Carving Techniques)

A studio course designed to develop the student's technical and compositional skill in the making of sculpture created in hard materials through subtractive techniques. The study and practice of stone and wood carving. Six hours studio work.
Prerequisite: ART 122 or permission of instructor.
Mr. G. Koras
*Spring, 3 credits*

## ART 323 Studio X (Assemblage)

Composing with more than one medium. The special, formal and aesthetic problems. Six hours studio work.
Prerequisites: ART 221, 222 or 223 or permission of instructor.
Mr. R. Lusker
*Fall, 3 credits*

## ART 324 Studio XI (Graphics II)

A graphics course devoted to the study of the techniques of woodcutting, wood engraving, intaglio color printing and serigraphy, supplemented by lectures and recitations on Oriental color prints and 20th century print making. Six hours studio work.
Prerequisite: ART 123 or permission of instructor.
Mr. E. Countey
*Spring, 3 credits*

## ART 328 Directed Studio Projects

Advanced studio projects in areas of specific interest to the student. The student works independently in the studio under the guidance of a sponsor in the area of concentration, who will criticize and evaluate the student's work.
Prerequisite: Sponsorship of a faculty member.
Staff
*Fall and Spring, 3 or 6 credits. May be repeated with permission of department.*

## ART 332 Italian Renaissance Art

Renaissance painting, sculpture and architecture in Italy.
Prerequisite: ART 101 or 102 or permission of instructor.
Mrs. N. Mallory
*Fall, 3 credits*

## ART 333 Northern Renaissance Art

Renaissance painting, sculpture and architecture in Northern Europe.
Prerequisite: ART 101 or 102 or permission of instructor.
Mrs. N. Mallory
*Fall, 3 credits*

## ART 335 19th Century Art

European art of the 19th century.
Prerequisite: ART 102 or permission of instructor.
Miss G. Berman
*Fall, 3 credits*

## ART 336 20th Century Art

European and American art of the 20th century.
Prerequisite: ART 102 or permission of instructor.
Mr. L. Alloway
*Fall, 3 credits*

## ART 337 Introduction to the Literature of Art

A selection of writing by artists, critics, art historians and theorists will be analyzed through lectures and class discussions.
Prerequisite: ART 101 or 102 or permission of instructor.
Staff
*Spring, 3 credits*

## ART 338 Senior Seminar in Problems of Art History

Introduction to research methods in art history and theory. Senior art majors will work on individual research projects under the supervision of the instructor.
Prerequisite: Art major with senior standing.
Staff
*Spring, 3 credits*

## ART 339 Pre-Columbian Art

A survey of the artistic forms of pre-Columbian civilizations from archaeological *Olmecs* to the architecture of *Machu Picchu*.

Prerequisite: ART 237 or permission of instructor.
Mr. L. Castedo
*Fall, 3 credits*

## ART 342 Northern Baroque Art

Painting, sculpture and architecture in Holland, Belgium, Germany and France in the 17th and 18th centuries.
Prerequisite: ART 102 or permission of instructor.
Mrs. N. Mallory
*Spring, 3 credits*

## ART 344 Baroque Art and Architecture in Spain and Italy

The study of the art and architecture of Italy and Spain from c. 1600 to c. 1750, including the investigation of the antecedents of the Baroque style in the art of the 16th century, and tracing its development in the 17th and 18th centuries. Special emphasis will be placed on the contributions of such major figures as Caravaggio, Bernini, Borromini and Velasquez.
Prerequisite: ART 102 or permission of instructor.
Mrs. N. Mallory
*Spring, 3 credits*

## ART 346 Ibero-American Plateresque and Baroque Art and Architecture

A study of the painting, sculpture and architecture of Ibero-America from the 16th to the 18th centuries.
Prerequisite: ART 101 or 102 or permission of instructor.
Mr. L. Castedo
*Spring, 3 credits*

## ART 349 Art and Communication

A spectrum of human communication of every kind will be proposed within which the position of art will be discussed. Both the unique properties of visual art and those shared with other media will be examined.
Prerequisite: ART 101 or 102 or permission of instructor.
Mr. L. Alloway
*Fall, 3 credits*

## ART 350 Art as Environment

A panorama of the interaction of the arts, including city-planning, popular culture and happenings. Critical discussion and individual research projects, analytical or original, will be required.

Prerequisite: ART 102 or permission of instructor.

Mr. L. Alloway

*Spring, 3 credits*

# INTERDISCIPLINARY PROGRAM IN ASIAN STUDIES

The interdisciplinary program in Asian Studies (ANS) is designed to provide students with a broad knowledge of Asian cultures and civilizations while requiring them to gain a closer acquaintance with one of the three major regions of Asia: East Asia (China, Japan, Korea and Taiwan); Southeast Asia (Burma, Thailand, Malaysia, Singapore, Cambodia, Laos, Vietnam, Indonesia and Philippines); and South Asia (India, Pakistan, Ceylon, Bhutan, Sikim and Nepal). At present, the program focuses on East Asia and Southeast Asia. South Asia is not now offered as an area of concentration, but will be added eventually.

## Requirements for the Major

In addition to the general university requirements for the bachelor of arts degree, a student majoring in this program must earn 30 credits distributed in three or more disciplines in Asian Studies and related courses. Twelve of these credits must be in one of the above-named major regions of Asia. All senior students will be required to take an interdisciplinary seminar in Asian Studies, ANS 391. Faculty members affiliated with the program will serve as student advisors.

## Courses in Asian Studies

I. The following courses are offered for the Southeast Asia concentration:
   *HIS 263 History of Southeast Asia to 1500
   *HIS 264 History of Southeast Asia from 1500 to the Present
   HIS 363 Nationalism in Southeast Asia
   HIS 364 Problems in the Modern History of Southeast Asia
   HIS 391, 392 Senior Honors Project in History
   HIS 399 Independent Readings in History
   **ECO 384 Topics in Development and Comparative Systems
   **ECO 386 Topics in Political Economy
   ECO 393, 394 Independent Study or Research
   *ANT 211 Peoples of Southeast Asia

II. The following courses are offered for the East Asia concentration:
   *HIS 197 Far Eastern Civilization
   *HIS 198 The Far East in Transition
   HIS 261 Intellectual History of China
   HIS 262 Contemporary China
   **ECO 384 Topics in Development and Comparative Systems
   **ECO 386 Topics in Political Economy
   ECO 393, 394 Independent Study or Research

* Suggested as an introductory course.
** Course content varies according to the interest of the instructor.

HIS 391, 392 Senior Honors Project in History
HIS 399 Independent Readings in History
\*ANT 213 China: The Social and Cultural Background
The following additional courses for the East Asia concentration are expected to become available in 1970-71 or 1971-72: Japanese History, Far Eastern Governments and Politics, Asian Theatre.

III. Related courses which may be taken to satisfy degree requirements:

HIS 255 Expansion of Europe, 1500-1800
HIS 256 Expansion of Europe, 1800 to the Present
HIS 259 History of the British Empire
HIS 355 Topics in the Expansion of Europe
ECO 325 Economic Development
ECO 330 Economic Anthropology
\*ANT 206 Peoples of Asia
ANT 261 Peasant Societies and Cultures
ANT 303 Evolution of the State
ANT 304 Problems in Political and Economic Development
PHI 109 Introduction to Oriental Philosophy
\*\*PHI 398, 399 Reading and Research in Philosophy
POL 202 Problems of Marxism
POL 209 Politics in the Developing Areas

IV. ANS 391 Senior Seminar in Asian Studies

This interdisciplinary seminar will bring together faculty members and students to discuss and do research on various problems of current interest in the field of Asian Studies, including such topics as agrarian unrest, nationalism, regional economic integration, problems of modernization, historical continuity and discontinuity, and comparative aesthetics. A single topic will be discussed each semester which could be repeated the next semester. A seminar director will be responsible for the selection of the topic and the faculty participants.

V. Languages

Students are strongly recommended to take Chinese if they plan to concentrate on East Asia and to take either Chinese, French, Spanish or Portuguese, if they plan to concentrate on Southeast Asia. The language courses are not counted toward the fulfillment of the major requirements. However, students planning to study abroad or enter graduate school will be advised to begin their language training as soon as possible.

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\* Suggested as an introductory course.
\*\* Course content varies according to the interest of the instructor.

VI. International Education

In conjunction with the SUNY international education program, qualified students in the program will be given an opportunity to study abroad in their respective areas of concentration. To obtain the greatest benefit from their foreign sojourn, students are advised to prepare themselves adequately in the languages of their areas of concentration.

# BIOLOGICAL SCIENCES

*Acting Provost:* [d]RAYMOND F. JONES
*Executive Officer:* ALBERT D. CARLSON
BIOCHEMISTRY
*Professors:* VINCENT P. CIRILLO, MELVIN V. SIMPSON *(Chairman)*
*Associate Professors:* [a]MARTIN FREUNDLICH, [d]CARL MOOS, MONICA RILEY
*Assistant Professors:* NORMAN ARNHEIM, JR., BERNARD S. DUDOCK, RAYMOND F. GESTELAND, BENJAMIN H. LEICHTLING, SANFORD R. SIMON, ROLF STERNGLANZ

BIOLOGY
*Distinguished Professor:* BENTLEY GLASS
*Professors:* [b]EDWARD R. BAYLOR, JOHN CAIRNS, ELOF A. CARLSON, FRANK C. ERK, [d]RAYMOND F. JONES *(Chairman)*, HOWARD L. SANDERS *(Adjunct)*, LAWRENCE B. SLOBODKIN, ROBERT R. SOKAL, [c]DONALD F. SQUIRES, [b]GEORGE C. WILLIAMS
*Associate Professors:* EDWIN H. BATTLEY, ALBERT D. CARLSON, LELAND N. EDMUNDS, JR., HARVARD LYMAN, ROBERT W. MERRIAM, F. JAMES ROHLF, ROBERT E. SMOLKER, BERNARD D. TUNIK, CHARLES WALCOTT
*Assistant Professors:* JOHN M. EMLEN, JAMES S. FARRIS, JAMES A. FOWLER, DOUGLAS J. FUTUYMA, JOHN J. GAUDET, GEORGE J. HECHTEL, RONALD R. HOY, R. PETER KERNAGHAN, RICHARD K. KOEHN, ABRAHAM D. KRIKORIAN, [b]CHARLES F. WURSTER, JR.
*Instructor:* JONATHAN T. HARRIS
*Lecturers:* MARTHA R. BAYLOR, GEORGE G. FOGG
(Professors in the health sciences who participate in the undergraduate program in the biological sciences: V. FARRIS, P. LEFEVRE, E. PELLEGRINO, A. UPTON)

The undergraduate program in the division of biological sciences is designed to provide an introduction to the principles and methodology of the biological sciences. The student can prepare for graduate study, for professional study in the health sciences, for secondary school teaching and for certain positions in industry and research. The program is based on a three semester core in the biological sciences and pertinent courses in mathematics, chemistry and physics.

### Requirements for the Major

In addition to the general university requirements for the bachelor of science degree, the following courses are required for the major in biological sciences.

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a Research Career Development Award, U.S.P.H.S.
b Member, Marine Sciences Research Center.
c Director, Marine Sciences Research Center.
d On leave academic year 1970-71.

A. Study within the area of the major

BIO 150 Biology of Plants and Animals

BIO 151, 152 Molecules, Genes and Cells

Note: Students are strongly advised to complete BIO 150, 151, 152 as soon as possible, preferably before their junior year.

At least 16 additional credits in biology or related areas, chosen by the student in consultation with his advisor, of which at least 12 must be taken within the division. The total must include credits from at least two different biology courses with laboratory, or laboratory courses.

Note: BIO 101, 102, 111, 113 (designed for non-majors) and BIO 159 History of Biology cannot be used to satisfy departmental graduation requirements.

B. Courses required in related fields

CHE 101, 102 Introductory Chemistry or CHE 103, 104

CHE 105, 106 Quantitative Chemistry Laboratory B or CHE 107, 108

CHE 201, 202 Organic Chemistry or CHE 211, 212

CHE 205 Organic Chemistry Laboratory B or CHE 203

MAT 102, 103 Calculus I, II and MAT 113; or MAT 102, 104; or MAT 102, ESA 325

PHY 131, 132 Introductory Physics or PHY 101, 102

Note: Students planning to take chemistry courses such as CHE 153, 154 should note course requirements in program planning and should take PHY 101, 102.

C. Selection of electives

1. The curriculum for biology majors is designed to allow a maximum degree of flexibility for students to plan programs best suited to their individual interests and goals. To take maximum advantage of this flexibility, and to prepare properly for desired post-college careers, students are *strongly urged* to consult their advisors, or other appropriate members of the division faculty, before making final course selections.

2. Students planning graduate or professional studies should obtain information on additional requirements of particular schools and programs.

3. Requirements for doctoral programs in the biological sciences usually include a reading knowledge of one or two approved languages. Preparation in languages should be completed as part of the undergraduate program.

4. Students preparing for secondary school teaching should note the new general requirements for provisional New York certification and for certification in science teaching.

5. For students with an interest in molecular or cellular biology, it is recommended that they include at least CHE 153 in their program.

D. Requirements for students enrolled before 1969-70

1. Students enrolled as *biological sciences majors* prior to academic year 1969-70 may choose to meet *either* the requirements specified in the *Bulletin* under which they entered the major, *or* the requirements specified in this *Bulletin*.

2. For students choosing the *Bulletin of entrance to the major:*

   a. elective credits may be substituted for BIO 201, 202 and for labs in BIO 151, 152;

   b. BIO 150 may be substituted for BIO 236 to meet the ecology core requirement;

   c. for fulfillment of major requirements, the total credits within the area of the major must equal the total number of (required and elective) *biology* credits in the *Bulletin* of entrance (1966-67=36 credits; 1967-68=29 credits; 1968-69=29 credits).

3. Students selecting the *present requirements* may make the following substitutions:

   a. BIO 236 is equivalent to BIO 150 plus one credit of biology elective;

   b. BIO 151 (Fall 1968 or earlier) is equivalent to the current BIO 151 plus one credit of biology elective;

   c. BIO 152 (Spring 1968 or earlier) is equivalent to the current BIO 152 plus one credit of biology elective.

E. Changes in program

1. With the consent of his advisor, a student may petition the undergraduate studies committee of the division for permission to change requirements of the major.

**Honors Program and Independent Study in Biological Sciences**

Divisional majors with a grade point average of 3.0 or better in courses in the biological sciences and related fields (see B and C above) are eligible to apply for the honors program, and should do so before the beginning of their senior year.

The student must find a member of the faculty of the division to act as sponsor. The student, with the approval of the sponsor, must submit a research proposal in writing to the division.

Acceptance into the honors program is contingent upon approval of the proposal by the division.

Honors students must be enrolled in BIO 298, 299 Research Project.

Three copies of the completed thesis or report must be submitted to the sponsor not later than 21 days before the date of graduation. One copy will

be returned to the student; one copy will remain with the sponsor; and the third will be placed on file in the division.

Conferral of honors is contingent upon the recommendation of a reading committee consisting of the sponsor, another member of the division and an outside reader. In addition, the student must maintain a grade point average of not less than 3.4 in all biological sciences and related courses taken in the senior year.

Students planning a program of independent study, which is generally for work outside the major, must have their proposal approved by their sponsor(s) and the acting provost before submission to the College Curriculum Committee. In those cases where an independent study program involves a study in the biological sciences, no more than eight credits of independent study and/or research project (BIO 298, 299) may be used toward biological sciences degree requirements.

## COURSES IN THE BIOLOGICAL SCIENCES

### BIO 101, 102 Biology: a Humanities Approach

The major concepts of biology are presented from historical, contemporary and critical viewpoints. These concepts include the cell, the gene, molecular biology, development and evolution. The human implications or values associated with each concept are emphasized. Biological principles and representative organisms are tied into this conceptual approach. Laboratory experiments and demonstrations are alternated with small seminar groups, the latter exclusively dealing with biology and human values. Two hours of lecture each week and alternating periods of a four-hour laboratory and two-hour discussion. Primarily intended for non-biology majors.
Mr. E. Carlson
*Fall and Spring, 4 credits each semester*

### BIO 111 Genetics and Man

A general introduction to genetics, with special attention to its importance in medicine, agriculture and other aspects of human life and culture. For students not majoring in the biological sciences. Three hours of lectures or discussions.
Mr. F. Erk
*Fall, 3 credits*

### BIO 113 General Ecology

Designed to provide a sense of the problems of modern ecology; for non-biologists. Population growth and regulation, interspecific interactions in natural communities and the concept of the balance of nature will be analyzed. The mutual relation between human activities and ecology will be discussed. Mathematics is not a prerequisite but might prove helpful. Three hours of lectures per week.
Mr. L. Slobodkin
*Fall, 3 credits*

### BIO 150 Biology of Plants and Animals

An introduction to the diversity of plants and animals, their interrelationships, ecological distributions and evolution. Three hours of lecture per week.
Mr. E. Battley
*Fall, 3 credits*

### BIO 151, 152 Molecules, Genes and Cells I, II

The cell is studied as the unit of structure, biochemical activity, physiological specialization and genetic control and continuity. The principles of cellular metabolism, bioenergetics and biosynthesis are applied to an understanding of the relationship between cell structure and function, the processes of

cell growth and multiplication and the activities of the cells of selected specialized tissues of higher organisms (e.g., nerve and muscle). The gene is examined as a unit of mutation, recombination and function. The mechanisms of genetic expression and regulation and the processes of transmission of inherited characteristics will be studied at the molecular, viral and cellular levels. Three hours of lectures and discussions per week.
Prerequisites: CHE 101, 102. BIO 151 is a prerequisite to BIO 152.
Corequisite: CHE 201.
Mr. V. Cirillo, Mr. H. Lyman, Mr. B. Dudock, Mr. D. Grace
*Fall and Spring, 3 credits each semester*

## BIO 159 History of Biology

A thorough examination of selected topics in the history of biology: for example, Darwinism, development of taxonomy, origins of cell theory, preformation-epigenesis controversy, development of biochemical biology. Reading of some original sources will be included. Three hours of lectures or discussions. This course is identical with HIS 259.
Prerequisite: Six credits of biology or permission of instructor.
Mrs. R. Cowan
*Fall, 3 credits. Not offered 1970-71.*

## BIO 161 Genetics Laboratory

Representative exercises and experiments that explore genetic phenomena such as mutation, recombination and gene action in several organisms. Some work in cytogenetics and population genetics is included. One three-hour laboratory and one hour of discussion per week.
Prerequisites: BIO 151, 152.
Mr. D. Grace
*Fall, 2 credits*

## BIO 162 Cell Biology and Biochemistry Laboratory

A series of laboratory experiments and discussions designed to complement BIO 151, 152. Topics covered will include cytological techniques and localization of cellular components, extraction and characterization of nucleic acids and enzymes, isolation of cellular organelles, osmosis and permeability,

bioenergetics and cell cycle control. Four hours of laboratory and discussion per week.
Prerequisite or corequisite: BIO 152.
Mr. L. Edmunds
*Spring, 2 credits*

## BIO 201 General and Comparative Physiology

Problems of tissue and organ function are considered on the basis of the physiology of the cell. A review of certain fundamentals of cell physiology is followed by a consideration of certain specialized cells, their integration into tissues and organs, and the contribution of these to coordinated physiological function in higher organisms. Three hours of lecture or discussion per week.
Prerequisites: BIO 151, 152.
Prerequisite or corequisite: PHY 131 or PHY 101.
Mr. B. Tunik
*Fall, 3 credits*

## BIO 203 General and Comparative Physiology Laboratory

An opportunity for the development of those intellectual, analytical and manipulative skills requisite for experimentation with living material is provided via library research, laboratory work and discussions. These will deal with selected topics presented in BIO 201, including active transport, bioelectric potentials, receptor and effector organs, and neural and hormonal regulatory mechanisms. Students will contribute to the selection of topics, and will design the experiments. The data obtained will be interpreted, with the aid of relevant literature, in written reports and discussions.
Prerequisite: BIO 201 or permission of instructor.
Mr. B. Tunik
*Fall, 2 credits*

## BIO 231 Statistics for Biologists

An introductory statistics course for students in all areas of biology. Normal statistics to analysis of variance, regression analyses and transformations. Nonparametric tests and chi-square testing. Properties of distributions and tests of fit to distributions. Fundamentals of probability theory, statistical decision

theory and the concept of statistical inference. Students desiring to take an intensive course in statistics for ecologists and evolutionists should consult the *Graduate Bulletin*. Three hours of lectures or discussions per week.

Prerequisites: Completion of one of the required math options and permission of instructor.

Mr. J. Farris

*Fall, 3 credits*

## BIO 236 Field and Theoretical Ecology

An examination of the interactions of living organisms with their physical and biological environments. The subject matters of modern population biology, including population ecology and dynamics, ecological genetics and biogeography will be discussed, with emphasis on their relevance to the study of evolving biotic communities. Two hours lecture, one four-hour laboratory period per week.

Prerequisite: BIO 150 or permission of instructor.

Staff

*Spring, 4 credits*

## BIO 237 Invertebrate Zoology

An introduction to the diversity, comparative and functional morphology, natural history and evolution of invertebrates, with interest centered on the modern fauna. Emphasis is placed on feeding and locomotory mechanisms, the adaptive radiation of major phyla and the evolution of the metazoan, metameric and coelomate conditions. Protozoans and insects receive brief introduction. The laboratory includes comparative studies of representatives of major groups and makes extensive use of living material. Three hours of lectures or discussions and one three-hour laboratory per week.

Prerequisite: BIO 150 or permission of instructor.

*Fall, 4 credits*

## BIO 238 Chordate Zoology

An introduction to the diversity, comparative and functional morphology, natural history and evolution of chordates, with interest centered on the modern fauna. Topics include the origin of the vertebrate body plan, the transition from water to land and the adaptive radiation of fishes and tetrapods. The laboratory includes a comparative study of organ systems in representative protochordates and vertebrates. Three hours of lectures or discussions and one three and one-half hour laboratory per week.

Prerequisite: BIO 150 or permission of instructor.

Staff

*Spring, 4 credits*

## BIO 240 Parasitology

An introduction to the study of parasitism with special reference to human and experimental animal hosts. The ecology, physiology and pathogenesis, treatment, control and relation of parasites to world-wide health problems is considered. Living materials are emphasized. Three hours of lecture or discussion and one three-hour laboratory per week.

Prerequisites: BIO 150, 151 or permission of instructor.

Mrs. V. Farris

*Fall, 4 credits*

## BIO 250 Animal Embryology

A survey of the developmental anatomy of animals, especially vertebrates. Laboratory experience includes the analysis of embryonic anatomy from sections and whole embryos. Living embryos will be studied depending on seasonal availability. Lectures and readings cover the evolutionary significance of many developmental sequences as well as experimental analysis of developmental processes. Two hours of lectures or discussions and one three-hour laboratory period per week.

Prerequisite: BIO 150 or permission of instructor.

Mr. J. Fowler

*Spring, 3 credits*

## BIO 261 Morphology of Vascular Plants

This course emphasizes the developmental morphology of vascular plants. Examination will be made of both normal forms of plant cells, tissues and organs as well as those forms that result from natural or artificial manipulation of the environment. Two hours of

lectures or discussion and one three-hour laboratory per week.
Prerequisite: BIO 150 or permission of instructor.
Mr. J. Gaudet
*Fall, 3 credits*

## BIO 293, 294 Special Topics from the Biological Literature

Tutorial reading in the biological sciences. Periodic conferences, final report and examinations arranged with instructor on an individual basis.
Prerequisite: Open to biology majors with the consent of the staff member who will supervise the work. The student *must* also register with the office of the division.
Staff
*Fall and Spring, 1 credit each semester*

## BIO 298, 299 Research Project

In this course the student will 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. Grade is determined on the basis of the adequacy of the project presented. The course may be taken more than two semesters, but no more than eight credits may be utilized for divisional major requirements.
Prerequisite: Open to biology majors with the consent of the acting provost and the staff member who will supervise the work.
Staff
*Fall and Spring, 2-4 credits each semester*

## BIO 300 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. Two hours of lectures or discussion and one three-hour laboratory per week.
Prerequisite: Attainment of senior status as biology major or permission of instructor.
Mr. R. Smolker
*Fall and Spring, 3 credits*

## BIO 302 Vertebrate Systems Physiology

Several vertebrate organ systems will be studied in depth as examples of biological organization and control. Emphasis will be placed upon the comparative approach to the physiology of animal organ systems. Three hours of lectures or discussions per week.
Prerequisite: BIO 201.
Mr. P. Lefevre
*Spring, 3 credits*

## BIO 310 Developmental Genetics

The genetic analysis of developmental events in higher organisms. Topics considered include structural and chemical differentiation, chromosomal differentiation, pleiotropism, sex differentiation and determination, and environmental effects on phenotypic expression. Two hours of lectures and discussion per week.
Prerequisites: BIO 151, 152 and permission of instructor.
Mr. F. Erk
*Spring, 2 credits*

## BIO 312 Population Genetics

A survey of mathematical methods, models and theory in population genetics together with a review of biological implications of the theory. Three hours of lectures or discussions per week.
Prerequisites: MAT 103, BIO 150, 151, 152 and permission of instructor.
Mr. F. Rohlf
*Spring, 3 credits*

## BIO 313 Molecular Genetics

The molecular bases of recombination, mutation, replication and gene expression are studied. The genetics of microorganisms is presented, and the experimental support for molecular models of basic genetic phenomena is examined. Three hours of lectures and discussion per week.
Prerequisites: BIO 151, 152 and permission of instructor.
Mrs. M. Riley
*Spring, 3 credits*

## BIO 314 Genetics of Higher Organisms

An in-depth survey of genetic mechanisms in sexually reproducing organisms from fungi to man, including transmission and distribution of the genetic material; sex determination, recombination and the organization of the chromosome, and gene interaction and balance.
Prerequisites: BIO 151, 152 and permission of instructor.
Mr. R. P. Kernaghan
*Fall, 3 credits*

## BIO 320 Physiology and Biochemistry of Microorganisms

Discussion of the physiology and biochemistry of microbial processes, such as nitrogen and hydrogen fixation, sulfur metabolism, photosynthesis, cell wall synthesis, membrane functions, motility and physiological adaptation. Three hours of lectures or discussions per week.
Prerequisites: BIO 201, CHE 201.
Mr. V. Cirillo
*Spring, 3 credits*

## BIO 321 Microbiology

An introduction to the study of microorganisms through a series of problems which include considerations of taxonomy, development, structure, physiology, reproduction and ecology. Two hours of lectures or discussion and two three-hour laboratories per week.
Prerequisites: CHE 201, 202 and 205 or permission of instructor.
Mr. E. Battley
*Spring, 4 credits*

## BIO 330 Ornithology

An advanced natural history of the birds, designed to provide a sufficiently detailed base for understanding currently active areas of research. Two hours of lectures or discussions per week.
Prerequisite: BIO 238.
Mr. R. Smolker
*Spring, 2 credits. Not offered 1970-71.*

## BIO 333 Control of Insect Populations

A lecture course designed to outline the concepts of modern integrated control of insect populations, with emphasis given to the impact of chemical insecticides on ecosystems.
Prerequisites: BIO 151, 152 and junior standing.
Mr. C. Wurster
*Fall, 1 credit*

## BIO 334 Marine Vertebrate Zoology

Ecology, systematics and evolution of marine fishes, and brief treatment of marine representatives of other vertebrate classes. Two hours of lectures or discussions per week.
Prerequisite: BIO 238.
Mr. G. Williams
*Spring, 2 credits. Not offered 1970-71.*

## BIO 338 Marine Planktonology

Ecology of coastal and estuarine plankton; trophic relations, seasonal and geographic succession, zooplankton behavior, evolutionary significance of meroplankton. Two hours of lectures or discussions per week.
Prerequisite: BIO 237.
Mr. G. Williams
*Spring, 2 credits*

## BIO 340 Marine Biology Laboratory

Work in the field and laboratory will emphasize quantitative sampling of populations and standard oceanographic techniques in the collection of data. Six hours of laboratory and field work on Saturdays.
Prerequisite or corequisite: BIO 334 or BIO 338.
Mr. G. Williams
*Spring, 2 credits*

## BIO 346 Aquatic Botany

A consideration of the systematics, distribution and evolution of aquatic plants, as exemplified by the aquatic flora of Long Island. The physical, chemical and biological aspects of the aquatic environment will be investigated by means of field and laboratory experiments.

Prerequisites: CHE 102 or 104 and one year of general biology or equivalent.
Mr. J. Gaudet
*Summer, 4 credits*

## BIO 347 Field Course in Marine Botany

This course will stress the collection, preservation and identification of the more common local seaweeds. The field collections will be used to illustrate the life cycles of the major groups of algae and the variation at species level within the marine flora. This course may be taken concurrently with BIO 346, which deals exclusively with the local fresh water flora.
Prerequisite: One year of general biology.
Mr. J. Gaudet
*Summer, 2 credits*

## BIO 351 General Plant Physiology

This course will emphasize the physiological patterns and integration of cellular processes that culminate in plant growth. Special attention will be given to water and salt uptake, translocation, mineral nutrition, transpiration, respiration, photosynthesis, nitrogen metabolism and reproduction as a function of age and the ecological environment. Three hours of lectures or discussions per week.
Prerequisites: BIO 151, 152 and CHE 201.
Mr. A. Krikorian
*Fall, 3 credits*

## BIO 352 Experimental Plant Physiology and Development

Projects emphasizing the correlation of growth and development with morphology and physiological functions. Two hours of discussion and two three-hour laboratories per week.
Prerequisite: BIO 261 or BIO 351.
Mr. A. Krikorian, Mr. J. Gaudet
*Spring, 4 credits*

## BIO 361 Biochemistry

A survey of the structure of the major chemical constituents of the cell including carbo-
hydrates, lipids, nucleic acids and proteins. Emphasis will be placed on enzyme structure, enzyme kinetics, reaction mechanisms including the role of coenzymes, metabolic pathways of biosynthesis and degradation involved in cellular activity. Four hours of lectures or discussions per week.
Prerequisites: CHE 201, 202 and permission of instructor.
Mr. M. Simpson
*Fall, 4 credits*

## BIO 381 Introduction to the Nervous System

The ionic basis of nerve potentials, the physiology of synapses and the comparative physiology of sense organs and effectors will be discussed. Consideration will also be given to the integrative action of the nervous system.
Prerequisite: BIO 201 or permission of instructor.
Mr. A. Carlson
*Fall, 3 credits*

## BIO 382 Principles of Behavior

An introduction to the study of animal behavior including a consideration of current research in the field. Topics considered will vary from year to year, but will include orientation, ethology and social behavior. Three hours of lectures or discussions per week.
Prerequisite: BIO 201 or permission of instructor.
Mr. C. Walcott
*Spring, 3 credits*

## BIO 384 Biological Clocks

A consideration of the temporal dimension of biological organization and of periodic phenomena which are a basic property of living systems. Topics include a survey of circadian rhythms; the role of nucleus and cytoplasm; influence of light, temperature and chemicals; use of the clock for adjustment to diurnal, tidal and lunar cycles, for direction finding (homing and orientation) and for day-length measurement (photoperiodism); breakdown of circadian organization; possible mechanisms of the clock. Three hours per week of lecture, discussion and reports.
Prerequisites: BIO 151, 152; CHE 201, 202; a basic knowledge of plant and animal physi-

ology is highly recommended; and permission of instructor.
Mr. L. Edmunds
*Spring, 3 credits*

## BIO 392 Seminar in Molecular and Cellular Biology

A series of reports on current research, with particular reference to research work in progress within the department. One hour of lecture and one hour of discussion per week. Prerequisite: Junior status as a biology major or permission of instructor.
Staff
*Spring, 2 credits*

## BIO 393 Seminar in Developmental Biology

A series of reports on current research, with particular reference to research work in progress within the department. One hour of lecture and one hour of discussion per week.

Prerequisite: Junior status as a biology major or permission of instructor.
Staff
*Fall, 2 credits*

## BIO 394, 395 Special Seminars in Biology

Discussions of a specific area of current interest in biology. The work of each semester covers a different area of biology. Two hours of discussion each week.
Prerequisite: Junior status as a biology major or permission of instructor.
Staff
*Fall and Spring, 2 credits each semester*

## Graduate Courses

Certain graduate courses are open to qualified advanced undergraduates. Consult the *Graduate Bulletin* for details about these courses.

# INTERDISCIPLINARY PROGRAM IN BLACK STUDIES

*Chairman:* [a]ANNIE MAE WALKER
*Associate Professor:* DONALD HOWIE
*Assistant Professors:* LEBERT BETHUNE, LAZARUS EKWUEME, ARMSTEAD ROBINSON
*Lecturer:* CANUTE PARRIS

The interdisciplinary program in Black Studies (BLS) is designed to provide an introduction to the cultural traditions, social institutions and contemporary problems of black peoples of Africa and of African ancestry. Special attention will be given to the social and political forces that have shaped the dynamics of black-white relations in the Americas, particularly in the United States.

Because the Black Studies program includes a broad spectrum of courses in the humanities and the social sciences, appropriate BLS courses may be used by majors and other interested students to meet general university requirements.

## Requirements for the Major in Black Studies

In addition to the general university requirements for the bachelor of arts degree, majors in the Black Studies program must complete the following courses:

|  | | *Credits* |
|---|---|---:|
| I. Black Studies Courses | | |
| | A. At least ten semester courses chosen from the BLS course offerings described below .......................... | 30 |
| | B. Two additional BLS courses, which may be independent study projects in Black Studies, chosen with the approval of the student's academic advisor after completion of five other BLS courses ............................... | 6 |
| II. Courses in Related Areas | | |
| | Two courses, chosen with the approval of the student's academic advisor, from departmental offerings in areas related to Black Studies ..................................... | 6-8 |
| | | 42-44 |

## COURSES IN BLACK STUDIES

### BLS 110, 111 The Experience of Literature I, II

Lectures on the major types of literature, in explanation of the form and content of poetry, prose fiction and drama, as seen in outstanding works of each type. Intensive discussion and criticism of written work by students, conducted in small sections. (BLS 110 is identical with EGL 110.)
Mr. K. Awooner (English Department)
*Fall and Spring, 3 credits each semester*

### BLS 251 Education of the Afro-American in America

An analysis of significant research and publications on the education of the Afro-American in America from Reconstruction to the present. Emphasis will be placed upon social, economic, political and psychological factors which have conditioned educational opportunities for Afro-American citizens and the present crises in America.
Mrs. A. Walker and staff

*Fall and Spring, 3 credits*

[a] On leave academic year 1970-71.

## BLS 253 Lecture Series on Black Studies

This course is designed as a series of lectures which will provide a general introduction to social and historical topics relevant to Black Studies. The course is recommended for majors in the Black Studies program and for other students seeking an introduction to the field.

Mrs. A. Walker and staff

*Fall and Spring, 3 credits*

## BLS 254 Socio-Cultural Features and Expressions of the Afro-American Experience, Part I

A course designed to focus on a consideration of primary cultural institutions and expressions of black people in the Americas. The course will treat, comparatively, the character, development and function of basic cultural patterns in the United States and selected societies within the circum-Caribbean.

Mr. L. Bethune

*Fall, 3 credits*

## BLS 255 The Politics of Race

An analysis of the role which race plays in national policy formulation in the United States. The following topics will be examined: the institutionalization of racism in the American political culture; how blacks perceive political reality; elitism and pluralism; non-violence; patriotism and black nationalism; black politics and black power; the response of government to the demands of blacks; new political forms; future directions in black—white political relations.

Prerequisite: Two previous courses in the social sciences or sophomore standing.

Mr. C. Parris

*Fall and Spring, 3 credits*

## BLS 256 History of West Africa

A general survey of the cultural and political history of the peoples of West Africa from about 1000 to 1950.

*Fall and Spring, 3 credits*

## BLS 257 Music in the Society of Sub-Saharan Africa

A survey of the role and function of music among the peoples of sub-Saharan Africa.

Discussion will include traditional music in the so-called "tribal" society, and contemporary trends in African music-making as affected by such external influences as Islam, Christianity, urbanization, mass communications and other aspects of western civilization. (BLS 257 is identical with MUS 110.)

Mr. L. Ekwueme

*Fall, 3 credits*

## BLS 258 The Politics of Africa

This course focuses upon the political evolution of Africa. While the course deals with general concepts and topics, attention will be devoted also to an analysis and understanding of specific problems in public policy formulation in Africa. Emphasis will be placed upon colonial policies, the independence movements, contemporary internal political, economic and social problems, and the role of the new states in international affairs.

Prerequisites: Two courses in the social sciences or sophomore standing.

Mr. C. Parris

*Fall and Spring, 3 credits*

## BLS 259 Socio-Cultural Features and Expressions of the Afro-American Experience, Part II

The course will be devoted to detailed analysis of contemporary institutional features and aspects of black culture in the United States with special concern for their implications for education and political socialization among Afro-Americans in urban areas.

Prerequisites: Two courses in the social sciences or BLS 254 or permission of the instructor.

Mr. L. Bethune

*Spring, 3 credits*

## BLS 260 African Music: Its Theory and Practice

The course will introduce students to the music of the peoples of sub-Saharan Africa through an analysis of its special characteristics of form, rhythm, melody and scales, harmony, instrumentation and performance techniques. (This course is identical with MUS 260.)

Prerequisite: MUS 119 or equivalent.

Mr. L. Ekwueme

*Spring, 3 credits*

## DEPARTMENT OF CHEMISTRY

*Professors:* JOHN M. ALEXANDER, FRANCIS T. BONNER (*Chairman*), BENJAMIN CHU, HAROLD L. FRIEDMAN, ALBERT HAIM, EDWARD M. KOSOWER, PAUL C. LAUTERBUR, WILLIAM J. LE NOBLE, YOSHI OKAYA, FAUSTO RAMIREZ, SEI SUJISHI

*Associate Professors:* THEODORE D. GOLDFARB, NOBORU HIROTA, RICHARD N. PORTER, ROBERT F. SCHNEIDER, DAVID W. WEISER, J. L. WHITTEN, ARNOLD WISHNIA

*Assistant Professors:* F. W. FOWLER, DAVID M. HANSON, RAYMOND G. JESAITIS, PHILIP M. JOHNSON, ROBERT C. KERBER, ALLEN KRANTZ, GEORGE H. KWEI, DAVID A. LLOYD, STEVEN L. MUROV, STEPHEN E. SCHWARTZ, CHARLES S. SPRINGER, EDWARD I. STIEFEL

*Director of Chemical Laboratories and Lecturer:* PAUL D. CROFT
*Coordinator of General Chemistry Laboratories and Lecturer:* JAMES W. HAGEN

The bachelor of science program in chemistry is designed to prepare the student for graduate study in chemistry or for industrial or other employment. The program of the Department of Chemistry is approved by the committee on professional training of the American Chemical Society.

The bachelor of arts program is designed to accommodate the needs of students preparing to teach chemistry in secondary schools, premedical students and others whose career objectives may call for a substantial introduction to chemistry.

### Requirements for the Bachelor of Science Degree in Chemistry

In addition to the general university requirements for the bachelor of science degree, the following courses are required:

A. Study within the area of chemistry
   CHE 101, 102 or 103, 104 Introductory Chemistry
   CHE 105, 106 or 109, 110 Introductory Chemistry Laboratory
   CHE 153 Physical Chemistry I
   CHE 154 Physical Chemistry II
   CHE 155 Solution Chemistry Laboratory
   CHE 156 Transport Properties and Thermodynamics Laboratory
   CHE 201, 202 or 211, 212 Organic Chemistry
   CHE 203, 204 Organic Chemistry Laboratory
   CHE 255 Introduction to Quantum Chemistry
   CHE 258 Molecular Structure and Spectroscopy Laboratory
   CHE 305 Inorganic Chemistry I

B. Courses in related fields
   1. MAT 102, 103, 155, 156 (Calculus I, II, III, IV)
      (The sequence MAT 193-196 may be substituted.)

2. Three semesters of physics (commonly PHY 101, 102, 151)

For those students who plan to pursue postgraduate studies in chemistry, it is recommended that a reading knowledge be attained in German and French or Russian.

All students who major in chemistry are urged to take at least 30 credits in the general areas of humanities and social sciences.

Students who wish to meet the American Chemical Society certification requirements must take, in addition to the above requirements, CHE 257 and one additional advanced chemistry course. They must also demonstrate a reading knowledge of German or Russian by taking two semesters of German or Russian respectively, or by passing the appropriate graduate language examination given by the Department of Chemistry. The German requirement can also be met by taking one semester of Scientific German, GER 115.

## Requirements for the Bachelor of Arts Degree in Chemistry

In addition to the general university requirements for the bachelor of arts degree, the following courses are required:

A. Study within the area of chemistry
   CHE 101, 102 or 103, 104 Introductory Chemistry
   CHE 105, 106 or 109, 110 Introductory Chemistry Laboratory
   CHE 153 Physical Chemistry I
   CHE 155 Solution Chemistry Laboratory
   CHE 201, 202 or 211, 212 Organic Chemistry
   CHE 205 Organic Chemistry Laboratory
   CHE 255 Introduction to Quantum Chemistry
   CHE 206 or 257 or 258 Organic Chemistry Laboratory or Instrumental Methods of Physical Chemistry or Molecular Structure and Spectroscopy Laboratory
   CHE 305 Inorganic Chemistry I

B. Courses in related fields
   1. MAT 102, 103, 155 (Calculus I, II, III)
      (The sequence MAT 193-195 may be substituted.)
   2. Three semesters of physics (commonly PHY 101, 102, 151)

## Honors Program in Chemistry

Students who have maintained a minimum cumulative grade point average of 3.0 in science and mathematics through the junior year are eligible for departmental honors in chemistry. An additional requirement for honors is the submission of a senior thesis based upon research performed during the senior year. The student will be given an oral exam in May by his research supervisor and the Undergraduate Research Committee. The awarding of honors requires the recommendation of this committee and is a recognition of superior performance

in research and scholarly endeavors. The award is contingent upon maintenance of a 3.0 cumulative grade point average in all course work in science and mathematics.

## COURSES IN CHEMISTRY

Students may request that prerequisites or corequisites be waived by petition to the chairman of the Department of Chemistry.

### CHE 091, 092 Developmental Course in Chemistry

This course seeks to develop the skills, methods and procedures required for effective participation in subsequent departmental courses. Admission by permission of the chairman of the Department of Chemistry. Staff

*Fall and Spring, no credit*

### CHE 101, 102 Introductory Chemistry B

The principal topics covered are: stoichiometry, the states of matter, chemical equilibrium, electrochemistry, thermodynamics, chemical kinetics, electronic structure, the chemical bond, periodic properties and selected topics in descriptive chemistry. The courses emphasize basic concepts, problem-solving, and factual material, and consequently serve a dual purpose. For the students who will take additional chemistry courses (e.g., chemistry, biology and pre-medical students), the CHE 101, 102 sequence provides the necessary foundation. For students who do not intend to take additional chemistry courses, the sequence provides a general, albeit elementary, view of many of the basic physico-chemical principles as well as significant aspects of organic, inorganic and biological chemistry. It is assumed that the student enrolled in CHE 101 has taken a high school chemistry course and has some familiarity with the following subjects: names and formulas of common elements and ions; elementary knowledge of fundamental particles and atomic structure, balancing of simple chemical equations, and elementary stoichiometric relationships. It is recommended that MAT 102 and 103 be taken concurrently with CHE 101 and 102, respectively. Three lecture hours and one discussion hour per week.

Corequisite to CHE 101: CHE 105.
Prerequisites to CHE 102: CHE 101 and CHE 105.
Corequisite to CHE 102: CHE 106.
Mr. A. Haim and staff
*Fall and Spring, 4 credits each semester*

### CHE 103, 104 Introductory Chemistry A

An introductory chemistry course, similar to CHE 101, 102 but requiring a stronger background in mathematics and physics, for those who may major in chemistry or another physical science. In addition to the background required for CHE 101, 102, a course of high school physics is assumed, and it is recommended that PHY 101, 102 be taken concurrently with CHE 103, 104. Three lecture hours and one discussion hour per week.
Corequisites to CHE 103: CHE 109, MAT 102.
Prerequisites to CHE 104: CHE 103, 109, MAT 102.
Corequisites to CHE 104: CHE 110, MAT 103.
Mr. E. Stiefel
*Fall and Spring, 4 credits each semester*

### CHE 105, 106 Introductory Chemistry Laboratory B

Laboratory experiments designed to fulfill the following goals: 1) Illustration of principles presented in CHE 101, 102; 2) introduction to some of the methods of quantitative chemistry; 3) development of proper and precise laboratory techniques; 4) training in scientific methodology: experimental observations, recording of results, processing of experimental data, interpretation of results. Four hours of laboratory and discussion per week.
Corequisite to CHE 105: CHE 101.
Prerequisite to CHE 106: CHE 105.
Corequisite to CHE 106: CHE 102.
Staff
*Fall and Spring, 1 credit each semester*

## CHE 109, 110 Introductory Chemistry Laboratory A

Laboratory experiments designed to illustrate the principles presented in CHE 103, 104 and with objectives similar to those in CHE 105, 106. Four hours of laboratory and discussion per week.
Corequisite to CHE 109: CHE 103.
Prerequisite to CHE 110: CHE 109.
Corequisite to CHE 110: CHE 104.
Staff

*Fall and Spring, 1 credit each semester*

## CHE 153 Physical Chemistry I

Chemical equilibria in ideal systems, solubility products, acid base ionization constants; reaction kinetics and mechanisms; chemical thermodynamics through the second law; energy; enthalpy; entropy; and free energy. Three lecture hours per week.
Prerequisite: CHE 102 or 104.
Corequisites: MAT 103 and PHY 101 or 161.
Mr. H. Friedman

*Fall, 3 credits*

## CHE 154 Physical Chemistry II

The laws of thermodynamics, chemical potential and chemical equilibria for non-ideal systems, transport phenomena. Three lecture hours per week.
Prerequisite: CHE 153.
Corequisites: MAT 155 and PHY 102 or 162.
Mr. R. Porter

*Spring, 3 credits*

## CHE 155 Solution Chemistry Laboratory

Chemical and instrumental analysis applied to solution equilibria and reaction kinetics. Six hours of laboratory and discussion per week.
Prerequisite: CHE 106 or 110.
Corequisite: CHE 153.
Mr. N. Hirota

*Fall, 2 credits*

## CHE 156 Transport Properties and Thermodynamics Laboratory

The measurement of reaction heats, EMF, transport coefficients and activity coefficients.
Six hours of laboratory and discussion per week.
Prerequisite: CHE 155.
Corequisite: CHE 154.
Mr. D. Hanson

*Spring, 2 credits*

## CHE 201, 202 Organic Chemistry A

A systematic discussion of the structure, physical properties and chemical reactions of carbon compounds, based on modern views of chemical bonding, thermodynamics and kinetics. Mechanistic as well as synthetic aspects of organic reactions are emphasized. Selected topics in the organic chemistry of naturally occurring substances are considered. It is recommended that CHE 203, 204 or CHE 205, 206 be taken concurrently with CHE 201, 202. Three lecture hours per week.
Prerequisites to CHE 201: CHE 102 or 104; 106 or 110.
Prerequisite to CHE 202: CHE 201.
Mr. F. Ramirez

*Fall and Spring, 3 credits each semester*

## CHE 203, 204 Organic Chemistry Laboratory B

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. Primarily for chemistry majors. Seven hours of laboratory and discussion per week.
Corequisites: CHE 201, 202 or 211, 212.
Prerequisite to CHE 204: CHE 203.
Mr. S. Murov, Mr. F. W. Fowler

*Fall and Spring, 2 credits each semester*

## CHE 205, 206 Organic Chemistry Laboratory A

Course material similar to CHE 203, 204. Primarily for non-chemistry majors. Four hours of laboratory and two hours of discussion biweekly.
Corequisites: CHE 201, 202 or 211, 212.
Prerequisite to CHE 206: CHE 205.
Mr. R. Jesaitis, Mr. A. Krantz

*Fall and Spring, 1 credit each semester*

## CHE 211, 212 Organic Chemistry B

An intensive introductory course similar to CHE 201, 202. For students with a background of chemical kinetics and thermodynamics. It is recommended that CHE 203, 204 or CHE 205, 206 be taken concurrently with CHE 211, 212. Three lecture hours per week.
Prerequisite to CHE 211: CHE 153 or permission of instructor.
Prerequisite to CHE 212: CHE 211.
Mr. R. Kerber
*Fall and Spring, 3 credits each semester*

## CHE 239 Materials and Methods in Teaching Chemistry

Designed for prospective secondary school teachers of chemistry, the course emphasizes the techniques appropriate to the teaching of chemistry at that level. Recent curricular developments are examined in detail. Three lecture hours per week.
Prerequisites: CHE 153; PHY 162 or equivalent.

## CHE 255 Introduction to Quantum Chemistry

Introductory quantum mechanics including applications to atomic and molecular systems. The Schrödinger differential equation will be solved for simple systems and the general theory applied in a discussion of chemical bonding, molecular structure and rotational, vibrational and electronic spectra. Three lecture hours per week.
Prerequisites: CHE 153, MAT 155.
Corequisite: PHY 151 or 261.
Mr. J. Whitten
*Fall, 3 credits*

## CHE 256 Statistical Thermodynamics and Kinetics

Introductory statistical mechanics including energy levels of idealized models for complex systems, effects of particle indistinguishability, statistical thermodynamics of classical systems, the microscopic basis for chemical equilibrium, the Gibbs Ensemble method for systems of chemical interest, the experimental basis for the study of kinetic phenomena and the models for the theoretical understanding of rate laws and mechanisms. Three lecture hours per week.
Prerequisites: CHE 154, 255, MAT 156.
*Spring, 3 credits*

## CHE 257 Instrumental Methods of Physical Chemistry

Electronics, vacuum systems, optical instrumentation, properties of gases, electric and magnetic properties of matter. Six hours of laboratory and discussion per week.
Prerequisite: CHE 155.
Corequisites: CHE 201 or 211 and 255.
Mr. P. Johnson
*Fall, 2 credits*

## CHE 258 Molecular Structure and Spectroscopy Laboratory

Basic principles of optical, EPR and NMR spectra of molecules. Six hours of laboratory and discussion per week.
Prerequisites: CHE 155, 201 or 211 and 255.
Mr. P. Johnson
*Spring, 2 credits*

## CHE 305 Inorganic Chemistry I

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. Three lecture hours per week.
Prerequisites: CHE 203 or 205 and 255.
Corequisite: CHE 202 or 212.
Mr. S. Sujishi
*Fall and Spring, 3 credits*

## CHE 306 Inorganic Chemistry II

A continuation of CHE 305. Three lecture hours per week.
Prerequisite: CHE 305.
Mr. S. Sujishi
*Spring, 3 credits*

## CHE 315 Intermediate Organic Chemistry

An extension of the material introduced in CHE 201, 202 or 211, 212. Electronic and stereochemical theory are utilized to discuss

selected organic reactions, syntheses and natural products. Three lecture hours per week. Prerequisite: CHE 202 or 212.

*Fall, 3 credits*

## CHE 325 Quantum Mechanics and Spectroscopy

An introduction to the quantum theory used in the spectroscopic investigation of atomic and molecular structure. Topics to be covered include elementary matrix techniques, time dependent perturbation theory, elementary group theory, applications to optical and magnetic resonance spectroscopy. Three lecture hours per week.
Prerequisites: CHE 256 and 258.

*Spring, 3 credits*

## CHE 391, 392 Senior Research

A two-semester research program to be carried out under the supervision of a staff member. The results of this work are to be submitted to the department in the form of a senior research report. The student will be given an oral examination in May by a faculty committee consisting of the student's supervisor and three other faculty members. A composite grade for the two semesters will be assigned. Students who are interested in registering for this course should apply to the office of the chairman prior to registration.
Prerequisites: CHE 156, 204, 258 and acceptance as a research student by a member of the departmental staff.
Corequisite: CHE 305.
Staff

*Fall and Spring, 3 credits each semester*

## CHE 393, 394 Tutorial in Special Topics in Chemistry

Supervised readings of specialized topics of mutual interest to the student and instructor. Intended for upperclassmen who wish to gain advanced knowledge in a subject which is not included or receives limited attention in other undergraduate courses. Conferences will be arranged to discuss the material and follow the progress of the subject.
Prerequisites: Consent of an instructor and permission of the chairman.
Staff

*Fall and Spring, 1-3 credits each semester*

## Graduate Courses

Senior chemistry students who have high academic standing may request permission to register in the following graduate courses. They are urged to consult the appropriate instructor to ascertain the background assumed in courses which interest them. See *Graduate Bulletin* for details.

CHE 501 Structural Organic Chemistry
CHE 502 Mechanistic Organic Chemistry
CHE 503 Synthetic Organic Chemistry
CHE 511 Inorganic Chemistry I
CHE 512 Inorganic Chemistry II
CHE 521 Quantum Chemistry I
CHE 522 Quantum Chemistry II
CHE 523 Chemical Thermodynamics
CHE 526 Chemical Kinetics
CHE 528 Statistical Mechanics
CHE 529 Nuclear Chemistry

## COURSES IN CHINESE

### CHI 111, 112 Elementary Chinese

An introduction to spoken and written Chinese Mandarin, with equal attention to speaking, reading and writing. Laboratory practice supplements class work.

*Fall and Spring, 3 credits each semester*

### CHI 151, 152 Intermediate Chinese

An intermediate course in Chinese Mandarin to develop audiolingual skills and reading and writing ability. Selected texts will serve as the basis for practice in reading comprehension and composition. Intensive exercises in "character writing" will be required to develop writing technique.
Prerequisites: CHI 111, 112 or permission of instructor.

*Fall and Spring, 3 credits each semester*

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## COURSES IN CLASSICS AND CLASSICAL LANGUAGES

An undergraduate degree program in classics is being developed for the near future. Pending completion of arrangements, the courses described below are being offered in classics (CLS) and in Latin and Greek. The classics courses and the language courses beyond the first year may be used to meet the general university requirement in arts and humanities.

### Classics

### CLS 111 The Classical Experience

A study, through analysis of Greek and Roman literature, of the basic ideas that distinguish the classical world-view from the Romantic-Modern world-view: reverence for tradition; the idea of high-style; the tragic vision; the ethical approach to history and to the arts and sciences.
Mr. R. Hathorn
*Fall, 3 credits. Not offered 1970-71.*

### CLS 115 Classical Mythology

A study of the Greek myths, classified according to the basic mythic patterns of Death and Rebirth and the Sacred Marriage; the influence of these myths on literature, art and the history of ideas.
Mr. R. Hathorn
*Fall and Spring, 3 credits. Not offered 1970-71.*

### CLS 211 Classical Drama and Its Influences

A study of the Greco-Roman Theatre, dramatic festivals and play production. Readings in English translation of most of the extant tragedies, comedies and satyr-plays, with consideration of their meaning and influence in European culture.
Mr. R. Hathorn
*Fall, 3 credits*

### Greek

### GRK 111, 112 Elementary Greek

An introduction to the Greek language, including the study of grammar, with reading and writing.
Staff
*Fall and Spring, 3 credits each semester*

## GRK 151, 152 Intermediate Greek

The reading and interpretation of works such as the *Apology* of Plato, the *Prometheus Bound* of Aeschylus or selections from the New Testament.
Prerequisite: GRK 112 or permission of instructor.
Staff

*Fall and Spring, 3 credits each semester. Not offered 1970-71.*

## Latin

## LAT 111, 112 Elementary Latin

This intensive course is designed to prepare the beginning student to translate Latin that he may need to use in his undergraduate or graduate study. Focus of the course is on the fundamentals of grammar and techniques of translation.
Mr. A. Godfrey

*Fall and Spring, 3 credits each semester*

## LAT 113 Intermediate Latin

This course is intended to serve as a transition between LAT 111, 112 and LAT 151. The course also outlines the fundamental distinction between classical and medieval Latin.
Mr. A. Godfrey

*Spring, 3 credits. Not offered 1970-71.*

## LAT 151, 152 Readings in Latin Literature

Readings in classical Latin literature of the Republic. The course will include a brief intensive review of grammar and the sampling of a number of authors, including Catullus, Cicero, Vergil and Livy.
Prerequisite: Three years of high school Latin or the equivalent.
Mr. A. Godfrey

*Fall and Spring, 3 credits each semester*

## LAT 153 Literature of the Roman Republic

Selected works of Plautus, Terence, Cicero, Lucretius and Catullus will be translated and examined in their social and historical context. The reading of critical works in English will also be required.
Prerequisite: Three years of high school Latin or the equivalent.
Mr. A. Godfrey

*Fall, 3 credits. Not offered 1970-71.*

## LAT 154 Literature of the Roman Empire

Selected works of Vergil, Horace, Livy, Petronius, Martial, Tacitus and Juvenal will be translated and examined in their social and historical context. The reading of critical works in English will also be required.
Prerequisite: Three years of high school Latin or the equivalent.
Mr. A. Godfrey

*Spring, 3 credits*

## LAT 155 Medieval Latin

Readings in Christian Latin literature, medieval Latin literature and Neo-Latin literature of the Renaissance.
Prerequisite: Three years of high school Latin or the equivalent.
Mr. A. Godfrey

*Fall, 3 credits*

## INTERDISCIPLINARY PROGRAM IN COMPARATIVE LITERATURE

This newly established undergraduate degree program in comparative literature (CLT) is intended to give interested students the opportunity to study two or more national literatures in relation to each other and to related disciplines in the social sciences and the arts and humanities.

Students who choose to major in comparative literature should begin as early as possible with the required 100-level CLT courses described below. These courses are devoted to the systematic study of techniques in and approaches to comparative literature and will provide the base upon which individual curricula can be designed.

Each student will work under close supervision of a faculty advisor who will belong to one of the departments cooperating in the interdisciplinary program and who will serve as tutor in a sequence of tutorial courses designed to bring into common focus the student's work in various national literatures and related fields of study.

All comparative literature majors will need competence in at least one language other than English and should plan to take appropriate courses in foreign languages. In certain cases competence may be demonstrated by examination.

For further information about the program in general and about specific requirements, students should consult the office of the vice president for liberal studies.

### Requirements for the Major in Comparative Literature

In addition to the general university requirements for the bachelor of arts degree, the following courses are required for the interdisciplinary major in comparative literature:

*Credits*

    I. Courses Introductory to the Program

        A. CLT 100 Introduction to Comparative Literature ......   3

        B. Either of the following sequences:

            1. CLT 101, 102 National Literature in Relation to Other Literatures OR

            2. CLT 103, 104 Literature in Relation to Other Disciplines .......................................   6

    II. Tutorial Study

        CLT 201, 202, 301, 302 Tutorials in Comparative Literature, to be taken during two academic years under direct supervision of the student's tutor .........................   12

III. Language Courses Emphasizing Grammar and Composition

Either of the following options: ........................ 6-24

A. Study in a single language

Six hours of language instruction in courses beyond the intermediate level* OR ........................... (6)

B. Study in two languages

Twelve hours of college-level or equivalent language instruction in each of two languages* ................ (24)

IV. Literature Courses in the Original Language

Two courses in each of at least two national literatures (not in translation), to be chosen in consultation with the student's advisor ........................................ 12

(British or American literature may serve as *one* of the national literatures.)

V. Additional Courses

Either of the following options: ........................ 6-8

A. Two courses in national literatures in translation ...... (6)

B. Two courses in related disciplines ................... (6-8)

In consultation with the student's tutor, courses may be chosen from departmental offerings in anthropology, art history and criticism, classics, economics, history, linguistics, music, philosophy, political science, sociology and theatre arts.

<div align="right">45-65</div>

## COURSES IN COMPARATIVE LITERATURE

### CLT 100 Introduction to Comparative Literature

This course will introduce the student to an understanding of what comparative literature means and what it involves. (Formerly GER 338)

*Fall and Spring, 3 credits*

### CLT 101, 102 National Literature in Relation to Other Literatures

Details to be announced.

### CLT 103, 104 Literature in Relation to Other Disciplines

Details to be announced.

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* In certain cases competence may be demonstrated by examination.

## DEPARTMENT OF EARTH AND SPACE SCIENCES

*Professors:* [a]HONG-YEE CHIU, DONALD H. LINDSLEY *(Coordinator, Solid Earth Studies)*, ALLISON R. PALMER *(Coordinator, Paleoecology)*, OLIVER A. SCHAEFFER *(Chairman)*, [b]BENGT STROMGREN

*Associate Professors:* ROBERT T. DODD, [c]M. GRANT GROSS, GILBERT N. HANSON, JOHANNES HARDORP, JAMES J. PAPIKE, CHARLES T. PREWITT, STEPHEN E. STROM *(Coordinator, Astronomy and Astrophysics)*

*Assistant Professors:* A. EDWARD BENCE, WILLIAM GEBEL, CONRAD D. GEBELEIN, ROGER F. KNACKE, JEFFREY S. LEVINTON, FRANK H. SHU, MICHEL SIMON, RAYMOND N. SMITH

*Lecturer and Curator:* CHARLES F. BUDDENHAGEN

The earth and space sciences undergraduate program is designed to offer a wide range of choice to the student interested in astronomy, the physical, geochemical and environmental history of the earth and the physical aspects of the environment. In addition to acquiring a strong background in the basic physical sciences, mathematics and in some cases, biology, ESS undergraduate majors will be introduced to the problems of the complex physical world with its large time-space scale. Interdisciplinary programs can be tailored to the special interests of the student through consultation with an advisor assigned by the department.

Students are prepared primarily for graduate studies in astronomy, astrophysics, petrology, paleoecology, or geological oceanography. Other course sequences can be designed to obtain training relevant to careers as earth science teachers in elementary or secondary schools or for work in a number of academic or governmental agencies concerned with the physical aspects of the environment.

Recommended sequences of courses related to all of these areas can be obtained from the director of undergraduate studies, Department of Earth and Space Sciences.

### Requirements for the B. S. Degree in Earth and Space Sciences

The department offers B. S. degree programs in each of the following areas: astronomy, solid earth studies, paleoecology, and marine sciences. Specific recommended course sequences can be obtained from the departmental office.

In addition to the general university requirements for the bachelor of science degree, the following are the minimum required for the major in earth and space sciences:

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[a] NASA/Goddard Space Studies Institute, part-time at Stony Brook.
[b] Distinguished Professor of Astronomy, Royal Danish Observatory, Copenhagen, adjunct at Stony Brook.
[c] Member of the Marine Science Research Center.

A. Study within the area of the major

27 credits of courses in the Department of Earth and Space Sciences, of which at least nine credits are numbered 300 or higher. Of these 27 credits, 12 credits may be substituted from chemistry or physics courses above the 200 level.

B. Courses in related fields

27 credits of courses in biology, chemistry, physics or mathematics, of which at least four courses of three or more credits are concentrated in either biology, chemistry or physics or in mathematics courses above MAT 150. At least one year each of chemistry, physics and mathematics is recommended. (These credits are in addition to any credits substituted for earth and space science courses under requirement A.)

## Requirements for the B. A. Degree in Earth and Space Sciences

A bachelor of arts degree program has been submitted to the Curriculum Committee of the College of Arts and Sciences for approval and should be available for the 1970-71 academic year. Interested students should inquire at the departmental office.

## Honors Program in Earth and Space Sciences

Students who have maintained a cumulative grade point average of 3.0 in natural sciences and mathematics through the junior year may become candidates for departmental honors in earth and space sciences upon application to the department. The basic requirement for honors is completion of a senior thesis based upon research performed during the senior year. The thesis will be read by a committee consisting of the student's senior research advisor, one other faculty member from the Department of Earth and Space Sciences and a faculty member from another department in a related field. The awarding of honors requires the recommendation of this committee, and is also contingent upon the maintenance of a 3.0 GPA in all course work in natural sciences and mathematics.

A supplement to this *Bulletin,* including latest course offerings, may be obtained from the department office.

## COURSES IN EARTH AND SPACE SCIENCES

### Introductory Courses

The following courses while of interest and value to science majors are primarily designed for the general university student who is not majoring in a physical science, but who elects the course either because of personal interest or to fulfill the general university requirement in the natural sciences.

## ESS 101 Revolutionary Concepts in Astronomy

The dynamic development of astronomy is traced to help elucidate the nature of modern science and the meaning of scientific discovery. Emphasis is placed on discoveries which have profoundly influenced man's outlook concerning the nature of the physical world and man's place in the universe. Topics which illustrate man's expanding horizons, as well as some of his misguided speculations, will include the influence of early astronomical observations on astrology and mythology, the Ptolemaic system, the Copernican revolution, Newton's synthesis of the law of universal gravitation, the determination of the distances to the nearest stars, the chemical composition of celestial objects, the energy sources of the stars and their evolution, theories of the origin of the solar system, the possibility of intelligent life on other worlds, Shapley's hypothesis, Hubble's law of recession, modern theories of cosmology and nucleosynthesis, and the discovery of pulsars, quasars and the universal thermal radiation. Three one-hour lectures per week.

*Fall, 3 credits*

## ESS 102 The Earth and the Moon

The exciting achievements of the Apollo missions now permit comparisons of the physical and chemical processes operating at the surface of and within two planetary bodies in our solar system: our Earth and her satellite, the Moon. Topics to be considered include surface weathering, volcanism, sedimentation, mountain building, and such controversial subjects as sea-floor spreading, continental drift and the origin of the Earth-Moon system. Three one-hour lectures per week.

*Fall, 3 credits*

## ESS 103 The Atmosphere

An introduction to the near-earth environment. The course will deal primarily with the physics and chemistry of the atmosphere. Topics covered will include composition, structure, motions, weather, climate and instrumentation, observations, synoptic analysis and research projects. Three one-hour lectures per week.

*Spring, 3 credits*

## ESS 104 Oceanography

This course examines the role the oceans play in making the surface of the earth suitable for the evolution and preservation of life. The evolution of the ocean basins and sea water are discussed. Topics cut across the usual fields of specialization because the economy of nature involves such diverse matters as the biochemistry of microscopic marine plants, inorganic weathering of rocks and physical processes in the oceans and the atmosphere. The complex life support system that has made the earth a manned satellite of the sun is studied. Three one-hour lectures per week.

*Spring, 3 credits*

## ESS 106 The Ages Before Man

The earth is viewed as a dynamic system undergoing constant but subtle change. The history of the earth from its formation to the present is explored through study of techniques for determining geologic age and for extracting historical information from rocks; the origin of life; evolution of major animal and plant groups; the changing relationships between lands and seas through time; and past changes in distribution of the continents. The impact of man on this dynamic system and speculations about the future are included. Three one-hour lectures per week. Prerequisite: ESS 102 or permission of instructor.

*Spring, 3 credits*

## ESS 112 Physical Geology Laboratory

Three-hour laboratory to include rock and mineral identification, introduction to topographic and geologic maps, and field trips in the vicinity.
Corequisite: ESS 102.

*Fall, 1 credit*

## ESS 116 Historical Geology Laboratory

An introduction to fossils and to the interpretation of geological history through use of geological maps and cross-sections. One three-hour laboratory per week.
Corequisite: ESS 106.

*Spring, 1 credit*

## Intermediate Courses for Undergraduates

The following courses are designed for majors in earth and space sciences or for other majors who choose to elect a course in this area. In general the courses require preparation in chemistry, physics and/or mathematics at the university level.

### ESS 121, 122 Introduction to Astronomy and Astrophysics

An introduction to the observational basis of astronomy and to the theory of stellar astrophysics. Discussion of the equilibrium conditions prevailing in stellar interiors, the nature of stellar atmospheres, the mechanism of element synthesis and the process of stellar evolution. Term projects may include student participation in carrying out a chemical abundance analysis of a star. All students will receive some instruction in the use of electronic computers. One three-hour lecture or recitation per week, plus an independent term project.

Prerequisites: MAT 103, PHY 102.

*Fall and Spring, 4 credits each semester*

### ESS 201 Mineralogy

An introduction to the structure, chemistry and physical properties of minerals, with particular emphasis on rock-forming minerals. Laboratories are devoted to elementary crystallography and the use of physical properties for mineral identification. Two lectures and one three-hour laboratory session per week.

Prerequisites: ESS 112, CHE 102 or 104 or permission of instructor.

*Fall, 3 credits*

### ESS 211 Introductory Paleontology

An introduction to the principles and practices of the study of ancient life. The nature and variety of fossil organisms, interpretation of environments of the past, the use of fossils in problems of evolution, biogeography and geological dating are considered. Two one-hour lectures and one three-hour laboratory per week.

Prerequisite: ESS 106 or 116.

*Fall, 3 credits*

### ESS 239 Materials and Methods in the Teaching of Earth and Space Sciences

Designed for prospective secondary school teachers in the earth and space sciences, the course emphasizes methods and materials appropriate to teaching physical science at the high school level or elementary science at the junior and elementary school level. Techniques in the preparation of rocks, fossils and minerals, field studies in the Long Island and New Jersey areas, collection, preparation and recent curriculum developments are stressed. Two one-hour lectures and one two-hour laboratory per week.

Prerequisites: ESS 102, ESS 106, junior or senior standing and permission of the instructor.

*Spring, 3 credits*

### ESS 244 Astronomy: The Observational Approach

A survey of the observed properties of stars and the interstellar medium. Topics include spectral classification, photometry, stellar evolution, variable stars, Stromgren spheres, ionization of the Hl gas, and star formation. The use of physical principles to interpret the observations is emphasized. Three one-hour lectures per week.

Prerequisites: PHY 151, MAT 155 or permission of instructor.

*Spring, 3 credits*

## Courses for Advanced Undergraduates

The following courses are designed primarily for science majors in their junior and senior years.

## ESS 301 Optical Mineralogy

Development of methods for the identification of rock-forming minerals using the petrographic microscope. Laboratory will stress the study of thin sections. Three two-hour lecture-laboratory sequences.
Prerequisite: ESS 201.

*Spring, 3 credits*

## ESS 302 Environmental Geology

How geologic processes past and present influence man and his environment as shown through: studies of the abundance of natural resources, of their development and rate of depletion, and of the environmental and political impact of the mineral and petroleum industry; applications of engineering geology and land-use planning, earthquake prediction and control, and consideration of the geologic influence on the design of buildings, dams, and highways; the consideration of waste disposal as a geologic process; the health hazards of natural radioactivity and trace elements. Two one-and-one-half-hour lectures per week.
Prerequisite: ESS 102.

*Fall, 3 credits*

## ESS 305 Field Geology

A field course which may be taken at any one of several approved university field stations.

*Variable credit*

## ESS 306 Petrology

Principles of the description, classification and interpretation of igneous, metamorphic and sedimentary rocks. The student will be introduced to the use of field and laboratory data for interpreting the origin and evolution of various rock types. Three one-hour lectures per week.
Prerequisite: ESS 201.

*Spring, 3 credits*

## ESS 308 Advanced Topics in Geology

Discussions of major problems of interest in geology. Two one-hour lectures per week and field trips.
Prerequisite: ESS 309 or equivalent.

*Spring, 3 credits and repetitive*

## ESS 309 Structural Geology

Principles of structural geology including classification, criteria for recognition and mechanics of formation of crustal structural features. Elementary concepts of rock mechanics. Discussion of important tectonic features of the continents and oceans. Accompanying laboratory to cover map interpretation and algebraic and graphical solutions of structural problems. Three one-hour lectures and one three-hour laboratory per week. Several two-day weekend field trips will be made to visit classical structural localities in the east.
Prerequisite: ESS 201 or permission of instructor.

*Fall, 4 credits*

## ESS 312 Stratigraphy

Introduces the concept of depositional models of major sedimentary environments and criteria for their recognition. The principles needed to interpret ancient sedimentary sequences in terms of depositional models are explored in lecture and seminar discussions. Three one-hour lectures per week and one weekend field trip.
Prerequisite: ESS 116 or permission of instructor.

*Spring, 3 credits*

## ESS 325 Marine Geochemistry

The chemistry of the oceans will be considered. The various mechanisms for regular ocean chemistry and the influence of ocean circulation on ocean chemistry will be discussed. The chemistry of the sea floor, including the ocean sediments, will be considered.
Prerequisite: CHE 153 or permission of instructor.

*Fall, 3 credits*

## ESS 326 Mineral Equilibria

After a brief introduction, carbonate systems, oxidation potential and pH relations, complex ions and applications to geological processes are discussed. Two one-hour lectures and one four-hour laboratory per week.
Prerequisite: CHE 153 or permission of instructor.

*Spring, 3 credits*

## ESS 331 X-ray Mineralogy

Principles of symmetry, single-crystal and powder x-ray diffraction techniques and elements of crystal structure determination. Use of crystallographic data in the study of mineral systems. Laboratory in diffraction techniques includes extensive use of digital computers. Two one-hour lectures and one three-hour laboratory per week.
Prerequisite: ESS 201.

*Fall, 3 credits*

## ESS 332 Crystal Chemistry

The study of the important geochemical parameters of the elements, especially the electronic and nuclear structures of the elements and their ions, chemical binding, atomic radii, electronegativity and ionization potential. The principles governing the abundances and distributions of the elements with emphasis on the chemical differentiation of the earth and moon; discussion of the formation of mineral phases upon elementary thermodynamics and of concepts of the crystalline state, solid solutions, diadochy, and polymorphism. Trace element geochemistry. Three one-hour lectures per week.
Prerequisites: ESS 201, CHE 154, ESS 331 or permission of instructor.

*Spring, 3 credits*

## ESS 341 Astrophysical Processes I

Introduction to transport processes of astrophysical importance; the conditions of thermal equilibrium for gases and radiation; the kinetic theory of gases and the theory of radiative transfer. Discussion of diffusion, convection, turbulence and waves in neutral and ionized gases. Theory of thermal and non-thermal emission of electromagnetic radiation. Application of the theory to a variety of astronomical problems. Two one-and-one-half-hour lectures per week.
Prerequisites: PHY 152 and 206.

*Fall, 3 credits*

## ESS 342 Astrophysical Processes II

Introduction to high-energy processes occurring in the interstellar medium and stellar interiors. The origin of cosmic rays, the mechanism of synchrotron radiation, thermonuclear reactions, and neutrino processes. Application to the study of highly evolved stars, supernovae remnants, radio galaxies and quasars. Two one-and-one-half-hour lectures per week.
Prerequisite: ESS 341.

*Spring, 3 credits*

## ESS 343, 344 Laboratory Course in Astronomical Techniques I, II

A number of laboratory experiments designed to illustrate modern astronomical techniques and to familiarize the student with the use of telescopes and the electronic instrumentation attached to astronomical telescopes. A survey of the methods of observational measurement and the reduction of data. Two four-hour laboratories per week.
Prerequisite: ESS 242.

*Fall and Spring, 4 credits each semester*

## ESS 345 Physics of the Interstellar Medium

Determination of temperature, density and composition of the interstellar medium; interstellar absorption and the physics of interstellar grains; star formation; radio observations of the interstellar gas; the intergalactic medium; in particular, H 11 regions, planetary nebulae and globules will be discussed. Three one-hour lectures per week.
Prerequisite: ESS 341 or permission of instructor.

*Spring, 3 credits*

## ESS 346 Galactic Structure

Introduction to the kinematics and dynamics of the interstellar medium and of stellar systems. The interaction between stars and the interstellar medium: the problems of star formation, mass ejection, radiative ionization and interstellar turbulence. The coupling of the interstellar medium with magnetic fields. Galactic rotation and the large-scale structure of our own galaxy as deduced from radio surveys of the emission and absorption of the 21 cm. hydrogen line. The dynamics of star clusters and galaxies. Application to the study of the distribution of stars in velocities and in space and to the study of

the large-scale structure of regular galaxies. Three one-hour lectures per week.
Prerequisite: PHY 205 or permission of instructor.
*Spring, 3 credits. Not offered 1970-71.*

## ESS 347 Solar System Astrophysics

The motions of the planets, comets and asteroids, planetary atmospheres, the surface of the moon and the planets as well as the origin of the solar system are considered. Three one-hour lectures per week.
Prerequisites: MAT 156, PHY 152 or permission of instructor.
*Fall, 3 credits*

## ESS 348 Intelligent Life in the Universe

A survey of the observable universe; cosmological system; the evolution of the elements. Observation of simple and complex molecules in astronomical sources; the evolution of life on earth; the observable consequences of advanced technology; can life be detected elsewhere? Three one-hour lectures per week.
Prerequisites: PHY 101, 102, MAT 102, 103.
*Spring, 3 credits*

## ESS 363 Sediments and Sedimentary Processes

A study of sedimentary processes and products. Marine environments (platform, continental shelf, deep ocean) terrestrial environments (fluvial) and transitional environments (deltaic) will be examined in terms of sediment production and provenance, transport, deposition and structures produced. Identification and understanding of sediment grain properties and of sedimentary structures will be emphasized. Field trips will examine recent and ancient depositional settings. Three one-hour lectures and one three-hour laboratory per week.
Prerequisite: ESS 201.
*Fall, 4 credits*

## ESS 364 Marine Geology

Intensive study of modern theories of the ocean basins, their morphology, origin and evolution. Topics included are a quantitative discussion of waves and tidal currents and their effect on beaches and coastal features.

Geophysical studies of continental margins, ocean basins and oceanic rises. Survey of sediments and sediment transport in the coastal and deep ocean areas. Sea floor spreading and continental drift. Three one-hour lectures and one three-hour laboratory per week.
Prerequisites: ESS 102, 104 or permission of instructor.
*Spring, 3 credits (alternate years)*

## ESS 371 Hydrology

Introductory course dealing briefly with major phases of hydrologic cycle, but emphasizing ground-water hydrology. Content of course will include measurement of precipitation, evaluation of precipitation data, isohyetal maps. Measurement of streamflow, analysis of stream hydrographs, elementary concepts of open-channel flow. Processes of evaporation and transpiration, evaluation of these quantities, and importance in hydrologic cycle. Extensive discussion of Darcy's law and permeability; concept of storage in ground-water reservoirs; types of boundaries in seepage problems; the flow net; hydrologic information obtained from wells and elementary well hydraulics; models for solving seepage problems with emphasis on electric-analog models; field examples showing relation of geology to movement and occurrence of ground water with particular reference to Long Island. One three-hour lecture per week.
Prerequisites: PHY 102, MAT 103.
*Spring, 3 credits*

## ESS 398 Senior Tutorial in Earth and Space Sciences

Seminar courses in advanced topics may be arranged prior to the beginning of the semester. Topics to be discussed will be announced by the department or students may petition for a particular topic. Weekly conferences will be held with a faculty member.
*Fall and Spring, 3 credits each semester, repetitive*

## ESS 399 Senior Research

With the approval and supervision of a faculty member, a major in the department may conduct research for academic credit. A research proposal must be prepared by the

student and submitted to the department chairman for approval before the beginning of the semester in which credit is to be given. A written report must be submitted before the end of the semester.

Prerequisite: Permission of the chairman of the Department of Earth and Space Sciences.

*Fall and Spring, 3 credits each semester*

## Graduate Courses

Qualified seniors may take 500-level courses with the permission of the department chairman. See *Graduate Bulletin.*

## DEPARTMENT OF ECONOMICS

*Professors:* EDWARD AMES (*Chairman*), CHARLES HOFFMANN, ROBERT LEKACHMAN, EGON NEUBERGER, HERMAN STEKLER

*Associate Professors:* ESTELLE JAMES, PETER KALMAN, [a]ELIYAHU KANOVSKY, MARVIN KRISTEIN, CHARLES E. STALEY, EDWARD VAN ROY, DIETER ZSCHOCK

*Assistant Professors:* JAMES CORNEHLS, WILLIAM DAWES, RICHARD DUSANSKY, LEONARD MILLER, DAVID M. NIENHAUS, LAWRENCE NORDELL, MAHMOUD SAKBANI, GREGORY SCHOEPFLE, C. ROBERT WICHERS, MICHAEL ZWEIG

The undergraduate program in economics provides opportunities for exploring many elements of the processes of production, exchange and distribution of goods and services.

After taking the introductory course, ECO 100, which presents some of the basic problems of economics, the student is free to study in greater depth in a number of broad areas including: economic theory; mathematical and quantitative techniques appropriate to economics; political economy and the institutional and cultural setting of economic activity; economic development and comparative economic systems; and other courses which apply economic theory to specific problems. Some courses are presented in mathematical terms, but a mathematical background is not required to complete an undergraduate major.

In each broad category of study the department offers one course in "Topics," which will be offered as student demand and faculty time and interest coincide. In any semester there might be one or more sections of a particular "Topics" course offered, each section being a substantively different course. *Each "Topics" course may be taken repeatedly by any student as long as a different substantive section is taken each time.* Students should check with department faculty for information about sections to be offered in any particular semester or consult course listings in the time schedule during registration.

Any student who wishes to do independent study may find a department faculty member to sponsor and help shape his work in ECO 393 and 394 which may be taken repeatedly.

### Mathematics and Economics

Students interested in economics may be interested in a mathematical treatment of some problems. The department does not require any mathematical training of majors, but there are a number of economics courses which rely on mathematical tools. Students interested in these courses, beginning with ECO 215 and 216, should first take and know MAT 102, 104 and 155, or MAT 102, 103, 155 and 156. The first sequence is adapted to the needs of social sciences, whereas

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[a] On leave fall semester 1970.

the latter is the traditional sequence oriented towards the physical sciences. Students planning graduate work in economics are urged to take one of the sequences. More advanced work in mathematics may also be required for certain topics in economics.

## 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:*

> ECO 100 Introductory Economics **
> ECO 211 or 215 Intermediate Microeconomic Theory
> ECO 212 or 216 Intermediate Macroeconomic Theory
> A total of 30 credit hours in courses in economics.

Students who are planning to do graduate work in economics, or who expect to work in business, are strongly recommended to take statistics, although this is not a requirement for the major.

## Exemption Program

To achieve the ends of an enriched and accelerated curriculum for those students who are ready for such advance, the department has established the following procedure:

1. Any student may be exempt from any required economics course by taking an examination in which he receives a grade of at least B.
2. The application for such exemption examinations should be filed with the department coordinator one month before the end of the semester; and upon approval of the application, the student will normally take the final examination with all the other members of the class taking that particular course, or if special circumstances require, will be given a special examination, at the discretion of the department. Only in exceptional circumstances will a student be permitted to take an exemption examination for any particular course more than once.

## Honors Program

*Eligibility.* To enter the honors program, a student must have a grade point average of 3.0 or better in economics. To graduate with honors a student must have a grade point average of 3.4 or better in economics and must complete an acceptable honors thesis.

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*These requirements apply to *all* economics majors, those already declared as well as those who enter the program after the academic year 1968-1969.

**Students who have already taken the old ECO 101 *or* 102 may take ECO 100 for credit, but are *not required* to do so for the major. The department will accept a passing grade in either ECO 101 or 102 as equivalent to completion of ECO 100 for any course having ECO 100 as a prerequisite. Students who have passed both ECO 101 *and* 102 may not enroll in ECO 100 for credit.

*The Program.* The honors program consists of a two-part sequence of work which will ordinarily commence after the student has completed ECO 211 or 215 and 212 or 216 and will culminate in an honors thesis.

In the first part the student will write a term paper serving as a preliminary study of the work he intends to pursue more deeply during the second part of the program. Normally the term paper will be written in conjunction with a regular undergraduate course, although in special circumstances it may be handled as an independent study project and may carry from one to three units of credit.

In the second part (to be spread over two semesters or concentrated in one semester, at the student's option) the student will register for three to six units of ECO 393 and/or 394, which will consist of intensive work on his honors thesis under the supervision of a faculty member chosen by mutual agreement. Students taking 393 or 394 for honors will also be expected to present their research methods, problems and results in a special honors seminar or tutorial, as part of their obligations for the course.

Upon completion, the honors thesis shall be submitted to an honors committee, consisting of the thesis supervisor, another member of the economics department and a member of another department (invited to serve by the provost at the suggestion of the chairman of the economics department). A majority of the committee must report that the thesis is of honors quality.

*Application.* The student should apply formally to the departmental honors advisor any time before beginning the second part of the sequence, indicating the preliminary course he is using for his honors work and the faculty member who has agreed to supervise his honors thesis.

*Administration.* This program will be administred by an honors advisor and may be reviewed annually by the department.

## COURSES IN ECONOMICS

### ECO 100 Introduction to Economics

Exposure to some of the important problems and social institutions which are studied in economics. Topics include: property relations; economic and social class; the functioning of markets and price and production decisions; problems of unemployment and inflation; technology.
Staff
*Fall and Spring, 4 credits*

### ECO 111 Applied Statistics I

An introduction to elementary statistical measures and some of their properties. Topics include: measures of central tendency; measures of dispersion; elementary statistical inference. Regular problem sets are required. Prerequisite: ECO 100 or permission of instructor.
Mr. W. Dawes
*Fall, 4 credits*

### ECO 112 Applied Statistics II

A continuation of ECO 111, covering elementary problems of simple and multivariate regression, analysis of variance and hypothesis testing. Regular problem sets are required. Prerequisite: ECO 111 or permission of instructor.
Mr. G. Schoepfle
*Spring, 4 credits*

## ECO 114 Economic Accounting

An introduction to some formal accounting statements commonly involved in economic analysis. Topics covered include business balance sheet and profit and loss statements, national and regional income and product statements, national and regional input-output transaction tables and flow of funds accounting.

*Spring, 3 credits*

## ECO 201 Money and Banking

An introduction to modern monetary institutions and mechanisms, their relationship to the economy and governmental policies in this area.
Prerequisite: ECO 100 or permission of instructor.
Mr. M. Kristein
*Fall, 3 credits*

## ECO 210 International Economics

The course covers the theory of international trade, protection, commercial policy, customs unions, capital movements and international finance.
Prerequisite: ECO 100 or permission of instructor.
Mr. C. Staley
*Fall, 3 credits*

## ECO 211 Intermediate Microeconomic Theory

Economic theory of cost, demand, price and markets. The application of theory to familiar problems is emphasized.
Prerequisite: ECO 100 or permission of instructor.
Staff
*Fall and Spring, 3 credits*

## ECO 212 Intermediate Macroeconomic Theory

The theory of national income determination, employment, distribution, price levels and growth.
Prerequisite: ECO 100 or permission of instructor.
Staff
*Fall and Spring, 3 credits*

## ECO 213 Institutional Economics

A systematic analysis of the bases and common approaches of major institutionalist thinkers in their criticism and reconstruction of economic theory. The continuity of institutionalism as a parallel stream of thought challenging the orthodox tradition is explored in the writings of such men as Hobson, Veblen, Commons, Mitchell, Ayres, Polanyi, Myrdal and Galbraith.
Prerequisite: ECO 100 or permission of instructor.
Mr. J. Cornehls
*Fall, 3 credits*

## ECO 214 Economics of Socialism

Analysis of the various approaches to the problems of translating Marxian socialist principles into functional economic institutions. Theoretical issues of socialism will be stressed, but will be illustrated with examples taken from the experience of various communist countries.
Prerequisite: ECO 100 or permission of instructor.
*Spring, 3 credits*

## ECO 215 Intermediate Mathematical Microeconomic Theory

Same as ECO 211, but developed in mathematical terms.
Prerequisites: ECO 100; MAT 102, 155 and either 104 or both 103 and 156; or permission of instructor.
Mr. M. Sakbani
*Fall, 3 credits*

## ECO 216 Intermediate Mathematical Macroeconomic Theory

Same as ECO 212, but developed in mathematical terms.
Prerequisites: ECO 100; MAT 102, 155 and either 104 or both 103 and 156; or permission of instructor.
Mr. R. Dusansky
*Spring, 3 credits*

## ECO 223 Logical Foundations of Quantitative Economics

An inquiry into the logical and semantic problems of quantitative economics with spe-

cial emphasis on the empirical interpretation and quantification of economic theories and hypotheses. Topics include: languages of economics; logic of theories, concrete interpretation, logical structure of explanatory economic hypotheses; elementary theory of quantity and measurement, empirical basis of measurement in economics.
Prerequisite: ECO 100 or permission of instructor.
Mr. G. Schoepfle
*Spring, 3 credits*

## ECO 233 Economics of Regulation Control

An examination of the structure of American industry and the deviations from competition with particular reference to governmental policy in this area. Criteria for the efficient control of prices, production and the flow of investment funds are analyzed.
Prerequisite: ECO 100 or permission of instructor.
*Fall, 3 credits. Not offered 1970-71.*

## ECO 235 Economic History of the United States

A survey of the United States economy from colonial times to the present. The changing structure of the economy is analyzed using the standard tools of the economist to throw light on the factors determining changes in factor inputs, institutional arrangements, prices and money, balance of payments and government policy.
Prerequisite: ECO 100 or permission of instructor.
*Spring, 3 credits*

## ECO 237 Economics of Industrial and Labor Relations

A study of the evolution of the 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: ECO 100 or permission of instructor.
Mr. E. Kanovsky
*Fall, 3 credits*

## ECO 238 Economics of Manpower Planning

Analysis of changing manpower requirements and labor force composition in the United States. Evaluation of manpower legislation and programs at national, regional and local levels, and of educational and other institutional responses to employment problems.
Prerequisite: ECO 100 or permission of instructor.
Mr. D. Zschock
*Spring, 3 credits*

## ECO 244 Urban Economics

Theories of residential and industrial location; examination of intrametropolitan changes in industry location, suburbanization of employment and population and ethnic problems in metropolitan areas; costs and benefits of urban services and policy formation for urban development and renewal.
Prerequisite: ECO 100 or permission of instructor.
*Spring, 3 credits*

## ECO 300 Monetary Theory and Policy

The influence of the quantity of money in the economic systems and policies employed by central banks to control the supply of money as an instrument for achieving various economic policy objectives. Emphasis on the development of monetary theory and policy: the quantity theory, liquidity preference theory; money as an asset; empirical research on the demand for money; monetary dynamics, etc.
Prerequisites: ECO 201, 211 or 215, 212 or 216, or permission of instructor.
Mr. M. Kristein
*Spring, 3 credits*

## ECO 302 Economic Forecasting and Business Fluctuations

Methods of short-run economic forecasting with emphasis on predictions of business fluctuations; turning point and quantitative forecasts; the causes of business fluctuations will be examined and different forecasting techniques will be analyzed.

Prerequisite: ECO 212 or 216 or permission of instructor.
Mr. H. Stekler
*Spring, 3 credits*

## ECO 303 Public Finance

Theories of taxation and the satisfaction of public wants. The nature of public goods. Theory of public expenditure. Effects of taxes on resource allocation and welfare. Theories of tax incidence. Fiscal and equity implications of alternative tax schemes. Fiscal dynamics and growth. Intergovernmental fiscal relations.
Prerequisites: ECO 211 or 215, 212 or 216, or permission of instructor.
Mr. R. Dusansky
*Fall, 3 credits*

## ECO 306 Theory of Welfare Economics

Analysis of the method, meaning and implications of modern welfare economics. Major topics to be covered include: the concept of Pareto-optimality, efficiency and equity under competitive equilibrium, causes of market failure, welfare under government planning, the measurement of social welfare and applications to intertemporal resource allocation.
Prerequisite: ECO 211 or 215 or permission of instructor.
Mrs. E. James
*Spring, 3 credits*

## ECO 311 History of Economic Thought

A study of the evolution of economic thought with reference to the basic problems of the discipline: factor allocation, distribution, growth, etc. The major schools are emphasized in the survey.
Prerequisite: ECO 100 or permission of instructor.
Mr. J. Cornehls
*Fall, 3 credits*

## ECO 314 International Economic Theory

An intensive study of the theory of international trade and finance, emphasizing compar-
ative advantage theories, the analysis of tariffs and other trade restrictions, common markets and economic integration, the balance of payments and theories of international monetary arrangements.
Prerequisites: ECO 210, 211 or 215, 212 or 216, or permission of instructor.
Mr. C. Staley
*Spring, 3 credits*

## ECO 316 Advanced Mathematical Macroeconomics

Selected topics in the theory of general economic equilibrium, and its application to macroeconomics, such as input-output, applications of control theory to economic problems, econometric models.
Prerequisites: MAT 155, ECO 216, or permission of instructor.
Mr. E. Ames
*Spring, 3 credits*

## ECO 320 Quantitative Economics I

An introduction to statistical methods, and their properties, which are useful in analysis of economic data. Topics include: elements of probability theory and its empirical application; univariate and multivariate distributions; sampling distributions; limiting distributions; point and interval estimation. Regular problem sets and occasional projects are required.
Prerequisites: ECO 100; MAT 102 and either 103 or 104; or permission of instructor.
Note: This course will not be offered by the economics department in the year 1970-71. Students interested in this material should enroll in MAT 205 section 1 (and no other section) in the fall semester. This will serve as a prerequisite for ECO 321, which will be offered in the spring.
Mr. G. Schoepfle
*Fall, 4 credits*

## ECO 321 Quantitative Economics II

The application of mathematical and statistical methods to economic theory. Topics include: concept of an explanatory economic model; multiple regression; hypothesis testing; simultaneous equations models and estimating techniques. Emphasis is placed on the application of econometric methods to eco-

nomic issues and the interpretation of various econometric studies.
Prerequisites: ECO 320, or MAT 205, 206; and MAT 155.
Mr. W. Dawes
*Spring, 4 credits*

### ECO 322 Theory of Sampling and Survey Design

The theory of replicated sampling; some sample functions and their properties; kinds of probability samples; sampling optimality; a priori constraints on sampling.
Prerequisites: ECO 100 and introductory knowledge of mathematical or applied probability and statistics or permission of instructor.
Mr. M. Sakbani
*Spring, 3 credits*

### ECO 325 Economic Development

A study of the process and problems of economic growth. Models of economic growth are examined and both developed and underdeveloped economies are reviewed with a view to isolating key factors involved in the growth process.
Prerequisite: ECO 100 or permission of instructor.
Mr. E. Van Roy
*Fall, 3 credits*

### ECO 330 Economic Anthropology

A critical examination of theories and controversies regarding economic behavior and institutions in various societies, with a view to identifying the cross-cultural applicability of economic theory. The interdisciplinary relevance of economics, anthropology and sociology will be stressed.
Prerequisite: ECO 100 or permission of instructor.
Mr. E. Van Roy
*Spring, 3 credits*

### ECO 331 Mathematical Foundations of Economics I

Examination of those topics in set theory and linear algebra that are most relevant to economics.

Prerequisites: ECO 100 and introductory knowledge of differential and integral calculus or permission of instructor.
Mr. P. Kalman
*Fall, 3 credits*

### ECO 332 Mathematical Foundations of Economics II

Examination of those topics in analysis, linear and non-linear differential equations, convexity and n-variable real-valued functions that are most relevant to economics.
Prerequisite: ECO 331 or permission of instructor.
Mr. P. Kalman
*Spring, 3 credits*

### ECO 333 Mathematical Foundations of Economics III

Examination of topics in integration theory, n-variable vector-valued function theory and topology that are most relevant to economists.
Prerequisite: ECO 332 or permission of instructor.
Mr. P. Kalman
*Fall, 3 credits*

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NOTE: After the academic year 1970-71, the economics department will no longer offer ECO 331, 332, and 333. Similar courses may be introduced in the mathematics department.

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### ECO 334 Introduction to Optimality

General optimization theory, local and global. Theory of linear programming, integral linear programming and non-linear programming. Elements of game theory.
Prerequisites: ECO 331 and 332 or permission of instructor.
*Fall, 3 credits*

### ECO 335 Properties of Microeconomic Models

Axiomatic foundation of consumer choice theory and production theory. Competitive equilibrium. Existence, uniqueness, optimality and stability of solutions to microeconomic models. Qualitative economics and dynamic systems.

Prerequisites: ECO 211 or 215, 332 or permission of instructor.
Mr. P. Kalman
*Spring, 3 credits*

## ECO 341 Political Economy of the United States

A study of the role of economic interests in determining government economic policy. Motivation and impact of specific government programs are analyzed as well as more general theories of the state. A limited treatment of United States economic history is included.
Prerequisite: ECO 211 or 215 or permission of instructor.
Mr. M. Zweig
*Fall, 3 credits*

## ECO 343 Comparative Economic Systems

A study of different types of economic systems, comparing structures, the ways basic economic problems of factor allocation and distribution are dealt with and the result achieved in output and growth.
Prerequisite: ECO 100 or permission of instructor.
Mr. E. Neuberger
*Spring, 3 credits*

## ECO 345 Law and Economic Issues

This course will consider the American system of law as the context within which resources are allocated, prices set and income and wealth produced and distributed. The liability of oil companies for damages to beaches and real estate values, the responsibilities of manufacturers for injuries to persons and property, and the role of tax law in land use and industrial investment will serve as examples of the fashion in which law and economic choice combine to shape the directions in which resources flow and the economy grows.
Prerequisite: ECO 211 or 215 or permission of instructor.
Mr. R. Lekachman
*Fall, 3 credits*

## ECO 346 Law and Poverty

Continuing the analysis of ECO 345, this course will focus particularly upon the relations between economic poverty and legal arrangements. Among the topics to be examined will be the extent of the protection afforded by law to small debtors and poor tenants, the impact of welfare law upon the economic situations of the poor, the impact of the law of local government upon the fiscal situation of the large cities and the adequacy of legal remedies for housing segregation. The large question which runs through the semester's work concerns the degree to which legislation and common law reinforce the existing distribution of income and wealth.
Prerequisite: ECO 345 or permission of instructor.
Mr. R. Lekachman
*Spring, 3 credits*

## ECO 351 Economic Theory and Operations Research

Presentation of the major conclusions of economic theory from the point of view of decision-making. Mathematical programming algorithms, activity analysis in production theory, input-output, investment and other static models.
Prerequisites: ECO 211 or 215, 212 or 216; MAT 102, 155 and either 104 or both 103 and 156; or permission of instructor.
Mr. M. Sakbani
*Fall, 4 credits*

## ECO 352 Dynamic Economics

Properties of dynamic economic systems. Some mathematical methods in economic dynamics. Dynamic programming applications to micro and macro problems. Elements of control systems; application to some economic problems.
Prerequisites: ECO 211 or 215, 212 or 216; MAT 102, 155 and either 104 or both 103 and 156; or permission of instructor.
Mr. M. Sakbani
*Spring, 3 credits*

## ECO 359 Income Distribution

The objective of this course is to provide an understanding of the distribution of personal income. Broadly, the topics to be examined are: neoclassical theory of distribution; the

behavior of factor shares over time; theory of human capital, with emphasis on education; the ownership of physical capital; and distribution-related institutions, such as taxes, transfers and allocation of public expenditures.
Prerequisite: ECO 211 or 215 or permission of instructor.
Mr. L. Miller
*Fall, 3 credits*

### ECO 361 Human Resources I, Education

Education as investment in human capital with concurrent problems of individual decision-making about the optimal level of education; the public and private benefits and costs of education, and the divergence between public and private optimizing of investment levels; education and growth; educational planning.
Prerequisite: ECO 211 or 215 or permission of instructor.
Mr. L. Nordell
*Fall, 3 credits*

### ECO 362 Human Resources II, Selected Topics

A consideration of selected topics in the human resources area, such as demography, migration, manpower, health and poverty.
Prerequisite: ECO 211 or 215; Human Resources I is not a prerequisite.
Mrs. E. James
*Spring, 3 credits*

### ECO 363, 364 Workshop in Human Resources

Research seminar in the economics of human resources. Students will work on individual or joint projects and present papers.
Prerequisites: ECO 339, 340 or 341 or permission of instructor.
Mr. L. Nordell
*Fall and Spring, 3 credits*

### ECO 380 Topics in Economic Theory

Topics in economic theory will be offered as student demand and faculty time and interest coincide. Some of the possible semester sections include: optimization theory; growth theory; investment determination; advanced

micro theory. Students should check with department faculty for information about sections to be offered in any particular semester.
Prerequisites: Vary with individual sections.
*Credit variable, course repeatable for different sections*

### ECO 382 Topics in Quantitative Economics

Topics in quantiative economics will be offered as student demand and faculty time and interest coincide. Some of the possible semester sections include: forecasting with econometric models; time series and spectral analysis; decision theory; game theory. Students should check with department faculty for information about sections to be offered in any particular semester.
Prerequisites: Vary with individual sections.
*Credit variable, course repeatable for different sections*

### ECO 384 Topics in Development and Comparative Systems

Topics in development and comparative systems will be offered as student demand and faculty time and interest coincide. Some of the possible semester sections include: economic development in modern Europe; China; Southeast Asia; Soviet and Eastern European economies; economic development in the Middle East; Latin America. Students should check with department faculty for information about sections to be offered in any particular semester.
Prerequisites: Vary with individual sections.
*Credit variable, course repeatable for different sections*

### ECO 386 Topics in Political Economy

Topics in political economy will be offered as student demand and faculty time and interest coincide. Some of the possible semester sections include: imperialism; political economy of Latin America; property relations. Students should check with department faculty for information about sections to be offered in any particular semester. During 1970-71 Imperialism (M. Zweig) and Political Economy of Latin America (J. Cornehls) may be offered in the spring semester.
Prerequisites: Vary with individual sections.
*Credit variable, course repeatable for different sections*

### ECO 388 Topics in Applied Economics

Topics in applied economics will be offered as student demand and faculty time and interest coincide. Some of the possible semester sections include: advanced topics in economics of education; capital and financial markets; medical economics. Students should check with department faculty for information about sections to be offered in any particular semester.

Prerequisites: Vary with individual sections.
*Credit variable, course repeatable for different sections*

### ECO 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.
*Fall and Spring, 3 credits each semester*

### ECO 393, 394 Independent Study or Research

A course of study providing opportunities for a student to undertake independently a special project entailing advanced readings, reports and discussion or research on topics or problems of his choosing and with the guidance of an assigned faculty member. When two or more students' work in this course is related, a seminar may be organized covering the area of common interest.

Prerequisite: ECO 100.
*Credit variable, course repeatable*

# DEPARTMENT OF EDUCATION

*Professors:* LEONARD GARDNER, [c]MORTIMER KREUTER, FRANK R. PETERS

*Associate Professors:* RICHARD D. BLOOM, AARON S. CARTON, [b]JAMES E. HIGGINS, [b]AARON LIPTON, ELI SEIFMAN (*Chairman*)

*Assistant Professors:* ALEX BASKIN, [b]THEODORE A. BREDDERMAN, W. EUGENE HEDLEY, [b]THEODORE C. ROTH, [d]ANNIE MAE WALKER

*Instructors:* [a]ESTHER W. GLASS, [a]MARK F. GOLDBERG, [a]SHI MING HU, [a]LOUIS MASLINOFF, [a]ANTHONY W. RAY

*Lecturers:* [a]WANDA RIESZ, [a]ARTHUR R. WEDEMEYER

The Department of Education offers courses of two distinct types: First, courses providing the opportunity to study education as a field of inquiry. Such courses address themselves to principles and issues in the field of education—the entire process by which a culture attempts to transmit itself across the generations. Second, courses providing "professional study in education." Such courses are designed for students enrolled in the university's Teacher Certification Programs.

## COURSES IN EDUCATION

### EDU 150 Children's Literature

An interpretive and critical study of literature for children in elementary grades.
Mr. J. Higgins
*Fall and Spring, 3 credits. Not offered 1970-71.*

### EDU 160 History of American Education

An analysis of various approaches to the study of the history of American education through an examination of selected histories of education in America. Emphasis will be placed on developing an understanding of the material of the historical writing (i.e., the events and the characteristics of the events), the principle or principles according to which the subject has been subdivided, and the aims of the particular history. Histories of education selected for study will be chosen from among the writings of such authors as Bernard Bailyn, Maxine Greene, Lawrence A. Cremin, Raymond Callahan and others. This course is identical with HIS 160.
Mr. A. Baskin, Mr. E. Seifman
*Fall and Spring, 3 credits*

### EDU 201 Psychological Foundations of Education

The course consists of a study of principles of psychology as they apply to elementary school education. Topics include measurement and evaluation, aptitude and "readiness," cognition, problem solving, retention and transfer, motivation and socialization.
Mr. A. Carton and staff
*Fall and Spring, 3 credits each semester*

### EDU 299 Independent Reading in Education

Individually supervised reading in the field of education under the guidance of a faculty member. Approval of the instructor must be secured before registering.
Prerequisite: Permission of instructor.
Staff
*Fall and Spring, 1-3 credits each semester*

### EDU 329 Educational Psycholinguistics

An examination of the psychology of language; the relations among language, behav-

ior and cognitive processes; and the specific contributions of psycholinguistics to educational practice. Psycholinguistic research on foreign language education, reading instruction, language arts curricula, the function of language in the classroom, and the interrelationship between cognitive development and linguistic development will be reviewed. (Small scale original research will be required of graduate students and may be substituted for the mid-term examination by undergraduates.) This course is identical with LIN 329.
Prerequisite: Permission of instructor.
Mr. A. Carton
*Fall and Spring, 3 credits*

## EDU 330 Foundations of Elementary School Mathematics and Science Curriculum

An examination and evaluation of present and prospective elementary math and science curriculum materials with special emphasis on their classroom application. Students will select materials from the more widely known curriculum projects and use them in classrooms of local schools. They will also develop and use their own curriculum materials. Individualized workshops and group seminars will be employed to analyze materials with a view toward defining principles of elementary math and science curriculum design and use.
Prerequisite: Permission of instructor.
Mr. T. Bredderman
*Fall and Spring, 3 credits*

## EDU 331 Instructional Programming I

An introductory presentation of the concepts, considerations and procedures involved in the preparation of instructional materials for mediation by an interactive computer. The retrieval and analysis of student data will also be examined, particularly as these affect the design of materials and of instructional experiments. This course is intended to prepare persons who are planning for, or will work with, an instructional computer. Elementary concepts of data processing and programming will be part of a course-within-a-course, from which the discussion of instructional strategies and paradigms will emerge.
Prerequisite: Permission of instructor.

Mr. E. Lambe
*Fall, 3 credits*

## EDU 335 Evaluation and Measurement in the Schools

An examination of the basic principles and concepts underlying educational measurement as they apply to practice in the schools. Experience will be provided in the preparation of informal classroom tests in a variety of content fields, in the development and use of nontest evaluation techniques and procedures and in the use and interpretation of common standardized achievement tests.
Prerequisite: Permission of instructor.
Mr. Peters
*Fall and Spring, 3 credits*

## EDU 345, 346 Philosophy 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 PHI 345, 346.
Prerequisite: Senior standing.
Mr. L. Gardner, Mr. W. E. Hedley
*Fall and Spring, 3 credits each semester*

## EDU 350 Supervised Secondary School Student Teaching*

Prospective secondary school teachers receive supervised practice in teaching their subjects to secondary school classes by arrangement with selected Long Island junior and senior high schools. The student teacher reports to the school to which he is assigned for the full school day for the semester. Frequent consultation with the supervising teacher and seminar meetings with a university faculty member help the student to interpret and evaluate his student teaching experience. Applications must be filed in the semester preceding that in which the student plans to student teach. The dates by which applications must be completed will be announced.
Prerequisites: Senior standing and approval of the director of teacher preparation.
Corequisite: EDU 354.
Mr. M. Kreuter and Staff
*Fall and Spring, 12 credits*

### EDU 351 Introduction to Instructional Methods and Materials in the Elementary School

An intensive study of instructional methods and materials related to curricular areas in the elementary school: reading, mathematics, language arts, social studies, science and the fine arts. Multi-media techniques will stress the use of films, television, transparencies, slides, film strips and recordings. Classroom management, lesson planning, school organization and interrelationships among teachers, students, parents and administrators will be included. Students will participate in classroom observations, trial teaching, microteaching, workshops, field trips and demonstration lessons. Course registration is restricted to students planning to enroll in EDU 352.
Prerequisites: Junior standing and approval of director of teacher preparation.
Staff
*Fall and Spring, 3 credits*

### EDU 352 Supervised Elementary School Student Teaching*

Prospective elementary school teachers will receive supervised practice in teaching at the elementary school level by arrangements with selected Long Island elementary schools. The student teacher reports to the school to which he is assigned for a full school day for the semester. Frequent consultation with the supervising teacher and seminar meetings with a university faculty member help the student to interpret and evaluate his student teaching experience. Applications must be filed in the semester preceding that in which the student plans to student teach. The dates by which applications must be completed will be announced.
Prerequisites: Senior standing and approval of the director of teacher preparation.
Corequisite: EDU 355.
Mr. M. Kreuter and staff
*Fall and Spring, 12 credits*

### EDU 354 Student Teaching Seminar (Secondary Education)

Seminar on problems and issues of teaching at the secondary school level. Analysis of actual problems and issues encountered by the student in his student teaching experience.
Corequisite: EDU 350.
Staff
*Fall and Spring, 3 credits*

### EDU 355 Student Teaching Seminar (Elementary Education)

Seminar on problems and issues of teaching at the elementary school level. Analysis of actual problems and issues encountered by the student in his student teaching experience.
Corequisite: EDU 352.
Staff
*Fall and Spring, 3 credits*

### EDU 364 The Teaching of Reading

This course is designed to familiarize future elementary and secondary school teachers with the methods and materials necessary to teach reading in today's schools. Moreover, ideas and developments which reflect the changing nature of reading instruction and materials for tomorrow's schools will also be explored in depth. Particularly stressed will be the relationship between the child and his language development as it involves the reading process; critical reading skills; reading and its relationship to the thinking process; and methods which consider cultural, personality and psycholinguistic diversity in children. The process of reading will be evaluated in the context of school system, child and community.
Prerequisite: Permission of instructor.
Mr. A. Lipton
*Fall and Spring, 3 credits*

### EDU 365 Workshop in Teaching Reading for Elementary School Teachers

An investigation into newer methods and

materials of teaching reading with special emphasis on: diagnostic concepts and tools; the impact of socio and psycholinguistics on reading; the role of the parent in the reading process; the role of the teacher in the reading process; the teacher-pupil relationship; grouping patterns in the school and classroom; methods and materials for culturally diverse populations; programs for beginning readers; reading in the content fields; word attack skills in proper perspective; comprehension and critical reading skills.

Prerequisite: Permission of instructor.

Mr. A. Lipton

*Fall and Spring, 3 credits*

## EDU 375 Social Studies Curriculum Development: Seminar-Laboratory

An analysis of selected theoretical constructs for social studies curriculum development and their application to the design of new curriculum materials. Special emphasis given to the design, analysis and evaluation of curriculum materials developed by the student and experimented with in actual teaching experiences.

Prerequisite: Permission of instructor.

Mr. E. Seifman

*Fall and Spring, 4 credits. Not offered 1970-71.*

## EDU 399 Independent Research in Education

Individually supervised research in the field of education. The student prepares a program of work in consultation with the instructor, meets with the instructor at regular intervals throughout the semester and presents evidence of his accomplishment at the end of the semester. Approval of the instructor must be secured before registering.

Prerequisites: Senior standing and permission of instructor.

Staff

*Fall and Spring, 1-3 credits each semester*

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* Student teaching assignments are made on the basis of the school system's availability and university program needs. Students entering this program are advised that transportation and in some cases housing away from campus during the student teaching period are student responsibilities and plans should be made accordingly. No student teaching assignments are available during the summer session.

## INTERDISCIPLINARY PROGRAM IN ELEMENTARY EDUCATION

*Program Chairman:* MORTIMER KREUTER

This interdisciplinary program offers students an opportunity to prepare for a career in elementary school teaching.

In response to the need for elementary school teachers with a broad academic background, the program combines a balanced variety of liberal studies, courses in educational theory and practice, and field experience in teaching.

The requirements for the elementary education major (EED) are:

*Credits*

I. Liberal Studies

(Courses taken to satisfy these requirements may also be used to meet appropriate general university requirements.)

A. Natural Sciences

1. One semester course in the biological sciences (BIO 101, 102, 111, 113 are recommended.) . . . . . . . . . . . . .  3-4

2. One semester course in the physical sciences, i.e., chemistry, earth and space sciences and physics (PHY 121, 122 are especially recommended.) . . . . . . . . . . . .  3-4

3. Two semester courses in mathematics (MAT 105, 107 or 108 are recommended.) . . . . . . . . . . . . . . . . . . . . . . .  6

B. Social Sciences

Four semester courses chosen from anthropology, economics, history, political science, psychology and sociology  12-16

C. Arts and Humanities

Four semester courses chosen from art, classics, English (except EGL 101), foreign languages (Chinese, Hebrew, Greek and Latin, Germanic and Slavic or Romance), music, theatre arts and world literature . . . . . . . . . . . . . .  12-16

D. Linguistics

One semester course chosen from LIN 102, 103, 105, or LIN/EDU 329 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .  3

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39-49

II. Professional Study in Education                    *Credits*

A. Foundations of Educational Theory and Practice

1. One semester course in the historical, philosophical or sociological bases of education chosen from EDU/HIS 160, EDU/PHI 345, EDU/PHI 346 or SOC 287. . . .  3

    2. One semester course in the psychological bases of education chosen from EDU 201 or PSY 211 ....... 3

B. Language and Reading in Elementary School Teaching

    1. EDU 364 The Teaching of Reading ............. 3

    2. EDU 365 Workshop in Teaching Reading for Elementary School Teachers, or EDU/LIN 329 Educational Psycholinguistics, if this course is not used to fulfill the linguistics requirement listed in ID above    3

C. Technical Skills and Competencies in Elementary School Teaching

    1. EDU 351 Introduction to Instructional Methods and Materials in the Elementary School .............. 3

    2. Two semester courses chosen from the following methods courses in teaching special subjects: EDU 330, 365 and/or other courses to be announced ........ 6

D. Field Experience in Teaching

    1. EDU 352 Supervised Elementary School Student Teaching open to EED seniors who have completed the professional study requirements listed in A, B, and C above .................................. 12

    2. EDU 355 Student Teaching Seminar (Elementary Education), which is corequisite to EDU 352 ....... 3

<div align="right">————<br>36</div>

III. Electives

Students are required to complete a minimum of six semester courses beyond the introductory level in a specific department or interdisciplinary program. (Courses taken to satisfy this requirement may also be used to meet appropriate general university requirements and/or appropriate requirements in I above.) .................................. 35-45

<div align="right">————<br>120</div>

(Reminder: General university requirements not covered by the EED major must be fulfilled: Proficiency in English composition, either by proficiency examination or EGL 101, and two semesters of physical education.)

At the present time, the EED program outlined above is undergoing study by the University Teacher Preparation Committee, which will publish its recommendations during the academic year. In the meantime, EED majors who are

seniors in the academic year 1970-1971 and who have completed education courses not listed in the above program will be permitted to offer these courses toward satisfaction of the requirements on an individual basis. However, students who will be juniors in the fall of 1970 should be able to complete the required education courses as outlined above. Questions about the EED major program should be directed to the office of teacher preparation as early as the second semester of the freshman year to allow for wise selection of courses.

Students interested in education primarily as a field for graduate study, i.e., experimental work and research rather than teaching, are advised to consult the Department of Education for help in choosing suitable undergraduate courses.

# ENGLISH

*Distinguished Professor:* ALFRED KAZIN

*Professors:* THOMAS J. J. ALTIZER, DAVID W. D. DICKSON, DAVID V. ERDMAN, HOMER B. GOLDBERG, THOMAS KRANIDAS, [a]RICHARD L. LEVIN, JACK LUDWIG, IRVING RIBNER, [a]LOUIS SIMPSON, JUDAH L. STAMPFER, MARTIN STEVENS, JOHN A. THOMPSON, HERBERT WEISINGER

*Associate Professors:* PAUL J. DOLAN (*Chairman*), EDWARD FIESS, DONALD K. FRY, RICHARD A. LEVINE, THOMAS E. MARESCA, RUTH MILLER, PETER F. NEUMEYER, JOSEPH PEQUIGNEY, [b]THOMAS ROGERS, [a]SALLIE SEARS, ROSE ZIMBARDO

*Assistant Professors:* KENNETH T. ABRAMS, FRANK ANSHEN, KOFI AWOONOR, JOSEPH BENNETT, ALLEN BERGSON, WILLIAM E. CARPENTER, DIANE FORTUNA, BEATRICE L. HALL, JOHN W. HALPERIN, HOWARD J. HARVEY, GERALD NELSON, PAUL A. NEWLIN, JONAH RASKIN, EARL G. SCHREIBER, PETER SHAW, KATHERINE B. TROWER, [a]ALICE S. WILSON

*Instructors:* BRUCE W. BASHFORD, JERRY A. DIBBLE, STEPHEN B. KOCH, YEHUDY LINDEMAN, GEORGE QUASHA

## Requirements for the Major in English

In addition to the general university requirements for the bachelor of arts degree, including proficiency in English composition, the following courses are required for the major in English:

| | *Credits* |
|---|---|
| 1. EGL 238 and 239 Survey of British Literature, which should be taken in the sophomore year. | 6 |
| 2. EGL 194 and 195 Tutorial in English Studies, which should be taken in the sophomore year. prerequisites. | 6 |
| 3. EGL 241 Shakespeare. | 3 |
| 4. Seven additional English courses distributed as follows: | |
| a. Four courses from the sequence numbered EGL 200-222, with at least one of the courses in American literature, EGL 216-222. | 12 |
| b. One course from the sequence numbered EGL 240-259, exclusive of EGL 241 Shakespeare. | 3 |

[a] On leave academic year 1970-71.
[b] On leave spring semester 1971.

c. One course from the sequence numbered EGL 260-279.     3

d. One course from the sequence numbered EGL 280-281, with EGL 282 an acceptable alternative for teacher certification candidates in English.     3

5. One year of college study of a foreign language beyond the introductory level.     36

Note that with the exception of EGL 194, 195 Tutorial in English Studies, no English courses below the 200 level may be counted toward the English major.

## COURSES IN ENGLISH

Most of the courses described below are offered every semester, unless otherwise indicated, but details of staffing and related information should be obtained from schedules published by the English department before registration each semester. Reading lists are also available in advance.

Certain courses may be repeated when the content varies. For example, EGL 248 Major Writers of the Romantic Period in England will have a changing course content which can be appropriately recorded on the student's transcript. In doubtful cases, the student should consult a departmental advisor before registering.

## I. THE CRAFT OF WRITING

### EGL 098 Basic Written English

Intensive training in writing skills for students who have difficulty with college level English.
*Fall and Spring, no credit*

### EGL 101 Composition

A course in writing. The course aims to develop abilities in expository and argumentative writing and must be taken, normally in the freshman year, to satisfy the university requirement for proficiency in English composition. Through the writing and revision of frequent short papers, the student is expected to become competent in the conventions of written English and to gain practice in the logical and clear expression of ideas and the exposition of facts and opinions.
*Fall and Spring, 3 credits*

### EGL 102 Advanced Composition

Students will work on advanced problems in exposition, argument, rhetoric, and style through writing and discussion of their own papers as well as analysis of prose texts.
*Fall and Spring, 3 credits*

### EGL 103 The Practice of Literary Criticism

The application of the principles of literary criticism to specific texts combined with the composition of critical essays for analysis.
*Fall and Spring, 3 credits*

### EGL 105 Writing Workshop: Fiction

A workshop in the development of writing skills through practice supplemented by readings.
*Fall and Spring, 3 credits*

## EGL 106 Writing Workshop: Poetry

A workshop in the development of skills in writing poetry. Poetry writing is supplemented by readings.

*Fall and Spring, 3 credits*

## EGL 107 The Exposition of Ideas: Journalism

Training in journalistic exposition through practical application supplemented by readings.

*Fall and Spring, 3 credits*

## II. UNIVERSITY LECTURES IN LITERATURE

These courses present lectures on major literary subjects by distinguished writers and scholars. The courses are open for registration to undergraduate and graduate students from all departments, to all members of the University, its employees and their families, and to the community.

The lectures are given once each week throughout the semester. In addition to attending the lecture, students taking the course for credit meet two hours a week with the staff of the University Lectures, for discussion, analysis of their papers and examinations.

## EGL 110 The Experience of Literature

Lectures on the major types of literature, in explanation of the form and content of poetry, prose fiction and drama, as seen in outstanding works of each type. Intensive discussion and criticism of written work by students, conducted in small sections.

*Spring, 3 credits*

## EGL 130 Shakespeare

Lectures on the works of Shakespeare and their significance as major interpretations of the human experience. Intensive discussion and criticism of written work by students, conducted in small sections.

*Fall, 3 credits*

## EGL 132 Great Figures in Literature

Lectures on the life and works of a major figure in literature. Intensive discussion and criticism of written work by students, conducted in small sections.

*Fall, 3 credits*

## EGL 150 Literature of the 20th Century

Lectures on the chief works of our own time in poetry, fiction and drama which have revolutionized the traditional modes of thought and experience. Intensive discussion and criticism of written work by students, conducted in small sections.

*Spring, 3 credits*

## III. TUTORIALS IN ENGLISH

## EGL 194, 195 Tutorial in English Studies

This sequence is restricted to and required of English majors and should be taken in the junior year. The tutorial is devoted to close supervision of student work in genre, period or author. Instruction is conducted in small groups or on an individual conference basis with the tutor, who directs the student in written practical criticism of literature. The student's work in the tutorial is recorded on the following basis: H (Honors), S (Satisfactory), U (Unsatisfactory).
Prerequisites: EGL 238, 239.

*Fall and Spring, 3 credits each semester*

## IV. THE LITERARY TRADITION OF ENGLAND AND AMERICA

These courses are directed towards an understanding of the various periods of English and American literature. They include study of both major and minor authors with consideration of intellectual and social history, developments in theme and style, and other matters as described in the detailed course descriptions and reading lists provided for each course before registration.

## EGL 200 Old English Literature

The study of English literature from its beginnings to the Middle Ages.
Prerequisite: Sophomore standing or permission of instructor.

*Fall and Spring, 3 credits*

## EGL 202 Medieval Literature in English

The study of English literature from the end of the Old English period to the Renaissance.
Prerequisite: Sophomore standing or permission of instructor.

*Fall and Spring, 3 credits*

## EGL 204 Renaissance Literature in English

The study of English literature of the Renaissance.
Prerequisite: Sophomore standing or permission of instructor.

*Fall and Spring, 3 credits*

## EGL 206 English Literature of the 17th Century

The study of English literature from late Renaissance to the Age of Dryden.
Prerequisite: Sophomore standing or permission of instructor.

*Fall and Spring, 3 credits*

## EGL 208 The Age of Dryden

The study of the English literature of the Restoration period.
Prerequisite: Sophomore standing or permission of instructor.

*Fall and Spring, 3 credits*

## EGL 210 Neo-Classical Literature in English

The study of English literature of the Neo-Classical period from the end of the Restoration period to the Romantic era.
Prerequisite: Sophomore standing or permission of instructor.

*Fall and Spring, 3 credits*

## EGL 212 Romantic Literature in English

The study of English literature of the Romantic period from the end of the Neo-Classical period to the Victorian Age.
Prerequisite: Sophomore standing or permission of instructor.

*Fall and Spring, 3 credits*

## EGL 214 Victorian Literature

The study of English literature of the Victorian Age from the end of the Romantic period to the beginning of the Modern Movement.
Prerequisite: Sophomore standing or permission of instructor.

*Fall and Spring, 3 credits*

## EGL 216 American Colonial and Federal Writers

The study of American literature from its beginnings to the period of the New England Imagination.
Prerequisite: Sophomore standing or permission of instructor.

*Spring, 3 credits*

## EGL 218 The New England Imagination

The study of American literature from the period of the American Colonial and Federal Writers to the era of the American Realists.
Prerequisite: Sophomore standing or permission of instructor.

*Fall and Spring, 3 credits*

## EGL 222 The Realist Movement in America

The study of American literature from the Civil War to World War I.
Prerequisite: Sophomore standing or permission of instructor.

*Fall and Spring, 3 credits*

## EGL 224 Modern English and American Literature

The study of English and American literature from the end of the Victorian era to World War II.
Prerequisite: Sophomore standing or permission of instructor.
*Fall and Spring, 3 credits*

## EGL 226 Contemporary English and American Literature

The study of English and American literature from World War II to the present.
Prerequisite: Sophomore standing or permission of instructor.
*Fall and Spring, 3 credits*

## EGL 238 Survey of British Literature

The study of British Literature from the Old English period to Milton.
Prerequisite: Sophomore standing or permission of instructor.
*Fall, 3 credits*

## EGL 239 Survey of British Literature

The study of British literature from Dryden to the present.
Prerequisite: Sophomore standing or permission of instructor.
*Spring, 3 credits*

## V. MAJOR AUTHORS

Intensive study in the works of one great writer. These courses in various individual figures are offered from time to time, as indicated by notices published by the department before each registration period.
Prerequisites are sophomore standing or permission of instructor.

## EGL 240 Chaucer

Intensive study in the works of Chaucer.
*Fall and Spring, 3 credits*

## EGL 241 Shakespeare

Intensive study in the works of Shakespeare.
*Fall and Spring, 3 credits*

## EGL 242 Milton

Intensive study in the works of Milton.
*Fall and Spring, 3 credits*

## EGL 243 Major Writers and Writings of Medieval Literature in English

Intensive study of selected major writers and/or writings of medieval literature in English.
*3 credits*

## EGL 244 Major Writers of the Renaissance Period in England

Intensive study of a selected major writer of the Renaissance period in England.
*3 credits*

## EGL 245 Major Writers of the 17th Century in England

Intensive study of a selected major writer of the 17th century in England.
*3 credits*

## EGL 246 Major Writers of the Restoration Period in England

Intensive study of a selected major writer of the Restoration period in England.
*3 credits*

## EGL 247 Major Writers of the Neo-Classical Period in England

Intensive study of a selected major writer of the Neo-Classical period in England.
*3 credits*

## EGL 248 Major Writers of the Romantic Period in England

Intensive study of a selected major writer of the Romantic period in England.
*3 credits*

### EGL 249 Major Writers of the Victorian Period in England

Intensive study of a selected major writer of the Victorian period in England.

*3 credits*

### EGL 250 Major Writers of Earlier American Literature

Intensive study of a selected major writer from earlier American literature.

*3 credits*

### EGL 251 Major Writers of Later American Literature

Intensive study of a selected major writer from later American literature.

*3 credits*

### EGL 252 Major Writers of Modern British and American Literature

Intensive study of a selected major writer from modern British and American literature.

*3 credits*

### EGL 253 Major Writers of Contemporary British and American Literature

Intensive study of a selected major writer from contemporary British and American literature.

*3 credits*

## VI. THE MODES AND FORMS OF LITERATURE

These courses provide special studies in regional literature, genres of literature and other topics. Detailed information on course content, staffing, and scheduling is published by the English department before registration each semester. Reading lists are also available in advance.

### EGL 191 Interpretation of Poetry

Intensive analysis of poems in English of various periods and types and varying complexity. (Not for English major credit)

*Fall and Spring, 3 credits*

### EGL 192 Interpretation of Fiction

Analysis of stylistic and structural modes employed by various writers of short stories and novels. (Not for English major credit)

*Fall and Spring, 3 credits*

### EGL 193 Interpretation of Drama

Introduction to the analysis of the drama, emphasizing the literary more than the theatrical dimension of the works, through examination of a range of plays from a variety of genres and periods. (Not for English major credit)

*Fall and Spring, 3 credits*

### EGL 260 Mythology in Literature

The study of the dissemination and use of mythological motifs and themes in English and American literature.

*3 credits*

### EGL 261 The Bible as Literature

The study of literary forms and themes in selected readings from the Old and New Testaments.

*3 credits*

### EGL 262 Poetry in English

The study of the development of form, theme and language of poetry in English.

*Fall and Spring, 3 credits*

### EGL 264 Drama in English

The study of the development of plot, structure, character, setting, theme and language of drama in English.

*3 credits*

### EGL 266 Fiction in English

The study of the development of plot, structure, character, theme and language of fiction in English.

*Fall and Spring, 3 credits*

### EGL 268 Prose in English

The study of the various forms of prose such as the essay, utopias, memoirs, autobiography, biography and non-fictional narrative.

*3 credits*

## EGL 270 History of Literary Criticism

Analytic survey of major texts in the history of European literary theory and criticism.
*Spring, 3 credits*

## EGL 272 Literature in English in its Relations to Other Literatures

The study of literature in English as it affects and is affected by other literatures.
*3 credits*

## EGL 274 Literature in English in its Relations to Other Disciplines

The study of literature in English as it affects and is affected by other disciplines, such as anthropology, science, sociology, the history of ideas, theology and psychology.
*3 credits*

## VII. LANGUAGE AND LINGUISTICS*

## EGL 280 The English Language: Introduction to Syntax

A linguistic approach to the syntax of contemporary English. This course is identical with LIN 211.
*Fall and Spring, 3 credits*

## EGL 281 History and Structure of the English Language

The development of the English language from its Indo-European origins. This course is identical with LIN 250.
Prerequisite: EGL 280/LIN 211.
*Fall and Spring, 3 credits*

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* For additional offerings in linguistics, see the section of this bulletin, "Interdisciplinary Program in Linguistics."

## EGL 282 Non-Standard Varieties of English

Intended for students who plan to teach in the elementary and secondary schools, the course will investigate the phonological and grammatical structures used by speakers of some of the significant social minority groups in the New York area. Special attention will be paid to black English, Puerto Rican English and the English of white migrant workers. This course is identical with LIN 105.
*Fall and Spring, 3 credits*

## EGL 283 Mathematical Aspects of Linguistics

An introduction to the mathematical concepts and procedures which underlie much contemporary linguistic practice. This course is identical with LIN 301.
Prerequisite: LIN 103.
*Fall and Spring, 3 credits*

## EGL 284 Phonology

An introduction to general phonetics, both articulatory and acoustic, and to phonological theory. This course will include two hours of work in the language laboratory.
*3 credits*

## EGL 285 Problems in Historical English Linguistics

This course will be devoted to tracing the development of selected structures in English from Old English to the present.
*3 credits*

## EGL 286 Introduction to Sociolinguistics

This course will provide an introduction to the interaction between language and society. Examples will be drawn largely from English. This course is identical with LIN 261.
Prerequisites: LIN 102 and 211.
*Fall and Spring, 3 credits*

## EGL 287 Morphological Analysis

The principles of generative phonology, applied morphophonemics and phonology. This course is identical with LIN 221.
Prerequisite: LIN 102
*Fall and Spring, 3 credits*

## EGL 288 Discourse Analysis of English

An investigation of the principal theories of grammatical constraints on units larger than the sentence. This course is identical with LIN 320.
Prerequisite: EGL 280/LIN 211.

*Fall and Spring, 3 credits*

## VIII. SPECIAL STUDIES IN ENGLISH

## EGL 290 Methods of Instruction in Literature and Composition

Examination of the intellectual grounds of the teaching of literature and composition in secondary school and exploration of the problems involved in communicating literary values to high school students.
*Fall and Spring, 3 credits*

## EGL 291 Senior Honors Seminar

Advanced intensive study of a special literary topic in preparation for the independent work of EGL 292. Admission to the course requires a major grade point average of at least 3.0 and invitation from the department or permission of the instructor.

*Fall, 3 credits*

## EGL 292 Senior Honors Seminar

Intensive inquiry and independent study culminating in an honors essay.
Prerequisite: EGL 291.

*Spring, 3 credits*

## EGL 299 Independent Project

Intensive study of a special topic undertaken with close faculty supervision. Permission of instructor required.

*Fall and Spring, 1-3 credits*

# DEPARTMENT OF GERMANIC AND SLAVIC LANGUAGES AND LITERATURE

*Professors:* EDWARD CZERWINSKI (*Chairman*), DENNIS GREEN, MICHAEL HAMBURGER, ROMAN KARST, JAN KOTT

*Associate Professors:* LEIF SJÖBERG, ANDREW WHITE

*Assistant Professors:* SAMUEL BERR, [a]RUSSELL E. BROWN, ANTHONY R. HIPPISLEY, SABINE HORL, DANIEL C. O'NEIL, PHILIPPE RADLEY, [b]FERDINAND A. RUPLIN, JOHN R. RUSSELL, ELISABETH STENGEL, LUCY VOGEL

*Instructors:* BARBARA E. ELLING, ELISABETH C. GLADIR, BRIAN T. REGAN, NINA THOMPSON

## Requirements for the Major in Germanic and Slavic Languages and Literatures

A. Germanic Languages and Literatures

In addition to the general university requirements for the bachelor of arts degree, the following courses are required for the major in Germanic languages and literatures:

| | | CREDITS |
|---|---|---|
| (I) | GER 181 Methodology I | 3 |
| (II) | GER 281, 282 Special Century Studies | 6 |
| (III) | GER 331 Special Periods | 3 |
| (IV) | GER 332 History of the German Language | 3 |
| (V) | GER 333 Special Author | 3 |
| (VI) | GER 334 Methodology II | 3 |
| (VII) | GER 335, 336 Goethe | 6 |
| | | 27 |

The curriculum for the major in Germanic languages has been designed to afford the student maximum flexibility of choice from the greatest number of literature and language offerings. The spectrum of offerings in literature has been made as wide as possible so that the student can plan his own curriculum following his interests and talents. "Courses" in the traditional sense are not offered, being replaced by options. Teaching for the major will take place mainly in tutorials and seminars.

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a On leave fall semester 1970-71.
b On leave spring semester 1971.

The ascending numbers of the required options for the major are intended to indicate the sequence in which, in the opinion of the department, these offerings might most favorably be studied. However, after consultation and agreement with his tutorial advisor in the department, a student may choose to take the options in a different order.

The following courses are strongly recommended for majors in Germanic languages and literatures:

>FLA 239 Methods and Materials in the Teaching of Foreign Languages
>
>GER 321, 322 Advanced German Conversation and Composition
>
>GER 338 Comparative Literature
>
>A course in a period or century of English literature
>
>Courses in a second language
>
>Courses in the literature of a second language

## B. Slavic Languages and Literatures

In addition to the general university requirements for the bachelor of arts degree, the following courses are required for the major in Slavic languages and literatures:

| LANGUAGE | CREDITS |
|---|---|
| (I) RUS 111, 112 Elementary Russian | 6 |
| (II) RUS 113, 114 Russian Conversation and Composition I | 6 |
| (III) RUS 151 Intermediate Russian | 3 |
| (IV) RUS 153, 154 Russian Conversation and Composition II | 6 |
| (V) RUS 221, 222 Conversation and Composition III | 6 |
| | 27 |

| LITERATURE | |
|---|---|
| (I) RUS 181 History of Russian Literature | 3 |
| (II) RUS 231 Methodology | 3 |
| (III) RUS 281, 282 Special Century Studies | 6 |
| (IV) RUS 331 Special Period and Genre Studies | 3 |
| (V) RUS 333 Special Author I | 3 |
| (VI) RUS 334 Special Author II | 3 |
| | 21 |

RELATED AREAS

Course work in related areas is no longer obligatory, but it is strongly recommended that 21 credits be earned in at least three of the following fields:

(I) Second and additional languages

(II) Second and additional literatures

    (III)  HIS 241, 242  (Russian history)

    (IV)  RUS 342 History of the Russian Language

    (V)  RUS 321, 322 Conversation and Composition IV

    (VI)  RUS 341 Research Methods

    (VII)  Linguistics or methods

  (VIII)  Comparative literature

    (IX)  Philosophy  (relevant courses)

    (X)  Political science  (relevant courses)

    (XI)  Economics  (relevant courses)

The curriculum for the major in Slavic languages has been designed to afford the tudent maximum flexibility of choice from the greatest number of literature and language offerings. The spectrum of offerings in literature has been made as wide as possible so that the student can plan his own curriculum following his interests and talents. "Courses" in the traditional sense are not offered, being replaced by options. Teaching for the major will take place mainly in tutorials and seminars.

The ascending numbers of the required options for the major are intended to indicate the sequence in which, in the opinion of the department, these offerings might most favorably be studied. However, after consultation and agreement with his tutorial advisor in the department a student may choose to take the options in a different order.

A second foreign language is strongly recommended, but not obligatory for the bachelor of arts degree. A student may earn some of his related area credits in a second foreign language, but it should be remembered that six of these 21 credits must be earned in senior level courses.

## Teaching Certification

Students who wish to prepare for certification as secondary school teachers should consult departmental advisors and the office of teacher preparation.

## Placement in Language Courses for Incoming Freshmen

Students continuing the study of a foreign language started in high school should register for the appropriate college course after consulting a departmental advisor; however, after two years of high school preparation, they will receive no graduation credit for the first course (111) in the same language and after three years of high school preparation they will receive no credit for the first two courses (111, 112) in the same language.

## COURSES IN GERMANIC LANGUAGES AND LITERATURES

### GER 099 Introduction to Language Study

This course is designed to introduce the student to the nature and interests of the Department of Germanic and Slavic Languages. It seeks to develop the skills, methods and procedures required for effective participation in subsequent language courses. In addition to outlining the rationale for drill types, explaining study techniques and the use of text and lab, some attention will be devoted to the nature of the spoken and literary language.
Mr. F. Ruplin

*Fall, no credit*

### GER 111, 112 Elementary German

An introduction to spoken and written German, stressing pronunciation, speaking, comprehension, reading, writing and culture. The course consists of three hours in a small section conducted in German, one hour in a group (plenary) section taught by a contrastive linguist and two lab hours (one computer-assisted and one audio-passive).
Mr. S. Berr and staff

*Fall and Spring, 4 credits each semester*

### GER 115, 116 Scientific German and Technical Translation

This course is designed to teach the student to read and translate German scientific prose of moderate difficulty. Practice in translating from German into English and in transferring ideas into the appropriate technical terminology. This course is not intended to prepare the student for the major.

*Fall and Spring, 3 credits each semester*

### GER 151, 152 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.
Prerequisites: GER 111, 112 or equivalent.
Mr. J. Russell and staff

*Fall and Spring, 3 credits each semester*

### GER 181 Methodology I

Using selected short texts easily read and understood by students whose background in German may not be great, this course is intended to introduce students to the enjoyment of German literature and the techniques of literary appreciation and criticism.
Prerequisite: Permission of instructor.
Miss E. Stengel

*Spring, 3 credits*

### GER 190 The Genealogy of the Modern Drama

A course in the University Lecture series alongside which there will be seminars for those students taking the course for credit. The course will deal with the evolution of the theatre from its earliest manifestations to modern times.
Mr. J. Kott and staff

*Fall, 3 credits*

### GER 221, 222 German Conversation and Composition

This course consists of the active use of spoken and written German. At least one hour per week of work in the language laboratory is required.
Prerequisites: GER 152 or language "proficiency" or equivalent and permission of instructor.

*Fall and Spring, 3 credits each semester*

### GER 281, 282 Special Century Studies

Readings in German literature from any one of the following periods: The Middle Ages, 1500-1600, 1600-1748, 1749-1832, 1832-1889, 1890-present day. Taught by tutorial method and/or seminar.
Prerequisite: At least sophomore status or permission of instructor. Open also to nonmajors with permission of instructor.
Mr. F. Ruplin, Miss S. Horl, Mr. J. Russell, Mr. D. O'Neil, Miss E. Stengel

*Fall and Spring, 3 credits each semester*

## GER 283, 284 Master Works of German Literature

Readings in German literature in translation from the Middle Ages to the present day, such as *Tristan und Isolde, Simplicissimus, Nathan the Wise, Sorrows of Young Werther, Faust I and II, From the Life of a Ne'er Do Well, Green Henry, Effi Briest, Duino Elegies, Doctor Faustus, Tin Drum, The Deputy, Marat/Sade.*
Mrs. B. Elling
*Fall and Spring, 3 credits each semester*

## GER 312 Modern Scandinavian Novel

(For course description, see Courses in Scandinavian Languages and Literature.)

## GER 321 Advanced German Conversation and Composition

A course designed to develop mastery of spoken German. Students will learn to express themselves idiomatically and fluently. At least two hours of weekly laboratory practice will be required.
Prerequisites: GER 221, 222 or junior or senior standing and permission of instructor.
Miss S. Horl
*Fall, 3 credits*

## GER 322 Advanced German Conversation and Composition

A course designed to acquaint students with the subtleties of German grammar and style. Extensive practice in written German.
Prerequisites: GER 221, 222, or junior or senior standing and permission of instructor.
Miss S. Horl
*Spring, 3 credits*

## GER 331 Special Periods

Readings in German literature of any one of the following periods or genres: Minnesang, Carolingian epic, medieval mysticism, Renaissance, baroque, mannerism, enlightenment, Sturm und Drang, romanticism, Biedermeier, young Germany, realism, naturalism, expressionism, German comedy: Gryphius to Hofmannsthal; German tragedy: Lessing to Hebbel; German novelle, 20th century epic, the German epic, German history: 1800-present day. Taught by tutorial method and/or seminars.
Prerequisite: Junior status or permission of instructor.
Mr. L. Ruplin, Miss S. Horl, Mr. J. Russell, Mr. D. O'Neil, Mr. R. Brown, Mr. A. White
*Fall and Spring, 3 credits*

## GER 332 History of the German Language

The development of the German language from Indo-European to modern High German. While special emphasis will be placed on western Germanic languages, specifically German, some attention will be given to the Scandinavian languages and Gothic. The framework within which work will be done will be that of modern linguistic theory (generative-transformational phonology). A historically representative selection of texts will be examined. Taught by tutorial method and/or seminar.
Prerequisite: Junior or senior status or permission of instructor.
Mr. B. Regan
*Fall and Spring, 3 credits*

## GER 333 Special Author

The purpose of this course is to study the works of the author chosen and also relevant scholarly criticism. Students may choose one of the following: Gottfried von Strassburg, Walther von der Vogelweide, Wolfram von Eschenbach, Hartmann von Aue, Der Stricker, Andreas Gryphius, Angelus Silesius (J. Scheffler), Grimmelshausen, Klopstock, Lessing, Schiller, Friedrich Schlegel, Novalis, E. T. A. Hoffmann, Heine, Börne, Keller Büchner, Fontane, Hauptmann, Hofmannsthal, George, Rilke, Musil, Broch, Thomas Mann, Max Frisch, H. v. Doderer, Brecht. Taught by tutorial methods and/or seminars.
Prerequisite: Senior status or permission of instructor. Open to non-majors by permission of instructor.
Mr. R. Brown, Mr. D. Green, Mr. R. Karst, Mr. D. O'Neil, Mr. F. Ruplin, Miss E. Stengel, Mr. A. White
*Fall and Spring, 3 credits*

## GER 334 Methodology II

An introduction to the techniques used in the scholarly criticism of literature. Students in this course will be trained to familiarize themselves with and use the apparatus of literary scholarship.
Prerequisite: Senior status or permission of instructor.
Miss E. Stengel
*Fall and Spring, 3 credits*

## GER 335, 336 Goethe

Reading and interpretation of the most important works by Goethe, including the poems, plays and novels. These will be studied against the background of Goethe's life and times.
Prerequisite: Senior status or permission of instructor.
Mr. R. Karst
*Fall and Spring, 3 credits each semester*

## GER 338 Introduction to Comparative Literature

This course will introduce the student to an understanding of what comparative literature means and what it involves.
Prerequisite: Senior status or permission of instructor.
Miss E. Stengel
*Fall and Spring, 3 credits*

# COURSES IN SCANDINAVIAN LANGUAGES AND LITERATURES

## SWE 114, 115 Elementary Swedish

An introduction to spoken and written Swedish, stressing pronunciation, speaking, comprehension, reading and writing. Selected texts will be read. Practice in the language lab supplements class work.
Mr. L. Sjöberg and staff
*Fall and Spring, 3 credits each semester*

## SWE 151, 152 Intermediate Swedish

The reading and interpretation of Swedish texts, with a review of Swedish grammar, composition and conversation.
Prerequisites: SWE 114, 115.
Mr. L. Sjöberg and Staff
*Fall and Spring, 3 credits each semester*

## GER 312 Modern Scandinavian Novel

The "great" tradition in the Scandinavian novel of the 19th century, covering major historic, political and economic changes during the same period. Works to be read and discussed by Hans C. Andersen, Kierkegaard, Strindberg, Kivi, Lagerlöf, Heidenstam, Hamsun, J. P. Jacobsen and others. Of 20th century works, major novels by the Nobel laureates Undset, Lagerkvist and Laxness will be discussed. This course is open to all undergraduates.
Mr. L. Sjöberg
*Spring, 3 credits*

## GER 367 Modern Scandinavian Drama

Plays of Ibsen and Strindberg will be read and discussed in English in the context of European naturalism and subsequent anti-naturalist tendencies and as a major continuing influence on modern drama. Among more recent Scandinavian dramatists, Pär Lagerqvist will be considered. This course is open to all undergraduates.
Mr. L. Sjöberg
*Fall, 3 credits*

## COURSES IN SLAVIC LANGUAGES AND LITERATURES

### RUS 111, 112 Elementary Russian

An introduction to written Russian stressing reading, writing and gammar. Class work will be supplemented by practice in the language laboratory.
Corequisite: RUS 113, 114.
Mr. A. Hippisley and staff
*Fall and Spring, 3 credits each semester*

### RUS 113, 114 Russian Conversation and Composition I

An introduction to spoken Russian, stressing pronunciation, speaking and listening comprehension.
Corequisite: RUS 111, 112.
Mrs. N. Thompson and staff
*Fall and Spring, 3 credits each semester*

### RUS 115, 116 Reading Russian

This course is designed to teach the student to read and translate Russian expository prose of moderate difficulty. It includes practice in translating ideas into the appropriate technical terminology. This course is intended to prepare the graduate student for the Ph.D. proficiency requirement, but is also open to undergraduates who do not intend to major in Russian.
*Fall and Spring, 3 credits each semester*

### RUS 147, 148 Intermediate Russian (Reading)

An intermediate course in the reading and translating of Russian texts in the humanities, sciences and social sciences. This course stresses a passive command of Russian and is intended for non-majors.
Prerequisite: RUS 112 or equivalent.
Staff
*Fall and Spring, 3 credits each semester*

### RUS 151 Intermediate Russian

An intermediate course in Russian grammar, stressing an active command of Russian.
Prerequisites: RUS 112 and RUS 114 or equivalent.
Corequisite: RUS 153.
Staff
*Fall, 3 credits*

### RUS 153, 154 Russian Conversation and Composition II

A course in the active use of spoken and written Russian. This course is conducted in Russian.
Prerequisites: RUS 112 and RUS 114 or equivalent.
Corequisite: RUS 151.
Mrs. L. Vogel and staff
*Fall and Spring, 3 credits each semester*

### RUS 181 History of Russian Literature

This course is designed to give a historical survey of Russian literature. Selected works of the most important writers will be read in translation. The course is open to all undergraduates.
Mr. A. Hippisley
*Fall, 3 credits*

### RUS 221, 222 Conversation and Composition III

An intermediate course in the active use of spoken and written Russian, dealing with more advanced conversational skills, the translation of more difficult literary texts and free composition.
Prerequisite: RUS 154 or equivalent.
Mrs. N. Thompson and staff
*Fall and Spring, 3 credits each semester*

### RUS 231 Methodology

Using selected short texts easily read and understood by students whose background in Russian may not be great, this course is intended to introduce students to the enjoyment of Russian literature and the techniques of literary appreciation and criticism.
Prerequisite: RUS 151 or equivalent.
Mr. A. Hippisley
*Spring, 3 credits*

### RUS 281, 282 Special Century Studies

Readings in Russian literature from any one of the following periods: 11th-17th centuries; 1700-1819, 1820-1892, 1893-1967. Taught in tutorials.

Prerequisite: RUS 151 or equivalent.
Mrs. L. Vogel, Mr. A. Hippisley
*Fall and Spring, 3 credits each semester*

## RUS 321, 322 Conversation and Composition IV

An advanced course in the active use of spoken and written Russian, dealing with more advanced conversational skills and further training in free composition.
Prerequisite: RUS 222.
Staff
*Fall and Spring, 3 credits each semester*

## RUS 331 Special Period and Genre Studies

Readings in Russian literature of any one of the following periods or genres, provided it does not fall within the period chosen for RUS 281, 282: the medieval epic, the baroque, neo-classicism, romanticism, the natural school, the realist novel, the satirical tradition, drama, poetry, literary criticism, the age of symbolism, prose of the 1920's, dissident literature, emigré literature, contemporary soviet prose, poetry and drama. Taught in tutorials.
Prerequisite: Senior status as Russian major or permission of instructor.
Mr. A. Hippisley, Mr. R. Karst, Mrs. L. Vogel

## RUS 333 Special Author I

The purpose of this course is to study the works of the author chosen and also relevant scholarly criticism. Students may choose one of the following, but must not duplicate the choice made for RUS 334: Pushkin, Gogol, Dostoevsky, Tolstoy. Taught in tutorials.
Prerequisite: Senior status as Russian major or permission of instructor.
Mr. R. Karst, Mrs. L. Vogel
*Fall, 3 credits*

## RUS 334 Special Author II

The purpose of this course is to study the works of the author chosen and also relevant scholarly criticism. Students may choose one of the following, but must not duplicate the

choice made for RUS 333: Pushkin, Gogol, Dostoevsky, Tolstoy, Avvakum, Lermontov, Turgenev, Gocharov, Leskov, Chekhov, Blok, Mandel'shtam Pasternak, Nabokov. Taught in tutorials.
Prerequisite: Senior status as Russian major or permission of instructor.
Mr. A. Hippisley, Mr. R. Karst, Mrs. L. Vogel
*Spring, 3 credits*

## RUS 341 Research Methods

An introduction to the techniques used in the scholarly criticism of literature. Students in this course will be trained to familiarize themselves with and use the apparatus of literary scholarship. Taught in seminars.
Prerequisite: Senior status as Russian major or permission of instructor.
Mr. A. Hippisley
*Fall, 3 credits. Not offered in 1970-71*

## RUS 342 History of the Russian Language

The development of the Russian literary language from its beginnings to the present day. The influence of Church Slavonic on the development of the language will be discussed.
Prerequisites: RUS 151 and permission of instructor.
Mr. A. Hippisley
*Spring, 3 credits*

## FLA 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.
Mrs. B. Elling
*Fall and Spring, 3 credits*

# COURSES IN HEBREW AND CIVILIZATION OF ISRAEL

### HBR 111, 112 Elementary Hebrew

An introduction to modern Hebrew as currently spoken and written in Israel, stressing pronunciation, speaking, listening comprehension, reading and writing.
Mr. Sperling
*Fall and Spring, 3 credits each semester*

### HBR 151, 152 Intermediate Hebrew

An intermediate course in conversation, composition and the reading of texts in modern Hebrew.
Prerequisites: HBR 111, 112 or permission of the instructor.
Mr. Sperling
*Fall and Spring, 3 credits each semester*

### INT 150 Civilization of Israel

An introduction to major currents of thought in relation to the development of the cultural, social, political and economic structure of modern Israel. Analysis of the spiritual ideas and the historical background that led to the re-emergence of the state in 1948. Attention is given to geography, focusing mainly on historical places and archaeological sites, religious shrines, cultural and educational institutions.

Mr. Sperling

*Fall, 3 credits. (For elective credit only)*

# DEPARTMENT OF HISTORY

*Professors:* WERNER T. ANGRESS, ERNESTO CHINCHILLA-AGUILAR, ERIC E. LAMPARD, JACKSON TURNER MAIN, [b] BERNARD SEMMEL, WILLIAM R. TAYLOR, DAVID F. TRASK (*Chairman*)

*Associate Professors:* DAVID B. BURNER, HUGH G. CLELAND, RICHARD F. KUISEL, HERMAN E. LEBOVICS, [a] ROBERT H. G. LEE, JOHN W. PRATT, JOEL T. ROSENTHAL, [b] PHILIP J. STAUDENRAUS, [a] FRED WEINSTEIN, RUBEN E. WELTSCH, ALLAN K. WILDMAN, JOHN A. WILLIAMS (*Director of Graduate Studies*)

*Assistant Professors:* PER A. ALIN, KARL S. BOTTIGHEIMER, RUTH S. COWAN, BRIAN R. HAMNETT, FRANKLIN W. C. KNIGHT, [a] TRUONG BỬU LAM, ROBERT M. LEVINE, ROBERT D. MARCUS, RICHARD T. RAPP, HELEN E. RODNITE, W. BURGHARDT TURNER

*Instructor:* KARL W. DEMUTH (*Executive Officer*)

*Documents Collector and Lecturer:* W. KEITH KAVENAGH

## 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

1. Two one-semester introductory courses at Level I (HIS 101-149).
   6 credits

2. Eight one-semester advanced courses selected from Levels II (HIS 150-299), III (HIS 300-399) and IV (HIS 400-499), of which at least six credits must be selected from the levels III or IV, excluding HIS 399.
   24 credits

B. Study in a related area

Two one-semester courses beyond the introductory level in a related discipline or disciplines.
6 credits

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[a] On leave academic year 1970-71.
[b] On leave Fall semester 1970.

## COURSES IN HISTORY

*Please Note:* Level I courses (HIS 101-149) are designed for freshmen but open to all undergraduates. Level II courses (HIS 150-299) are open to sophomores and above; Level III courses (His 300-399 except 391, 392) to juniors and above; Level IV courses (HIS 400-499 and 391, 392) to seniors only.

### HIS 101 European Civilization from the Renaissance to the French Revolution

A study of European ideas and institutions from the Renaissance to the French Revolution, including the heritage of the Middle Ages; Renaissance art, politics and thought; the Reformation and Counter-Reformation; the rise of the modern state; the new science; the Enlightenment; and the course of the French Revolution to 1815.
Staff

*Fall, 3 credits. Not offered 1970-71.*

### HIS 102 The Civilization of Modern Europe

A study of European ideas and institutions during the 19th and 20th centuries: the growth of industrialism and of democracy; the Marxist challenge and the Russian Revolution; the great world wars and the waning of European hegemony.
Staff

*Spring, 3 credits. Not offered 1970-71.*

### HIS 103, 104 Introduction to the Study of American History: The Historian as Investigator

This course will emphasize the whole process of historical inquiry: the analysis and interpretation of the raw materials, the accumulation of evidence, the use of concepts, historical argumentation and the explanation of historical events. While occasional lectures will be given, the student will spend most of his time in a small "laboratory" working team analyzing specific historical situations. Brief progress reports on the students' findings will make up the written assignments.
Prerequisite for 104: HIS 103 or permission of instructor.
Mr. J. Main, Mr. D. Burner

*Fall and Spring, 3 credits each semester*

### HIS 105 American Historical Writing

An introduction to American history through an examination of the varieties of historical writings about the American past.
Mr. R. Marcus

*Spring, 3 credits*

### HIS 107 America in the 1960's

An introduction to the study of hisotry through an analysis of contemporary American politics and culture. Topics will include the Eisenhower legacy, Kennedy years, Great Society, Vietnam crisis, black revolution and youth culture.
Mr. D. Burner

*Fall, 3 credits*

### HIS 121 Latin American Civilization I

Beginning with an introduction to the historic indigenous cultures of the Americas, the course assesses the impact of three centuries of Iberian rule, 1490's-1820's, with regard to religion and culture, ethnic mixtures, political life and the economy.
Mr. E. Chinchilla-Aguilar

*Fall, 3 credits*

### HIS 122 Latin American Civilization II

Themes in the intellectual, social and political development of Latin America since independence. Argentina, Mexico and Brazil are stressed, as well as such generic problems as land tenure, social mobility and the role of the military.
Mr. R. Levine

*Spring, 3 credits*

### HIS 127 The Culture and Conflict of Colonial Societies

An introduction to historical study through an examination of the variety of problems which confronted colonizers and colonized in areas other than the United States from about the 16th century to the 20th century. The course emphasizes the response of non-Europeans to the integration of world cultures, and the challenges and conflicts of the colonial situation.
Mr. F. Knight
*Fall, 3 credits*

### HIS 131 Ancient History from the Classics

A study of selected readings from the works of Greek and Roman historians, orators, poets and philosophers with interpretations directed primarily at the interests of the historian.
Mr. P. Alin
*Fall, 3 credits. Not offered 1970-71.*

### HIS 132 The Greek City-State

An introduction to the study of history through a consideration of the role of the city-state in Greek civilization based upon readings in both ancient sources and modern commentaries.
Mr. P. Alin
*Spring, 3 credits*

### HIS 133 The Medieval Imagination

A study of how the men of the Middle Ages set themselves within the context of a Christian, anthropocentric universe, as expressed in the creative literature of the civilization.
Mr. J. Rosenthal
*Fall, 3 credits*

### HIS 134 Medieval Historical Society

A survey of medieval historical writing with special attention to the "world view" and sense of chronological perspective revealed by medieval historians; the relationship between a culture's own achievements and its view of the past, whether that be "objective" or mythopoeic.
Mr. J. Rosenthal
*Spring, 3 credits. Not offered 1970-71.*

### HIS 135 Science in History

An examination of the relation between scientific developments and history. In particular the course will examine theories of technological determination, as well as changes in intellectual life which have been brought about by developments of science.
Mrs. R. Cowan
*Fall, 3 credits*

### HIS 137 Classics of European Social History

An examination of important landmarks in the narrative history and theoretical analysis of modern European society. Among the authors treated will be John Locke, Karl Marx, Max Weber, Ferdinand Tonnies, Charles Booth, Talcott Parsons and Karl Polanyi.
Mr. H. Lebovics
*Spring, 3 credits*

### HIS 139 Modern Imperialism

An investigation of the empire-building of the last three centuries, its nature and motives, the controversy concerning theories of "imperialism."
Mr. B. Semmel
*Fall, 3 credits. Not offered 1970-71.*

### HIS 160 History of American Education

An analysis of various approaches to the study of the history of American education through an examination of selected histories of education in America. Emphasis will be placed on developing an understanding of the material of the historical writing (i.e., the events and the characteristics of the events), the principle or principles according to which the subject has been subdivided, and the aims of the particular history. Histories of education selected for study will be chosen from among the writings of such authors as Bernard Bailyn, Maxine Greene, Lawrence A. Cremin, Raymond Callahan and others. This course is identical with EDU 160.
Mr. A. Baskin, Mr. E. Seifman
*Fall, 3 credits*

## HIS 161 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. Formerly HIS 239.
Prerequisite: Permission of the chairman of the student's major department.
Staff
*Fall and Spring, 3 credits*

## HIS 162 History of Western Education

An analysis of various approaches to the study of the history of western education through an examination of selected histories of education. Emphasis will be placed on developing an understanding of the materials of the historical writing (i.e., the events and the characteristics of the events), the principle or principles according to which the subject has been subdivided, and the aims of the particular history. The semester will be devoted to the analysis of works dealing with the history of education during the ancient, medieval and early modern eras. Histories of education selected for study will be chosen from among the writings of such authors as Henri I. Marrou, E. B. Castle, William K. Medlin, Charles H. Haskins, Robert Ulrich and others. This course is identical with EDU 162.
Mr. A. Baskin
*Spring, 3 credits*

## HIS 191 American History to 1877

The United States from the Age of Discovery to the end of 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. Formerly HIS 151.
Mr. H. Cleland
*Fall, 3 credits*

## HIS 192 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. Formerly HIS 152.
Mr. H. Cleland
*Spring, 3 credits*

## HIS 195 England from 1066 to 1688

The first half of a survey course in English history. The development of English society will be traced from the Norman Conquest to the "Glorious Revolution" with special attention to the feudal constitution, the evolution of Parliament, the Civil War and the Commercial Revolution. Formerly HIS 155.
Mr. K. Bottigheimer
*Fall, 3 credits*

## HIS 196 England since 1688

A survey of the transformation of English society by the Industrial Revolution, the development of parliamentary politics and democracy, the growth of imperial power and the readjustment to 20th century realities. Formerly HIS 156.
Mr. K. Bottigheimer
*Spring, 3 credits*

## HIS 197 Far Eastern Civilization

Chronologically, the course surveys the origin and development of Far Eastern civilization from its beginning to the mid-19th century. Its emphasis will be on the intellectual artistic and institutional foundations of the traditional societies of China, Japan and Korea.
Formerly HIS 157.
Mr. R. Lee
*Fall, 3 credits. Not offered 1970-71.*

## HIS 198 The Far East in Transition

A survey of modern Far Eastern history, this course will concentrate on the social, political and economic developments in the Far East during the last 100 years. Special attention will be given to the relationships between the United States and the Far Eastern countries. Formerly HIS 158.
Mr. R. Lee
*Spring, 3 credits. Not offered 1970-71.*

## HIS 200 The Ancient Near East and Early Greece

The development of early civilizations in the eastern Mediterranean area, including those of Egypt, Mesopotamia, Anatolia and the Aegean area from the Neolithicum to the rise of the Persian Empire. Special emphasis will be put on Greece in the late Bronze Age and the Age of Homer.
Mr. P. Alin

*Spring, 3 credits*

## HIS 201 History of Classical Greece and the Hellenistic World

A survey of the history of the Greeks and Greek civilization from the Archaic Age, through its classical period in the 5th and 4th centuries B.C. and the era of Alexander the Great and his successors, to the Roman conquest.
Prerequisite: HIS 200 or some background in early Greek history.
Mr. P. Alin

*Spring, 3 credits. Not offered 1970-71.*

## HIS 202 History of the Roman Republic

The development of the Roman State from its earliest beginnings to the 1st century B.C. with an emphasis upon its institutions and factors which led to Roman domination of the Mediterranean area.
Mr. P. Alin

*Fall, 3 credits. Not offered 1970-71.*

## HIS 203 History of the Roman Empire

History of the Roman world from the Principate of Augustus in the 1st century B.C. to the disintegration of the Western Empire in the late 5th century.
Prerequisite: HIS 202 or permission of instructor.
Mr. P. Alin

*Spring, 3 credits. Not offered 1970-71.*

## HIS 204 Medieval Europe, 300—1400

A survey of medieval Europe, with emphasis upon the basic institutions of medieval society: the Church, feudalism, kingship and monarchy. Formerly HIS 209.
Miss H. Rodnite

*Fall, 3 credits*

## HIS 205 Humanism and Renaissance

An examination of the political and ecclesiastical crisis of the later Middle Ages; two centuries of humanistic growth; the influence of the humanists on Western values and attitudes; the Renaissance as a cultural manifestation and as a historical concept.
Miss H. Rodnite

*Spring, 3 credits*

## HIS 206 The Age of Reformation

A survey of the political, social and religious changes in Europe during the 14th and 15th centuries, followed by an examination of the 16th century reformations and their relationship to the emerging state system; the religious wars up to 1648.
Miss H. Rodnite

*Fall, 3 credits*

## HIS 207 Europe in the 17th Century

A comparative examination of the societies of Western Europe in a period of marked stress and change.
Mr. K. Bottigheimer

*Spring, 3 credits*

## HIS 209 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. Formerly HIS 207.
Mr. R. Kuisel

*Fall, 3 credits*

## HIS 210 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. Formerly HIS 208.
Mr. W. Angress

*Spring, 3 credits. Not offered 1970-71.*

## HIS 211 Founding of Colonial America

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.
Staff
*Fall, 3 credits. Not offered 1970-71.*

## HIS 212 American Colonial Society

Political, economic, social and cultural characteristics of the colonies during the 18th century.
Staff
*Spring, 3 credits. Not offered 1970-71.*

## HIS 213 Age of the American Revolution

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 are examined.
Mr. J. Main
*Spring, 3 credits*

## HIS 214 The Early National Era

Political, economic, social and cultural developments from the American Revolution to the rise of Jackson.
Mr. J. Main
*Spring, 3 credits. Not offered 1970-71.*

## HIS 215 The Age of Jackson

A study of the era of Andrew Jackson which deals with the democratization of American society, the rise of a national economy, the impact of sectionalism and manifest destiny.
Mr. P. Staudenraus
*Fall, 3 credits. Not offered 1970-71.*

## HIS 216 Civil War and Reconstruction

The course deals with the crisis of sectionalism, the rise of Southern nationalism and of the Republican Party, secession, the Civil War, abolition and the Reconstruction period.
Mr. P. Staudenraus
*Spring, 3 credits*

## HIS 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. D. Burner, Mr. H. Cleland
*Fall, 3 credits. Not offered 1970-71.*

## HIS 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. H. Cleland, Mr. D. Burner
*Spring, 3 credits. Not offered 1970-71.*

## HIS 219 U. S. Urban History

Introduction to historical studies of urbanization in the United States, with special reference to demographic, economic and organizational features of urban and rural populations. Some attention will be given to the physical building of cities and to contemporary understandings of urban "problems." Prerequisites: HIS 191, 192 or permission of instructor.
Mr. E. Lampard
*Fall, 3 credits. Not offered 1970-71.*

## HIS 220 History of Canada

A survey of the conflicting interpretations of the major issues in Canadian history: How does Canada survive as a separate state in North America? How do the French Canadians survive as a separate cultural and linguistic group in Canada? Is Canadian society basically distinct from that of the United States? Prerequisites: HIS 191, 192 or permission of instructor.
Mr. J. Williams
*Spring, 3 credits. Not offered 1970-71.*

## HIS 221 History of Central America

Central America from pre-colonial times to the present: the Maya and Aztec civilizations; Spanish conquest; independence; efforts at political and economic unity; relations with the United States and other powers.
Mr. E. Chinchilla-Aguilar

*Spring, 3 credits*

## HIS 222 Modern Andean Republics

Central aspects of the political and intellectual development of the Andean countries from Colombia to Chile viewed within their social and economic environment in the 19th and 20th centuries.
Mr. B. Hamnett

*Spring, 3 credits. Not offered 1970-71.*

## HIS 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. R. Levine

*Fall, 3 credits*

## HIS 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. F. Knight

*Fall, 3 credits*

## HIS 225 Social and Economic History of Colonial Spanish America

The emergence of new social and economic practices in the Spanish New World Empire. The political effects of these new forms, as well as the Crown's efforts to control them directly will be examined. Events leading to the Independence period will also be studied.
Prerequisite: HIS 121 or permission of instructor.
Mr. B. Hamnett

*Spring, 3 credits. Not offered 1970-71.*

## HIS 227 Colonial and Neo-Colonial Brazil

Aspects of Brazilian history, 1500-1889. The course will treat such themes as the transition of Portuguese political and cultural institutions to Brazil, the emergence of the Brazilian nation and the period of the Empire through 1889.
Prerequisites: HIS 121, 122 or permission of the instructor.
Mr. R. Levine, Mr. F. Knight

*Spring, 3 credits*

## HIS 228 Modern Brazil

Brazil from 1889 to the present: the old Republic; the Liberal Alliance and the Vargas regime; post-Vargas Brazil; and social, economic and cultural developments will be examined.
Prerequisite: HIS 122 or permission of instructor.
Mr. R. Levine

*Spring, 3 credits. Not offered 1970-71.*

## HIS 229 Argentina since 1810

The political, economic and social history of Argentina from the end of the colonial period to the present with special attention to the Rosas tyranny, the "Argentine miracle" of development from 1880 to 1914 and the background, evolution and aftermath of the Perón regime.
Staff

*Fall, 3 credits. Not offered 1970-71.*

## HIS 233 Early Modern England: Change and Reformation, 1509–1603

An examination of the development of English society from the reign of Henry VIII to the death of Elizabeth. Attention will be focused upon the decline of medieval institutions, the course of the Reformation and its impact upon the political, economic and intellectual life of the society.
Mr. K. Bottigheimer

*Fall, 3 credits. Not offered 1970-71.*

### HIS 234 Early Modern England: Revolution and War, 1603–1714

An inquiry into the source, nature and outcome of the English Revolution, conceived as a single, systematic disorder causing intermittent crises throughout the 17th century. Particular topics will include the Parliamentary struggles of the 1620's, the civil war of the 40's and the re-establishment of stability in 1688.
Mr. K. Bottigheimer

*Spring, 3 credits. Not offered 1970-71.*

### HIS 235 18th Century England, 1714–1815

A survey of the century which witnessed the beginning of the transformation of Great Britain from a traditional pre-industrial society to a modern democratic nation. The course will discuss a variety of problems: the growth of parliamentary government; the commercial, agricultural and industrial revolutions; the Methodist revival; the Scottish Enlightenment; and England and the French Revolution.
Mr. B. Semmel

*Spring, 3 credits. Not offered 1970-71.*

### HIS 236 England, 1782–1867: Industrialism, Reform and the Advent of Democracy

An examination of English political, social, economic and intellectual development from the time of the younger Pitt and the early years of industrialism to the coming of democracy and the emergence of the *Pax Britannica*; the wars of the French Revolution; the struggles for political and economic reform; romanticism and philosophical radicalism; free trade and the Workshop of the World.
Mr. B. Semmel

*Fall, 3 credits. Not offered 1970-71.*

### HIS 237 Modern Britain, 1867 to the Present; England in the Age of Democracy

An analysis of English society from the era of Gladstone and Disraeli to that of Wilson and Heath; the continuance of reform; the rise of socialism and the Labour party; imperialism; the world wars against Germany; the welfare state; the decline of Britain's international, economic and political position.
Mr. B. Semmel

*Spring, 3 credits. Not offered 1970-71.*

### HIS 238 History of the British Commonwealth

The political, social and economic development of Australia, New Zealand, Canada and South Africa, studied comparatively.
Prerequisites: HIS 191, 192 or HIS 196 or permission of instructor.
Mr. J. Williams

*Spring, 3 credits. Not offered 1970-71.*

### HIS 239 Ireland from St. Patrick to the Present

A survey of the history of Ireland with emphasis upon its colonization and the subsequent emergence of an independent, though troubled and fragmentary national state.
Mr. K. Bottigheimer

*Spring, 3 credits. Not offered 1970-71.*

### HIS 240 History of the British Empire

The course of British imperial control over tropical dependencies in Africa, Asia and the Pacific since the late 18th century. Among the questions studied comparatively will be: imperial advance, the means and ends of colonial policy, problems of plural societies, resistance to imperial rule and the transfer of power. Formerly HIS 259.
Prerequisite: HIS 196 or permission of instructor.
Mr. J. Williams

*Fall, 3 credits. Not offered 1970-71.*

### HIS 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 problem of its relations with the West.
Mr. A. Wildman

*Fall, 3 credits. Not offered 1970-71.*

## HIS 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. A. Wildman

*Fall, 3 credits*

## HIS 244 East Central Europe, 1453–1945

A survey of the territorial belt between the German and Russian power bases; the rise and decline of the Polish, Bohemian and Hungarian kingdoms; the role of the Hapsburg Empire; the Eastern question; the national movements and successor states up to the Second World War.

Mr. R. Weltsch

*Spring, 3 credits. Not offered 1970-71.*

## HIS 249 European Economic History in the Pre-Industrial Age

An examination of the major features of European economic development from the early Middle Ages to the 18th century. Topics covered will include the character of medieval agriculture and its significance for European society, the rise of urban centers and the revival of trade, the development of capitalism, the economic role of government, the shifting patterns of economic activity and the "crisis" theories of 16th and 17th century economic history.

Mr. R. Rapp

*Fall, 3 credits*

## HIS 250 European Economic History in the Industrial Age

An examination of the major features of European economic development since the Industrial Revolution. Topics covered will include the causal factors in industrialization, changing concepts of economic development, the growth of an integrated world economy and the disparity between industrialized and "underdeveloped" Europe.

Mr. R. Rapp

*Spring, 3 credits*

## HIS 251, 252 History of Science

During the first semester, the course will deal with the Greek scientific tradition and with the manner in which that tradition later was transformed during the scientific revolution of the 16th and 17th centuries. The second semester will be devoted to scientific developments of the 18th and 19th centuries. Some attention will also be given to the growth of science as a social institution.

Prerequisites: For HIS 251, two semester courses in natural science or equivalent or permission of instructor; for HIS 252, HIS 251 or permission of instructor.

Mrs. R. Cowan

*Fall and Spring, 3 credits each semester*

## HIS 253 Social and Intellectual History of Europe, 1648–1848

A history of social and political thought in post-Reformation Europe, the Age of Enlightenment, with particular reference to such developments as the beginnings of modern science, empiricism, rationalism, the philosophical origins of the French Revolution, romanticism, nationalism, industrialization and Marxism.

Mr. H. Lebovics

*Fall, 3 credits*

## HIS 254 Social and Intellectual History of Europe, 1848–Present

A history of social and political thought in post-1848 Europe with particular reference to the social and political implications of Darwinism, socialism, new conservatism, Freudianism and the varities of existential thought.

Mr. H. Lebovics

*Spring, 3 credits*

## HIS 255 Expansion of Europe, 1500–1800

An analysis of the interrelationship between European cultures and other cultures of the world in the period from the Age of Discovery to the end of the 18th century. Pre-industrial

forms of European overseas activity will be examined with emphasis on the revolution in transportation, trading post empires and plantation systems.

Mr. F. Knight

*Fall, 3 credits. Not offered 1970-71.*

## HIS 256 Expansion of Europe, 1800 to the Present

The European influence on the wider world during the industrial age. Forms of European overseas settlement, conditions of conquest, local responses to the Europeans and the 20th century liquidation of Europe's overseas empires will be studied.

Prerequisite: HIS 255 or permission of instructor.

Mr. F. Knight

*Spring, 3 credits. Not offered 1970-71.*

## HIS 257 History of the Physical Sciences I: Theories of the Universe

The course will trace the development of theories of the universe from ancient Greece to the present day, emphasizing changes in ideas on the physical structure of the universe which occurred during the late Renaissance and from which emerged the general pattern of modern cosmologies. Einstein's ideas and modern cosmologies will also be discussed with a view to understanding the general structure of the science and its evolution. This course is intended for students with a scientific background.

Mrs. E. Garber

*Fall, 3 credits*

## HIS 258 History of the Physical Sciences II: The Structure of Matter

Modern chemistry and atomic theory emerged from a fusion of scientific theories and the craft traditions developed in alchemy. The course will trace the growth of this synthesis in the Arabic Empire and the European Renaissance and the subsequent development of chemistry in the 19th century and atomic theory and quantum mechanics in the 20th century. The general patterns of change which emerged in physics and chemistry will

be emphasized. This course is intended for students with a scientific background.

Mrs. E. Garber

*Spring, 3 credits*

## HIS 259 History of Biology

The course will examine ancient Greek ideas about the nature of life and the modification of those ideas in succeeding centuries. The development of taxonomy, embryology and cytology will be discussed, as well as Darwinism, biochemical biology, and the debate between vitalism and mechanism. This course is identical with BIO 159.

Prerequisite: Six credit hours of biology or permission of instructor.

Mrs. R. Cowan

*Fall, 3 credits. Not offered 1970-71.*

## HIS 261 Intellectual History of China

A study of the major schools of Chinese thought from the classical era of Chinese philosophy through the 19th century to the modern age of Mao Tse-tung and their influence upon the historical development of Chinese society.

Prerequisite: HIS 197 recommended.

Mr. R. Lee

*Fall, 3 credits*

## HIS 262 Contemporary China

This course will examine the history of China from the Revolution of 1911 to the present day. It will emphasize the intellectual, social and political movements of 20th century China.

Mr. R. Lee

*Fall, 3 credits*

## HIS 263 A History of Southeast Asia to 1500

A survey of the historical development of the countries of Southeast Asia to the 15th century with reference to their political, artistic and religious components. The impact of Indian and Chinese cultures on the region will be viewed against the background of the indigenous inheritance.

Mr. T. Lam

*Fall, 3 credits*

## HIS 264 A History of Southeast Asia from 1500 to the Present

A study of the impact of Western imperialism in Southeast Asia. The rivalry between the European powers and their pattern of economic and territorial expansion will be examined against the background of Southeast Asian historical development. Particular attention will be paid to problems of colonization and decolonization.
Prerequisite: Some background in early Southeast Asian history is desirable.
Mr. T. Lam

*Spring, 3 credits. Not offered 1970-71.*

## HIS 265 Japan before the Modern Era

The course will examine the historical development of Japan in its major political, social, economic and cultural aspects from pre-history to the end of the Tokugawa Shogunate in 1868.
Staff

*Fall, 3 credits. Not offered 1970-71.*

## HIS 266 Modern Japan, 1868–Present

Political, social, economic and cultural history of Japan with emphasis upon the Meiji restoration, industrialization and its impact on society, imperialistic expansion, the Second World War, and Japanese resurgence in the postwar era.
Staff

*Spring, 3 credits. Not offered 1970-71.*

## HIS 269 History of American Industrial Society to 1860

The economic and social development of North America and the United States from colonial settlement through early industrialization. Emphasis is placed on the growth and redistribution of population, the structure of the labor force, use of natural resources, technological advances in production and transport, the development of markets, and the role of public policy.
Mr. E. Lampard

*Fall, 3 credits*

## HIS 270 Development of American Industrial Society since 1860

The industrial transformation of economy and society in the late 19th and 20th centuries. Emphasis is on factors contributing to economic growth and instability, the development of corporate organization, and the changing character of public policy.
Mr. E. Lampard

*Spring, 3 credits*

## HIS 271 American Constitutional Origins

A study in the law, institutions and customs of the American constitutional system. The course will examine the English and colonial foundations of American constitutionalism, formation of the federal Constitution, the instituting of new government and the rise of political democracy.
Mr. J. Pratt

*Fall, 3 credits*

## HIS 272 American Constitutional Development

The development of the federal constitutional system with emphasis on the national sovereignty-states rights controversy to 1876, the effects of industrial change, the enlargement of the Presidency, and the impact of crisis government on the American Constitution in the 20th century.
Mr. J. Pratt

*Spring, 3 credits*

## HIS 273 Social and Intellectual History of the United States to 1865

A study of the development of American institutions and thought in the years before the Civil War.
Mr. R. Marcus

*Fall, 3 credits*

### HIS 274 Social and Intellectual History of the United States Since 1865

A study of the development of American institutions and thought in the years since the Civil War.
Mr. R. Marcus
*Spring, 3 credits*

### HIS 275 History of U. S. Foreign Relations, 1774–1900

The evaluation of American foreign policy and diplomacy from 1774 to 1900 in terms of acquisition and confirmation of independence; geographical expansion and economic growth; achievement of great power capabilities and imperialistic consequences.
Mr. D. Trask
*Fall, 3 credits. Not offered 1970-71.*

### HIS 276 History of U. S. Foreign Relations, 1900 to the Present

The evaluation of American foreign policy and diplomacy from 1900 to the present in terms of: the imperial interlude; the cycle of violence associated with two world wars; post World War II development, especially the Russo-American confrontation and social revolution in the non-western world.
Mr. D. Trask
*Fall, 3 credits*

### HIS 277 History of American Labor to 1900

The course considers the development of the labor force and the labor movement in its broader setting. It considers labor in colonial times, the coming of the industrial revolution, the labor movement of the Jacksonian era, the Knights of Labor and the AFL, and the influence of agrarians, anarchists and socialists on the labor movecent.
Mr. H. Cleland
*Fall, 3 credits. Not offered 1970-71.*

### HIS 278 History of American Labor since 1900

The course deals with the rivalry between the AFL and the Industrial Workers of the World; the effects of mass production and scientific management; labor and the ethnic groups; the changing role of the national government; the CIO challenge to the AFL; and the effects of automation.
Mr. H. Cleland
*Spring, 3 credits. Not offered 1970-71.*

### HIS 279 Afro-American History to Reconstruction

Designed to supplement a basic knowledge of U.S. history, this course will consider the particular relationship of the Afro-American to the social, political and economic development of the United States. Special attention will be given to the African background, slavery, slave resistance and the effort to effect emancipation under Reconstruction.
Prerequisite: HIS 191 or 192 or permission of the instructor.
Mr. W. Turner
*Fall, 3 credits*

### HIS 280 Afro-American History from Reconstruction to the Present

The course will consider the fate of the Afro-American after the failure of Reconstruction, tracing the institutionalized resistance of the black community to oppression and second class status, and culminating in the civil rights struggle of the 1950's and 1960's and the current conflict.
Prerequisite: HIS 191 or HIS 192 or permission of instructor.
Mr. W. Turner
*Spring, 3 credits*

### HIS 281 France under the Old Regime, 1598–1750

An examination of the development of French society under Bourbon absolutism from the end of the religious wars to the onset of the crisis of the Old Regime. The interaction between the royal government and social pressures will be emphasized.
Mr. K. Demuth
*Fall, 3 credits. Not offered 1970-71.*

### HIS 282 The Revolutionary Era in France, 1750–1815

An examination of the final crisis and collapse of the Old Regime in France, the unfolding of the Revolution of 1789, and its transformation

under Napoleonic dictatorship. Within a framework of political history, emphasis will be placed upon the origins and dynamics of the French Revolution and its impact on society.

Mr. K. Demuth

*Fall, 3 credits*

### HIS 283 Modern France, 1815-1900

The French nation's search for definition from the fall of Napoleon to the Dreyfus crisis of the Third Republic with much attention given to the social and economic background of political change.

Mr. R. Kuisel

*Fall, 3 credits*

### HIS 284 Modern France, 1900—Present

The French nation's response to the pressures of the 20th century from the aftermath of the Dreyfus affair through the traumas of World War I and the Depression to the Fifth Republic with much attention to the social and economic background of political change.

Mr. R. Kuisel

*Spring, 3 credits*

### HIS 285 Germany, 1806–1890

The course will examine the development of Germany from the Napoleonic period, through unification and the founding of the Empire, to Bismarck's dismissal. Although the emphasis will be on political and social aspects of this period, economic and cultural trends will be included in the investigation.

Mr. W. Angress

*Fall, 3 credits*

### HIS 286 Germany, 1890 to the Present

The course will examine the development of Germany from Bismarck's dismissal, through the Wilhelmian period, the First World War, the Weimar Republic and the Third Reich, to and beyond the Second World War. Although the emphasis will be on political and social aspects of this period, economic and cultural trends will be included in the investigation.

Mr. W. Angress

*Spring, 3 credits*

### HIS 289, 290 History of Spain, 711-1808

Political history set in its social, economic and international background. The first semester will consider developments in Spain from the Islamic Conquest to the accession of Charles V in 1516. The second semester will consider Spanish history under the Hapsburg and Bourbon dynasties down to the fall of the Ancien Régime with the Napoleonic invasion in 1808.

Prerequisite for HIS 290: HIS 289 or permission of instructor.

Mr. B. Hamnett

*Fall and Spring, 3 credits each semester*

### HIS 291 History of Africa South of the Sahara

The states and empires of independent Africa, 800-1800; the quickening pace of internal change and external contact, 1800-1880; European conquest and administration, 1880-1945; the end of empire and the recovery of independence, 1945 on.

Mr. J. Williams

*Spring, 3 credits*

### HIS 294 History of New York State

A survey of the development of New York from the colonial period to the present, with special emphasis on the role it played in the development of the United States and the interaction of national affairs on the state.

Mr. W. Kavenagh

*Spring, 3 credits. Not offered 1970-71.*

### HIS 300 Mycenae, Crete and Troy

A study of several problems relating to the prehistoric cultures of Greece, Crete and Anatolia with particular emphasis on the archaeological material but also using contemporary and later written sources.

Prerequisite: The course assumes some background in Ancient Near Eastern history.

Mr. P. Alin

*Fall, 3 credits*

### HIS 308 Problems in Modern European History since 1870

A study of the interrelations of politics, ideas and socioeconomic forces in an age of transformation and conflict.

Prerequisite: The course assumes some background in Modern European history.
Staff

*Fall, 3 credits*

## HIS 309 Problems in Medieval History

Selected topics in medieval history will be studied with attention to primary sources, the relationship between social and intellectual history and current historiographic controversies and developments.
Prerequisite: Permission of instructor.
Mr. J. Rosenthal

*Spring, 3 credits*

## HIS 311 Topics in Colonial American History

Selected topics in the development of colonial society, the influence of the New World on English traditions, the problems of internal growth and expansion, the influence of British colonial policy to 1715. Use of primary source materials is stressed.
Mr. W. Kavenagh

*Fall, 3 credits*

## HIS 312 Topics in 18th Century Colonial American Society

Topics concerning the social and intellectual growth of the American colonies up to the revolutionary period. The use and interpretation of primary source materials will be stressed.
Prerequisite: Assumes a background in American colonial history.
Mr. W. Kavenagh

*Spring, 3 credits*

## HIS 313 Topics in Revolutionary America

The students will investigate through reading in primary and secondary sources and through discussions, major aspects of the revolutionary era including economic, social, political and cultural characteristics.
Prerequisite: HIS 213 or permission of instructor.
Mr. J. Main

*Spring, 3 credits. Not offered 1970-71.*

## HIS 315 Topics in Jacksonian America, 1815–1850

The course will analyze through discussions and independent research such leading problems of the Jacksonian period as the different types of reform movements and the influence on society of American conceptions of the west.
Prerequisites: HIS 215 and permission of instructor.
Mr. P. Staudenraus

*Spring, 3 credits. Not offered 1970-71.*

## HIS 319 Studies in the History of Urbanization

Selected topics in the history of urbanization in the United States, with special reference to demographic, economic and organizational aspects of population concentration and the process of city building. Primarily reading, discussion and independent research.
Prerequisite: HIS 219 or consent of instructor.
Mr. E. Lampard

*Spring, 3 credits*

## HIS 325 Cultural History of Latin America I

Precolonial period literature, its permanent influence on Latin American thinking. Early history and description of the New World. Discussion about the nature of the New World and the Indians; schools and universities; the Baroque times; the Enlightenment; modern ideas during the 18th century.
Mr. E. Chinchilla-Aguilar

*Fall, 3 credits. Not offered 1970-71.*

## HIS 326 Cultural History of Latin America II

The cultural history of Latin America during the national period, including such topics as the ideals of independence and the search for national goals, French and American influences, liberalism and the early Romantic period, church and state, and modernism and the contemporary search for identity.
Mr. E. Chinchilla-Aguilar

*Spring, 3 credits. Not offered 1970-71.*

### HIS 342 Topics in the History of the Russian Revolution and the Soviet Union

Advanced study on selected problems of the Russian Revolution of 1917 and the development of the Soviet Union. Students will be encouraged to do independent research and writing.
Prerequisite: HIS 241 or HIS 242 or permission of instructor.
Mr. A. Wildman
*Spring, 3 credits*

### HIS 353 Topics in the History of European Conservatism

An examination of the major traditions and theories of European conservatism from Thomas Aquinas to the radical right theories of the 20th century.
Prerequisite: This course assumes a fair knowledge of European history and European thought in the modern period.
Mr. H. Lebovics
*Fall, 3 credits. Not offered 1970-71.*

### HIS 355 Topics in the Expansion of Europe

An examination of the interrelationship of cultures in the pre-industrial age, with emphasis on the expansion of Europeans into the wider world. Topics of concentration will be the revolution in transportation; the acquisition of new knowledge and its diffusion; trading post empires and plantation systems of the Europeans.
Mr. F. Knight, Mr. J. Williams
*Fall, 3 credits*

### HIS 363 Nationalism in Southeast Asia

This course will examine the development of nationalist movements in Southeast Asia both comparatively and in individual case studies. The evolution of these movements will be cast in the light of events occurring on the international scene.
Prerequisite: This course assumes some background in Southeast Asian history.
Mr. T. Lam
*Fall, 3 credits*

### HIS 364 Problems in the Modern History of Southeast Asia

An examination of particular political, social, economic and cultural problems of modern southeast Asian countries, such as colonial administration of policies, ethnic minorities, the process of nation-building and the interaction of religion and politics.
Prerequisite: The course assumes some background in Southeast Asian history.
Mr. T. Lam
*Spring, 3 credits. Not offered 1970-71.*

### HIS 378 Topics in American Labor History

The course will consider in some detail the ideological, economic and sociological factors which have shaped the American labor movement. It will also study the relationship of the labor movement to American society as a whole and to the contemporary crisis.
Prerequisite: History 277 or 278, or HIS 269 or HIS 270, or permission of instructor.
Mr. H. Cleland
*Fall, 3 credits*

### HIS 379 Topics in Afro-American History

Advanced study of selected problems of the role and status of the Afro-American in U.S. history. Students will be encouraged to develop their own critical analysis of the subject through independent research and writing.
Prerequisite: HIS 279 or HIS 280 or BLS 251 or permission of instructor.
Mr. W. Turner
*Fall, 3 credits*

### HIS 382 Topics in the Ancien Régime and the French Revolution

A study of selected topics on the crises of French Government and society in the 17th and 18th centuries including the French Revolution.
Prerequisite: HIS 281 or 282 or permission of instructor.
Mr. K. Demuth
*Spring, 3 credits*

## HIS 391, 392 Senior Honors Project in History

A two-semester project for qualified senior majors which will enable them to fulfill the requirements for bachelors degrees with honors. Arranged in consultation with the department, the project involves independent study and the writing of an honors paper under the close supervision of an appropriate instructor on a suitable topic selected by the student.

Prerequisite: A 3.0 average in social science courses and permission of the department.
Staff

*Fall and Spring, 3 credits each semester*

## HIS 399 Readings in History

Qualified juniors and seniors in history will be afforded the opportunity to read selectively under the guidance of a faculty member. No student will be allowed to enroll in this course more than once in each semester of his junior and senior years.

Prerequisites: Major in history, junior or senior standing and permission of the department.
Staff

*Fall and Spring, 1 to 3 credits*

## Colloquia in History

Readings and reports on selected topics of political, social, intellectual or economic history. The approach of each course will be comparative and will center around a broad theme chosen by the instructor in the subject area.

Prerequisite: Senior major standing or permission of instructor.

HIS 411   Colloquium in American History
Mr. W. Taylor
*Fall, 3 credits*

HIS 412   Colloquium in American History
Mr. H. Cleland
*Spring, 3 credits*

HIS 421   Colloquium in Latin American
          History
Mr. E. Chinchilla-Aguilar
*Fall, 3 credits*

HIS 422 Colloquium in Latin American
          History
Mr. B. Hamnett
*Spring, 3 credits*

HIS 431   Colloquium in European History
Mr. H. Lebovics
*Fall, 3 credits*

HIS 432   Colloquium in European History
Mrs. R. Cowan
*Spring, 3 credits*

HIS 461   Colloquium in Asian History
Staff
*Fall, 3 credits. Not offered 1970-71.*

HIS 462   Colloquium in Asian History
Staff
*Spring, 3 credits. Not offered 1970-71.*

# INTERDISCIPLINARY PROGRAM IN LINGUISTICS

In addition to the general university requirements for the bachelor of arts degree, the following courses are required for the major in linguistics:

1. LIN 102 Methods of Linguistic Description and LIN 211 Introduction to Syntax
2. One year of a non-Indo-European language
3. PHI 162 Symbolic Logic
4. Seven additional courses to be selected after consultation with the student's advisor
5. Two years of a modern foreign language

Recommended undergraduate courses in other departments:

GRK 111, 112 Elementary Greek
PHI 311 Contemporary Philosophies of Language
ESA 165 or ESG 162 Introduction to Digital Computers
ESA 335 Computer Organization and Programming
ESA 340 Introduction to the Theory and Applications of Computers

For further information about the linguistics program, consult Professor Frank Anshen in the English department.

## COURSES IN LINGUISTICS

### LIN 102 Methods of Linguistic Description

An introduction to phonology and morphology.
*Spring, 3 credits*

### LIN 105 Nonstandard Varieties of English

An investigation of the phonological and grammatical structures used by speakers of some of the significant social minority groups in the New York area. Special attention will be paid to black English, Puerto Rican English and the English of white migrant workers. This course is identical with EGL 282.
Staff
*Fall and Spring, 3 credits*

### LIN 201 Phonetics

Special emphasis on developing the ability to recognize and produce the more commonly used sounds among the languages of the world.
Prerequisite: LIN 102.
Staff
*Fall and Spring, 3 credits*

### LIN 204 Phonology

This course deals with the problem of how the sound systems of languages are structured. Major emphasis will be given to the theory of generative phonology, but the theories of the Post-Bloomfieldians, the Prague School, and the Stratificationalists will also be considered.
Prerequisite: LIN 201.
*Spring, 3 credits*

## LIN 211 Introduction to Syntax

An introduction to transformational-generative grammar. Special attention will be given to the grammar of English. This course is identical with EGL 280.

*Fall and Spring, 3 credits*

## LIN 221 Morphological Analysis

The principles of generative phonology, applied morphophonemics and morphology. This course is identical with EGL 287.
Prerequisite: LIN 102.
Staff

*Fall and Spring, 3 credits*

## LIN 241 History of Linguistics

Pānini, Greek and Roman grammarians, 19th century European comparativists, and American structuralists will be among the linguistic schools studied.

*Spring, 3 credits*

## LIN 250 History and Structure of the English Language

The development of the English language from its Indo-European origins. This course is identical with EGL 281.
Prerequisite: LIN 211/EGL 280.

*Fall and Spring, 3 credits*

## LIN 251 History of the Spanish Language

This course is identical with SPN 324.
Prerequisite: LIN 102.

*Fall and Spring, 3 credits*

## LIN 260 Methods and Materials in the Teaching of Foreign Languages

This course is identical with FLA 239.
Prerequisite: LIN 102.

*Fall and Spring, 3 credits*

## LIN 261 Introduction to Sociolinguistics

An examination of the interaction between language and society. Examples will be drawn largely from English. This course is identical with EGL 286.
Prerequisites: LIN 102 and LIN 211.

*Fall and Spring, 3 credits*

## LIN 263 Language and Culture

The study of language as an aspect of culture; the relation of habitual thought and behavior to language; the problem of meaning. This course is identical with ANT 263.
Prerequisite: ANT 150 or permission of instructor.

*Fall and Spring, 3 credits*

## LIN 301 Mathematical Aspects of Linguistics

An introduction to the mathematical concepts and procedures which underlie much contemporary linguistic practice. This course is identical with EGL 283.
Prerequisite: LIN 211/EGL 280.

*Fall and Spring, 3 credits*

## LIN 311 Advanced Syntax

A detailed consideration of syntactical problems in English and other languages, within a transformational generative framework.
Prerequisite: LIN 211/EGL 280.

*Fall, 3 credits*

## LIN 320 Discourse Analysis of English

An investigation of the principal theories of grammatical constraints on units larger than the sentence. This course is identical with EGL 288.
Prerequisite: LIN 211/EGL 280.

*Fall and Spring, 3 credits*

## LIN 329 Educational Psycholinguistics

An examination of the psychology of language, the relations among language, behavior and cognitive processes and the specific contributions of psycholinguistics to educational practice. Psycholinguistic research on foreign language education, reading instruction, language arts curricula, the function of language in the classroom and the interrelation be-

tween cognitive development and linguistic development will be reviewed. This course is identical with EDU 329.

Prerequisites: A course in linguistics, in psychology and in research methodology or permission of instructor.

*Fall and Spring, 3 credits*

## LIN 350 Seminar in Historical Linguistics

Examination of selected problems in the historical development of languages of interest to the members of the seminar.
Prerequisite: LIN 250.

*Fall and Spring, 3 credits*

## LIN 361 Field Methods in Sociolinguistics

Problem of sampling, interview technique, construction and scoring of linguistic variables, and presentation of results will be stud-ied in the context of a study by the class of the sociolinguistic patterns of a nearby community.
Prerequisite: LIN 261/EGL 286.

*Spring, 3 credits*

## LIN 371 Field Methods in Linguistics

Students will learn techniques of writing a grammar of a language unknown to them by working with a speaker of that language.
Prerequisites: LIN 201 and LIN 211.

*Spring, 3 credits*

## LIN 399 Readings in Linguistics

Qualified juniors and seniors in linguistics will be offered the opportunity to read selectively under the guidance of a faculty member.

*Fall and Spring, variable credit*

# DEPARTMENT OF MATHEMATICS

*Professors:* ALFRED ADLER, JAMES AX, WILLIAM D. BARCUS, RAOUF DOSS, RONALD G. DOUGLAS, DETLEF GROMOLL, WILLIAM G. LISTER, JOEL D. PINCUS, ELVIRA S. RAPAPORT, CHIH-HAN SAH, JAMES SIMONS *(Chairman)*, PETER SZÜSZ

*Associate Professors:* LEONARD S. CHARLAP, JEFF CHEEGER, DAVID EBIN, HERSHEL FARKAS, WILLIAM C. FOX, IRWIN KRA *(Director of Undergraduate Studies)*, WOLFGANG MEYER, STEVEN SCHANUEL, JOHN A. THORPE, EUGENE ZAUSTINSKY

*Assistant Professors:* GREGORY BACHELIS, HUGO D'ALARCAO, LAWRENCE FEINER, DAVID FRANK, MICHAEL FRIED, JOHN W. HELTON, ROGER HOWE, PAUL KUMPEL, ANTHONY PHILLIPS, JOSEPH ROITBERG, JOHN ROSENTHAL, R. SHANTARAM

*Research Instructor:* GARO KIREMIDJIAN

The undergraduate program in mathematics is designed to prepare the student for graduate study, for secondary school teaching or for certain positions in industry. Since the needs and interests of students will be at least as varied as their professional plans, the departmental requirements are designed to allow the student a great deal of flexibility in selecting his courses.

## 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:

> *Either* MAT 102, 103, 155, 156, 201, 232 plus 18 additional credit hours in mathematics courses numbered above 200, *Or* MAT 193, 194, 195, 196, 232 plus 15 additional credit hours in mathematics courses numbered above 200.

Students preparing for a Ph.D. program in pure mathematics are encouraged to include in their programs:

> MAT 202, 301 or 522, 302, 312, 323, 331.

Students preparing for a career in high school teaching are encouraged to include in their programs:

> MAT 204 or 301, 205, 239, 312, 321, 332.

Students preparing for a career in applied mathematics are encouraged to include in their programs:

MAT 203, 204 or 301, 205, 303, 304, 305, 306.

The department encourages students majoring in mathematics to begin advanced work in the sophomore year, by enrolling for MAT 232 in the second semester of that year, for example. Students planning graduate study in mathematics are advised to elect either French, German or Russian since many graduate schools require two of these three languages. Furthermore, prospective graduate students are encouraged to take graduate courses in mathematics during their junior and senior years.

For entering students with above average interest and ability in mathematics the department directs attention to its honors calculus sequence MAT 193, 194, 195, 196. In particular, students entering with advanced placement in mathematics are encouraged to consider this sequence.

All mathematics majors are urged to take at least one year of physics.

## Honors Program in Mathematics

The honors program consists of two parts: completion with a grade point average of 3.5 or higher of a set of designated mathematics courses and participation in at least one semester of the Senior Seminar.

A student interested in the honors program should apply formally to the department's Undergraduate Committee during the junior year. The Undergraduate Committee in consultation with the student and his advisor will then designate a set of courses that will constitute the student's honors program. These courses will normally be:

MAT 391 or 392, and 301, 302, 312, 323, 331.

Every honors program must include either MAT 391 or MAT 392, and must consist of six mathematics courses numbered 300 or above. First year graduate courses may be substituted for the corresponding 300 level courses. Thus a student may include in his program MAT 522 instead of MAT 301, and MAT 512 in place of MAT 302. Other programs must be formally approved by the Undergraduate Committee. Conferral of honors is contingent upon:

1. Achieving a 3.5 grade point average in the courses that constitute the student's honors program, and

2. active participation in Senior Seminar including at least two lectures on a topic chosen by the professor in charge of the Senior Seminar in consultation with the students in the seminar.

## COURSES IN MATHEMATICS

### MAT 100 Elementary Functions

Functions, graphing, algebraic operations on functions; analysis of rational, trigonometric and exponential functions. This course is intended for students who have taken *at most* three years of secondary school mathematics and whose program may require courses in the sequence MAT 102, 103, 104, 155, 156. It may not be counted toward the general university requirement in natural science.
Prerequisite: May be taken only by students who have had *at most* three years of secondary school mathematics except by permission of instructor.
Mr. J. Helton
*Fall and Spring, 3 credits*

### MAT 102 Calculus I

The derivative and integral: fundamental properties, interpretations and computations for elementary functions. Introduction to techniques of integration.
Mr. W. Lister and staff
*Fall and Spring, 4 credits*

### MAT 103 Calculus II

Integration techniques. Selected applications of the derivative and integral. First order differential equations. Taylor's formula. Infinite series. Introduction to partial derivatives and multiple integrals.
Prerequisite: MAT 102 or MAT 193. May not be taken for credit in addition to MAT 104.
Mr. J. Thorpe and staff
*Fall and Spring, 4 credits*

### MAT 104 Calculus II and Probability

Taylor's formula with remainder. Partial derivatives. Multiple integrals. Continuous and discrete probability: density; expectation; binomial, Poisson, uniform, exponential and normal distributions; moment generating functions; Poisson and normal approximation to binomial distribution; central limit theorems. This course is designed for social science majors and those students who do not expect to take the two-year calculus sequence. May

not be taken for credit in addition to MAT 103.
Prerequisite: MAT 102 or MAT 193.
Mr. W. Lister
*Fall and Spring, 4 credits*

### MAT 105 Elements of Probability

Random events and finite probability, discrete probability models, counting procedures. Some basic discrete probability distributions and their uses, including prediction and hypothesis testing.
Mr. P. Kumpel
*Fall and Spring, 3 credits*

### MAT 107 Introductory Mathematics I

A course designed to acquaint the student with the flavor of mathematics, what mathematics is and what modern mathematicians do, through consideration of specific topics chosen from: logic, set theory, elementary number theory, algebraic systems. MAT 107 and MAT 108 are intended primarily for those who do not plan to take more advanced courses in mathematics and may be taken in any order.
Mr. R. Howe
*Fall, 3 credits*

### MAT 108 Introductory Mathematics II

A course designed to acquaint the student with the flavor of mathematics, what mathematics is and what modern mathematicians do, through consideration of specific topics chosen from: the limit concept—area, length, rates of change; combinatorial topology; geometric structures. MAT 107 and MAT 108 may be taken in any order.
Mr. R. Howe
*Spring, 3 credits*

### MAT 113 Introduction to Probability

Introduction to continuous and discrete probability: basic properties of probability distributions, examples (from the physical sciences), expectations, binomial, Poisson and normal distributions.
Corequisite: MAT 103 or MAT 194.
Mr. R. Shantaram
*Spring, 1 credit*

## MAT 155 Calculus III

Introduction to linear algebra and to ordinary differential equations: vector spaces, subspaces, linear independence, bases, dimension, linear transformations and matrices; theory and techniques for the solution of linear differential equations and linear systems, including power series and power series solutions.
Prerequisite: MAT 103 or MAT 104.
Mr. J. Roitberg and staff
*Fall and Spring, 3 credits*

## MAT 156 Calculus IV

Differential and integral calculus in 2- and 3-space: directional derivatives, differential, Jacobian matrix, chain rule, multiple integrals, line and surface integrals, applications.
Prerequisite: MAT 155.
Mr. J. Cheeger and staff
*Fall and Spring, 3 credits*

## MAT 187 Mathematical Foundations of Economics I

Examination of those topics in set theory and linear algebra that are most relevant to economics. This course may not be used towards fulfilling the department's course requirement for majors. This course will not be offered beyond the 1970-71 academic year. This course is the same as ECO 331.
Prerequisites: ECO 100 and introductory knowledge of differential and integral calculus or permission of instructor.
Mr. P. Kalman
*Fall, 3 credits*

## MAT 188 Mathematical Foundations of Economics II

Examination of those topics in analysis, linear and non-linear differential equations, convexity and n-variable real-valued functions that are most relevant to economics. This course may not be used towards fulfilling the department's course requirement for majors. This course will not be offered beyond the 1970-71 academic year. This course is the same as ECO 332.
Prerequisite: MAT 187 or permission of instructor.
Mr. P. Kalman
*Spring, 3 credits*

## MAT 189 Mathematical Foundations of Economics III

Examination of topics in integration theory, n-variable vector-valued function theory and topology that are most relevant to economists. This course may not be used towards fulfilling the department's course requirement for majors. This course will not be offered beyond the 1970-71 academic year. This course is the same as ECO 333.
Prerequisite: MAT 188 or permission of instructor.
Mr. P. Kalman
*Fall, 3 credits*

## MAT 193, 194, 195, 196 Honors Calculus I-IV

This four-term sequence of four-credit courses is designed for students with above average interest and ability in mathematics. The material covered will be substantially that of MAT 102, 103, 155, 156, 201 and 202. Using a more theoretical approach from the beginning, this sequence will give the student an earlier introduction to modern mathematics. Students finding the material inappropriate for them will be encouraged to transfer into the regular calculus sequence in the first few weeks or after completing MAT 193, which satisfies the prerequisites for MAT 103. Students taking this honors sequence may not take for credit MAT 102, 103, 104, 155, 156, 201 or 202.
Mr. A. Phillips, Mr. D. Gromoll
*Fall (MAT 193, 195) and Spring (MAT 194, 196), 4 credits each semester*

## MAT 201 Analysis I

The topology of metric spaces, limits, continuity, mean value theorems. The operations of differentiation and integration and their interchange with limits.
Prerequisite: MAT 155.
Mr. A. Adler
*Fall and Spring, 3 credits*

## MAT 202 Analysis II

Calculus of several variables: inverse and implicit function theorems, differential forms, submanifolds of n-space, Stokes' theorem.

Prerequisites: MAT 156 and MAT 201.

Mr. A. Adler

*Fall and Spring, 3 credits*

## MAT 203 Differential Equations

Review of linear ordinary differential equations and linear systems. Series solutions. Eigenvalue problems. Bessel and Legendre functions. Expansions in series of orthogonal functions including Fourier series. Introduction to partial differential equations.

Prerequisite: MAT 156 or MAT 194.

Mr. S. Schanuel and staff

*Fall and Spring, 3 credits*

## MAT 204 Introduction to Complex Function Theory

Functions of a complex variable including a description of the elementary functions. Holomorphic functions. Cauchy-Riemann equations. Power series expansions. Contour integrations; the Cauchy theory. Residues and poles. Conformal mappings. Laplace and Fourier transforms. This course differs from MAT 301 in that it is more applications-oriented; it may not be taken for credit in addition to MAT 301.

Prerequisite: MAT 156 or MAT 194.

Mr. J. Pincus

*Fall and Spring, 3 credits*

## MAT 205, 206 Probability and Statistics

Finite, discrete and continuous probability distributions, random variables, conditional probability, multivariate distributions, Markov chains, laws of large numbers, central limit theorem. Statistical applications: random sampling, estimation, significance testing, hypothesis testing, regression correlation. Further topics.

Prerequisite: MAT 103, or MAT 104, or MAT 194.

Mr. R. Shantaram and staff

*Fall and Spring, 3 credits each semester*

## MAT 232 Algebra I

Basic concepts in abstract algebra: groups and rings together with their homomorphisms and quotient structures. Integral domains, unique factorization domains and principal ideal domains. Fields and polynomial domains over fields.

Prerequisite: MAT 155 or MAT 194.

Mr. E. Zaustinsky and staff

*Fall and Spring, 3 credits*

## MAT 233 Number Theory

Congruences, quadratic residues, quadratic forms, continued fractions, Diophantine equations, number-theoretical functions and properties of the prime numbers.

Prerequisite: MAT 155 or MAT 194.

Mr. P. Szüsz

*Fall, 3 credits*

## MAT 234 Linear Algebra

Vector spaces over fields, linear transformations, the orthogonal and unitary groups, canonical forms for matrices, the spectral theorem, multilinear algebra.

Prerequisite: MAT 155 or MAT 194.

Mr. R. Howe

*Fall and Spring, 3 credits*

### MAT 239 Elements of Secondary School Mathematics

An examination of the conceptual organization for instructional purposes of topics from secondary school mathematics. Foundations, general instructional techniques and available curricular materials are reviewed.

Prerequisite: Junior or senior standing as a mathematics major or permission of instructor.

Mr. W. Lister

*Spring, 3 credits*

### MAT 291, 292 Junior Seminar

This course is designed to give students an opportunity to learn some mathematics in a more seminar-like situation than is encountered in an ordinary class. Each term a topic will be selected usually comprising material not ordinarily presented in undergraduate courses. Students will lecture on the material.

Prerequisites: Permission of instructor. Permission of instructor may be contingent upon completion of certain courses, for example, MAT 201 or MAT 232.

Mr. I. Kra

*Fall and Spring, 3 credits each semester*

### MAT 301 Introduction to Complex Analysis

Holomorphic functions. Cauchy-Riemann equations. Cauchy Theory. Maximum modulus principle. Taylor series expansions. Differential forms. Meromorphic functions. Laurent series expansions. Evaluation of integrals by the method of residues. Topics chosen from: harmonic functions, Dirichlet problem for the disc, Hilbert transforms.

Prerequisite: MAT 201 or MAT 195. This course may not be taken for credit in addition to MAT 204.

Mr. M. Fried

*Fall and Spring, 3 credits*

### MAT 302 Introduction to Real Analysis

Lebesgue and Lebesgue-Stieltjes measures and integrals and their fundamental properties. Comparison with Riemann integration. Basic properties of $L_2$.

Prerequisite: MAT 202 or MAT 196.

Mr. W. Barcus

*Spring, 3 credits*

### MAT 303, 304 Non-Linear Ordinary Differential Equations

Singular points of vector fields, the degree and index of a mapping, limit cycles, the existence and stability of periodic solutions, differential equations of second order, approximation methods including the Poincaré small parameter method, the Bogoliubov-Krylov-Mitropolsky asymptotic method, the method of averaging and the method of Andronov and Witt. Oscillations of non-linear systems with slowly varying parameters, forced oscillations, subharmonic oscillations and entrainment, bifurcation of solutions, Hamiltonian systems, small denominators.

Prerequisites: MAT 203 and either MAT 204 or MAT 301.

Mr. J. Pincus

*Fall and Spring, 3 credits each semester*

### MAT 305, 306 Partial Differential Equations

Fourier series, orthogonal functions, eigenfunctions of Sturm-Liouville operators, Green's functions, Fourier integrals, Laplace transforms. Second order partial differential equations: Laplace equation and the wave equation. Calculus of variations. Additional topics to be chosen from: asymptotic distribution of eigenvalues, spectral theory for compact operators on Hilbert spaces, special functions and group representations.

Prerequisites: MAT 203, MAT 204 or MAT 301, and PHY 102 or permission of instructor.

Mr. J. Helton

*Fall and Spring, 3 credits each semester*

## MAT 312 Introduction to Topology

Introduction to point set topology: connectedness, compactness, continuity, etc. The fundamental group and covering spaces.

Prerequisites: Either MAT 201 or MAT 195, and MAT 232.

Mr. P. Kumpel

*Fall and Spring, 3 credits*


## MAT 321 Geometric Structures

Formal geometries, their relationship and interpretations; projective, affine, Euclidean and non-Euclidean geometries.

Prerequisite: MAT 232.

Mr. H. D'Alarcao

*Spring, 3 credits*


## MAT 323 Introduction to Differential Geometry

Geometry of curves and surfaces in 3-space. Introduction to manifolds and to Riemannian geometry.

Prerequisite: MAT 202 or MAT 196.

Mr. W. Meyer

*Fall and Spring, 3 credits*


## MAT 331 Algebra II

Structure theory of finitely generated modules over principal ideal domains. Applications to group theory and to linear algebra. Further topics such as homological algebra, field theory, structure of rings.

Prerequisite: MAT 232.

Mr. W. Lister

*Fall and Spring, 3 credits*


## MAT 332 Theory of Polynomials

Detailed study of polynomials, including elementary Galois theory with emphasis on quadratic, cubic and quintic equations. Further topics such as real fields, Sturm's theorem.

Prerequisite: MAT 232.

Mr. J. Rosenthal

*Fall and Spring, 3 credits*


## MAT 341, 342 Independent Study in Special Topics

A reading course for juniors and seniors. The topics may be chosen by the student with the approval of a supervising member of the faculty who will also take responsibility for evaluation. A topic that is covered in a course regularly offered by the department is not appropriate for independent study.

Prerequisite: Permission of the director of undergraduate studies, who will arrange for a faculty member to supervise the project.

Staff

*Fall and Spring, 3 credits each semester*


## MAT 351 Logic

A survey of the logical foundations of mathematics. Development of propositional calculus and quantification theory. The notions of a proof and of a model. The completeness theorem.

Corequisite: MAT 232.

Mr. J. Rosenthal

*Fall, 3 credits*


## MAT 391, 392 Senior Seminar

This course is designed for seniors who are majoring in mathematics and who have a serious interest in mathematical research. Each term a topic will be selected comprising material not presented in undergraduate courses. By the end of the term, students will be acquainted with a limited area of current research interest. The material will be presented in seminar style with students giving the lectures.

Prerequisite: Permission of instructor.

Mr. J. Cheeger

*Fall and Spring, 3 credits each semester*

# GRADUATE COURSES

Junior and senior mathematics students of above average ability are encouraged to take graduate courses in mathematics. Permission of the instructor is a prerequisite for registering in a graduate course. See *Graduate Bulletin* for details.

MAT 502 Algebra I
MAT 503 Algebra II
MAT 504 Homological Algebra
MAT 505 Group Theory
MAT 506, 507 Theory of Numbers
MAT 508, 509 Algebraic Geometry
MAT 512 Real Analysis I
MAT 513 Real Analysis II
MAT 514, 515 Functional Analysis
MAT 516, 517 Partial Differential Equations
MAT 518, 519 Harmonic Analysis
MAT 522 Complex Analysis I
MAT 523 Complex Analysis II
MAT 524, 525 Riemann Surfaces and
              Automorphic Functions

MAT 532 Algebraic Topology I
MAT 533 Algebraic Topology II
MAT 534 Differential Topology
MAT 540, 541 Student Seminar in
              Geometry
MAT 542, 543 Introduction to
              Differential Geometry
MAT 546, 547 Lie Groups and
              Homogeneous Spaces
MAT 548, 549 Complex Manifolds
MAT 552, 553 Logic
MAT 598 Independent Study
MAT 602, 603 Topics in Algebra
MAT 612, 613 Topics in Analysis
MAT 622, 623 Topics in Complex Analysis
MAT 632, 633 Topics in Topology
MAT 642, 643 Topics in Geometry
MAT 644 Characteristic Classes
MAT 645 Comparison Theorems in
              Riemannian Geometry
MAT 646, 647 Analysis on Manifolds
MAT 648 Minimal Surfaces
MAT 652, 653 Topics in Logic

# DEPARTMENT OF MUSIC

*Professors:* BILLY JIM LAYTON (*Chairman*), ISAAC NEMIROFF

*Associate Professors:* [a] EDWARD A. BONVALOT, JOHN LESSARD, DAVID LEWIN

*Assistant Professor:* SARAH FULLER

*Instructors:* [a] RICHARD A. KRAMER, DAVID LAWTON

*Director of Choral Music:* GREGG SMITH

*Director of the University Band:* SIMON KARASICK

*Performing Artists in Residence:* ADELE ADDISON, RONALD ANDERSON, SAMUEL BARON, ALVIN BREHM, MARTIN CANIN, RAYMOND DES ROCHES, JEAN DUPOUY, RALPH FROELICH, DAVID GLAZER, BERNARD GREENHOUSE, JACK KREISELMAN, RONALD ROSEMAN, [a] CHARLES ROSEN, ARTHUR WEISBERG, PAUL ZUKOFSKY

The undergraduate major in music is designed as a balanced educational program which serves as preparation for professional careers and advanced training in performance, composition, scholarship and teaching.

### Requirements for the Major in Music

In addition to the general university requirements for the bachelor of arts degree, the following requirements must be met for the major in music:

A. Admittance to the major

Any student wishing to major in music should apply to the department office for a theory placement interview and an audition in voice or instrument.

B. Study within the area of the major

1. Theory

MUS 122 Foundations of Musicianship II

MUS 125 Modal Counterpoint I

MUS 127, 128 Tonal Harmony I, II

MUS 201 Analysis of Tonal Music

MUS 203 Analysis of 20th Century Works

2. History and Literature

MUS 143 Western Music before 1600

MUS 144 Western Music from 1600 to the Early 19th Century

MUS 249 Western Music of the 19th and 20th Centuries

Three additional courses numbered 341 or higher, to be chosen in consultation with the student's advisor. The courses should be distributed among a range of historical periods.

[a] On leave academic year 1970-71.

3. Performance

At least one course from the groups MUS 161-199 Secondary Instrument or Voice or MUS 261-299 Primary Instrument or Voice every semester.

MUS 114 University Chorus or MUS 115 University Orchestra or MUS 116 University Band for two years.

Note: Although there is no upper limit on the number of credits a student may elect in Performance, no more than 32 credits in this area may be included in the 120 credits required for the B.A. degree.

C. Piano proficiency

Each student will be expected to pass a piano proficiency test at the end of his first year as a music major. A student who has not passed his proficiency test by the end of his second year of study will not be permitted to continue as a music major. The test may be waived in the case of an obviously qualified student upon the recommendation of the piano instructor.

D. Foreign language

Students who intend to continue their studies beyond the B.A. degree are advised that most graduate music programs require a reading knowledge of French or German, often both.

## COURSES IN MUSIC

### MUS 091 Introduction to Music Theory

Study of scales, intervals, meter, rhythm, notation. Approach will include written exercises, sight singing, melodic and rhythmic dictation. Emphasis on learning basic concepts of music theory.

Staff

*Fall and Spring, no credit*

### MUS 101 Music in Western Civilization

Examination of the musical heritage of Europe and America in terms of its development from antiquity to the present day. A survey of Medieval and Renaissance forms will introduce a closer study of the period after 1600. Emphasis will fall on major composers and specific works.

Staff

*Fall and Spring, 3 credits*

### MUS 103 Music in the Romantic Era

The expressive art of the century between the birth of Schubert and the death of Brahms is examined in selected works of these and other figures, such as Berlioz, Mendelssohn, Chopin, Schumann, Liszt, Wagner and Verdi.

Staff

*Fall, 3 credits*

### MUS 104 Music and Drama

The ritual and dramatic uses of music from antiquity to the modern lyric theatre, with emphasis upon the operatic repertory from Mozart to Berg.

Miss S. Fuller

*Spring, 3 credits*

### MUS 105 The Music of Beethoven

An exploration of the meaning and continuing relevance of one of the pivotal composers of the western world by the study of his symphonies, string quartets, piano sonatas and other works.

Miss S. Fuller

*Fall, 3 credits*

## MUS 106 Music of the 20th Century

An introduction to the variegated and rapidly changing trends of the present century, including impressionism, expressionism, neo-classicism, twelve-tone and other serialism, constructivism, chance music, electronic and computer music, as well as styles derived from folk music, jazz and other forms of popular music.

Staff

*Spring, 3 credits*

## MUS 110 Music in the Society of Sub-Saharan Africa

A survey of the role and function of music among the peoples of sub-Saharan Africa. Discussion will include traditional music in the so-called "tribal" society, and contemporary trends in African music-making as affected by such external influences as Islam, Christianity, urbanization, mass communications and other aspects of western civilization. This course is identical with BLS 257.

Mr. L. Ekwueme

*Fall, 3 credits*

## MUS 114 University Chorus

Open to all students. Study and performance of a repertory from the Middle Ages to the present. More than four unexcused absences from rehearsals eliminates credit.

Prerequisite: Auditions.

Mr. G. Smith

*Fall and Spring, 1 credit*

## MUS 115 University Orchestra

Open to all students. Study and performance of works from the repertory of the concert orchestra. More than four unexcused absences from rehearsals eliminates credit.

Prerequisite: Auditions.

Mr. D. Lawton

*Fall and Spring, 1 credit*

## MUS 116 University Band

Open to all students. Study and performance of works from the repertory of the concert band. More than four unexcused absences from rehearsals eliminates credit.

Prerequisite: Auditions.

Mr. S. Karasick

*Fall and Spring, 1 credit*

## MUS 119 The Elements of Music

The notation of intervals, scales, chords, rhythms and meters. Practical exercises and ear training, intended for students majoring in fields other than music.

Staff

*Fall and Spring, 3 credits*

## MUS 121 Foundations of Musician-ship I

Beginning music theory including notation of rhythms, scales, intervals, chords, sight singing and simple rhythmic exercises. Elementary melodic, rhythmic and harmonic dictation. Intended for students who are not prepared to enter MUS 122.

Prerequisite: Placement interview.

Mr. D. Lawton

*Fall and Spring, 3 credits*

## MUS 122 Foundations of Musician-ship II

Intended to develop the student's aural perception. Problems in melodic, rhythmic and harmonic dictation. Sight singing exercises including complex rhythms, tonal and modal melodies, modulation. Elementary analysis of a few basic musical forms.

Prerequisite: MUS 121 or the equivalent.

Mr. J. Lessard

*Fall and Spring, 3 credits*

## MUS 123, 124 The Structural Princi-ples of Music I, II

Intended for students majoring in fields other than music. An introduction to the language and basic structural concepts of the art through the study of such elements as melody, rhythm, harmony, counterpoint and form. Analysis, written exercises and discussion of theoretical principles. Students lacking some prior familiarity with musical notation will be given supplementary exercises. MUS 123 may be taken alone.

Mr. I. Nemiroff

*Fall and Spring, 3 credits each semester*

## MUS 125 Modal Counterpoint I

Counterpoint in 16th century style for two voices.
Prerequisite or corequisite: MUS 122.
Mr. J. Lessard
*Fall and Spring, 3 credits*

## MUS 127, 128 Tonal Harmony I, II

Practice in homophonic writing, including the harmonization of chorales.
Prerequisite: MUS 125.
Mr. D. Lewin, Mr. I. Nemiroff
*Fall and Spring, 3 credits each semester*

## MUS 143 Western Music before 1600

The history of western music from antiquity to the late 16th century.
Prerequisite: MUS 122.
Miss S. Fuller
*Fall, 3 credits*

## MUS 144 Western Music from 1600 to the Early 19th Century

A survey of style and form from early opera through the late quartets of Beethoven.
Prerequisite: MUS 143.
Miss S. Fuller
*Spring, 3 credits*

## MUS 145 Collegium Musicum

A workshop in the performance of music scored for small vocal and instrumental ensembles, with emphasis upon the repertory from the Middle Ages to 1750.
Prerequisite: MUS 122 or permission of instructor.
Staff
*Fall and Spring, 1 credit*

## MUS 151 Basic Piano

Instruction in keyboard skills for beginners, intended for music majors who are unable to pass the department's piano proficiency examination. Small groups of students meet one hour per week with the instructor, with four hours individual practice required.
Prerequisite: Permission of instructor.
Mr. M. Canin and staff
*Fall and Spring, 1 credit*

## MUS 161 to 191 Secondary Instrument or Voice

One half-hour individual lesson each week, with five hours practice required. Open to music majors and, enrollment permitting, to other students with a serious interest in music.
Prerequisite: Permission of instructor.
*Fall and Spring, 2 credits*

MUS 161   Piano

   Mr. C. Canin

MUS 167   Violin

   Mr. P. Zukofsky

MUS 168   Viola

   Mr. J. Dupouy

MUS 169   Cello

   Mr. B. Greenhouse

MUS 170   String Bass

   Mr. A. Brehm

MUS 174   Flute

   Mr. S. Baron

MUS 175   Oboe

   Mr. R. Roseman

MUS 176   Clarinet

   Mr. J. Kreiselman

MUS 177   Bassoon

   Mr. A. Weisberg

MUS 183   Horn

   Mr. R. Froelich

MUS 184   Trumpet

   Mr. R. Anderson

MUS 185   Trombone

   Mr. S. Karasick

MUS 186   Tuba

Mr. S. Karasick

MUS 191   Percussion

Mr. R. Des Roches

MUS 199   Voice

Miss A. Addison

## MUS 201 Analysis of Tonal Music

The course will examine, through the study of selected works, the action and interaction of harmonic progression, rhythm, meter, motive and line in defining and articulating tonal structures.
Prerequisite: MUS 128.
Mr. D. Lewin
*Fall, 3 credits*

## MUS 203 Analysis of 20th Century Works

Music to be studied will be selected from representative works by Debussy, Bartok, Schoenberg, Stravinsky, Webern, and others.
Prerequisite: MUS 201.
Mr. D. Lewin
*Spring, 3 credits*

## MUS 205 Analysis of Medieval and Renaissance Works

The course aims at an understanding of some of the principles underlying the structure of pre-tonal music through the study of a selection of works representative of important periods and styles up to the 16th century.
Prerequisite: MUS 128.
*3 credits. Not offered 1970-71.*

## MUS 211 Modal Counterpoint II

Counterpoint in 16th century style for three or more voices.
Prerequisite: MUS 125.
*3 credits. Not offered 1970-71.*

## MUS 213 Tonal Counterpoint

A study of the art of combining voices under the conditions of tonal harmony as observed in works from Bach through the Romantic composers.
Prerequisite: MUS 128.
Mr. I. Nemiroff
*Spring, 3 credits*

## MUS 215 Advanced Harmony

Techniques and practices beyond those studied in MUS 127, 128.
Prerequisite: MUS 128.
Mr. I. Nemiroff
*Fall, 3 credits*

## MUS 249 Western Music of the 19th and 20th Centuries

A survey of music from the early 19th century until the present day with emphasis on major currents of stylistic development.
Prerequisite: MUS 144.
*3 credits. Not offered 1970-71.*

## MUS 260 African Music—Its Theory and Practice

The course is aimed at bringing an understanding of the music of the peoples of sub-Saharan Africa from a study of its qualities and an analysis of its theoretical peculiarities with special reference to form, rhythm, melody and scales, harmony, instrumentation and performance techniques. This course is identical with BLS 260.
Prerequisite: MUS 122 or permission of instructor.
Mr. L. Ekwueme
*Spring, 3 credits*

## MUS 261 to 299 Primary Instrument or Voice

One hour individual lesson each week, with 15 hours practice required. Open only to students with adequate preparation who demonstrate a professional commitment to the performance of music.
Prerequisite: Permission of instructor.
*Fall and Spring, 4 credits*

MUS 261   Piano

Mr. M. Canin

MUS 267   Violin

Mr. P. Zukofsky

MUS 268   Viola

Mr. J. Dupouy

MUS 269   Cello

Mr. B. Greenhouse

MUS 270   String Bass

Mr. A. Brehm

MUS 274   Flute

Mr. S. Baron

MUS 275   Oboe

Mr. R. Roseman

MUS 276   Clarinet

Mr. D. Glazer, Mr. J. Kreiselman

MUS 277   Bassoon

Mr. A. Weisberg

MUS 283   Horn

Mr. R. Froelich

MUS 284   Trumpet

Mr. R. Anderson

MUS 285   Trombone

Mr. S. Karasick

MUS 286   Tuba

Mr. S. Karasick

MUS 291   Percussion

Mr. R. Des Roches

MUS 299   Voice

Miss A. Addison

## MUS 301 Homophonic Forms

Composition in Classical and Romantic styles, proceeding from individual phrases to large movements.

Prerequisite: MUS 128.
*3 credits. Not offered 1970-71.*

## MUS 303 Fugue

Application of the skills of tonal counterpoint to fugal composition.
Prerequisite: MUS 213.
*3 credits. Not offered 1970-71.*

## MUS 305 Orchestration

The possibilities and limitations of the commonly used instruments. Conventions of notation. Practice in scoring for various ensembles.
Prerequisite: MUS 128.
Mr. J. Lessard
*Fall, 3 credits*

## MUS 313 Composition

Open only to students demonstrating sufficient aptitude and capacity for original work.
Prerequisite: Permission of instructor.
Mr. B. J. Layton, Mr. J. Lessard, Mr. D. Lewin, Mr. I. Nemiroff
*Fall and Spring, 3 credits*

## MUS 317 Basic Conducting Techniques

Baton technique and the analysis and preparation of instrumental and vocal scores for performance.
Prerequisites: MUS 128 and permission of instructor.
Mr. G. Smith
*Fall and Spring, 3 credits*

## MUS 319 Ensemble

Chamber music ensembles such as the string quartet, solo vocal ensemble, piano trio, piano duo, and other ensembles, including the mixed groupings characteristic of the 20th century, each meet one hour per week under the direction of a member of the performance faculty for the study and preparation of works from the repertories of the respective groups. The work of the course is normally directed toward the performance of the compositions

studied. Open only to students with adequate preparation in their primary instrument or voice.
Prerequisite: Permission of instructor.
Mr. D. Lawton and staff
*Fall and Spring, 2 credits*

## MUS 321 Piano Literature I

Performance and analysis of representative works for the solo keyboard repertory beginning with the English virginal school and continuing through the piano music of the Classical period. Intended for advanced students of piano enrolled in MUS 261.
Prerequisite: Permission of instructor.
Mr. M. Canin
*Fall, 2 credits*

## MUS 322 Piano Literature II

Performance and analysis of solo piano music from 1800 through the mid-20th century. Intended for advanced students of piano enrolled in MUS 261.
Prerequisite: Permission of instructor.
Mr. M. Canin
*Spring, 2 credits*

## MUS 345 Classical Chamber Music

The string quartets of Haydn, Mozart and Beethoven provide a central point of reference in the course.
Prerequisites: MUS 128, 144.
*Fall, 3 credits*

## MUS 347 Johann Sebastian Bach

A study of selected vocal and instrumental works.
Prerequisites: MUS 128, 144.
Staff
*3 credits. Not offered 1970-71.*

## MUS 349 The 16th Century Madrigal

The development in Italy of this important form is traced to its eventual influence on England.
Prerequisites: MUS 128, 144.
*3 credits. Not offered 1970-71.*

## MUS 351 Beethoven

Works of differing scope and medium drawn from every period of his life will be studied.
Prerequisites: MUS 128, 144.
Staff
*Spring, 3 credits*

## MUS 353 The Operas of Mozart

A general consideration of *opera seria, opera buffa, Singspiel* and other traditions affecting the composer's style accompanies a detailed examination of selected works.
Prerequisites: MUS 128, 144.
*3 credits. Not offered 1970-71.*

## MUS 355 Verdi

The operas selected for critical comparison will illustrate the steady growth and refinement of his art over more than 50 years.
Prerequisites: MUS 128, 249.
Mr. D. Lawton
*Fall, 3 credits*

## MUS 357 The Lied from Schubert to Wolf

This course explores a peak of German tradition in the matching of text and music.
Prerequisites: MUS 128, 249.
*3 credits. Not offered 1970-71.*

## MUS 359 Wagner

A study of his progress from romantic opera to music drama will be supplemented by readings in the prose works.
Prerequisites: MUS 128, 249.
*3 credits. Not offered 1970-71.*

## MUS 361 Piano Music of the 19th Century

The repertory of the solo instrument from Beethoven to Debussy.
Prerequisites: MUS 128, 249.
*3 credits. Not offered 1970-71.*

## MUS 363 Stravinsky

The changing stylistic manners adopted by a pivotal composer of the 20th century.
Prerequisites: MUS 128, 249.

*3 credits. Not offered 1970-71.*

## MUS 365 Schoenberg

The course will turn on his double role as child of an old tradition and father of a new language.

Prerequisites: MUS 128, 249.
Mr. D. Lawton
*Spring, 3 credits*

## MUS 399 Independent Project

Individual study under the guidance of a staff member leading to a major essay or composition.
Prerequisites: Permission of instructor and approval of department chairman.
*Fall and Spring, 3 credits*

# DEPARTMENT OF PHILOSOPHY

*Professors:* SIDNEY GELBER, PATRICK A. HEELAN *(Chairman)*, CHAIM PERELMAN *(Visiting)*, ROBERT STERNFELD, HAROLD ZYSKIND

*Associate Professors:* DON IHDE, MARSHALL SPECTOR, VICTORINO TEJERA, WALTER WATSON, [a] EDDY M. ZEMACH

*Assistant Professors:* EDWARD ERWIN, SIDNEY GENDIN, PATRICK J. HILL, JOHN W. LANGO, ABIGAIL ROSENTHAL

*Instructors:* DAVID BENFIELD, ANTONIO deNICOLAS

## 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:

1. At least one semester course from each of the following five areas:

   I. History of Philosophy
   II. Logic or Philosophy of Science
   III. Epistemology or Metaphysics
   IV. Ethics, Esthetics, Political or Social Philosophy
   V. Study of a single philosopher or classic text

   Designation of appropriate courses in terms of the above areas is indicated by Roman numbers after title of courses. Unnumbered courses may be taken for elective credit (see 2). For more detailed information the student should consult a departmental advisor.

2. At least three other semester courses in philosophy

N.B. Students preparing for graduate work are advised to take additional work to that specified above. Specific information and individual advice should be sought from the student's departmental advisor.

## Courses in Philosophy

Courses numbered 101-120 are designed to serve both as introductions to philosophy and as general philosophical perspectives for the non-major. The content of each section of the multisection courses will vary; detailed information for each section is available at the philosophy office.

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[a] On leave academic year 1970-71.

Students who become majors after having taken courses in the 101-110 and 113-120 ranges will be given credit toward satisfying the major requirements for only one such course. The most efficient introduction to philosophy for philosophy majors is the PHI 111, 112 sequence.

## Honors Program in Philosophy

A student qualifying for the honors program as determined by the consensus of the philosophy faculty (and based upon his cumulative grade average and his average in philosophy courses) shall plan a program with a departmental advisor not later than the registration period of his senior year.

The program shall consist of three courses at the 390 level (usually both 398 and 399), concentrated on related aspects of a central problem, leading to a senior paper which will become the focus of an oral examination. Honors will be awarded upon passage of the examination.

## COURSES IN PHILOSOPHY

### PHI 098, 099 Introduction to Philosophical Readings

This course is designed to introduce students to the construction of philosophical arguments as found in the writings of eminent philosophers both past and present. The emphasis is not on historical or topical coverage, but simply on following an argument.
Staff
*Fall and Spring, no credit*

### PHI 101 Ancient and Medieval Philosophic Classics

Readings and discussions of major philosophic texts of ancient and medieval philosophers such as Plato, Aristotle, Cicero, Marcus Aurelius, Plotinus, Lucretius, St. Augustine, St. Thomas.
Staff
*Fall and Spring, 3 credits*

### PHI 102 Modern Philosophic Classics

Readings and discussions of selected philosophic texts from the 17th century to the present by such philosophers as Descartes, Hume, Kant, Hegel, Nietzsche, Wittgenstein and Sartre.
Staff
*Fall and Spring, 3 credits*

### PHI 103 Philosophic Classics: Major Issues

Topics selected from recurrent philosophic issues from man's social, intellectual, religious and artistic experience in the traditions of western civilization.
Staff
*Fall and Spring, 3 credits*

### PHI 104 Contemporary Morality

A philosophical inquiry into moral questions raised by contemporary personal and social issues such as the justification of social protest, the right to complete sexual freedom, and the morality of new life styles. The student will be expected to master methods of philosophical inquiry and analysis and to apply them to the moral questions under discussion.
Mr. D. Benfield
*Fall and Spring, 3 credits*

### PHI 106 Radical Thought

An inquiry into radical criticisms of western values, with emphasis on advocates of existentialism (e.g., Nietzsche, Sartre), Marxism (e.g., Marx, Marcuse), pacifism (e.g., Thoreau, Gandhi) and violence (e.g., Sorel, Fanon).
Mr. J. Lango
*Spring, 3 credits*

## PHI 107 Philosophic Bases of Argument

Introductory inquiry into how principles affect or determine the structure as well as content of an argument. The question is directed first to philosophic arguments, in readings from such authors as Plato, Hume and Nietzsche; and then to controversies or oppositions in special disciplines, in readings from such pairs as Herodotus and Thucydides, Lincoln and Douglas, and R. S. Crane and Cleanth Brooks.
Mr. H. Zyskind
*Schedule to be announced, 3 credits*

## PHI 109 Introduction to Oriental Philosophy

The course is centered around the fundamental themes of the Vision of the Vedic Seers, existence, non-existence, consciousness, time, the self and Man. These themes are made comprehensive with a study of the language of the Vedas and of the pre-supposition, basic to all the Oriental tradition, that at the origin of all manifestation (tad) there is a unity (ekam).
Prerequisite: Sophomore standing or permission of instructor.
Mr. A. de Nicolas
*Fall, 3 credits*

## PHI 110 Historical Introduction to Philosophy

An introductory study of the nature of philosophy through an analysis of philosophic activity in the context of its socio-historical setting. In order to heighten awareness of the nature of the activity, pairs of philosophers will be studied in each of the major periods of the history of philosophy. The course will focus on such thinkers as Plato and Aristotle, Descartes and Hobbes, Marx and Kierkegaard.
Mr. P. Hill
*Fall and Spring, 3 credits*

## PHI 111 Major Thinkers in the History of Philosophy: Ancient and Medieval (I)

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. (This course was formerly listed as PHI 201.)
Miss A. Rosenthal
*Fall, 3 credits*

## PHI 112 Major Thinkers in the History of Philosophy: Modern (I)

Study of the writings of the major thinkers from Descartes to Kant on the problems of metaphysics and epistemology. This course was formerly listed as PHI 202.
Mr. M. Spector, Mr. R. Sternfeld
*Spring, 3 credits*

## PHI 115 Justice

A discussion of Justice and related political and ethical issues: law, fairness, etc.
Mr. C. Perelman
*Fall, 3 credits*

## PHI 116, 117 Innovation and Tradition

An introductory inquiry into how man shapes his thought and action to discover and cope with new problems. Topics include: the break with tradition; the making of facts; self-expression as a source of novelty; patterns of discovery and invention; problems of stability and continuity in the face of innovation. Readings are drawn from such sources as the following: Aristotle, *Rhetoric;* Lincoln-Douglas Debate; Socrates' *Apology;* Ghiselin, *The Creative Process;* T. S. Kuhn, "The Essential Tension: Tradition and Innovation."
Prerequisite to PHI 116: None; to PHI 117: PHI 116. No credit will be given to students who have already taken PHI 105.
Mr. L. Gardner, Mr. W. Watson, Mr. H. Zyskind
*Fall and Spring, 3 credits each semester*

## PHI 141 Issues in Civil Liberties: Equality

This course traces the development of the concept of equality in America; examines current efforts to offer equal protection of the

laws to racial, religious and economic minorities; and analyzes the values and theories implicit in an egalitarian ideal.

Mr. S. Ackley

*Fall, 3 credits*

## PHI 151 Ethics (IV)

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 and modern works, such as those of Spinoza, Kant, William James and Sartre, are studied to make clear the character of ethical problems and the principles and methods available for their solution.

Mr. S. Gendin

*Fall, 3 credits*

## PHI 152 Ethical Inquiry (IV)

An investigation of selected ethical problems emphasizing the experiential basis required for their adequate resolution. Readings will be drawn from various disciplines—historical, biological, psychological, sociological, legal, political or literary—and are brought together in their bearing upon ethical issues.

*Spring, 3 credits*

## PHI 161 Logic (II)

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.

Mr. D. Benfield

*Fall and Spring, 3 credits*

## PHI 162 Symbolic Logic (II)

The course covers topics such as: proof and rules of inference of propositional calculus, predicate logic at first order along with related concepts of normal forms, quantification, etc., metalogical concepts of consistency, completeness, decidability of a logical system, etc.

Prerequisite: PHI 161.

Mr. D. Benfield

*Spring, 3 credits*

## PHI 201 Philosophy of Perception (III)

An inquiry into the philosophical problems pertaining to the sensing, perceiving and observing of the world. Various historial solutions (e.g., phenomenalism, representationalism, scientific realism, naive realism, etc.) will be examined. Special attention is given to contemporary views and to the impact of recent research (e.g., in the psychological and the biological sciences) on the issue in question.

*Fall, 3 credits*

## PHI 202 Ontology (III)

Ontology is the study of what there is. Philosophers do not agree about what there is or the grounds for determining this. This course focuses on the disputes about and the arguments supporting or disproving the existence of matter, souls, God, etc. It uses both classical writings (Plato, Berkeley, etc.) and contemporary writings (Whitehead, Quine, etc.).

Mr. J. Lango

*Fall, 3 credits*

## PHI 211 Problems of Esthetics (IV)

An introduction to esthetics, examining the range of its problems treated by recent and contemporary authors such as Freud, Clive Bell, Dewey, Santayana and Sartre.

Prerequisite: Sophomore standing.

Mr. H. Zyskind

*Spring, 3 credits*

## PHI 213 Philosophy of Art (IV)

Comparative study of various philosophies of art, with emphasis on their application to literature. Such authors are read as Plato, Kant and Croce.

Prerequisite: Sophomore standing.

Mr. V. Tejera, Mr. H. Zyskind

*Fall, 3 credits*

## PHI 214 Philosophy of Literary Form (IV)

Study of the philosophic bases of such literary concepts as tragedy and comedy and of their relevance to practical experience and history.

Such authors are read as Aristotle, Hume, Kant, Nietzsche, Bergson and Unamuno.
Prerequisite: Sophomore standing.
Mr. H. Zyskind

*Spring, 3 credits*

## PHI 215, 216 Political Philosophy (IV)

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 independently of the other.
Prerequisite: Sophomore standing.
Mr. S. Gelber

*Spring, 3 credits*

## PHI 217 Concept Formation in the Social Sciences (II)

A critical analysis of theory construction in the social sciences with emphasis on such concepts as model formation, typology, ideal types, function, cultural adaptation and evolution.
Prerequisites: Two semesters of biology or social science or one semester of each. (Biology is given as an alternative prerequisite because on the approach represented by this course many social science concepts, such as function or evolution, have biological analogues.)
Mr. W. Watson

*Fall, 3 credits*

## PHI 220 Philosophy of History (IV)

A critical examination of theories of historical processes and developments, and an evaluation of such concepts as progress, cause, purpose and meaning in history. Pertinent materials will be drawn from historical and philosophic writings of such figures as Hegel, Nietzsche, Berdyaev, Collingwood and Randall.
Prerequisites: Two semesters of social science.
Mr. V. Tejera, Mr. H. Zyskind

*Spring, 3 credits*

## PHI 228 Philosophy of Religion

An inquiry into the function of philosophic principles in religious thought. The course examines basic philosophic structures for such

thought. It makes use of readings drawn from such writers as Augustine, Hume, Kant, Whitehead and Buber.
Prerequisite: Sophomore standing.
Mr. D. Ihde

*Fall, 3 credits*

## PHI 235 Philosophy of Science: Concepts (II)

An inquiry into the function of philosophic principles in the natural sciences, with the focus on concepts such as space, time, causality and life as they are treated in important philosophic and scientific works.
Prerequisites: PHI 102 or 112 and PHI 161, or permission of instructor.
Mr. M. Spector, Mr. R. Sternfeld

*Fall, 3 credits*

## PHI 236 Philosophy of Science: Structure (II)

A systematic study of some central problems in the methodology of the sciences. The focus is on the general structure of scientific knowledge.
Mr. M. Spector

*Spring, 3 credits*

## PHI 237 Theories of Knowledge (III)

This course consists of a study of a variety of conceptions of the structure of knowledge, the roles of the knower, the various kinds and status of objects known as found in classical and contemporary epistemologies.
Prerequisite: PHI 101, 102 or 103.
Mr. S. Gendin, Mr. P. Hill

*Spring, 3 credits*

## PHI 238 Indian Buddhism: Its Essence and Development

The analysis of the basic tenets of Buddhism with the added corollaries of Language, Space and Time, as brought out by the different philosophical Buddhist systems, will be the main aim of this course.
Prerequisite: PHI 109.
Mr. A. de Nicolas

*Fall and Spring, 3 credits*

## PHI 241 Philosophy of Rhetoric IV)

The nature and role of philosophic principles in determining various theories of rhetoric and propaganda are studied, with attention to the relation of rhetoric to political strategy, psychological manipulation and literary devices. Such authors are read as Plato, Aristotle, Francis Bacon, Cicero, Machiavelli and I. A. Richards.

Prerequisite: Sophomore standing.
Mr. H. Zyskind
*Fall, 3 credits*

## PHI 246 Nihilism and Problems of Evil

The aim of the course will be to secure an adequate concept or adequate concepts of "Evil." What, in the history of thought, is involved, and may be involved, in the negation of any or all explicit values? And can a coherent answer be given to this question?
Miss A. Rosenthal

*Fall and Spring, 3 credits*

## PHI 251 Analytic Philosophy of Mind (III)

The course applies techniques of contemporary analytic philosophy to problems in the philosophy of mind. Among the topics discussed are: the logical status of discourse about psychological phenomena and events and of discourse about other minds; philosophical materialism (the identity thesis), philosophical behaviorism and the thesis of physicalism; and the distinction between thoughts and sensations.
Prerequisite: PHI 101, 102, or 103 or permission of instructor.
Mr. E. Erwin
*Fall, 3 credits*

## PHI 275 Philosophy of Law (IV)

An examination of the philosophical principles underlying the law and an introduction to different legal philosophies. Among the topics covered are: the relation of morality to the law, theories of criminal responsibility, theories of punishment, the idea of natural rights and natural law. Readings from Aquinas, Austin, Hart, Locke, Mill, Kelsen, Rousseau and others.
Prerequisite: Sophomore standing.
Mr. S. Gendin
*Fall, 3 credits*

## PHI 301 Metaphysics (III)

An inquiry into the first principles of all science, art and action as these are treated in representative classical and modern authors.
Prerequisite: PHI 111, 112 or permission of instructor.
*Fall, 3 credits*

## PHI 309 Logical Theory (II)

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: PHI 161.
Mr. R. Sternfeld
*Spring, 3 credits*

## PHI 310 Contemporary Philosophies of Experience (I)

This course is a study of recent philosophies which have made important contributions to the study of the concept of experience. Works from such thinkers as Dewey, Bradley, Husserl, James, Whitehead, Bergson, Sartre, Santayana, Heidegger will be used.
Prerequisite: PHI 112.
Mr. R. Sternfeld
*Spring, 3 credits*

## PHI 311 Contemporary Philosophies of Language (I)

This course examines the modern attempt to treat all basic problems in terms of language. Readings are from authors such as Ludwig Wittgenstein, J. L. Austin, Martin Heidegger, Richard McKeon and Rudolph Carnap.
Prerequisite: One semester of philosophy.
Mr. E. Erwin
*Spring, 3 credits*

## PHI 312 Contemporary Value Theory (IV)

Examination of the nature and status of value judgments, emphasizing problems of verification. Articles in contemporary literature by

Frankenna, Lewis, Browning, Dewey, Hempel, Nagel, Scheffler, White, etc.
Prerequisite: PHI 151 or 237 or permission of instructor.
*Spring, 3 credits*

## PHI 313 Existentialism (III)

Study of the origins and relevance of contemporary existentialist writers. The implication for modern thought of Kierkegaard, Nietzsche and Husserl will be examined. Additional readings are from Buber, Camus, Heidegger, Jaspers and Sartre.
Prerequisite: PHI 112 or permission of instructor.
Mr. J. Lango, Miss A. Rosenthal
*Fall, 3 credits*

## PHI 314 Phenomenology (III)

An investigation of the methods, concepts and history of phenomenology with particular emphasis upon its philosophical basis. Readings from the major works of representative phenomenologists such as Husserl, Scheler, Heidegger, Merleau-Pont and Ricoeur are to be balanced by applications of phenomenological analysis to contemporary philosophical problems.
Prerequisite: At least one course in philosophy.
Mr. D. Ihde
*Spring, 3 credits*

## PHI 315 American Philosophy (I)

An evaluation of the major contributions in American philosophic thought as reflected in the works of such figures as William James, Josiah Royce, C. S. Peirce, George Santayana, G. H. Mead, Alfred N. Whitehead and John Dewey.
Prerequisite: PHI 112 or permission of instructor.
Mr. S. Gelber
*Spring, 3 credits*

## PHI 316 The Structure of Controversy (IV)

A sustained inquiry into the nature and patterns of persistent disagreements and into the capacity of reason to deal with them. Focus is on such things as the formal structure of agreement and disagreement, the adequacy of our symbols, the nature of contradictory judgments and the preconditions for communal inquiry.
Prerequisite: At least one semester of philosophy or permission of instructor.
Mr. P. Hill
*Fall, 3 credits*

## PHI 317 Philosophy of Myth

Studies in myth are undertaken in a wide range of disciplines, from literature to anthropology to philosophy. This course will examine the structural forms of myth, the relation of myth to language, and the role of myth in social and self-interpretation. In addition to the central emphasis upon a philosophy of myth, occasional lectures will be given by experts in other areas.
Prerequisite: Any combination of at least two courses in classics, philosophy, cultural anthropology, literature, psychology or sociology.
Mr. D. Ihde
*Fall, 3 credits*

## PHI 318 The Philosophical Methodology of the Rig Veda

This course aims at bringing out what the Rig Vedic composers had in mind, i.e., the need to structure experience; the different forms of these structures; the dynamism of insight generated by contrasting structures; and the efficient-continuous-viewpoint which mounting insights produce.
Prerequisite: PHI 109 or two courses in philosophy, Oriental history, anthropology, psychology or sociology.
Mr. A. de Nicolas
*Spring, 3 credits*

## PHI 320 Philosophical Psychology (III)

A philosophical examination of the traditional and contemporary accounts of psychological concepts, such as: belief, hope, fear, pain, intention, learning and reason.
Mr. A. Collins
Prerequisite: One course in philosophy.
*Fall, 3 credits*

## PHI 330 The Methodology of Plotinus (V)

An inquiry into the metaphysic of methodology of the so-called mystic philosopher, especially Plotinus and the influence his methodology had on philosophers like Dionysius, Meister Eckhart, Anselm of Canterbury and Nicholas of Cusa.
Prerequisite: PHI 111.
Mr. A. de Nicolas

*Fall, 3 credits*

## PHI, 345, 346 History and Philosophy 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 EDU 345, 346.
Prerequisite: Senior standing.

*Fall and Spring, 3 credits each semester*

## PHI 350 Individual Systems of the Great Philosophers (V)

A detailed study of the works of a selected, single great philosopher, with some reference both to the enduring contribution of his philosophy and its place in the history of thought.
Prerequisite: Permission of instructor.
Staff

*Fall and Spring, 3 credits each semester*

## PHI 370 Advanced Ethical Theory (IV)

The course will examine current ethical theory and develop in particular the relationship between Ethics and the Philosophy of Rhetoric and problems of persuasion.

Prerequisite: One course in philosophy.
Mr. C. Perelman

*Fall, 3 credits*

## PHI 391, 392 Advanced Seminar (V)

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.
Prerequisites: PHI 111, 112.
Staff

*Fall and Spring, 3 credits each semester*

## PHI 393, 394 Analysis of Philosophic Texts (V)

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.
Prerequisites: PHI 111, 112.
Staff

*Fall and Spring, 3 credits each semester*

## PHI 398, 399 Reading and Research in Philosophy (V)

Individually supervised reading and research for senior philosophy majors. The student prepares a program of work in consultation with the instructor, meets with the instructor at regular intervals throughout the semester and presents evidence of his accomplishment at the end of the semester. Approval of the instructor must be secured before registering.
Prerequisites: Philosophy major of senior standing and permission of department.
Staff

*Fall and Spring, 1-3 credits each semester*

# PHYSICAL EDUCATION

*Associate Professors:* LESLIE F. THOMPSON (*Acting Chairman*), A. HENRY VON MECHOW

*Assistant Professors:* KENNETH C. LEE, ROLAND V. MASSIMINO, JOHN W. RAMSEY

*Instructors:* DONALD J. COVELESKI, PAUL J. DUDZICK, LINDA I. HUTTON, EVE SIEGEL (*part-time*), ROBERT B. SNIDER, MARJORY VAN WART (*part-time*), SANDRA WEEDEN

## Physical Education Requirement

The physical education requirement states that each undergraduate student of the University must satisfactorily complete one year (two semesters) of physical education courses. This requirement can be fulfilled during any two semesters chosen by the student but usually by the end of the sophomore year. The physical education requirement can also be fulfilled, in whole or in part, by a student's participation in intercollegiate athletics.

Each student must earn a minimum of 100 points to satisfy the university's physical education requirement. All successfully completed physical education classes are awarded 50 points per semester.

To receive credit for a semester of physical education, a course will have to be passed, but no credit is to be received nor grades given other than Pass or Fail. The Pass or Fail grade is computed by evaluating the student's attendance and attitude during the semester.

Any student participating in an intercollegiate sport will be awarded points based on attitude and attendance during practice and games; and the equating of time in relation to courses offered.

## COURSES IN PHYSICAL EDUCATION

Physical Education courses for men are indicated as PEM; courses for women are PEW; those courses that are co-educational are PEC. These courses aim to develop knowledge, understandings and skills as well as strategy and social behaviors of a sport or dance activity selected by the student from a wide range of offerings. Unless otherwise indicated, courses are offered in both fall and spring semesters, but the appropriate class schedules should be consulted for details.

## Individual and Team Sports

Courses will consist of two or three sports as scheduled by the physical education department according to the availability of staff and facilities. Instruction will include the techniques, rules, strategy and social behaviors involved in team and individual sports activities. Selections will include the following: archery, badminton, baseball, basketball, deck tennis, fencing (basic), field hockey, golf, gymnastics, handball, karate, paddleball, physical conditioning, soccer, softball, speedball, squash, table tennis, tennis, touch football, track and field, volleyball and weightlifting.

PEM, PEW 100  Tennis/Badminton
PEM, PEW 101  Squash/Badminton
PEM, PEW 102  Volleyball/Badminton
PEM 103  Handball/Squash
PEW 103  Badminton/Archery
PEM 104  Paddleball/Squash
PEW 104  Golf/Squash
PEM 105  Physical Conditioning
PEW 105  Tennis/Archery
PEC 106  Basic Karate
PEW 106  Volleyball/Archery
PEC 107  Intermediate Karate
PEM 110  Golf/Squash
PEM 111  Squash/Tennis
PEM 112  Volleyball/Golf
PEM 113  Volleyball/Archery
PEC 113  Basic Fencing
PEM 114  Volleyball/Tennis
PEC 114  Badminton/Tennis
PEC 115  Archery/Badminton
PEW 115  Tennis/Volleyball
PEM 116  Badminton/Squash/Paddleball
PEM 117  Squash/Handball/Paddleball
PEM, PEW 118  Golf/Badminton
PEM 119  Touch Football/Volleyball
PEM, PEW 142  Basketball/Softball
PEM, PEW 143  Volleyball/Softball
PEM 144  Soccer/Volleyball
PEW 144  Field Hockey/Volleyball
PEM 145  Touch Football/Basketball
PEM 146  Basketball/Track & Field

## PEC 104  Physical Education in the Elementary School

A course to help prospective classroom teachers conduct physical education activities for the first six grades. The course will include the responsibilities of the classroom teacher in meeting the needs of the elementary child in an activity program.

## PEM, PEW 107  Self-Defense

Separate courses for men and women in the instruction and practice of the basic self-defense techniques of judo, aikido and jujitsu. PEW 107 is adapted to the special needs and capacities of young women.
Mr. N. Higashi

## PEM, PEW 108  Judo

Separate courses for men and women in the instruction and practice of the fundamentals of judo: breakfalls, throws and grappling techniques. Limited application of skills to competitive randori (sparring) and shiai (contest). PEW 108 is adapted to the special needs and capacities of young women.
Mr. N. Higashi

## PEM 109  Weightlifting

A basic course in the techniques and fundamentals of weightlifting, exercises for specific muscle groups and development of personal work-out schedules.

## PEC 110  Horseback Riding (Equitation)

This course is designed to equip students at the beginner and intermediate level with the theory and practical application of equitation. This course meets for a double period (2½ hours) once a week and a special fee of $35 is necessary for enrollment.
Mr. G. Lukemire

## PEC 111  Golf/Bowling

This course is designed for students interested in recreational activities. Class sections meet once a week for a double period (2½ hours). A special fee of $25 is necessary for enrollment in this course.

## PEC 112  Bowling

This course is designed for students interested in recreational activities. Class sections meet once a week for a double period (2½ hours). A special fee of $25 is necessary for enrollment in this course.

## PEM, PEW 120  Basic Swimming

Separate courses for men and women designed to equip students at the non-swimmer and beginner levels with basic swimming skills and knowledge.

## PEM, PEW 121  Intermediate Swimming

Separate courses for men and women designed to equip the novice swimmer with more advanced strokes and water skills.

### PEC 122 Advanced Swimming and Life Saving

A course designed to equip the student with advanced strokes, life saving and water safety skills. A prerequisite is demonstration of a skill level necessary for participation in this course.

Mrs. M. Van Wart

### PEC 123 Water Safety Instructor

This course is designed to help the student meet the requirements for certification as a Red Cross water safety instructor.
Prerequisite: PEC 122 or equivalent.

Mr. A. von Mechow

### PEM 125 Aquatic Sports

Instruction and practice in water sports including such areas as water basketball, water polo, stunts and recreational games.
Prerequisite: PEM 121 or equivalent.

Mr. A. von Mechow

### PEC 126 Instructor's Course for Swimming for the Handicapped

This course is designed to help the student meet the requirements for certification as a Red Cross instructor in swimming for the handicapped.
Prerequisite: PEC 123 Water Safety Instructor or permission of instructor.

Mr. A. von Mechow

### PEC 127 Scuba Diving

A basic course covering selection, usage and care of equipment, and basic principles of skin and scuba diving. A strong emphasis on safety in all aspects of diving.
Prerequisite: Swimming proficiency acceptable to instructor.

Mr. K. Lee

### PEW 130 Basic Modern Dance

A study of the fundamentals of modern dance, including an analysis of movement, conditioning techniques and simple compositional forms.

### PEW 133 Movement Fundamentals

A basic course designed to orient students with all phases of movement. Course will include the role of exercise, weight control, balance, relaxation, locomotor skills, rhythmic skills, play skills and work skills.

### PEC 133 Folk and Social Dance

A basic course in dance divided into two phases, folk and social dance. Course will include traditional American and European folk dances and the fundamentals of ballroom dancing.

*Spring*

### PEC 134 Intermediate Modern Dance

Modern dance techniques on an individual level, including an introduction to dance composition.

Prerequisite: PEW 130 or permission of instructor.

### PEW 135 Dance Teaching Methods for Elementary School Teachers

A study of the teaching methods and materials used for teaching dance for ages 6-13. Simple body-building techniques and methods to develop freedom of expression and therapeutic values.

### PEW 140 Basic Gymnastics

A basic course covering the four olympic pieces: free exercise, un-even parallel bar, horse and balance beam.

*Fall*

### PEW 141 Intermediate Gymnastics

An intermediate course covering the four olympic pieces, including adaptation of techniques in compositional performances.

*Spring*

## DEPARTMENT OF PHYSICS

*Professors:* AKITO ARIMA, NANDOR L. BALAZS, [a] GERALD E. BROWN, [e] HONG-YEE CHIU, [a, f] ERNEST D. COURANT, [b] MAX DRESDEN, LEONARD EISENBUD, ARNOLD M. FEINGOLD, GUIDO FINOCCHIARO, DAVID FOX, [a] MAURICE GOLDHABER (*Adjunct*), MYRON L. GOOD, [g] EDWARD D. LAMBE, [a] BENJAMIN W. LEE, [c] LINWOOD L. LEE, JR., HERBERT R. MUETHER, ROBERT NATHANS, T. ALEXANDER POND, HENRY B. SILSBEE, ARNOLD A. STRASSENBURG, CLIFFORD E. SWARTZ, JOHN S. TOLL, LEE WILCOX, [d] CHEN NING YANG (*Einstein Professor*)

*Associate Professors:* OAKES AMES (*Chairman*), H. R. BLIEDEN (*Visiting*), [f] PAUL P. CRAIG, ROBERT L. DEZAFRA, DAVID B. FOSSAN, PAUL D. GRANNIS, PETER B. KAHN, YI-HAN KAO, JANOS KIRZ, T. T. S. KUO, JULIET LEE-FRANZINI, RICHARD A. MOULD, PETER PAUL, STEPHEN E. STROM

*Assistant Professors:* JAMES A. COLE, MARGARET C. FOSTER, [a] DANIEL Z. FREEDMAN, [a] ALFRED S. GOLDHABER, ERLEND H. GRAF, [a] RUDOLPH C. HWA, ANDREW D. JACKSON, YONG Y. LEE, [a] BARRY M. McCOY, ROBERT L. McGRATH, [a] HWA-TUNG NIEH, [a] JOHN SMITH, GENE D. SPROUSE, [a] JUINN-MING WANG

A student wishing to major in physics may elect either the research degree program, the general degree program, or an appropriate combination of the two. The *research degree program* 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 general degree program.

The *general degree program* in physics is designed for students who wish to acquire considerable knowledge of the subject, but who do not intend to go on to a research-oriented career in physics. This program may be useful to premedical students, prospective secondary school science teachers and many others interested in science. This latter group might include students who will someday work in the areas of science teaching, administration relating to science or technology, the history of science, technical writing, patent law, science and public policy, etc.

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[a] Member, Institute for Theoretical Physics.
[b] Executive Officer, Institute for Theoretical Physics.
[c] Director, Nuclear Structure Laboratory.
[d] Director, Institute for Theoretical Physics.
[e] Member, NASA Goddard, on part-time appointment at Stony Brook.
[f] Physicist, Brookhaven National Laboratory, on part-time appointment at Stony Brook.
[g] Director of Instructional Resources Center.

**Minimum Requirements for the B.S. in Physics**

1. Ten courses in the department, six of which must be at the junior level or above. Of these six, at least two semesters must be chosen from the junior or senior laboratories.

2. Four semesters of mathematics: MAT 102, 103 and MAT 155, 156 or MAT 193-196 (honors calculus sequence) .

3. Twelve credits of other science, mathematics or science-related courses (e.g., History of Science, Science and Public Policy) chosen with the approval of the departmental advisor.

A student wishing to major in physics must, at the end of his sophomore year, consult with his departmental advisor in order to draw up a preliminary plan of study which will then be submitted to the department. The plan can be revised at any time with the advisor's approval.

**Honors**

To receive the bachelor of science in physics with honors, a student must take ten courses in the department at the junior level or above, receiving an overall grade point average in these courses of at least 3.3. Two of the ten courses must be chosen from among the following: PHY 345, 346 Senior Laboratory and PHY 391, 392 Research.

**The Research Program**

A student electing the research track in physics has considerable flexibility in his choice of courses. The following sample program is recommended. Variations in the program are acceptable with the approval of the student's advisor.

**Freshman Year**

PHY 101 Mechanics and Waves
PHY 102 Electricity, Magnetism, Optics
MAT 102 or 193
MAT 103 or 194
CHE 101 or 103
CHE 102 or 104

(Chemistry may equally well be taken in the sophomore year.)

### Sophomore Year

PHY 151 Modern Physics
PHY 152 Electricity and Magnetism
MAT 155 or 195
MAT 156 or 196

### Junior Year

PHY 203 Physical Optics and Waves
PHY 208 Quantum Physics
PHY 205 Mechanics
PHY 206 Kinetic Theory, Statistical Mechanics
At least one semester of Junior Lab (PHY 235, 236)
MAT 203* Differential Equations
MAT 204** Complex Variables

### Senior Year

PHY 343 Methods of Math Physics
PHY 345 Senior Lab
Two selections from courses listed below:
    PHY 305 Advanced Quantum Physics
    PHY 331 Nuclear and Elementary Particle Physics
    PHY 336 Topics in Electrodynamics
    PHY 344 Methods of Math Physics
    PHY 346 Senior Lab
    PHY 372 Solid State Physics
    PHY 391, 392; 393, 394 Research: Tutorial in Advanced Topics
    ESS 341 Astrophysical Processes
    ESS 342 Interstellar and Galactic Astrophysics
    ESS 345
    ESS 346

### The General Degree Program

A student electing this track is free to choose from many possible courses depending on his interests and goals. The following sample program is recommended. Other choices are acceptable with the advisor's approval.

    PHY 131, 132 (formerly 161, 162) Introductory Physics
    PHY 141, 142 (formerly 261, 262) Topics in Intermediate Physics
    MAT 102, 103 and 155, 156 *or*

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\* Prerequisite for PHY 208, 336 and 343; corequisite for PHY 205.
\*\* Corequisite for PHY 208; prerequisite for PHY 343.

MAT 193–196 Honors Calculus Sequence
PHY 241, 242 Topics in Modern and Quantum Physics
PHY 321, 322 Advanced Laboratory
PHY 361, 362 Senior Seminar
Twelve credits of other science, mathematics or science-related courses meeting the approval of the department. PHY 239 may be counted toward these 12 credits; it may not be included as one of the ten departmental courses required for the degree.

Those wishing to transfer from this sequence to the program designed as preparation for graduate study should take PHY 152 following PHY 142.

### Certification for Secondary-level Teaching

The four one-year courses in physics and the senior seminar of the general degree program represent 32 credits. Four additional credits in any science and also 12 credits in the professional study of education and a college supervised student-teaching experience are required to obtain state certification as a high school teacher of physics. PHY 239 may be counted toward these 12 credits, and is strongly recommended to all prospective high school and two-year college physics teachers. With six hours in mathematics in addition to those required above, it is possible to obtain dual certification in physics and mathematics. Dual certification in physics and earth sciences or in physics and chemistry is feasible within the boundaries of the general degree program.

## COURSES IN PHYSICS

The courses General Physics I–III present an intensive introduction to classical and modern physics for those who may major in physics, some other physical science or engineering.

### PHY 101, 102 General Physics I and II

The first semester will be largely a study of mechanics. Topics will include kinematics and vectors; momentum, force and energy; the conservation laws; rotational motion; gravitation and planetary motion; oscillations, wave motion and sound. Use of the calculus will be introduced concurrently with its exposition in MAT 102. A high school physics course is not required background, but is desirable. The second semester will be a study of electromagnetism and optics. Topics include the electric field, Gauss's law and electric potential; currents; the magnetic force, sources of the magnetic field and inductance; oscillations and electromagnetic waves; the nature and propagation of light, interference and diffraction. The laboratory program introduces elementary experimental techniques and provides an opportunity for the observation of the phenomena on which the theory is built. One lecture hour, one problem-solution hour, one discussion hour and one three-hour laboratory per week.
Corequisites: MAT 102, 103.
*Fall and Spring, 4 credits each semester*

## PHY 121, 122 An Approach to Physical Science

Experimental investigations into the mechanical, electrical and thermal properties of solid matter. The concepts of force, motion, temperature, energy, interference and diffraction of waves, electric charge, atoms, molecules, crystals, symmetry and randomness are introduced and discussed. Students are encouraged to formulate and test particle models of matter. Careful observation and logical reasoning are stressed. The relationships between atomic structure and observable properties will be developed for a few representative materials. This course provides an opportunity for students with limited backgrounds in science and mathematics to engage in a serious study of a limited range of physical phenomena using a laboratory-oriented approach. The laboratory work and problem solving can be completed successfully without special talent in experimental technique or knowledge of college mathematics. One lecture, one discussion period and one two-hour laboratory period each week.

*Fall and Spring, 3 credits each semester*

## PHY 131, 132 Introductory Physics

This course consists of an introductory survey of standard physics topics, arranged for individualized study. On the basis of diagnostic tests and interviews of each student, a faculty tutor recommends a starting level and initial projects for the student. All students begin with topics in mechanics including kinetics, Newton's laws and energy. Most students will study thermodynamics during the first semester, and during the second semester will take up topics in wave motion, optics, electromagnetism and atomic physics. The pace of study, the level of sophistication, and the emphasis among the topics, are all determined by student background, professional intentions and individual progress. The faculty tutors decide letter grades on the basis of effort and also provide for the student's permanent record a statement about the level and extent of the topics covered. Each individual assignment includes both theoretical and experimental work, defined in terms of a proficiency demonstration that the student must pass before proceeding. The level of study may range from that of a good high school course to that of a rigorous first year course for physics majors using calculus. There is one lecture

each week on a general physics topic, and one required meeting each week with a tutor. Study material and tutorial assistance are available during many hours of each day and evening.

*Fall and Spring, 4 credits each semester*

## PHY 141, 142 Topics in Intermediate Physics

This course contains a selection of topics chosen from diverse areas of physics with an emphasis placed on direct application to physical phenomena. The primary goal is to make the student conversant with these phenomena with an inclination toward experimental investigation, rather than through deductive or problem-solving techniques. Topics will include scattering, gravitation, oscillatory motion, kinetic theory, geometrical and physical optics, wave motion, and elements of atomic and nuclear structure. The laboratory will be "open ended" and will stress independent investigation. Three class meetings and one laboratory each week.

Prerequisites: PHY 101, 102 or PHY 131, 132 (formerly 161, 162) and MAT 102, 103; or permission of the chairman of the Department of Physics.

*Fall and Spring, 4 credits each semester*

## PHY 151 General Physics III

This course is principally an introduction to particle and quantum physics. Topics studied will include special relativity, the particle aspects of electromagnetic radiation, the wave aspects of material particles, the concept of a wave function and other fundamentals of the quantum theory. These ideas will be discussed as they relate to atomic spectra and structure, nuclear structure, elementary particles and aspects of molecular and solid state physics. Three lecture hours and one three-hour laboratory per week.

Prerequisites: PHY 101, 102.
Corequisite: MAT 155.

*Fall, 4 credits*

## PHY 152 Electromagnetic Theory

Electromagnetic phenomena and the elementary equations describing them are reviewed. Vector calculus is introduced, and is used to develop these relationships into Maxwell's Equations. The transformations of electric

and magnetic fields in the special theory of relativity are discussed. Topics studied will include: electrostatic fields, fields of moving charges, magnetic fields, electromagnetic induction, electric currents, and electric and magnetic fields in matter. Three lecture hours and one three-hour laboratory per week.
Prerequisite: PHY 151.
Corequisite: MAT 156.

*Spring, 4 credits*

## PHY 175, 176 Concepts, Methods and Significance of Physical Science

A course for students with philosophical, literary or humanistic interests in physical science. The structures of the major theories of physics are investigated and analyzed. In relation to each theory the mode of its development, its limitations, its relation to the total structure of physics, its philosophical and pseudo-philosophical implications and its technological and social consequences are studied. Three instructional hours per week.
Prerequisites: Junior or senior standing and permission of instructor.

*Fall and Spring, 3 credits each semester*

## PHY 203 Optics and Waves

A survey of geometrical and physical optics. The basic phenomena of optics—ray optics, interference, diffraction, and polarization—will be demonstrated and discussed in terms of the wave theory of light. Applications will be made to the design and performance of optical instruments, crystal optics, lasers and holography. Three class hours per week.
Prerequisites: PHY 152, MAT 155, 156.

*Fall, 3 credits*

## PHY 205 Mechanics

The Newtonian formulation of classical mechanics is reviewed and applied to more advanced problems than those considered in PHY 101, 102. The Lagrangian and Hamiltonian methods are then derived from the Newtonian treatment and applied to various problems.
Corequisite: MAT 203.

*Fall, 3 credits*

## PHY 206 Thermodynamics, Kinetic Theory and Statistical Mechanics

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, beginning 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.
Prerequisites: PHY 151, 152 and MAT 155, 156.

*Spring, 3 credits*

## PHY 208 Quantum Physics

An introduction to the concepts and mathematical methods of quantum mechanics. Some stress will be placed on historical development. Topics will include early quantum theory, Schroedinger's equation in time dependent and time independent forms, one and three dimensional solutions including the treatment of angular momentum and spin, and perturbation theory. Applications to simple systems, especially the hydrogen atom, will be stressed. Three class hours per week.
Prerequisites: PHY 203, PHY 205, MAT 203.

*Fall and Spring, 3 credits each semester*

## PHY 235, 236 Junior Laboratory

Emphasis will be on the basic techniques of electrical and electronic measurements, the physical principles underlying various solid state and vacuum devices, and applications of these devices to linear and logic circuitry including computers. There will also be opportunity to carry out experiments with contemporary optical equipment. Two three-hour laboratories per week.
Prerequisite: PHY 152 or permission of instructor.

*Fall and Spring, 3 credits each semester*

### PHY 239 Materials and Methods in Teaching Physics

Designed for prospective teachers of physics in secondary schools and two-year colleges, the course emphasizes methods and materials appropriate to the teaching of introductory physics and stresses recent curriculum developments. Students are required to become familiar with texts, laboratory materials and other teaching aids, and are given the opportunity to demonstrate their proficiency in peer teaching situations. Three class hours per week. This course may not be counted as one of the ten departmental courses required for the degree.

Prerequisites: PHY 141, 142 or equivalent.

*Spring, 3 credits*

### PHY 241, 242 Topics in Modern and Quantum Physics

Primarily for those in the general degree program. A study of those developments in physics that lead beyond classical mechanics. Special relativity, an introduction to quantum mechanics, and the study of atomic structure and spectra are covered. Radioactivity, nuclear structure, modern theory of solids, plasma physics and high energy elementary particle physics will be discussed briefly. The quantum and relativistic viewpoints are stressed throughout. Three class hours per week.

Prerequisites: PHY 141, 142 or permission of the chairman of the Department of Physics.

*Fall and Spring, 3 credits each semester*

### PHY 305 Advanced Quantum Physics

This course offers further development and extension of the principles introduced in PHY 208. Topics will include the quantum mechanical description of identical particles, symmetry principles, the structure of multi-electron atoms, the application of perturbation theory to radiative transitions, external perturbations (Zeeman and Stark splitting), an introduction to the matrix formulation of quantum theory, and the quantum mechanical description of scattering. Three class hours per week.

Prerequisite: PHY 208.

*Fall and Spring, 3 credits each semester*

### PHY 321, 322 Advanced Laboratory

Primarily for those in the general degree program. The experiments will be selected from among those presently performed in PHY 235, 236 Junior Laboratory and PHY 345, 346 Senior Laboratory. The emphasis during the first semester will be on electrical measurements including electronics. Experiments for the second semester will involve work in atomic, nuclear and solid state physics. Two three-hour laboratory sessions per week.

Corequisites: PHY 241, 242.

*Fall and Spring, 3 credits each semester*

### PHY 331 Nuclear and Particle Physics

Primarily for majors in physics. The topics will include: The interaction of radiation with matter, radiation detectors, nuclear structure, nuclear reactions, nuclear forces, accelerators, the properties of elementary particles and resonances. Applications of quantum mechanics and the role of symmetry principles will be stressed. Three class hours per week.

Prerequisite: PHY 208.

*Fall and Spring, 3 credits*

### PHY 336 Topics in Electrodynamics

Subjects to be studied include multipole fields, solutions of Laplace's equation, electromagnetic waves in free space and in cavities, the fields of moving charges, radiation and radiating systems, classical electron theory, spherical waves, and relativistic electrodynamics. Three class hours per week.

Prerequisites: PHY 152, PHY 203 and MAT 203.

*Spring, 3 credits*

### PHY 343, 344 Methods of Mathematical Physics

This course 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, generalized function theory; probability. Three class hours per week.

Prerequisites: PHY 152, PHY 205 and MAT 203, 204 or permission of the chairman of the Department of Physics.

*Fall and Spring, 3 credits each semester*

## PHY 345, 346 Senior Laboratory

Primarily for majors in physics. A number of historically important experiments are studied and performed with the aid of modern instrumentation. As they progress, students are encouraged to pursue independent projects in which there are no rigidly fixed formats or procedures. Primary emphasis is on the development of experimental skills and on professionally acceptable analysis and presentation of results, both in written and oral form. Projects are typically chosen from such fields as atomic and nuclear spectroscopy, electron physics, solid state and low temperature physics, optics and electromagnetism. Two three-hour laboratory sessions per week.

Prerequisites: PHY 203, 208 or permission of the chairman of the Department of Physics.

*Fall and Spring, 3 credits each semester*

## PHY 361, 362 Senior Seminar

During the first semester, each student will select two fairly short and simple papers for presentation before the class. Assignments for individuals not presenting papers will include written critiques based on criteria which must be developed by the class. In the second semester each student will deliver a colloquium talk on some creative project of his own. These talks may either be verbal presentations of written materials prepared to explicate a physical theory or experiment, or lecture demonstrations using equipment which the student developed. Two class meetings per week.

Prerequisites: PHY 241, 242 or permission of the chairman of the Department of Physics.

*Fall and Spring, 2 credits each semester*

## PHY 372 Solid State Physics

Introduction to the principal types of solids, with emphasis on their electrical and magnetic properties and elementary theory of electrons in metals, energy bands. Applica-

tions to semi-conductors, superconductors, para- and ferromagnetism, magnetic resonance. Three class hours per week.

Prerequisites: PHY 152, PHY 206, PHY 208 or permission of the instructor.

*Spring, 3 credits*

## PHY 391, 392 Research

With the approval of the faculty, a major 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.

Prerequisite: Permission of the chairman of the Department of Physics.

*Fall and Spring, 2-4 credits each semester at discretion of instructor*

## PHY 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.

Prerequisite: Permission of the chairman of the Department of Physics.

*Fall and Spring, 2-4 credits each semester at discretion of instructor*

## GRADUATE COURSES

Qualified seniors may take 500-level courses with the permission of the department chairman. See *Graduate Bulletin* for details.

Classical Physics
Quantum Mechanics
Statistical Mechanics
Nuclear Physics
Astrophysics
Solid State Physics
Elementary Particle Physics

# DEPARTMENT OF POLITICAL SCIENCE

*Professors:* HOWARD A. SCARROW, ALBERT SOMIT, JOSEPH TANENHAUS (*Chairman*), MARTIN B. TRAVIS, RUDOLPH WILDENMANN, JAY C. WILLIAMS

*Assistant Professors:* STEPHEN J. CIMBALA, KENNETH P. ERICKSON, EDWARD I. FRIEDLAND, BERNARD GROFMAN, NORMAN J. JACKNIS, EDWARD N. MULLER, FRANK E. MYERS, JONATHAN R. POOL

*Lecturer:* RODNEY P. STEIFBOLD

*Visiting Lecturers:* LEE E. KOPPELMAN, JOSEPH KOTTLER

### Requirements for the Major in Political Science

Students majoring in political science must complete a minimum of 39 credit hours in political science and related areas, to be divided as follows:

1. From 24 to 30 credits in political science, at least 18 of which must be at the 200 level or higher;

2. Included in the 18 200-level credits must be at least one political science course in three of the following four areas: American politics, comparative politics, international relations, and political theory and methodology;

3. From 9-15 credits in related courses in other departments, usually at the 200 level.

## COURSES IN POLITICAL SCIENCE

Note: Because of extensive revision of course offerings, final details of scheduling and staffing must be obtained from fall and spring class schedules.

### POL 110 POWER

Recent political rhetoric has increasingly emphasized the problem of power. "Black power," "student power," "the arrogance of power," and other expressions are used to talk about who has power and who ought to have it, about how it is wielded and how it should be wielded. A number of political scientists have also treated "power" as the most important concept in their field of study. This course will critically discuss and evaluate the uses of the notion of "power" in both scholarly literature and the debates of contemporary politics.

*3 credits*

### POL 111 Contemporary Political Problems

Analysis of current and recurrent issues in the politics of civil rights, urban problems, race relations, great power alliances, arms development and control, the Vietnam War and the problems political institutions face in meeting and managing social change.

*Fall and Spring, 3 credits*

## POL 112 Readings in Politics and Modern Society

Significant writings dealing with such persistent political problems as democracy, elitism, equality, liberty, participation, alienation and power. Books assigned may include classics, such as Machiavelli and Hobbes, as well as more contemporary works, including novels.

*3 credits*

## POL 140 Introduction to 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.

*3 credits*

## POL 151 Contemporary Political Institutions and Processes

Analysis of political institutions and processes in the contemporary world. Democratic, totalitarian and developing nations will be considered. Examples will be drawn from United States, Britain, Western Europe, U.S.S.R., Asia, Africa and Latin America.

*Fall and Spring, 3 credits*

## POL 200 Political Analysis

Social scientific concepts and methods as they relate to the study of political systems and political behavior. Subjects covered include the nature of scientific inquiry, explanation, systems analysis and various approaches to the study of politics, including elites, groups, power and political culture. Especially recommended for all majors.

*Fall and Spring, 3 credits*

## POL 201 American Political Thought

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

*3 credits*

## POL 202 Problems of Marxism

The problems 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.

*Spring, 3 credits*

## POL 209 Politics in 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.
Prerequisite: Junior or senior standing.

*Fall, 3 credits*

## POL 210 Politics in Africa

A study of nationalism, political thought and political institutions in Africa. Consideration is given to the quest for unity, the problems of liberation and the political implications of social change.

*Spring, 3 credits*

## POL 211 Comparative Political Parties and Pressure Groups

An 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, election campaigns and pressure group activity. Analysis of cross-national public opinion survey data using card sorter.

*3 credits*

## POL 213 British Parliamentary Democracy

Examination of the working 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.

*Fall, 3 credits*

## POL 214 Politics of Latin America

A comparative investigation of political trends in Latin American nations. The course will include a survey of 20th century political change, contemporary political culture, the framework and institutions of government and the interacting social and political forces of the post-World War II period. Attention will be centered on Latin America within the general pattern of political modernization, political development and prevailing ideologies. Wherever applicable, there will be an analysis of policy making and the role of political leadership.

*Fall, 3 credits*

## POL 215 Contemporary Political Systems in Latin America

Comparative analysis of selected major Latin American political systems to illustrate continuities and differences in their responses to the crises of economic, social and political modernization. Consideration of the implications of modernization by revolution and by reform, and of the impact of foreign powers on the political process in these countries.

*Spring, 3 credits*

## POL 216 Democratic Politics in Western Europe

Examination of the political process in France, Italy and Western Germany. The course will focus on selected problems, rather than presenting a country-by-country summary. Emphasis will be placed upon the interplay of institutions, ideas and personalities as they affect the vitality of democratic politics and the future of Western European unity.

*3 credits*

## POL 217 The Politics of Nonviolent Action

Analysis of the origin and substance of the theory and practice of nonviolent resistance as a method of influencing social and political change.

*3 credits*

## POL 218 Politics of Germany and Austria

Study of politics and government of divided Germany and Austria, with emphasis on the social and psychological bases of politics, and their relationship to pressure groups, parties and the working of governmental institutions.

*Fall, 3 credits*

## POL 219 Revolution and Reform in the Middle East

The Middle East has been the scene of several attempts to make radical social and cultural transformations by political means. This course will examine the fate of both Communist and non-Communist strategies of change in selected areas of the Middle East, including regions which are part of the Soviet Union. The course will also provide an occasion for background reading on Middle Eastern politics and societies, including the political roles of the military and the intelligentsia, and the relationship between religion and politics. Prerequisite: None (POL 151 helpful).

*3 credits*

## POL 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.

*Fall, 3 credits*

## POL 222 International Organization

The course will cover a survey of alternative forms of political organization, their conditions and problems; historical precedents of international organization; the experience of the League of Nations; the United Nations and some of the more important specialized agencies; proposals for reforming the U.N. and possible future developments.

*Fall, 3 credits*

## POL 223 Latin America and the United States

Survey of the international relations of the Latin American 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.

*3 credits*

## POL 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.

*Spring, 3 credits*

## POL 225 Introduction to International Relations

Introductory survey of the international system, its characteristic forms and the principal forces making for conflict and adjustment. Examination of some prevalent analytical concepts, of major current problems and developments, and of prospects and alternatives for the future.

*Fall, 3 credits*

## POL 226 Problems of Politics and International Relations in Latin America

Consideration in depth of selected problems of foreign relations in Latin America including policy formulation, inter-American community development and foreign policies of key Latin American governments.

Prerequisite: POL 223 or HIS 227 or permission of instructor.

*Spring, 3 credits*

## POL 227 Peace and War

Political issues in war and human conflict are considered in terms of diverse philosophical assumptions about the nature of man, the state, and international relations. The effects of war on man and society are evaluated in the context of more general political, social and moral questions.

*Spring, 3 credits*

## POL 228 American Defense Policy

Historical and political investigation of salient trends in American military and national security policy since World War II, with special attention to domestic political groups and forces which influence defense policy making. Models of the political process in foreign and defense policy making are contrasted in terms of available evidence.

*3 credits*

## POL 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.

*3 credits*

## POL 232 Comparative Judicial Processes

The role of courts, lawyers, judges and interest groups in the American and selected foreign political systems.

*3 credits*

## POL 233 Comparative Political Culture and Socialization

Discussion of principal concepts, methods and findings in the related fields of political culture and political socialization. Political learning at all ages.

Prerequisite: POL 200 or permission of instructor.

*3 credits*

## POL 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 other political determinants of interest and participation levels and political loyalties; (3) the nature, varieties and actual effects of propaganda. Some attention will also be given to attitude research methods.

*Fall, 3 credits*

## POL 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.

*3 credits*

## POL 243 Politics of New York State

Analysis of parties, pressure groups and the political process in New York State. Particular attention paid to the legislative process in Albany.

*Fall, 3 credits*

## POL 244 The Development of American Political Science

Traces the professional and intellectual history of political science from the latter part of the 19th century to the present. Attention is given to changing concerns, concepts, interests —fashions and fads; to the manner in which developments in other disciplines have affected the course of political science; and to the relationships between the academic value system and the practice of political science, with particular attention to recent tendencies and problems.

*3 credits*

## POL 246 Urban Politics

Analysis of the formal structure and political processes of American cities with emphasis on the role of political parties, elites and interest groups.

*3 credits*

## POL 249 American Federalism and Intergovernmental Relations

A survey of the constitutional, institutional and political interrelationships among federal, state and local governments; covering grant-in-aid and interstate compacts.

*3 credits*

## POL 250 Bureaucracy and Public Administration

Intended for students interested in a public service career. Functions of bureaucracy in American society and in various cultural contexts. Relationships between policy and administration; development of organizational and bureaucratic theories with emphasis on decision making, innovation and responsibility.

*Fall, 3 credits*

## POL 251 Policy and Administration of Natural Resources

Policy development in the resources area as influenced by the structure and pattern of political power on international, national, state and local levels of government. The significance of technological innovation, value orientations and economic welfare analysis in giving direction to policy planning.

*3 credits*

## POL 252 The Legislative Process

An examination of American legislative institutions—Congress, state governments, local legislatures—in light of recent research. How legislatures actually operate and how American legislatures contribute to the "democratic culture."

*3 credits*

## POL 254 The Politics of Governmental Planning

An examination of the governmental planning process of all levels—federal, state, regional and local—with emphasis on the theory and practice of "creative federalism" related to the process and the relationships between planning and general governmental decision making.

*3 credits*

## POL 257 Political and Administrative Decision Making

Exploration of approaches to the study of political choice. Topics dealt with include: decision theory, bargaining and negotiation, rationality, the political context of decisions, decision tools, the empirical study of decision making, social criticism and the decisionist perspective.

*3 credits*

## POL 260 Classical Political Theory: Plato to Mill

Plato, Aristotle, St. Thomas, Machiavelli, Hobbes, Locke, Montesquieu, Hume, Mill, Rousseau are to be read and discussed to the end of discovering their relevance to the understanding of political behavior.

*3 credits*

## POL 261 Contemporary Political Theory

How has political theory assimilated the advances and discoveries in the other social sciences and developments in the analysis of language and reversals in Hegelianism and anarchism? Original writing from Mosca to Marcuse.

*3 credits*

## POL 262 Political Mobilization: Theories and Cases

How are activists, interest groups and parties initially assembled, motivated, organized, disciplined and sustained? A variety of theories as advanced by liberalism, pluralism, Marxism, functionalism will be analyzed and compared with descriptions of such processes in cases such as student movement, Nazism, Bolshevism and older revolutionary movements.

*3 credits*

## POL 263 Utopias

Inquiry into the political bases and purposes of community via exploration of major utopian social models and experiments. Appraisal of the political significance and scientific status of utopian thoughts.

*3 credits*

## POL 271 Introduction to Methods of Political Research

Techniques of investigating selected questions of interest to political scientists. Uses of qualitative data. Introduction to measurement, including data collection, the reliability and validity of data, and procedures for preparing data for analysis.
Prerequisite: POL 200.

*3 credits*

### POL 272 Advanced Research Methods

Advanced procedures for data preparation. Analytic techniques; the models implicit in statistical techniques including multiple correlation and regression analysis, factor analysis, discriminant function analysis, and the analysis of variance; the relationships of these models to problem solving in political science. Prerequisite: POL 271.

*3 credits*

### POL 281 Introduction to Mathematical Applications in Political Analysis

Basic introduction to logic, probability, matrix algebra, systems of equations, maxima-minima problems, etc. as applied to the study of political phenomena. Intended for students without any mathematics background. Oriented toward mathematics as a language of discourse.

*3 credits*

### POL 282 Advanced Topics in Mathematical Applications in Political Science

Mathematical approaches to the study of power, general systems theory, democratic theory, theories of choice, stochastic modeling and the simulation of political behavior. Prerequisite: MAT 103.

*3 credits.*

### POL 299 Directed Readings in Political Science

Individually supervised reading in selected topics of the discipline.

*3 credits.*

### POL 391, 392 Seminars in Advanced Topics

Special projects and research papers on a topic of political interest which will be announced before the start of the term.

*3 credits each semester*

# DEPARTMENT OF PSYCHOLOGY

*Professors:* John Garcia, Harry I. Kalish (*Chairman*), Leonard Krasner (*Director Clinical Training*), Marvin Levine, Sidney Merlis (*Visiting Clinical Professor*), [a] Francis H. Palmer, Alan O. Ross, John S. Stamm, Everett J. Wyers

*Associate Professors:* Dana Bramel, Gerald C. Davison, James H. Geer, [b] Marvin R. Goldfried, [c] H. William Morrison, David M. Pomeranz (*Director Psychological Services*), Howard C. Rachlin, Jerome E. Singer, Stuart Valins

*Assistant Professors:* John D. Bransford, James F. Calhoun, [d] Theodore Doll, Thomas J. D'Zurilla, David Emmerich, Lester G. Fehmi, Ronald Friend, Jon Barry Gholson (*Visiting*), Marcia K. Johnson, Richard Kestenbaum, Fredric M. Levine, John M. Neale, K. Daniel O'Leary, Roger Schvaneveldt, Marius C. Smith, Sarah H. Sternglanz, Sheldon Weintraub, Grover J. Whitehurst, Robin C. Winkler (*Visiting*), Joseph L. Young

*Clinical Associate:* John McConnell

## 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 26 units in psychology
PSY 101, 102 Introduction to Psychology
PSY 162 Statistical Methods
PSY 200 Experimental Methodology
One of the following laboratory courses: PSY 201, 202, 203, 204 or 206. Nine credit hours in psychology electives, no more than six to be chosen from the 391, 392, 393 series.

B. Study in related areas

MAT 102 or 193 or equivalent
BIO 101, 102 or two other courses in biology with laboratory
Two courses in anthropology and/or sociology

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[a] Provost for Educational Research and Training.
[b] Not in residence academic year 1970-71.
[c] Associate in Instructional Resources.
[d] Member, Institute for Research in Learning.

Courses which fulfill the requirements for the major (A and B) must be taken for grade credit. Courses listed in Section B may also fulfill university requirements.

The program outlined above presents the general major requirements. In addition, the department recommends that students who wish to take a more intensive program or who plan to enter graduate school elect further courses in psychology and incorporate into their programs study in some of the following areas: computing science, chemistry, physics, biology and mathematics beyond the requirement, history and philosophy of science, and additional courses in the social sciences.

## COURSES IN PSYCHOLOGY

### PSY 098, 099 Fundamentals of Psychology

This course is designed to introduce the student to the nature and interests of the department of psychology. It seeks to develop the skills, methods and procedures required for effective participation in subsequent departmental courses.

*Fall and Spring, no credit*

### PSY 101, 102 Introduction to Psychology

An introduction to psychology as the science of behavior. The first semester provides an intensive investigation of the major research areas covering learning, perception and the physiological foundations of behavior. The second semester offers an introduction to the areas of personality theory, testing and social psychology.
Prerequisite for PSY 102: PSY 101.
Staff
*Fall and Spring, 3 credits each semester*

### PSY 162 Statistical Methods in Psychology

Designed to provides 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 sessions and a one-hour laboratory each week.
Prerequisites: PSY 101, 102 and MAT 102.
Staff
*Fall and Spring, 3 credits*

### PSY 200 Experimental Methodology

An introduction to experimental methodology as applied to psychological processes: conditioning, motivation, psychophysiology of emotion, sensory and perceptual processes and symbolic mediation.
Prerequisites: PSY 101, 102, 162.
Staff
*Fall and Spring, 4 credits*

### PSY 201 Laboratory in Perception

A study of the techniques and experimental problems in perception and sensation with emphasis on the visual, auditory and tactual senses. The role of motivation and selective attention on the detection and recognition of stimuli will be investigated.
Prerequisite: PSY 200.
Staff
*Fall and Spring, 4 credits*

### PSY 202 Laboratory in Physiological Psychology

A study of the techniques and experimental problems in the neurophysiological basis of

behavior. Techniques and problems relating to sensation, perception, motivation, learning and memory will be investigated.
Prerequisite: PSY 200.
Staff
*Fall and Spring, 4 credits*

## PSY 203 Laboratory in Personality

A study of the techniques and experimental problems in personality. This course will deal with selected topics in personality derived from most of the prominent theories. Experiments will serve to illustrate many of the major propositions from these theories of personality.
Prerequisite: PSY 200.
Staff
*Fall and Spring, 4 credits*

## PSY 204 Laboratory in Social Psychology

A study of the techniques and experimental problems in social psychology. Techniques will include natural observation, surveys and experimental design.
Prerequisites: PSY 200, 309.
Staff
*Fall or Spring, 4 credits*

## PSY 206 Laboratory in Learning and Performance

A study of experimental methodology as applied to associative and motivational processes. Response acquisition and extinction, reward and punishment, discrimination learning, retention, perceptual-motor skills and cognitive processes.
Prerequisite: PSY 200.
Staff
*Spring, 4 credits*

## PSY 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.
Prerequisites: PSY 101, 102.
Staff
*Fall and Spring, 3 credits*

## PSY 209 Social Psychology

A survey of basic social psychology: communication, attitude formation and change, social perception, interpersonal relations, and group performance.
Prerequisites: PSY 101, 102; not open to students who have taken PSY 309.
Staff
*Fall and Spring, 3 credits*

## PSY 210 Studies of Social Conflict

A research course in which students will formulate and carry out team research projects. These projects will be field studies focusing on issues involving conflict within the university or in the surrounding communities.
Prerequisites: PSY 101, 102, 162 and permission of instructor.
Staff
*Spring, 3 credits*

## PSY 211 Developmental Psychology

A study of the hereditary, maturational and learning factors responsible for the development of human behavior from birth through adolescence. Emphasis will be on the theoretical and research aspects of social learning from the point of view of modified behaviorism and cognitive social psychology.
Prerequisites: PSY 101, 102.
Staff
*Fall and Spring, 3 credits*

## PSY 213 Behavior Deviation in Children

The major focus will be the development and modification of behavioral deviations in children. After an examination of principles derived from the experimental analysis of behavior, applications of these principles to children's problems such as self-destructive behavior, retardation, autism, phobias and classroom management problems will be studied.
Prerequisites: PSY 211 and permission of instructor.
Staff
*Fall and Spring, 3 credits*

## PSY 215 Abnormal Psychology

The major categories of psychopathology, including the neuroses and functional and organic psychoses, will be examined. Emphasis will be placed on an analysis of current research in psychopathology and its relationship to the theories of abnormal behavior.
Prerequisites: PSY 101, 102.
Staff

*Fall and Spring, 3 credits*

## PSY 218 Animal Learning

Study of the principles and techniques by which the behavior of organisms may be modified. The effects of reward and punishment are considered and the techniques of stimuli control examined.
Prerequisites: PSY 101, 102.
Mr. H. Rachlin

*Fall and Spring, 3 credits*

## PSY 219 Human Learning

A critical examination of the basic concepts, empirical findings and theoretical interpretation in the experimental study of learning and motivation.
Prerequisites: PSY 101, 102.
Staff

*Fall and Spring, 3 credits*

## PSY 244 Comparative Psychology

This course will be concerned with the phylogenetic distribution and evolution of both learned and unlearned behavioral patterns with an emphasis on the former. Such phenomena as kineses, taxes, instinct, respondent and operant conditioning, generalization and discrimination will be considered.
Prerequisites: PSY 101, 102 and BIO 101 or equivalent.
Staff

*Fall, 3 credits*

## PSY 309 Experimental Social Psychology

An intensive treatment of several main topics in social psychology: consistency theory, pressures to uniformity, models of attitude change, social comparison and attribution theory. This course is intended for students who wish a rigorous discussion of these topics or who intend to proceed to laboratory work in social psychology.
Prerequisites: PSY 162 and permission of instructor. Not open to students who have taken PSY 209.
Staff

*Fall, 3 credits*

## PSY 322 Advanced Statistics

Survey of probability and sampling theory, descriptive and inferential statistics and introduction to experimental design.
Prerequisite: PSY 162 or permission of instructor.
Staff

*Fall and Spring, 3 credits*

## PSY 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.
Prerequisites: Advanced standing in psychology and written permission of the faculty supervisor.
Staff

*Fall and Spring, 1 to 3 credits each semester, may be repeated*

## PSY 332, 333 Readings in Psychology

Senior majors in psychology will be afforded the opportunity to read selectively under the guidance of a faculty member.
Prerequisites: Major in psychology, senior standing and permission of the faculty supervisor.
Staff

*Fall and Spring, 1 to 3 credits each semester, may be repeated*

## PSY 340 Physiological Psychology

This course will consider in detail the evolution of the nervous system with an emphasis on integrative processes and their relationship to behavior.
Prerequisites: PSY 101, 102 and BIO 101 or equivalent.
Staff

*Fall, 3 credits*

## PSY 341 Introduction to the Nervous System

Comparative survey of gross and microscopic anatomy, physiology and integrative capacities of nervous systems from coelenterates to mammals including a consideration of integrative capacities of non-neural systems such as protozoa, porifera and mesozoans. Emphasis will be on the relation of increasing structural complexity of nervous systems to their integrative capabilities.

Prerequisite: BIO 201 or permission of instructor.

Staff

*Fall, 3 credits*

## PSY 343 Seminar in Synaptic Processes

The morphological, ionic, pharmacological and electrical factors associated with transmission across excitatory and inhibitory synapses and neuro-effector junctions will be compared. Consideration will also be given to trophic and plastic properties of synapses such as those associated with development, regeneration and learning.

Prerequisites: PSY 340 and junior standing.

Staff

*Spring, 2 credits*

## PSY 352 History and Systems of Psychology

The history and present status of conceptual trends in psychology. The development of psychological principles and theories will be traced from the early Greek philosophers through the European philosophers and empiricists to their embodiment in contemporary psychological theory.

Prerequisite: Nine credits of psychology.

Staff

*Spring, 3 credits*

## PSY 362 Sensation—Perception

An introduction to the phenomena of sensation and perception and the methods by which they may be studied. Different theoretical frameworks will also be considered.

Prerequisites: PSY 101, 102.

Staff

*Fall and Spring, 3 credits*

## PSY 372 Tests and Measurements

A study of selected principles of psychological measurement with emphasis upon mental tests. Materials will include a brief survey of statistical bases for the construction of and evaluation of tests and an examination of selected examples of tests primarily in personality, intelligence and achievement.

Prerequisites: PSY 101, 102 and permission of instructor.

*Fall, 3 credits*

## PSY 381, 382 Introduction to Mathematical Psychology

A study of mathematical formulations of theories of behavioral phenomena, with emphasis on learning. Attention will be paid to the process of turning intuition into theory, the mathematical tools and techniques needed to derive testable consequences of theoretical assumptions and the process of evaluating such theories in the light of empirical evidence. The student will complete an individual project in the second term.

Prerequisites: PSY 162 and MAT 103 or permission of instructor.

*Fall and Spring, 3 credits each semester*

## PSY 391, 392, 393 Special Topics in Psychological Research and Theory

A seminar to be offered to selected senior majors 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. No more than 6 credits from this series may be offered toward the major requirement.

Prerequisites: PSY 200 and permission of instructor.

Staff

*Fall and Spring, 3 credits each semester*

# INTERDISCIPLINARY PROGRAM IN RELIGIOUS STUDIES

The interdisciplinary program in Religious Studies (RLS) is designed as a highly flexible curriculum which will introduce undergraduates to several distinct areas of religious study by combining appropriate courses from such varied disciplines as philosophy, literature and certain of the social sciences. The program is not intended as preparation for graduate study in religion but rather as an opportunity for interested students to explore a wide range of views of past and present thinkers. The courses listed below have been chosen as appropriate for the religious studies major. The student, in consultation with his academic advisor, may combine them in a variety of ways to create a program which meets his individual interests. Additional courses are under consideration and will be announced as they become available.

Further information about the program may be obtained from the chairman, Professor Thomas J. J. Altizer.

### Requirements for the Major in Religious Studies

In addition to the general university requirements for the bachelor of arts degree, a student majoring in this program must earn a minimum of 30 credits distributed as follows:

*Credits*

  I. At least two semester courses in each of three areas:
    A. Religious literature
    B. Theory of religious thought
    C. Socio-historical studies of religion     24
  II. Two semester courses in *either* of the following:
    A. Symposium in religious studies OR
    B. Directed study in a special area     6

                                             30

## COURSES APPROVED FOR THE PROGRAM IN RELIGIOUS STUDIES

Detailed course descriptions appear under appropriate departmental listings and should be examined there.

| | | |
|---|---|---|
| ANT | 251 | Comparative Religious Systems |
| CLS | 115 | Classical Mythology |
| EGL | 260 | Mythology in Literature |
| EGL | 261 | The Bible as Literature |
| HIS | 133 | The Medieval Imagination |
| HIS | 206 | The Age of Reformation |
| PHI | 109 | Oriental Philosophy |
| PHI | 228 | Philosophy of Religion |
| PHI | 317 | Philosophy of Myth |
| PHI | 318 | Rig Veda |
| PSY | 392 | Psychology, Philosophy and Religion |
| SOC | 235 | Sociology of Religion |
| WL | 102 | Judaeo-Christian Tradition |
| WL | 106 | The Enlightenment |

## RLS 201 Fundamentals of Religion

A critical introduction to the study of religion focusing upon both the modern understanding of religion and the situation of religion in the modern world.
Mr. T. Altizer

*Fall, 3 credits*

## RLS 202 Contemporary Theology

A critical examination of contemporary theology with a primary emphasis upon modern Protestant and radical theology.
Prerequisite: RLS 201.
Mr. T. Altizer

*Spring, 3 credits*

# DEPARTMENT OF ROMANCE LANGUAGES

*Professors:* KONRAD BIEBER, LINETTE F. BRUGMANS, JORGE CARRERA ANDRADE *(Visiting)*, OSCAR A. HAAC, G. NORMAN LAIDLAW, IVAN A. SCHULMAN, *(Chairman)*

*Associate Professors:* [a] FREDERICK BROWN, JAIME A. GIORDANO, JAMES B. MCKENNA, LEONARD R. MILLS, PHILIP W. SILVER, JOSEPH A. TURSI, IRIS M. ZAVALA

*Assistant Professors:* HARRIET R. ALLENTUCH, [a] CAROL BLUM, DIANA M. CAPUTO, LISA E. DAVIS, CARL T. ERICKSON, THOMAS MERMALL, MIEKO NOROLOEB, J. ENRIQUE OJEDA, D. SANDY PETREY, ANTHONY RIZZUTO, KATHLEEN WILKINS

*Instructors:* NICOLE BECKER, MERYL EASSON, ALFRED EHRENFELD, ELLEN ENGELSON, GABRIELA GREENFIELD, GABRIEL LANDAU, MARIO MIGNONE, GIORGIO PERISSINOTTO, NORMAN POULIN, ELIZABETH RIGGS, CHARLES SCLAFANI, KAREN SMYLEY, THOMASINE WALLACE, ELLEN WECKER

At present the department offers major programs leading to the bachelor of arts degree in French and Spanish, as well as a variety of courses of interest to non-majors in French, Italian, Portuguese and Spanish. Students wishing to major in French or Spanish should examine the requirements listed below and consult with appropriate departmental advisors to choose individual programs.

## Requirements for the Major in French

## RLS 201 Fundamentals of Religion

A critical introduction to the study of religion focusing upon both the modern understanding of religion and the situation of religion in the modern world.
Mr. T. Altizer
*Fall, 3 credits*

## RLS 202 Contemporary Theology

A critical examination of contemporary theology with a primary emphasis upon modern Protestant and radical theology.
Prerequisite: RLS 201.
Mr. T. Altizer
*Spring, 3 credits*

# DEPARTMENT OF ROMANCE LANGUAGES

*Professors:* Konrad Bieber, Linette F. Brugmans, Jorge Carrera Andrade (*Visiting*), Oscar A. Haac, G. Norman Laidlaw, Ivan A. Schulman, (*Chairman*)

*Associate Professors:* [a] Frederick Brown, Jaime A. Giordano, James B. McKenna, Leonard R. Mills, Philip W. Silver, Joseph A. Tursi, Iris M. Zavala

*Assistant Professors:* Harriet R. Allentuch, [a] Carol Blum, Diana M. Caputo, Lisa E. Davis, Carl T. Erickson, Thomas Mermall, Mieko Noro-Loeb, J. Enrique Ojeda, D. Sandy Petrey, Anthony Rizzuto, Kathleen Wilkins

*Instructors:* Nicole Becker, Meryl Easson, Alfred Ehrenfeld, Ellen Engelson, Gabriela Greenfield, Gabriel Landau, Mario Mignone, Giorgio Perissinotto, Norman Poulin, Elizabeth Riggs, Charles Sclafani, Karen Smyley, Thomasine Wallace, Ellen Wecker

At present the department offers major programs leading to the bachelor of arts degree in French and Spanish, as well as a variety of courses of interest to non-majors in French, Italian, Portuguese and Spanish. Students wishing to major in French or Spanish should examine the requirements listed below and consult with appropriate departmental advisors to choose individual programs.

### Requirements for the Major in French

In addition to the general university requirements for the bachelor of arts degree, the following courses are required for the major in French:

*Credits*

I. Language Courses  15

FRN 221 French Conversation and Composition

FRN 222 Explication de Texte

FRN 321 French Phonetics and Diction

FRN 322 French Stylistics

FRN 396 Advanced French Language Seminar

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[a] On leave academic year 1970-71.

II. Literature Courses       21

    FRN 297 Major Writers in French through the 18th Century
    FRN 298 Major Writers in French since the 19th Century
    FRN 397 Senior French Literature Seminar

    Four additional semester courses chosen from the series 334-390
    (Teacher certification candidates may substitute 6 credits in education
    courses other than student teaching.)

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## Requirements for the Major in Spanish

In addition to the general university requirements for the bachelor of arts degree, the following courses are required for the major in Spanish:

            *Credits*

I. Language Courses       15

    SPN 221 Conversation and Composition I
    SPN 222 Conversation and Composition II
    SPN 321 Language Usage—Spoken Spanish
    SPN 322 Language Usage—Written Spanish
    SPN 396 Advanced Spanish Language Seminar

II. Literature Courses       9

    A. General

        SPN 297 Introduction to Hispanic Literature I
        SPN 298 Introduction to Hispanic Literature II
        SPN 341 Introduction to Cervantes

    B. Special       12–15

        In consultation with a departmental major advisor, each
        student should choose one of the following programs to
        follow SPN 298.

            36–39

*Program A (12 credits)*

Designed for students who seek a broad understanding of the language, literature and culture of the Spanish-speaking peoples, this program will prepare majors for careers in teaching, industry and public service. One semester course is required in each of the following areas:

    1.  The Golden Age
    2.  20th Century Literature (Spain)

3. 20th Century Literature (Spanish America)
4. Areas of literature not covered in 1-3; courses in civilization; language

Program A majors are encouraged to enroll in courses in a second language and in related courses in such departments as art, music, history and anthropology.

### Program B (15 credits)

Designed for students who plan to do graduate study in Romance languages, this program requires one semester course in each of the areas listed under Program A, and SPN 397 Senior Hispanic Literature Seminar. Program B majors are urged to acquire proficiency in at least one other Romance language and to take the Graduate Record Examination during their senior year.

### Placement

Entering students who wish to continue study of a foreign language started in high school should register for the appropriate college course, consulting a departmental advisor in doubtful cases. Note that no graduation credit is given for the first semester course (111) if the student has had two years of high school preparation; no graduation credit is given for the first two semester courses (111, 112 or 115), if the student has had three years of high school preparation.

### Teacher Training Program

Students interested in certification to teach foreign languages should consult appropriate departmental advisors concerning requirements and procedures of the teacher preparation program.

## COURSES IN FRENCH

### FRN 098 Developmental Course

This course is designed to introduce the student to the nature and interests of the Department of Romance Languages. It seeks to develop the skills, methods and procedures required for effective participation in subsequent departmental courses.

*Fall, no credit*

### FRN 111, 112 Elementary French

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

*Fall and Spring, 3 credits each semester*

## FRN 115 Intensive Elementary French

An intensive course covering the elementary French program (FRN 111, 112) in one semester.

*Fall and Spring, 6 credits*

## FRN 191, 192 Intermediate French

An intermediate course in conversation, composition and the interpretation of French texts. Practice in the language laboratory supplements classwork.
Prerequisite: FRN 112 or equivalent.

*Fall and Spring, 3 credits each semester*

## FRN 195 Intensive Intermediate French

An intensive course covering the intermediate French program (FRN 191, 192) in one semester.
Prerequisite: FRN 112 or equivalent.

*Fall and Spring, 6 credits*

## FRN 221 French Conversation and Composition

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.
Prerequisites: FRN 192 or 195, and permission of instructor.

*Fall, 3 credits*

## FRN 222 Explication de Texte

Reading and discussion of selected authors designed to improve the comprehension of literary texts. Reports in oral and written form.
Prerequisite: FRN 221 or permission of instructor.

*Spring, 3 credits*

## FRN 297 Major Writers in French through the 18th Century

Reading and interpretation of selected works by great French writers from the Middle Ages to the 18th century. Works are treated in the context of the history of French literature.
Prerequisite: French 192 or permission of instructor.

*Fall, 3 credits*

## FRN 298 Major Writers in French since the 19th Century

Reading and interpretation of selected works by great French writers from the 19th century to the present. Works are treated in the context of the history of French literature.
Prerequisite: French 297 or permission of instructor.

*Spring, 3 credits*

## FRN 321 French Phonetics and Diction

A course designed to develop mastery of the spoken language. Students will learn to express themselves in the current idiom with fluency and accuracy. At least two hours of weekly laboratory practice will be required.
Prerequisites: French 221, 222 or permission of instructor.

*Fall, 3 credits*

## FRN 322 French Stylistics

A course designed to acquaint students with the subtleties of French grammar and style. Extensive practice in composition and in translation from English to French.
Prerequisites: French 221, 222 or permission of instructor.

*Spring, 3 credits*

## FRN 334 Renaissance Prose

The work of the major French prose writers of the 16th century, in the intellectual and cultural context of the Renaissance.
Prerequisites: French 297, 298 or permission of instructor.

*Spring, 3 credits*

## FRN 343 French Classical Theatre

Reading of selected works by Corneille, Racine and Molière.
Prerequisites: French 297, 298 or permission of instructor.

*Fall, 3 credits*

## FRN 344 French Classical Prose and Poetry

Reading of texts from such authors as Pascal, La Rochefoucauld, La Bruyère, Madame du

Sévigné, Madame de Lafayette, Saint-Simon, La Fontaine.
Prerequisites: French 297, 298 or permission of instructor.
*Spring, 3 credits*

## FRN 351 French Literature in the 18th Century I

Reading of selected literary works of the Enlightenment from 1685 to 1750.
Prerequisites: French 297, 298 or permission of instructor.
*Fall, 3 credits*

## FRN 352 French Literature in the 18th Century II

Reading of selected works of Diderot, Rousseau and their contemporaries.
Prerequisites: French 297, 298 or permission of instructor.
*Spring, 3 credits*

## FRN 361 19th Century French Literature I

Studies in French Romanticism from Chateaubriand to Hugo.
Prerequisites: French 297, 298 or permission of instructor.
*Fall, 3 credits*

## FRN 362 19th Century French Literature II

Studies in French realism, naturalism, and symbolism.
Prerequisites: French 297, 298 or permission of instructor.
*Spring, 3 credits*

## FRN 364 French Romantic Poetry from Chénier to Baudelaire

A study of the major poets and schools since romanticism, with discussion of changing poetic practices and doctrines. Critical readings in Baudelaire, Rimbaud, Mallarmé and Verlaine with explication of individual poems.
Prerequisites: French 297, 298 or permission of instructor.
*Fall, 3 credits. Not offered in 1970-71.*

## FRN 371 The Modern French Theatre

Representative French playwrights from Alfred Jarry to the present, with particular emphasis on the post-war theatre.
Prerequisites: French 297, 298 or permission of instructor.
*Fall, 3 credits. Not offered in 1970-71.*

## FRN 373 Modern French Fiction to 1945

Critical reading and interpretation of French fiction in the 20th century with emphasis on Proust and Gide.
Prerequisites: French 297, 298 or permission of instructor.
*Fall, 3 credits*

## FRN 374 Modern French Fiction since 1945

Critical readings with emphasis on novelists from Sartre and Camus to Beckett, Robbe-Grillet and Sarraute.
Prerequisites: French 297, 298 or permission of instructor.
*Spring, 3 credits*

## FRN 376 20th Century Poetry

A study of the major poets from Apollinaire to St. John Perse. Explication of individual poems.
Prerequisites: French 297, 298 or permission of instructor.
*Spring, 3 credits. Not offered in 1970-71.*

## FRN 382 The Literature of Commitment in France

Literature of commitment and the reaction against commitment in the 20th century. Selected readings, prose, poetry, drama and essays, centered around the theme.
Prerequisites: French 297, 298 or permission of instructor.
*Fall, 3 credits*

## FRN 390 Pensée et Culture (French Civilization)

French writers and artists and their interpretation of society. The intellectual and cultural climate of modern France.

Prerequisites: French 297, 298 or permission of instructor.

*Spring, 3 credits. Not offered in 1970-71.*

## FRN 396 Advanced French Language Seminar

This seminar is intended to develop the student's skill in the use of the French language both written and oral, as well as to provide an adequate approach to the history and theory of the French language.
Prerequisite: French 322 or equivalent.

*Spring, 3 credits*

## FRN 397 Senior Literature Seminar

This seminar is intended to provide the major with an overall view of French literature.
Prerequisite: Senior standing.

*Fall, 3 credits*

## FRN 399 Directed Readings in French

Individually supervised readings in selected topics of French language and literature.

*Fall and Spring, 1-4 credits*

## COURSES IN ITALIAN

## ITL 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 language laboratory supplements classwork.

*Fall and Spring, 3 credits each semester*

## ITL 129 Master Works of Italian Literature in Translation

Readings in English translation of Italian literature from the 13th century to the present, from such authors as Dante, Petrarch, Boccaccio, Ariosto, Machiavelli, Lorenzo de Medici, Foscolo, Leopardi, Manzoni, Giusti, Pascoli, Pirandello, Ungaretti, Moravia, Montale.

*Spring, 3 credits*

## ITL 191, 192 Intermediate Italian

An intermediate course in the reading and discussion of selected Italian texts. An intensive grammar review with practical language laboratory exercises will offer an opportunity to develop conversational ability.
Prerequisite: ITL 112 or the equivalent.

*Fall and Spring, 3 credits each semester*

## ITL 221 Italian Conversation

A course in spoken Italian for advanced students. At least one hour of language laboratory is required.
Prerequisite: ITL 192 or permission of instructor.

*Fall, 3 credits*

## ITL 222 Readings and Discussion of Modern Authors

Readings selected from the works of modern Italian authors, with explication of the texts and oral and written reports.
Prerequisite: ITL 221 or permission of instructor.

*Spring, 3 credits*

## ITL 297 Major Writers in Italian to the 18th Century

Discussion of representative Italian writers from St. Francis of Assisi to Giuseppe Parini. The works read are treated in the context of the history of Italian literature.
Prerequisite: ITL 192 or permission of instructor.

*Fall, 3 credits*

## ITL 298 Major Writers in Italian of the 19th and 20th Centuries

Reading and discussion of representative writers in Italian literature of the 19th and 20th centuries. The works read are treated in the context of the history of Italian literature.
Prerequisite: ITL 192 or permission of instructor.

*Spring, 3 credits*

## ITL 301 Special Author

Tutorial or seminar format, devoted to one author such as: Lorenzo de Medici, Ariosto,

Tasso, Machiavelli, Alfieri, Manzoni, Carducci and others. Essential works and significant criticism will be analysed.
Prerequisites: ITL 297, 298 or permission of instructor.
*Fall and Spring, 3 credits*

## ITL 327 Dante's *Divina Commedia* I

Reading and interpretation of the *Inferno,* preceded by a study of the *Vita Nuova* as an introduction to the *Divina Commedia.*
Prerequisites: ITL 297, 298.
*Fall, 3 credits*

## ITL 328 Dante's *Divina Commedia* II

Reading and interpretation of the *Purgatorio* and the *Paradiso.*
Prerequisite: ITL 327.
*Spring, 3 credits*

## ITL 332 Italian Literature of the Renaissance

The study of *Orlando Furioso* by Ariosto and the *Gerusalemme Liberata* by Tasso, together with selected works by Lorenzo de Medici, Poliziano, Machiavelli, Castiglione, Michelangelo and Bembo.
Prerequisites: ITL 297, 298.
*Spring, 3 credits*

## ITL 341 Early Italian Lyric through Dante

A study of the origin, development and trends of early Italian lyric poetry, beginning with the Sicilian School, through the Dolce Stil Novo and Dante's poetry other than the *Divina Commedia.*
Prerequisites: ITL 297, 298 and permission of instructor.
*Fall, 3 credits. (Offered alternate years.)*

## ITL 342 Petrarch and Boccaccio

Reading and discussion of the major works of Petrarch and Boccaccio, with special attention to the treatment of themes and mode of expression.
Prerequisites: ITL 297, 298.
*Spring, 3 credits. (Offered alternate years.)*

## ITL 371 Contemporary Italian Poetry

A study of contemporary Italian poetry, including D'Annunzio, Marinetti, Saba, Campana, Ungaretti, Montale and Quasimodo as individual poets and as representatives of the principal trends.
Prerequisites: ITL 297, 298 and permission of instructor.
*Fall, 3 credits. (Offered alternate years.)*

## ITL 372 Contemporary Italian Fiction

An examination of the Italian novel and short story since World War I.
Prerequisites: ITL 297, 298.
*Spring, 3 credits. (Offered alternate years.)*

# COURSES IN PORTUGUESE

## POR 111, 112 Elementary Portuguese

An introduction to spoken and written Portuguese, stressing pronunciation, speaking, comprehension, reading and writing. Selected texts will be read. Practice in the language laboratory supplements classwork.
*Fall and Spring, 3 credits each semester*

## POR 191, 192 Intermediate Portuguese

An intermediate course in conversaton, composition and the interpretation of Portuguese texts. Practice in the language laboratory will further develop audiolingual skills.
Prerequisite: POR 112.
*Fall and Spring, 3 credits each semester*

# COURSES IN SPANISH

## SPN 098 Developmental Course

This course is designed to introduce the student to the nature and interests of the Department of Romance Languages. It seeks to

develop the skills, methods and procedures required for effective participation in subsequent departmental courses.

*Fall, no credit*

## SPN 109 Masterpieces of Spanish Literature in Translation

Readings from *El Cid,* the picaresque novel, Cervantes, Golden Century drama, and significant contemporary authors.

*Fall, 3 credits. Not given 1970-71.*

## SPN 110 Literature of Dissent in Spanish America (in translation)

An examination of representative literary examples of the main currents of social and political dissent in Spanish America.

*Spring, 3 credits*

## SPN 111, 112 Elementary Spanish

An introduction to spoken and written Spanish, stressing pronunciation, speaking, comprehension, reading and writing. Practice in the language laboratory supplements classwork.

*Fall and Spring, 3 credits each semester*

## SPN 115 Intensive Elementary Spanish

An intensive course covering the elementary Spanish program (SPN 111, 112) in one semester.

*Spring, 6 credits*

## SPN 191, 192 Intermediate Spanish

An intermediate course in conversation, composition, and the interpretation of Spanish texts. Practice in the language laboratory. Prerequisite: SPN 112 or equivalent.

*Fall and Spring, 3 credits each semester*

## SPN 195 Intensive Intermediate Spanish

An intensive course covering the intermediate Spanish program (SPN 191, 192) in one semester. Prerequisite: SPN 112 or equivalent.

*Spring, 6 credits*

## SPN 221 Spanish Conversation and Composition I

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.
Prerequisite: SPN 192, or 195 or permission of instructor.

*Fall, 3 credits*

## SPN 222 Spanish Conversation and Composition II

A course in the active use of spoken and written Spanish. A discussion of texts.
Prerequisite: SPN 221 or permission of instructor.

*Spring, 3 credits*

## SPN 227 Spanish Composition (for Spanish native speakers)

A course intended for native speakers of the Spanish language and designed to improve their competence in written Spanish.

*Fall, 3 credits*

## SPN 250 Antillean Culture and Literature

Analysis of the social background and culture of the Antilles, with special emphasis on Puerto Rico. The collective ideals, the image of the past and the aspirations for the future of the society—the theme of uncertainty, hope, faith and despair. Hostos, Martí, Afro-Caribbean poetry, J. Bosch and René Marqués will be among the writers and topics discussed. Lectures will be in English.

*Fall and Spring, 3 credits*

## SPN 297 Introduction to Hispanic Literature I

Theories and practice of literary analysis and scholarship through readings of representative works of Hispanic literature.
Prerequisite: SPN 192 or equivalent.

*Fall, 3 credits*

## SPN 298 Introduction to Hispanic Literature II

Readings and practice of literary analysis and scholarship through readings of representative works of Hispanic literature.
Prerequisite: SPN 192 or equivalent.

*Spring, 3 credits*

## SPN 307 Spanish-American Literature from the 16th to the 19th Century

Reading and interpretation of selected works by representative writers of Spanish America during the Colonial period and the 19th century.
Prerequisites: SPN 297, 298 or permission of instructor.

*Fall, 3 credits*

## SPN 308 Spanish-American Literature of the 20th Century

Reading and interpretation of selected works by representative writers of Spanish America during the 20th century.
Prerequisites: SPN 297, 298 or permission of instructor.

*Spring, 3 credits*

## SPN 321 Language Usage—Spoken Spanish

This course intends to develop fluency and accuracy in the use of the spoken language through intensive practice, exposition, class discussion and the use of the language laboratory.
Prerequisite: SPN 222 or permission of instructor.

*Fall, 3 credits*

## SPN 322 Language Usage—Written Spanish

A course designed to acquaint students with the subtleties of Spanish grammar and style. Extensive practice in composition and in translation from English to Spanish.
Prerequisite: SPN 321 or permission of instructor.

*Spring, 3 credits*

## SPN 324 History of the Spanish Language

A historical survey of the phonetics, morphosyntax and lexicon of Castilian Spanish from the Roman conquest to the present.
Prerequisites: Introductory course in linguistics and SPN 192 or equivalant.

*Spring, 3 credits*

## SPN 341 Introduction to Cervantes

A consideration of the literary career of Cervantes including lyrics, theatre, novels, short stories and *Don Quixote*.
Prerequisites: SPN 297, 298 or permission of instructor.

*Fall, 3 credits*

## SPN 342 Spanish Drama of the Golden Age

An analysis of several of the most representative plays by Lope de Vega, Calderón de la Barca, Tirso de Molina and others.
Prerequisites: SPN 297, 298 or permission of instructor.

*Spring, 3 credits*

## SPN 343 Spanish Prose of the Golden Age except Cervantes

An examination of the major prose genres beginning with the Celestina and including courtly, picaresque and pastoral narration as well as mystic and historical prose.
Prerequisites: SPN 297, 298 or permission of instructor.

*Fall 1971, 3 credits*

## SPN 344 Spanish Poetry of the Golden Age

An examination in depth of Spanish poetic literature from the late Middle Ages to the Baroque, from the Cancioneros to Góngora.
Prerequisites: SPN 297, 298 or permission of instructor.

*Spring, 3 credits*

## SPN 372 Spanish Novel from Galdós to the Generation of 1898

Representative novels of the period. Special emphasis will be given to the historical novels of Galdós, Unamuno, Baroja and Valle-Inclán. Prerequisites: SPN 297, 298 or permission of instructor.

*Spring, 3 credits*

## SPN 373 The Generation of 1898

A study of selected works of Ganivet, Unamuno, Azorin, Valle-Inclán, Ortega y Gasset, Machado, Pérez de Ayala and Baroja. Prerequisites: SPN 297, 298 or permission of instructor,

*Fall, 3 credits*

## SPN 374 Spanish Poetry from Bécquer to the Generation of 1927

Spanish poetry from Bécquer to Lorca and the Generación del 27. Special emphasis will be made on the different post-war "ismos" and on the influence of the Spanish Civil War on certain poets like Machado, Miguel Hernandez, Alberti. Prerequisites: SPN 297, 298 or permission of instructor.

*Fall, 3 credits*

## SPN 375 Contemporary Spanish-American Novel

A study of contemporary Spanish-American novelists: Asturias, Carpentier, Yañez, Fuentes, Cortazar, etc. Prerequisites: SPN 297, 298.

*Fall, 3 credits*

## SPN 376 Contemporary Spanish-American Poetry

A study of contemporary Spanish-American poetry, including Dario, Gabriela Mistral, Vallejo, Neruda, Paz, Fernández and Cardenal as individual poets and as representatives of the principal trends. Prerequisites: SPN 297, 298 or permission of instructor.

*Spring, 3 credits*

## SPN 378 Contemporary Spanish-American Essay

The quest for identity in the contemporary Spanish-American essay, since *Ariel* of Rodó (1900) . Carlos O. Bunge, José Vasconcelos, Alfonso Reyes, Eduardo Mallea, José C. Mariátequi, Mariano Picón-Salas, Jorge Mañach, Leopoldo Zea, Octavio Paz and Ezequiel Martinez Estrada will be among the writers to be discussed. Prerequisites: SPN 297, 298 or permission of instructor.

*Spring, 3 credits*

## SPN 388 Spanish Essay in the 18th and 19th Centuries

The essay in the 18th and 19th centuries, including Feijoo, Jovellanos and such major costumbristas as Mesonero Romanos and Larra. Prerequisites: SPN 297, 298 or permission of instructor.

*Spring, 3 credits*

## SPN 390 Spanish Civilization

Spanish writers and artists and their interpretation of society. The intellectual and cultural climate of modern Spain. Prerequisites: SPN 297, 298 or permission of instructor.

*Spring, 3 credits*

## SPN 393 Spanish-American Civilization

The reality of Spanish America, as seen through some of its artists, historians, writers and public figures. Prerequisites: SPN 307, 308 or permission of instructor.

*Fall, 3 credits. Not offered 1970-71.*

## SPN 396 Advanced Spanish Language Seminar

Intended to develop the student's skill in the use of the Spanish language, both written and oral, as well as to provide an adequate approach to the history and theory of the Spanish language. Prerequisite: SPN 322 or equivalent.

*Spring, 3 credits*

### SPN 397 Senior Hispanic Literature Seminar

Intended to provide the major with an overall view of Spanish literature.
Prerequisite: Senior standing.
*Fall, 3 credits*

### SPN 399 Directed Readings in Spanish

Individually supervised readings in selected topics of Hispanic language and literature.
*Spring and Fall 1971, 1-4 credits*

### FLA 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 audio-lingual 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.
*Fall and Spring, 3 credits*

# INTERDISCIPLINARY PROGRAM IN SOCIAL SCIENCES

This recently established interdisciplinary degree program (SSC) is designed for students with broad interests in the achievements, concerns and methods of the social and behavioral sciences. Individual plans of study can be created by combining courses chosen from among the offerings of six departments: anthropology, economics, history, political science, psychology and sociology. In addition, special interdepartmental SSC courses are being developed, two of which are described below.

### Requirements for the Major in Social Sciences

In addition to the general university requirements for the bachelor of arts degree, the following courses are required for the interdisciplinary major in social sciences:

|  | *Credits* |
|---|---|
| I. Courses in at least four different social sciences departments distributed as follows: | |
| A. Two courses in *each* of any two departments | 12-16 |
| B. Four courses in *each* of any two *other* departments (At least two of the four courses in each department must be beyond the introductory level.) | 24-32 |
| C. Two additional courses, both of which must be beyond the introductory level, in any social science department or departments, including A and B above | 6-8 |
|  | 42-56 |

(Note: With approval of the student's advisor, appropriate SSC courses may be substituted for any of the above requirements.)

II. Two courses in related areas (e.g., education, philosophy, computer science, linguistics) chosen in consultation with the student's advisor.

Further information about the SSC major may be obtained in the office of the vice president for liberal studies.

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## INTERDISCIPLINARY COURSES IN THE SOCIAL SCIENCES

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The following courses are offered as an introduction to the social sciences for freshmen. The courses may be used to meet the general university requirement in social sciences as well as to satisfy certain of the requirements of the SSC interdisciplinary major.

## SSC 101 Social Control

An introductory exploration of the nature and variety of social organization. Special attention is paid to political philosophy on the nature of the "social contract," to various forms of social determinism and to the bonds of traditional social organizations, such as kinship, primitive economic systems and the controls exercised by religion. Readings will be drawn from the various social sciences.

Prerequisite: Freshman standing or permission of instructor.

Mr. J. Rosenthal

*Fall, 3 credits*

## SSC 102 Social Change

An examination of the nature of change in society. Both planned and unplanned social development will be studied in contexts which range from personality and character adjustment to town planning, economic development, revolutionary action by a small group and the building of the revolution on a national basis. Readings will be drawn from the various social sciences.

Prerequisite: Freshman standing or permission of instructor.

Mr. J. Rosenthal

*Spring, 3 credits*

# DEPARTMENT OF SOCIOLOGY

*Distinguished Professor:* LEWIS A. COSER

*Professors:* ROSE L. COSER (*Adjunct Professor*), JOHN H. GAGNON, [a] KURT LANG, CHARLES PERROW, HANAN C. SELVIN, EUGENE WEINSTEIN (*Chairman*)

*Associate Professors:* STEPHEN COLE, O. ANDREW COLLVER, KENNETH A. FELDMAN, ERICH GOODE, [a]NORMAN GOODMAN, [b]NED POLSKY, DAVID STREET

*Assistant Professors:* STEPHEN D. BERGER, KENNETH BRYSON, HARVEY A. FARBERMAN, MICHAEL HARRISON, [a]CLINTON HERRICK, JAMES R. HUDSON, DAVID PHILLIPS, MICHAEL SCHWARTZ, GAYE TUCHMAN, SASHA WEITMAN

*Instructor:* RAYMOND MAURICE

*Lecturer:* JUDITH TANUR

## Requirements for the Major in Sociology

In addition to the general university requirements for the bachelor of arts degree, the following courses are required for the major in sociology:

    I. Study within the area of the major (to total 30 credits)

        A. SOC 103 Introduction to Sociology

        B. SOC 201 Research Methods to be taken in the sophomore year

        C. *Either* of the following sequences; to be taken in the junior or senior year:

            1. SOC 361 Historical Development of Contemporary Sociology and SOC 362 Introduction to Sociological Theory OR

            2. SOC 396, 397 Sociological Theory and Research I, II

        Note: The sequence SOC 361, 362 is for sociology majors who do not wish to participate in the departmental honors program. Students interested in the honors program should consult a departmental advisor.

        D. Additional courses in sociology to complete the required total of 30 credits. SOC 202 Statistical Methods is strongly recommended but is not required. Qualified seniors may register for graduate courses with approval of the departmental advisor.

    II. Study in related areas

        A. MAT 102 or two other courses in mathematics chosen in consultation with a departmental advisor

        B. At least three courses in social science related to sociology, to be chosen in consultation with a departmental advisor

[a] On leave academic year 1970-71.
[b] On leave spring semester 1971.

**Honors Program**

Students interested in graduating with honors in sociology should discuss the honors program with a departmental advisor. The following requirements must be met:

1. A 3.3 cumulative grade point average in all sociology courses through the junior year.

2. Enrollment in SOC 396, 397 rather than the sequence SOC 361, 362.

3. Completion of a senior honors essay under the direction of one or more faculty members. The subject and scope of the essay will be jointly determined by the student and his faculty sponsor (s), who will judge the quality of the completed essay.

## COURSES IN SOCIOLOGY

### SOC 101 Contemporary Society

The basic characteristics of modern industrial society, such as population growth, urbanization, technological change and bureaucratic organization.
Mr. M. Harrison
*Fall and Spring, 3 credits*

### SOC 103 Introduction to Sociology

A survey of the main concepts in sociological analysis. This course is the prerequisite for all further courses in sociology.
Mr. E. Goode, Mr. S. Weitman (fall), Mr. H. Selvin, Mr. S. Weitman (spring)
*Fall and Spring, 3 credits*

### SOC 161 Ethnic Relations

The formation, migrations and conflicts of ethnic and other minority groups; prejudice, discrimination and minority self-hatred.

Prerequisite: SOC 103 or permission of instructor.
Mr. M. Schwartz (fall), Mr. S. Berger, Mr. M. Schwartz (spring)
*Fall and Spring, 3 credits*

### SOC 201 Research Methods in Sociology

Methods of collecting and analyzing empirical data to test sociological hypotheses. Emphasis will be on multivariate analysis of tabular and statistical data.
Prerequisite: SOC 103 or permission of instructor.
Mr. S. Cole, Mr. D. Phillips (fall), Mr. D. Phillips, Mrs. J. Tanur (spring)
*Fall and Spring, 3 credits*

### SOC 202 Statistical Methods in Sociology

An introduction to the use and interpretation of statistical methods in social research; descriptive and inferential statistics.

Prerequisite: SOC 103 or permission of instructor.
Mrs. J. Tanur
*Fall, 3 credits*

## SOC 203 Social Stratification

Theories of social stratification; patterns of differentiation in wealth, prestige and power; social mobility; power structures and elites.
Prerequisite: SOC 103 or permission of instructor.
Mr. K. Bryson
*Fall, 3 credits*

## SOC 204 Courtship and Marriage

Social factors affecting courtship, mate-selection, and engagement; dynamics of marital adjustment and parenthood.
Prerequisite: SOC 103 or permission of instructor.
Mr. H. Selvin (fall), Mr. J. Gagnon (spring)
*Fall and Spring, 3 credits*

## SOC 205 Principles of Sociology

An introduction for non-sociology majors emphasizing major sociological works and ideas.
Prerequisite: Junior or senior standing or permission of instructor.
Mr. J. R. Hudson
*Fall, 3 credits*

## SOC 207 Social Planning

Deliberate attempts to introduce change in society; methods of evaluating the success of social change programs; conditions affecting the success of such programs.
Prerequisite: SOC 103 or permission of instructor.
Staff
*Fall, 3 credits. Not offered 1970-71.*

## SOC 209 Social Conflicts and Movements

An examination of aggregate phenomena. "Revolutionary" and "counter-revolutionary"

programs and organizations. Historical and cross-cultural examples will be emphasized.
Prerequisite: SOC 103 or permission of instructor.
Mr. K. Bryson
*Fall, 3 credits*

## SOC 220 Population Problems

Sources and consequences of changes in population size and composition; the "demographic explosion."
Prerequisite: SOC 103 or permission of instructor.
Mr. K. Bryson
*Fall, 3 credits*

## SOC 223 Urban Society

The emergence of cities and the process of urbanization; an examination of urban structure. The consequences of the urban milieu for interpersonal relations and institutions.
Prerequisite: SOC 103 or permission of instructor.
Mr. O. A. Collver (fall), Mr. H. Farberman (spring)
*Fall and Spring, 3 credits*

## SOC 235 Sociology of Religion

The ways in which sociocultural processes affect and are influenced by religious belief systems and organizations; changing structures and functions of religious institutions.
Prerequisite: SOC 103 or permission of instructor.
Mr. M. Harrison
*Spring, 3 credits*

## SOC 236 Technology and Social Change

Technological and organizational preconditions of economic development; social implications of automation and other changes in technology.
Prerequisite: SOC 103 or permission of instructor.
Mr. C. Perrow
*Spring, 3 credits*

## SOC 237 Deviance and Delinquency

Social factors related to juvenile crime, non-victim crime and legal but stigmatized behavior; competing theories and research methods.
Prerequisite: SOC 103 or permission of instructor.
Mr. N. Polsky (fall), Mr. E. Goode (spring)
*Fall and Spring, 3 credits*

## SOC 239 Sociology of Crime

Crime as a social institution; problems of research method; types of criminal behavior systems and subcultures; sociology of law enforcement; theories of crime causation and control.
Prerequisite: SOC 103 or permission of instructor.
Mr. E. Goode
*Spring, 3 credits*

## SOC 241 Social Psychology

Individual and social factors in human behavior; the structure of personality; identity development; communication processes, attitudes.
Prerequisites: SOC 103 and PSY 101 or permission of instructor.
Mr. H. Farberman
*Fall and Spring, 3 credits*

## SOC 243 Sociology of Youth

Adolescent socialization; age structures and intergenerational conflict; peer groups and youth subcultures.
Prerequisite: SOC 103 or permission of instructor.
Mr. R. Maurice
*Fall and Spring, 3 credits*

## SOC 251 Work and the Professions

The social patterning of work situations and careers; relations of work organizations to each other and to larger social structures.
Prerequisite: SOC 103 or permission of instructor.
Mr. J. Hudson
*Fall, 3 credits*

## SOC 253 Sociology of Science

Social influences on the choice of research problems and on the behavior of scientists; the social organization of scientific enterprises.
Prerequisite: SOC 103 or permission of instructor.
Staff
*3 credits. Not offered 1970-71.*

## SOC 254 Sociology of Law

Law as an institution of social control; the legal profession, court systems and bureaucratization of the legal process; the relation of law to social change.
Prerequisite: SOC 103 or permission of instructor.
Staff
*3 credits. Not offered 1970-71.*

## SOC 256 Political Sociology

Social structure and processes as affecting, and affected by, political behavior and organizations; the sociology of power, authority and legitimacy.
Prerequisite: SOC 103 or permission of instructor.
Mr. M. Schwartz (fall), Mr. J. Hudson (spring)
*Fall and Spring, 3 credits*

## SOC 260 Comparative Social Structures

The principal complex societies and their central institutions, with emphasis on industrialization and economic development.
Prerequisite: SOC 103 or permission of instructor.
Mrs. R. Coser
*Spring, 3 credits*

## SOC 262 Mass Communications

Social influences on the content and effects of mass communications; communication systems; the public functions of mass communication.
Prerequisite: SOC 103 or permission of instructor.
Miss G. Tuchman (fall), Mr. R. Maurice (spring)
*Fall and Spring, 3 credits*

## SOC 263 Collective Behavior

Major unstructured social phenomena, such as mob violence, panics, fads and fashions, and public opinion; as the outcome of collective problem-solving activity.
Prerequisite: SOC 103 or permission of instructor.
Mr. D. Street
*Fall, 3 credits*

## SOC 281 Sociology of Organizations

Bureaucracy as a form of organization; the structure of relations between and within organizations.
Prerequisite: SOC 103 or permission of instructor.
Mr. C. Perrow
*Spring, 3 credits*

## SOC 282 Small Groups

The structure and functioning of face-to-face groups in field and laboratory settings.
Prerequisite: SOC 103 or permission of instructor.
Staff
*Fall, 3 credits. Not offered 1970-71.*

## SOC 287 Sociology of Education

Educational institutions as social systems; social patterns in the life-cycles of students and teachers; class and ethnic factors in educational development.
Prerequisite: SOC 103 or permission of instructor.
Mr. K. Feldman (fall), Mr. K. Bryson (spring)
*Fall and Spring, 3 Credits*

## SOC 304 Sociology of the Family

Analysis of the family as a major social institution; examination of the structure and functions of the family in various societies.
Prerequisite: SOC 103 or permission of instructor.
Mrs. R. Coser
*Fall, 3 credits*

## SOC 341 Historical Sociology

Sociological theories and methods applied to the study of historical phenomena such as revolutions, migration and industrialization.
Prerequisites: SOC 103 and permission of instructor.
Staff
*Fall, 3 credits. Not offered 1970-71.*

## SOC 351 Sociology of Literature

Literature as a symbolic expression of social structure; the relations between literary movements and other forms of social activity.
Prerequisites: SOC 103 and permission of instructor.
Miss G. Tuchman
*Spring, 3 credits*

## SOC 358 War and Military Institutions

The role of violence in social affairs; military organizations; civil-military relations.
Prerequisite: SOC 103 or permission of instructor.
*Fall, 3 credits. Not offered 1970-71.*

## SOC 361 Historical Development of Contemporary Sociology

Main currents in the development of theories and empirical studies of society, culture and personality.
Prerequisite: SOC 103 or permission of instructor.
Mr. S. Berger, Mr. H. Farberman
*Fall and Spring, 3 credits*

## SOC 362 Introduction to Sociological Theory

A systematic treatment of the dominant general orientations in sociology including structural functional analysis and symbolic interactionism.
Prerequisite: SOC 103 or permission of instructor.
Mr. D. Phillips, Mr. S. Weitman
*Fall and Spring, 3 credits*

## SOC 391, 392 Senior Seminars in Sociology

Special projects and research papers on a topic of sociological interest, which will be announced before the start of the term.

Prerequisite: Permission of instructor.
Mr. E. Goode, Mr. M. Harrison (fall), Miss
G. Tuchman, Mr. H. Selvin (spring)
*Fall and Spring, 3 credits*

## SOC 394, 395 Readings in Sociology

Selected readings, usually in a special area, to
be arranged by the student and the instructor.
A student may register for each course only
once.
Prerequisites: Junior or senior standing,
major in sociology and permission of depart-
ment.

*Fall and Spring, 1 to 3 credits each semester*

## SOC 396, 397 Sociological Theory and Research I, II

An intensive examination of sociological
theory. Special attention will be paid to the
ways in which theoretical ideas can be empiri-
cally tested. This course is intended primarily
for students planning to do graduate or profes-
sional work in the social sciences; it is *re-
quired* of students who wish to graduate with
honors in sociology, to be taken preferably in
the junior year.
Prerequisites: SOC 103 and SOC 201, junior
or senior standing and permission of depart-
ment.
Mr. L. Coser, Mr. O. A. Collver
*Fall and Spring, 6 credits each semester*

# DEPARTMENT OF THEATRE ARTS

*Professors:* JAN KOTT, JOHN NEWFIELD

*Associate Professors:* WILLIAM J. BRUEHL *(Chairman)*, RICHARD DYER-BENNET, RICHARD F. HARTZELL, MILTON B. HOWARTH

*Assistant Professors:* CECILY DELL, PETER FELDMAN, THOMAS G. NEUMILLER

*Instructor:* ROGER B. BOND

*Lecturer:* JULIAN OLF

## Requirements for the Major in Theatre Arts

In addition to the general university requirements for the bachelor of arts degree, the following courses are required for the major in theatre arts:

*Credits*

A. Any three of the following two semester course sequences:
  1. THR 323, 324 The Dramatic Tradition
  2. THR 325, 326 Theatre History: Readings, Colloquies, Projects
  3. THR 327, 328 Contemporary Drama and Theatre
  4. THR 329, 330 Experimental Theatre Workshop     18
B. Either THR 241 Production Workshop or THR 242 Workshop in Stage Technique     3
C. Seven additional courses chosen with approval of the departmental advisor and distributed as follows:
  1. Three 100-level courses     9
  2. Four 200 or 300-level courses not included in A or B above     12
      —
      42

## COURSES IN THEATRE ARTS

### THR 130 Voice Training for Actors

Individualized training designed to strengthen and clarify the speaking voice. Students arrange weekly tutorials with instructor. Open only to students with a professional commitment to acting or other professional users of the speaking voice. May be repeated once, but counts toward the major once only. Prerequisite: Permission of instructor.

Mr. R. Dyer-Bennet

*Fall and Spring, 3 credits*

### THR 131 The Nature of Drama

The fundamentals of dramaturgy: the elements of drama, dramatic composition, plot, characterization, dramatic language. Readings of significant plays from the repertoire of world drama in connection with available records of their theatrical productions.

Mr. J. Olf and staff

*Fall, 3 credits*

### THR 132 Fundamentals of Technical Theatre

The planning, construction and handling of stage scenery and properties.

Prerequisite: Permission of instructor.

Mr. R. Bond

*Fall and Spring, 3 credits*

## THR 133 Voice and Diction

Students who have made sufficient progress in THR 130 now proceed to combine those advances with methodical reconstruction of habits of articulation and idiomatic usage toward the goal of a cleanly articulated, standard American usage.
Prerequisite: Permission of instructor.
Mr. R. Dyer-Bennet
*Spring, 3 credits*

## THR 135 The Forms of Modern Theatre

A course designed to introduce the general student to the nature of drama and theatre in the modern world, to the basic elements of theatre arts, and to important contemporary and modern drama examined in the full dimensions of projected productions. Each student, during the semester, is expected to see and evaluate a professional Broadway or off-Broadway play in performance.
Mr. R. Bond and Mr. J. Olf
*Fall and Spring, 3 credits*

## THR 136 Acting I

The basic elements of the actor's craft. Stage movement, sense exercises, improvisation, characterization, mime, sight-reading and script analysis in order to stimulate creative imagination and emotional capacities.
Mr. P. Feldman and Mr. J. Olf
*Fall and Spring, 3 credits*

## THR 137 Cinema . . . Now and Then

Beginning now, with Godard, Lester and Leacock (and Brakhage, Clarke and Mailer too), this course defines what movies are and how they came to be what they are. A large number of movies are viewed, as students learn to identify those qualities which make a movie filmic. While the course is not a history of the film it does describe the traditions and identify the traditionmakers of this youngest of the arts.
Mr. R. Hartzell
*Fall, 3 credits*

## THR 138 Movement as Medium

An examination and an extension of the movement patterns of everyday life aimed at better physical functioning; an exploration of movement as a medium of behavior.
Prerequisite: Permission of instructor.
Miss C. Dell
*Fall and Spring, 3 credits*

## THR 139 Movement for Actors

An examination of movement focused on the individual student's preferred movement patterns. An extension of these patterns to allow the actor more choices in performing.
Prerequisites: THR 136 and permission of instructor.
Miss C. Dell
*Fall and Spring, 3 credits*

## THR 234 The Moving Image

This first course in film-making technique requires students to explore the esthetics of motion through the use of a movie camera and through the experience of combining moving images, by creative editing, into meaningful sequences.
Prerequisite: Permission of instructor.
Mr. R. Hartzell
*Fall and Spring, 3 credits*

## THR 236 Stage Costume

An introduction to the history and esthetics of stage costumes and the fundamentals of costume design. The technique of theatrical make-up.
Prerequisite: Permission of instructor.
Mr. M. Howarth
*Fall and Spring, 3 credits*

## THR 237 Acting II

Continued training in basic techniques. Advanced work in character analysis and development. Enphasis is on scene study and introduction to styles of acting.
Prerequisite: THR 136 or permission of instructor.
Mr. P. Feldman and staff
*Fall and Spring, 3 credits*

## THR 238 Stage Lighting

Basic theories of stage lighting approached from a technical and an esthetic viewpoint, leading to the practical planning of light plots for individual plays.

Prerequisite: THR 132 or permission of instructor.
Mr. R. Bond
*Spring, 3 credits*

## THR 239 Directing

The process of selecting the play and preparing its production. Problems of interpretation. The production book.
Prerequisite: Permission of instructor.
Mr. T. Neumiller
*Fall, 3 credits*

## THR 241 Production Workshop

Students in the course, in addition to working with the instructor throughout the planning, preparation and execution of a major theatre event, will assume key positions of responsibility such as production manager, assistant production manager, and principal acting roles. May be repeated, but may count toward major once only.
Prerequisite: Permission of instructor.
Mr. W. Bruehl, Mr. T. Neumiller, and directing staff
*Fall and Spring, 3 credits*

## THR 242 Workshop in Stage Technique

Students will have the opportunity to combine theory and practical experience in all aspects of stagecraft. They will work with the faculty in planning and executing real projects in costume, sound, lighting and set construction in connection with university and other departmental productions. May be repeated, but may count toward major once only.
Prerequisite: THR 232 or permission of instructor.
Mr. R. Bond
*Fall and Spring, 3 credits*

## THR 243 Elements of Stage Design

Perspective and mechanical drawing for the stage. Principles of designing for the theatre, including color composition. These techniques are related to the esthetics both of dramatic composition and the flexibility of modern staging. This course was formerly THR 331 Scene Design.

Prerequisite: THR 132 or permission of instructor.
Mr. M. Howarth
*Fall, 3 credits*

## THR 321 Workshop in Dialects and Voices

Students will study the characteristics of selected dialects of the English language and attempt to develop a fluency in the various sound patterns and idiomatic usages. Portable tape recorder required.
Prerequisites: THR 133, 237 and permission of instructor.
Mr. W. Bruehl
*Spring, 3 credits*

## THR 322 Ensemble Acting

Development of a craft for the experiments now being carried on in post-Stanislavskian ensemble acting. Improvisations, transformations, vocal patterns and rhythms, non-naturalistic exercises, emphasis on movement as external manifestation of internal impulse, all designed to stimulate ensemble creativity.
Prerequisites: THR 237 and permission of instructor.
Mr. P. Feldman
*Spring, 3 credits*

## THR 323, 324 The Dramatic Tradition

Each year a different facet of the dramatic tradition will be analyzed in the context of modern theatre. Thus, e.g., one year's work might explore Greek tragedy: the classical models, the later developments and the place of Greek tragedy in modern drama and tradition. During another year the work might involve Shakespearean comedy, or Medieval religious drama, or 17th century French drama, etc. During the first semester emphasis will generally be theoretical and historical and prepare the way for various projects, either artistic or scholarly, in the second semester. May be repeated, but may count toward the major once only.
Prerequisites: Junior-senior standing and permission of instructor.
Mr. J. Kott
*Fall and Spring, 3 credits each semester*

### THR 325, 326 Theatre History: Reading, Colloquies, Projects

Assigned readings in selected chapters from the history of the theatre with special emphasis on the relation of theatre to society. Bi-weekly colloquies. Independent research projects. Production projects, concentrating on different historical styles.
Prerequisites: Junior-senior standing and permission of instructor.
Mr. J. Newfield
*Fall and Spring, 3 credits each semester*

### THR 327, 328 Contemporary Drama and Theatre

An intensive study of theories of the modern stage from Craig to the present and of stage production from the theatre of the absurd to the contemporary experimental and underground theatre. Readings, colloquies, workshop, productions.
Prerequisites: Junior-senior standing and permission of instructor.
Mr. J. Newfield, Mr. J. Olf, and staff
*Fall and Spring, 3 credits each semester*

### THR 329, 330 Experimental Theatre Workshop

Work begins with an untried hypothesis probing new directions in performance or production. Projects may be focused on one idea advanced by the instructor or on several ideas advanced and developed by the students individually. First semester will be concerned with exploration in workshop of theoretical ideas; second semester will be concerned with the shaping and preparation for performance of material developed earlier. May be repeated. May count towards the major once only.
Prerequisites: Junior-senior standing and permission of instructor.
Mr. W. Bruehl
*Fall and Spring, 3 credits each semester*

### THR 336 Projects in Design

Practice in stage design; analysis and expression of the play in scenic terms. Individual work.
Prerequisites: THR 243 and permission of instructor.
Mr. M. Howarth
*Spring, 3 credits*

### THR 340 Oriental Theatre and Drama

Readings and discussions of the esthetic principles, theatre practice and dramatic literature of selected Asian Nations. There will be emphasis on the various forms, both ancient and contemporary, of Japan.
Prerequisite: Permission of instructor.
Mr. W. Bruehl
*Fall, 3 credits*

### THR 341 Projects in Acting

An opportunity for advanced work in individual projects in acting.
Prerequisites: Junior-senior standing and permission of instructor.
Mr. T. Neumiller and staff
*Fall, 3 credits*

### THR 344 Projects in Directing

An opportunity for advanced work in individual projects in stage direction.
Prerequisites: Junior-senior standing and permission of instructor.
Mr. T. Neumiller and staff
*Spring, 3 credits*

### THR 347 Projects in the History of Drama and Theatre

An opportunity for advanced work in individual projects in the history of drama and theatre.
Prerequisites: Junior-senior standing and permission of instructor.
Mr. J. Newfield
*Fall and Spring, 3 credits*

### THR 350 The Art of Minstrelsy

An exploration of the art of performing narrative poetry to music, together with a close look at the traditions of minstrelsy, its place in the social context and in the history of the performing arts generally. Sessions will include lecture, musical illustration and discussion.
Prerequisite: Permission of instructor.
Mr. R. Dyer-Bennet
*Fall, 3 credits*

# INTERDEPARTMENTAL COURSES IN WORLD LITERATURE

Note: Students interested in additional literature courses in English should consult the departmental offerings in classics, English, Germanic and Slavic languages, Romance languages and theatre arts.

## WL 101 The Classical Tradition

Studies in major writers from Homer to Virgil. General lectures followed by discussion in small groups.

*Fall, 3 credits. Not offered 1970-71.*

## WL 102 The Judaeo-Christian Tradition

Studies in major texts from the Bible through the medieval period. General lectures followed by discussion in small groups.

*Fall, 3 credits*

## WL 104 The Renaissance

Studies in major European writers of the Renaissance. General lectures followed by discussion in small groups.

*Spring, 3 credits*

## WL 106 The Enlightenment

A survey of the phenomenon of the European Enlightenment including an analysis of the rational and critical attack on tradition, and the strong current of sensitivity and pre-romanticism. Readings will include the works of such authors as Montesquieu, Voltaire, Diderot, Rousseau, Goethe, Lessing, Fielding, Johnson.

*Fall, 3 credits*

## WL 107 Romanticism

Studies in outstanding authors of the Romantic period from Rousseau to Melville. General lectures followed by discussion in small groups.

*Fall, 3 credits*

## WL 109 French Literature: The Contemporary Scene

Readings in French literature in translation from the modern period, chosen from such authors as Proust, Gide, Malraux, Bernanos, Claudel, Sartre, Camus, Beckett, Genet, Sarraute, Robbe-Grillet, etc.

*Fall, 3 credits*

## WL 110 French Literature: The Great Works

Readings in French literature in translation from the Renaissance to the beginning of the 20th century from such authors as Rabelais, Montaigne, Molière, Racine, Voltaire, Diderot, Rousseau, Laclos, Balzac, Flaubert, Zola.

*Spring, 3 credits*

## WL 346 The Modern European Drama

A critical examination of the development of dramatic literature in Europe from Ibsen to Anouilh, including a comparative study of such movements as naturalism, existentialism and expressionism.

Mr. K. Bieber

*Spring, 3 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 applied mathematics, mechanics, thermodynamics, electrical systems, properties of matter and in engineering design. In addition, the curriculum embraces broad training in the arts and humanities, social and behavioral 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. Some specialization in particular engineering areas is provided in the senior year through elective courses and senior projects. In addition to elective courses for specialization, there are also sequences of courses of an interdepartmental nature, such as bioengineering and computing science.

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, which generally are influenced by economic and social considerations.

Programs of graduate work with specialization in the various engineering departments are offered. (For further information see the *Graduate Bulletin*.)

### Requirements for the Bachelor of Engineering Degree—129 Credits

All candidates for the bachelor of engineering science degree must satisfy the following requirements, normally by attaining a passing grade in appropriate courses and exceptionally by being granted exemption, in which case no course credits are given:

    I. General University Requirements

        A. Proficiency in English Composition

            All entering students are expected to demonstrate competence in the clear and logical expression of ideas in written English. This

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An engineering student interested in a later medical degree should participate in the premedical advisement program.

requirement may be met by passing the English proficiency examination or by completing EGL 101 English Composition.

3 credits

B. Natural Sciences

Two semester courses, to be chosen from among the offerings of the following departments: biological sciences, chemistry, earth and space sciences, mathematics and physics. (Appropriate courses in chemistry, mathematics and physics may be used to meet both this requirement and specific engineering major requirements listed in II below.)        6-8 credits

C. Social and Behavioral Sciences

Two semester courses, to be chosen from among the offerings of the following departments or interdisciplinary programs: anthropology, appropriate courses in black studies, economics, education, history, political science, psychology, social sciences interdisciplinary program (SSC) and sociology. (Student teaching courses may not be used to satisfy this requirement.)        6-8 credits

D. Arts and Humanities

Two semester courses, to be chosen from among the offerings of the following departments or interdisciplinary programs: art, appropriate courses in black studies, Chinese, classics and classical languages, comparative literature, English, Germanic and Slavic languages, Hebrew, linguistics, music, philosophy, Romance languages, theatre arts and world literature.        6-8 credits

Note: Not acceptable to meet the arts and humanities requirement are the following courses:

1. Art: the first two semesters of studio courses ART 120, 121, 122, 123, 124.
2. Music: performance or studio courses MUS 114, 115, 116, 151 and the first two semesters of MUS 161-199 and MUS 261-299.
3. English: courses in composition EGL 101, 102, 105.
4. Theatre arts: courses in diction: THR 130, 133.
5. Foreign language courses below the second year or intermediate level.

E. Physical Education

Two semester courses, which may be taken at any time prior to graduation, or participation in intercollegiate athletics. No academic credit is given.

II. Required Preparatory Courses in the Natural Sciences

The following courses provide the necessary preparation for the engineering science concentration requirements:

A. Chemistry: CHE 101, 105, 102, 106 . . . . . . . . . . . . . . . . 10 credits

B. Mathematics: MAT 102, 103, 155 .................. 11 credits

C. Physics: PHY 101, 102, 151 ...................... 12 credits

(Note that any two of the above courses may be used to meet the general university requirement in natural sciences.)

III. Engineering Science Concentration Requirements

Every student must meet the requirements of a program of concentration in engineering science approved by the faculty of the College of Engineering.

A. Required Courses (57 credits):

Credit for, or exemption from, each of the following is required of all candidates:

ESG 101, 202 Thermodynamics I, II ................ 6 credits

ESG 211, 212 Engineering Laboratory I, II ......... 4 credits

ESA, ESE, ESM or ESC 213 Engineering

Experimentation ............................. 2 credits

ESG 121, 222 Applied Mathematics I, II ........... 8 credits

ESG 232, 233 Materials Science I, II .............. 8 credits

ESG 340, 341 Engineering Design I, II ............. 6 credits

ESG 151 Graphic Arts ........................... 3 credits

ESG 251, 252 Electrical Sciences I, II ............. 8 credits

ESG 161, 263, 264 Mechanics I, II, III ............ 9 credits

ESG 162 Introduction to Computing Science ....... 3 credits

B. Required distribution of elective courses (24 credits):

The distribution of the 24 credits in elective courses required of all candidates is given below:

1. Technical electives (12 credits):

   a. any engineering departmental or interdepartmental elective courses.

   b. any engineering first-year graduate courses open to undergraduates. A student wishing to take an engineering graduate course must have a cumulative grade-point average of 3.0 or better and the approval of the instructor. He should apply to the departmental office for information on the graduate courses currently open to undergraduates.

   c. any courses from the natural sciences (biological sciences, chemistry, earth and space sciences, mathematics and physics) approved by individual petition to the curriculum committee of the College of Engineering.

2. Non-technical electives (6 credits):

   Any courses in the areas of the arts and humanities (except foreign language skill courses) or the social and behavioral

sciences. Three credits must be at a level beyond the introductory sequence in a given area.

3. Open electives (6 credits) :

    Any courses offered by the University for credit at any level.


## Exemptions

A student can gain an exemption from any of the course requirements specified in section III above by submitting a petition together with supporting material to the College of Engineering curriculum committee and getting committee approval.

A student can gain an exemption from a required engineering course by petitioning the College of Engineering curriculum committee and by arranging with the current instructor to take a comprehensive examination (e.g., the final examination) along with the enrolled students. The results of the examination and their evaluation, submitted by the instructor, together with any other supporting material submitted by the student, will provide the basis for the curriculum committee's decision.


## Optional Undergraduate Sequence

The four-year sequence of courses presented below is given as an aid in planning an undergraduate program leading to the bachelor of engineering degree. However, any sequence which satisfies the requirements stated above may be equally appropriate and should be discussed with an academic advisor. (The central advising office of the College of Engineering will refer the student to an appropriate advisor.)

### First Year

| 1st Semester | Credits | 2nd Semester | Credits |
|---|---|---|---|
| EGL 101 .................. | 3 | *ESG 151 Graphic Arts ...... | 3 |
| Arts and Humanities ........ | 3 | Arts and Humanities ........ | 3 |
| MAT 102 ................. | 4 | MAT 103 ................. | 4 |
| PHY 101 .................. | 4 | PHY 102 ................. | 4 |
| Social and Behavioral Sciences | 3 | Social and Behavioral Sciences | 3 |
| | 17 | | 17 |

* May be taken in either semester.

## Second Year

| 1st Semester | Credits |
|---|---|
| *ESG 162 Introduction to Computing Science | 3 |
| CHE 101 | 4 |
| CHE 105 | 1 |
| MAT 155 | 3 |
| PHY 151 | 4 |
| Elective (Non-Technical) | 3 |
| | 18 |

| 2nd Semester | Credits |
|---|---|
| ESG 101 Thermodynamics I | 3 |
| ESG 121 Applied Mathematics I | 4 |
| ESG 161 Mechanics I | 3 |
| CHE 102 | 4 |
| CHE 106 | 1 |
| **Elective (Non-Technical) | 3 |
| | 18 |

## Third Year

| 1st Semester | Credits |
|---|---|
| †ESG 202 Thermodynamics II | 3 |
| ESG 211 Engineering Lab. I | 2 |
| ESG 222 Applied Mathematics II | 4 |
| †ESG 232 Materials Science I | 4 |
| †ESG 251 Electrical Sciences I | 4 |
| †ESG 263 Mechanics II | 3 |
| | 16-17 |

†Choose 3 of 4 (and see below)

| 2nd Semester | Credits |
|---|---|
| ESG 212 Engineering Lab. II | 2 |
| ESA, ESE, ESM or ESC 213 Engineering Experimentation | 2 |
| ESG 233 Materials Science II | 4 |
| ESG 252 Electrical Sciences II | 4 |
| ESG 264 Mechanics III | 3 |
| | 15 |

## Fourth Year

| 1st Semester | Credits |
|---|---|
| ESG 340 Engineering Design I | 2 |
| ESG course not yet taken | 3-4 |
| Elective (Technical) | 3 |
| Elective (Technical) | 3 |
| Elective (Open) | 3 |
| | 14-15 |

| 2nd Semester | Credits |
|---|---|
| ESG 341 Engineering Design II | 4 |
| Elective (Technical) | 3 |
| Elective (Technical) | 3 |
| Elective (Open) | 3 |
| | 13 |

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** Must be at a level beyond the introductory sequence in a given area.

† Any of these courses may be taken during the senior year. The student should schedule his courses so that he may take his technical electives in the areas of his interests and, subject to prerequisite requirements, these may be begun in the junior year.

## Two Baccalaureate Degrees

Qualified students whose special interests and career plans make such study appropriate may be granted permission to earn two degrees at the undergraduate level by planning a program which leads to a bachelor of engineering degree from the College of Engineering and a bachelor of arts or a bachelor of science degree from the College of Arts and Sciences. *The program requires five years for completion.* Written approval to undertake this curriculum must be obtained from the dean of the College of Engineering and the vice president for liberal studies, subject to review and final authorization by the academic vice president. In addition to meeting all general university requirements, the candidate for two degrees must fulfill the requirements of the undergraduate program in engineering science in the College of Engineering and the requirements of an established degree program in the College of Arts and Sciences.

## Independent Study Projects (ESI 200)

An engineering student may, in consultation with faculty members, develop an individual course of academic investigation and study. The student must prepare an outline of the proposed project, clearly stating its scope and intent, and methods which will be used to conduct it. He must obtain from two faculty members written approval of the project and agreement to supervise it and to recommend appropriate academic credit. The project then requires final approval by the curriculum committee of the College of Engineering.

The maximum allowable total credit for independent study is 30 credits with no more than 18 credits in any one semester. Though independent study may be taken in any semester, it is normally expected that an engineering student will take independent study as a junior or senior. The academic credit assigned to independent study projects is normally drawn from the block of elective credits and engineering design in the curriculum.

Proposals for independent study during the fall semster must be submitted to the curriculum committee on or before September 22, and for the spring semester on or before December 15.

## Pass-Fail Option

The only courses which may be taken on a pass/fail option basis by engineering majors are those fulfilling the arts and humanities, social and behavioral sciences, non-technical elective and open elective requirements.

**Courses of Instruction**

Course designations are abbreviated according to the following scheme:

ESI:     Interdepartmental courses offered by the College of Engineering

ESG:     Required engineering courses for program of concentration

ESA:     Courses offered by the Department of Applied Analysis

ESE:     Courses offered by the Department of Electrical Sciences

ESM:     Courses offered by the Department of Materials Science

ESC:     Courses offered by the Department of Mechanics

Courses are numbered in accordance with the following general pattern:

101 - 199    freshman-sophomore courses

200 - 399    junior-senior courses

500 - 699    graduate courses

# INTERDEPARTMENTAL ENGINEERING COURSES

### ESI 98 Engineering Fundamentals

Instruction in the material contained in one or more required courses in the engineering science program. To be eligible, a student must obtain the approval of the central advising office of the College of Engineering, and of the chairman of the department to which the required course is assigned. (Normally a student may not receive credit in the same semester for both the required course and tutoring in material which is contained in it.) Grading is pass/fail only, and the course carries non-degree credit.

*Fall and Spring, variable up to 6 credits each semester, repetitive*

### ESI 100 Engineering Orientation Seminar

One-hour lecture each week by a speaker from outside or from the College of Engineer-

ing faculty, followed by an informal discussion hour with the speaker. All students enrolled are expected to attend the lectures, but only those students sufficiently interested to learn more from the speaker should attend the discussion. No reports are required. Grading is pass/fail only, based on attendance, and the course may be taken up to three times. Credit obtained may be applied toward the open elective requirement by an engineering student.

*Spring, 1 credit, repetitive*

### ESI 200 Independent Study Project

See page 241

*Fall and Spring, variable up to 18 credits each semester, repetitive*

# REQUIRED ENGINEERING COURSES FOR PROGRAM OF CONCENTRATION

## ESG 101 Thermodynamics I

The absolute temperature and other thermodynamic variables, including the thermodynamic potentials, are used to describe systems in thermal equilibrium by considering their interrelationships as governed by the laws of classical thermodynamics. Applications to phase transformations, inert and chemically reacting multi-component systems, power cycles and engines are considered.

Prerequisite: MAT 155.

*Fall and Spring, 3 credits each semester*

## ESG 121 Applied Mathematics I: Multivariate Calculus

Calculus of functions of several variables, including scalar and vector functions and functions of a complex variable. Emphasis is placed on those concepts and techniques which are of interest for their applications in biological, engineering and physical sciences. The following topics are included: maxima and minima of functions of several variables, elementary calculus of variations, computation with implicit functions, evaluation of multiple integrals, and the properties of analytic functions of a complex variable.

Prerequisite: MAT 194 or MAT 103.

*Spring, 4 credits*

## ESG 151 Graphic Arts

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. Classwork covers free-hand drawing and sketching through finished drawing using mechanical drafting tools and lettering. At each stage the student studies and discusses the work of such artists as Uccello, Da Vinci, Dürer, Fulton and Morse.

Six laboratory hours.

*Fall and Spring, 3 credits each semester*

## ESG 161 Mechanics I: Particles and Rigid Body Mechanics

A review of vector algebra and calculus with kinematic applications such as curves in space, displacement, velocity and acceleration of point particles in classical orthogonal coordinate systems; notion of force; statics of a single particle including gravity, friction, electrostatic and magnetostatic forces; force as a vector field, moment about a point and moment about a line, couples, work; equivalent force systems and the wrench; equilibrium of systems of mass particles; special case of the rigid body. Rigid body kinematics and the kinematics of relative motions; single particle dynamics, including charge carrying particles and elementary linear vibrations; dynamics of clusters of particles; dynamics of the rigid body.

Corequisite: ESG 121 Applied Mathematics I.
Prerequisites: PHY 151, MAT 155.

*Spring, 3 credits*

## ESG 162 Introduction to Computing Science

The course consists of three parts. The first part is an introduction to basic computer organization and a working knowledge of the Fortran language as a communication medium with the digital computer. The second part makes use of the acquired skills in practicing the solution of engineering problems appropriate to computing science. The final third serves as a basic introduction to computing science in general, with emphasis on computer programming systems structure. Practical and illustrative problems are solved in laboratory sessions, using the IBM 360/67 computer and an individual course project is assigned requiring the demonstration of capability in the computing medium.

Prerequisite: MAT 102.

*Fall and Spring, 3 credits each semester*

## ESG 202 Thermodynamics II

The course starts with a review of the basic notions of probability and statistics and a discussion of the microscopic nature of systems of special interest. The fundamental problem of statistical thermodynamics—to relate the

microscopic properties to the bulk properties of a system—is then considered. The relationship between entropy and information, and also between fluctuation and noise, will be pointed out and applications to problems associated with kinetic theory, the heat capacity of gases and solids, radiation and imperfect gases will be studied.

Prerequisite: ESG 101 Thermodynamics I.

*Fall, 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.

Prerequisite: Junior standing.

*Fall, 2 credits*

### ESG 212 Engineering Laboratory II: Electronic Instrumentation

The junction and application of electronic circuits and instrumentation as applicable to engineering and scientific measurements are developed in the classroom and the laboratory. Students will have the opportunity for individual training in the use of power sources, metering devices, operational amplifiers, oscilloscopes, digital data acquisition and other instrumentation techniques.

Prerequisite: ESG 211.

Corequisite: ESA 213, ESE 213, ESM 213 or ESC 213 Engineering Experimentation.

*Spring, 2 credits*

### ESA, ESE, ESM or ESC 213 Engineering Experimentation

The student will undertake an independent project under faculty supervision which emphasizes the principles of experimental design and data evaluation. Projects will generally be undertaken by teams of two students from a selection of problems submitted by the engineering faculty or suggested by the student with faculty approval.

Prerequisite: ESG 211 Engineering Laboratory I.

Corequisite: ESG 212 Engineering Laboratory II.

*Spring, 2 credits each*

### ESG 222 Applied Mathematics II: Partial Differential Equations

Partial differential equations and numerical analysis. Second-order partial differential equations are studied in detail with emphasis on the linear theory. Methods based on the theories of Fourier series and transforms, and conformal mappings are developed. Numerical techniques are studied for approximation to functions and solution of linear and nonlinear systems of algebraic, differential and integral equations.

Prerequisite: ESG 121 Applied Mathematics I or MAT 156.

*Fall, 4 credits*

### ESG 232 Materials Science I: Structure and Mechanical Properties

A review of binding forces in molecules and crystals is followed by a study of the structure of perfect crystals. Various imperfections which can exist in real lattices, such as surfaces, grain boundaries, twins, stacking faults, dislocations, voids and point defects are treated physically and mathematically. The molecular structure of polymers is considered as well as the nature of amorphous phases in plastics and glasses. The influence of structure and lattice imperfections upon the elastic, plastic and fracture properties of metals, ceramics and polymers is considered. Next attention is focused upon phase equilibrium and diffusion in multicomponent systems and the mechanisms of phase transformations in solids. The role of such transformations in structural control, i.e., in modifying materials to produce desired properties is treated, with examples from various alloy, ceramic and polymer systems.

Prerequisites: CHE 102, PHY 151, ESG 101 Thermodynamics I.

*Fall, 4 credits*

## ESG 233 Materials Science II: Electronic Properties

After a description of the fundamental types of lattices and simple crystal structures the problem of crystal diffraction is discussed and the concept of reciprocal lattice introduced. Emphasis is placed on the quantum nature of matter and the resulting properties of molecular and crystalline systems. Properties of perfect crystals such as band formation are developed and the electronic structure is discussed. The related properties of metals, semiconductors, superconductors and insulators are derived, attention being also devoted to the problem of lattice vibrations, thermal and elastic characteristics and magnetic and optical properties of materials.

Prerequisites: CHE 102, PHY 151. ESG 232 Materials Science I is not a prerequisite.

*Spring, 4 credits*

## ESG 251, 252 Electrical Sciences I, II

These two courses together comprise a unified introduction to the field of electrical sciences. The application of electromagnetic and network theory will be approached from the functional requirements of engineering systems. The topics to be covered will include the following: Maxwell's equations; static and quasi-static fields; conduction processes; network theory; basic elements and their properties; linearity, passivity, time-invariance, reciprocity; Kirchhoff's current and voltage laws; development of loop, node and state equations; solution techniques for linear and non-linear and/or time-varying networks; processing of analog and digital signals; digital logic circuits; functional requirements of networks; two and three-terminal elements in networks, coupled elements; electronics, transistor and tube amplifiers; distributed parameter networks, transmission lines, integrated circuits; electromagnetic waves, waveguides, antennas, oscillators, detectors.

Prerequisite: ESG 121 Applied Mathematics I.

*Fall and Spring, 4 credits each semester*

## ESG 263 Mechanics II: Mechanics of Solids

An introduction to the mechanics of deformable solids used in engineering structures. Topics include: three-dimensional and two-dimensional descriptions of stress; principal stresses; coordinate transformations using Cartesian tensors; displacements and strain; elastic stress-strain-temperature relations; stress equations of motion; equations of elasticity; 2-D compatibility equation; beam deformations due to bending and axial forces; statically indeterminate beams; elastic instability.

Prerequisite: ESG 161 Mechanics I.

*Fall, 3 credits*

## ESG 264 Mechanics III: Mechanics of Fluids

A physical introduction to the mechanics of fluids is presented and engineering applications are stressed. The concept of pressure is explored in the statics and uniform rotation of fluids. Physical laws of flow, the stream tube and control volume concepts are applied to internal and external force determinations in a perfect fluid. The effects of friction on flow rates and force distributions in an incompressible flow are studied. The thermodynamic and thermal effects of compressibility are introduced and shockwave phenomena are discussed.

Prerequisite: ESG 161 Mechanics I.

*Spring, 3 credits*

## ESG 340 Engineering Design I

Lectures by faculty and visitors on typical design problems encountered in engineering practice. During this semester each student will choose a senior design project for Engineering Design II. A preliminary design report is required.

Prerequisite: Senior standing.

*Fall, 2 credits*

## ESG 341 Engineering Design II

Student groups carry out the detailed design of the senior projects chosen during the first semester. A final and detailed design report must be prepared.

Prerequisite: ESG 340 Engineering Design I.

*Spring, 4 credits*

## INTERDEPARTMENTAL ELECTIVE

### ESI 310 Biomedical Engineering

This course provides a systematic and basic development of the engineering principles applicable to medicine and biological systems. The subject matter is developed in terms of the following basic disciplines: biological systems analysis, biomechanics (viscoelastic, rheological properties of tissues, stress distributions in living organisms, etc.) bioenergetics and radiation technology, mass and heat transport in living systems, bioelectronics and biomaterials sciences. Applications are provided to bioastronautics, artificial organs, environmental control, man-machine systems and the stimulation of biological systems.

*3 credits*

### ESI 320 Analysis of Public Systems

An introduction to the quantitative analysis of systems in the public sector. Topics will include: modeling and simulation of public systems; optimization techniques, including linear and dynamic programming; economic factors in public systems; cost measures and projected demands; the analysis of economic-engineering systems; risk assignment and decision theory; structure and interaction in complex systems; counter-intuitive behavior in complex systems. Particular emphasis will be placed upon developing the student's ability to organize unstructured problems for systematic analysis and his ability to evaluate public policy alternatives. Examples will be chosen from the areas of criminal justice, pollution, housing, air traffic control, among others.
Prerequisite: Permission of instructor.
Mr. T. O. Carroll
*Fall, 3 credits*

# DEPARTMENT OF APPLIED ANALYSIS

*Professors:* EDWARD J. BELTRAMI, DANIEL DICKER, VACLAV J. DOLEZAL, AARON FINERMAN, HERBERT L. GELERNTER, IRVING GERST *(Chairman)*, JACK HELLER, [a] REGINALD P. TEWARSON, DANIEL H. TYCKO, ARMEN H. ZEMANIAN

*Associate Professors:* ARTHUR J. BERNSTEIN, YUNG-MING CHEN, MARTIN A. LEIBOWITZ, RAM P. SRIVASTAV, [a] DEVIKUMARA V. THAMPURAN

*Assistant Professors:* F. JOANNE HELTON, ROY D. JOSEPH, WOO JONG KIM

## ESA 165 Elements of Digital Computers

This course is similar to ESG 162, but with applications appropriate to the social sciences and humanities. For social science and humanities majors only. Two lecture hours, one laboratory hour.
Prerequisites: Sophomore standing and MAT 103 or permission of instructor.

*Spring, 3 credits*

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## DEPARTMENTAL ELECTIVES

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## ESA 301 Research in Applied Mathematics

A course which gives the student an opportunity to be involved in an independent research project with supervision by the faculty. Permission to register requires that the student have an average grade of B in his engineering courses and that he obtain the agreement of a faculty member to supervise the research. Only three credits of research electives (ESA 301, ESE 301, ESM 301, ESC 301) may be counted towards fulfillment of technical elective requirements.

*Fall and Spring, 3 credits, repetitive*

## ESA 311 Complex Variables and their Applications

An applications-oriented course emphasizing techniques of problem-solving in engineering and physical sciences. Appropriate selections

from the following topics: analytic functions, harmonic functions, integration in the complex plane, Taylor and Laurent expansions, conformal mapping, entire and meromorphic functions.
Prerequisite: ESG 121 Applied Mathematics I or MAT 156.

*Spring, 3 credits*

## ESA 316 Special Functions of Applied Mathematics

A study of the more common higher mathematical functions which are required for the analytical solution of engineering and scientific problems. The Bessel, Legendre, hypergeometric and Mathieu functions are among those 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: ESG 222 Applied Mathematics II.

*3 credits*

## ESA 317 Ordinary Differential Equations

This course deals with the theory and properties of ordinary differential equations which are of importance in the application of this subject. Among the topics covered are solutions of singular equations; boundary value problems; the Green's function method; eigenvalue problems; oscillation and nonoscillation theorems; asymptotic behavior of linear systems; nonlinear autonomous systems; focal,

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[a] On leave academic year 1970-71.

nodal and saddle points; cycles; stability; Lyapunov functions; the van der Pol, Liénard and Duffing equations; approximate solutions. Prerequisite: ESG 121 Applied Mathematics I or MAT 156.

*3 credits*

## ESA 320 Introduction to Applied Probability Theory

Elements of combinatorial analysis. Random variables and expectatoins. Laws of large numbers. The central limit theorem and its applications. Recurrent events and Markov chains. Applications to information theory, methods of coding, queueing problems, theory of games, problems of strategy, decisionmaking, etc.
Prerequisite: MAT 102.

*3 credits*

## ESA 321 Introduction to Applied Statistics

Basic statistical concepts. Probability. Distribution functions and moment generating functions. Frequency distributions. Central limit theorem. Sampling. Regression and correlation. Analysis of variance. Testing of hypotheses. Applications to interpretation of engineering and industrial data by means of statistical methods, curve fitting, methods of quality control and preparation and use of control charts, reliability, various experimental designs, estimation of response relationships, determination of optimum conditions.
Prerequisite: MAT 102.

*3 credits*

## ESA 325 Mathematics in the Social and Behavioral Sciences

This course develops the concepts and techniques which are basic in any consideration of the mathematical models which are currently being used in such fields as anthropology, biology, economics, sociology, psychology and linguistics. The theories discussed are illustrated by problems from these areas. Topics covered include matrix algebra, linear programming, game theory, probability theory (including Markov chains, graph theory and optimization).

*Fall and Spring, 3 credits*

## ESA 326 Numerical Analysis

Direct and indirect methods for the solution of linear and non-linear equations. Computation of eigenvalues and eigenvectors of matrices. Quadrature, differentiation and curve fitting. Numerical solution of ordinary and partial differential equations.
Prerequisite: MAT 156 or ESG 121 Applied Mathematics I.

*Fall, 3 credits*

## ESA 330 Linear Programming

Formulation of linear programming models. The simplex method and its variations. The duality theorem. Sensitivity analysis. Solution of practical problems in blending, transportation, etc. with the help of computer.
Prerequisites: ESG 162 Introduction to Computing Science, ESG 121 Applied Mathematics I.

*3 credits*

## ESA 335 Computer Organization and Programming

Logical basis of computer structure, machine representation of number and characters, flow of control, instruction codes, arithmetic and logical operations, indexing and indirect addressing, input-output, subroutines, linkages, macros, interpretive and assembly systems, pushdown stacks and recent advances in computer organization. Several computer projects to illustrate basic concepts are incorporated.
Prerequisite: ESG 162 Introduction to Computing Science.

*3 credits*

## ESA 340 Introduction to the Theory and Applications of Computers

Topics covered include: introduction to the notions of effective calculability and computability, Turing machines, representation of information in a digital computer, axiomatic

development of Boolean algebra, digital computer organization and logic, computer storage, control and input-output devices, online data acquisition systems, information display devices, image scanning and processing systems, very large read-only memories and information retrieval. Appropriate problems in engineering, physics, chemistry and biology are discussed and analyzed.
Prerequisite: ESA 335 Computer Organization and Programming.

*3 credits*

## ESA 342 Introductory Network Synthesis

Review of complex variables and Laplace transforms. Properties of positive real functions and Hurwitz polynomials. Matrix analysis of networks. Derivation of positive real character of RLC driving-point impedances. Synthesis of two-element kind networks. Use of Bott-Duffin and Darlington techniques for synthesis of RLC networks. Synthesis of transfer functions using RC and RLC networks. Design of lossless filters with loading. Use of negative impedance converter and isolation amplifier in design of driving-point and transfer functions. Introduction to approximation techniques in the frequency and time domains. Amplitude and frequency scaling. Design of specific filters, delay lines, phase shifters and oscillators.
Prerequisites: ESG 222 Applied Mathematics II, ESG 252 Electrical Sciences II.

*3 credits*

# DEPARTMENT OF ELECTRICAL SCIENCES

*Professors:* SHELDON S. L. CHANG, RICHARD B. KIEBURTZ, VELIO A. MARSOCCI (*Acting Chairman*), GEORGE W. STROKE

*Associate Professors:* ARTHUR J. BERNSTEIN, CHI-TSONG CHEN, PETER M. DOLLARD, DAVID R. SMITH, HANG-SHENG TUAN

*Assistant Professors:* PATRICK E. BARRY, T. OWEN CARROLL, STEPHEN S. RAPPORT, GARY L. THOMAS

*Lecturer:* KENNETH L. SHORT

## DEPARTMENTAL ELECTIVES

### ESE 301  Research in Electrical Sciences

A course which gives the student an opportunity to be involved in an independent research project with supervision by the faculty. Permission to register requires that the student have an average grade of B in his engineering courses and that he obtain the agreement of a faculty member to supervise the research. Only three credits of research electives (ESA 301, ESE 301, ESM 301, ESC 301) may be counted towards fulfillment of technical elective requirements.

*Fall and Spring, 3 credits, repetitive*

### ESE 303  Electronic Circuits and Instrumentation

This course presents the elements of electronic circuitry and instrumentation at an introductory level. Operation of vacuum tubes, transistors and other electronic devices. Description of the operational aspects of power supplies, amplifiers, oscillators and logic circuits. Survey of applications to industrial and scientific instrumentation and to familiar electronic systems such as television, radio, audio amplifiers and recorders. A discussion of the new advances in electronic devices and circuits.

*3 credits*

### ESE 310  Modern Circuit Theory

Matrix representation of circuits. Applications to filter and transmission lines and coaxial cables. Introduction of controlled sources to represent active elements. The concepts of linearity and reciprocity. Network theorems. Stability of active circuits. Transient response. Non-linear and time varying circuits. State variable representation.
Prerequisite: ESG 251 Electrical Sciences I.

*3 credits*

### 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 101 Thermodynamics I, ESG 252 Electrical Sciences II, ESG 161 Mechanics I.

*3 credits*

### ESE 316  Digital Devices and Circuits

Survey of active switching devices, circuit models, large signal amplification, simple logic circuits, design of regenerative circuits, survey of storage devices, circuit systems of logic and design problems of circuit interconnection. Laboratory on construction and testing of simple circuits in latter half of semester.
Prerequisite: ESG 252 Electrical Sciences II.

*3 credits*

## ESE 317 Digital Logic and Systems

Switching algebra and its relation to logic and the algebra of sets. Analysis and synthesis of combinational networks, including multiple outputs, symmetric functions and functional decomposition. Minimization techniques. Analysis, synthesis and minimization of sequential networks. Counting devices, arithmetic units and algorithms. Simple codes.

*3 credits*

## ESE 320 Electromagnetic Waves and Antennas

Fundamentals of wave propagation and antenna theory, and applications to communications systems, radar and radio astronomy. Some of the topics included are: radio waves in the ionosphere, guided wave propagation, transmission lines and waveguides, basic antenna theory, low-noise antennas, introduction to statistical electromagnetic theory, data-processing antenna arrays, radio astronomy antennas.

*3 credits*

## ESE 330 Integrated Electronics

An introduction to semiconductor electronics leading to the characterization of various passive and active devices, with emphasis on integrated-electronic structures. Theory of p-n junctions, the operation of transistors; the characterization of integrated electronic elements, such as passive devices, diodes and transistors, in terms of equivalent circuits; the applications of these devices in active networks; linear amplifiers, switching characteristics of transistors, switching circuits.
Prerequisite: ESG 252 Electrical Sciences II.

*3 credits*

## ESE 340 Basic Communication Theory

Signals, spectra and linear networks, elements of probability theory, random signals and noise, filtering, narrowband signals, amplitude modulation schemes, angle modulation schemes, comparison of modulation systems, sampling theory and pulse code modulation.
Prerequisites: ESG 222 Applied Mathematics II, ESG 252 Electrical Sciences II.

*3 credits*

# DEPARTMENT OF MATERIALS SCIENCE

*Professors:* FRANCO P. JONA, SUMNER N. LEVINE, ROBERT NATHANS, LESLIE L. SEIGLE, ROBB M. THOMSON (*Chairman*)

*Associate Professors:* HERBERT R. CARLETON, HERBERT HERMAN, JOSEPH JACH, RICHARD W. SIEGEL, FRANKLIN F. Y. WANG

*Assistant Professor:* JOHN C. BILELLO

## DEPARTMENTAL ELECTIVES

### ESM 301 Research in Materials Science

A course which gives the student an opportunity to be involved in an independent research project with supervision by the faculty. Permission to register requires that the student have an average grade of B in his engineering courses and that he obtain the agreement of a faculty member to supervise the research. Only three credits of research electives (ESA 301, ESE 301, ESM 301, ESC 301) may be counted towards fulfillment of technical elective requirements.

*Fall and Spring, 3 credits, repetitive*

### ESM 302 Techniques of Materials Science

A survey of the important experimental methods employed in studies of materials. This is essentially a laboratory course where the student carries out refined measurements using research grade equipment. The areas covered include electrical and magnetic measurements, thermal properties and calorimetry, X-ray diffraction studies of crystalline and amorphous materials, optical and electron microscopic examination of materials and the mechanical properties of materials.

Prerequisites: ESG 232 and 233 Materials Science I and II.

*3 credits*

### ESM 304 Materials Design by Structure and Purity Control

The basic concepts of materials science can be used to modify existing materials or to produce new materials in order to satisfy a broad range of design criteria. In most engineering applications it is usually necessary for a material to have the optimum value of several physical properties. As examples consider the following: a semiconductor used in certain transducer applications would require specified electronic and mechanical properties; also a steel used in a pressure vessel must meet specified mechanical and chemical (corrosion) properties, etc. The aim of this course is to combine theory and practice to show how control of the structure and purity of materials can be utilized to produce metals, semiconductors, glasses, ceramics and polymers which fulfill predetermined design goals. Lectures and demonstrations are integrated so that it is possible to obtain practical experience in applying theory to the actual control of physical properties of materials. Topics covered include: crystal growth, doping and diffusion in metals and semiconductors, texture and recrystallization, magnetic domain structures, age-hardening systems, solid state phase transformations, composites and structure and purity control in polymers and glasses.

Prerequisites: ESG 232 and 233 Materials Science I and II.

*3 credits*

## ESM 325 Diffraction Techniques and the Structure of Solids

The structure of solids can be studied using X-ray, neutron and electron diffraction techniques. X-ray diffraction techniques are emphasized in this introductory course. Topics covered are: coherent and incoherent scattering of radiation, structure of crystalline and amorphous solids, stereographic projection and crystal orientation determination. The concept of reciprocal vector space is introduced early in the course and is used as a means of interpreting diffraction patterns. Laboratory work in X-ray diffraction is also included to illustrate the methods.

Prerequisite: ESG 232 Materials Science I.

*3 credits*

## ESM 328 Nuclear Technology and Materials

This course covers broadly the field of nuclear engineering and emphasizes the principles which form the basis of today's knowledge of nuclear materials. The course covers such topics as radioactivity, fission, reactor theory and materials, radiation effects and shielding, industrial applications of nuclear energy and the general use of radiation.

*3 credits*

## ESM 335 Introduction to Polymers

The objective of this course is to provide an introductory survey of the physics, chemistry and technology of polymers. The topics covered include classification of polymers, molecular forces and bonds, structure of polymers, measurement of molecular weight and size, rheology and mechanical properties, thermodynamics of crystallization, polymerization mechanisms, commercial polymer production and processing.

Prerequisite: ESG 232 Materials Science I.

*3 credits*

## ESM 336 Modern Theory of Solids

A development of the modern theory of solids from the quantum nature of matter. After a review of basic concepts the band structure of solids is derived as a consequence of the Bloch theorem. The band theory is then applied to the interpretation of the properties of metals and alloys, semiconductors and ionic crystals. Topics include dielectric and magnetic properties, electrical and thermal conductivity and the interpretation of resonance techniques.

Prerequisite: ESG 233 Materials Science II.

*3 credits*

# DEPARTMENT OF MECHANICS

*Professors:* Abraham L. Berlad, Walter S. Bradfield, Robert D. Cess, Thomas F. Irvine, Jr., Richard Shao-Lin Lee (*Chairman*), Edward E. O'Brien, Ching H. Yang

*Associate Professors:* Stewart M. Harris, George R. Stell, James Tasi

*Assistant Professors:* Rene Chevray, Fu-Pen Chiang, Prasad Varanasi, Lin-Shu Wang

Students who intend to follow either one of the standard sequences of electives in mechanics or an improvised sequence are urged to consult the instructor listed with each course.

## DEPARTMENTAL ELECTIVES

### ESC 301  Research in Mechanics

A course which gives the student an opportunity to be involved in an independent research project with supervision by the faculty. Permission to register requires that the student have an average grade of B in his engineering courses and that he obtain the agreement of a faculty member to supervise the research. Only three credits of research electives (ESA 301, ESE 301, ESM 301, ESC 301) may be counted towards fulfillment of technical elective requirements.

*Fall and Spring, 3 credits, repetitive*

### ESC 302  Internship in Engineering Science—Mechanics

This program is designed to provide an educational opportunity for several outstanding students seeking in-the-field enrichment in a special branch of mechanics. Selected students may choose to participate in an approved cooperative work-study program involving SUNY and one or more outstanding laboratories. Lectures by SUNY faculty are augmented by a work-study program conducted in residence at the prescribed outside laboratory. Prerequisite: Permission of instructor.

*Summer, 3 credits (pass/fail)*

### ESC 305  Heat and Mass Transfer

The fundamental laws of momentum, heat and mass transfer are discussed, and the corresponding transport coefficients are examined for gases using elementary kinetic theory. Principles of steady-state and transient heat conduction in solids are investigated. Analyses of laminar and turbulent boundary layer flows are treated, as well as condensation and boiling phenomena. Thermal radiation, including the analogy between molecular and photon transport, is discussed. Radiation heat transfer between surfaces is treated, as well as the derivation and application of the radiation flux equation for absorbing-emitting media.

Prerequisites: ESG 101 Thermodynamics I and ESG 264 Mechanics III.

Mr. L.-S. Wang

*Fall, 3 credits*

### ESC 311  Wave Theory

A more detailed consideration of the theory and application of the wave equation than is given in the introductory physics course. In addition to an exposition of the general consequences of the wave equation, special consideration is given to applications in the areas of optics and acoustics, and, to a lesser extent, electromagnetic waves. Emphasis is directed

toward establishing a close connection between the mathematical formulation and the associated physical ideas.
Prerequisite: ESG 222 Applied Mathematics II.
Mr. S. Harris
*3 credits*

## ESC 322 Reactive Media

Lectures designed to provide the student with an introduction to the rate processes, flow and stability of reactive media. Fundamentals of theory and experiment for combustion, condensation, crystallization and other phase transition and transport phenomena. Energy transfer processes and molecular states. Onset and properties of laser action. Determination of thermokinetic rates from experiment. Applications to modern systems.
Mr. A. Berlad
*3 credits*

## ESC 323 Combustion

Lectures and laboratory work designed as an introduction to the fundamentals of combustion processes. Combustion theory. Experimental properties of the ignition, quenching, propagation and stability of flames. Explosions and detonations. Combustion processes and air pollution. Radiative properties of flames. Dust explosions. Applications to modern systems.
Mr. A. Berlad
*Fall, 3 credits*

## ESC 342 Introduction to Experimental Stress Analysis

Elementary theory of elasticity, electrical and mechanical strain gauges, introduction to photoelasticity and moire method. Brittle coating and analog methods. Application of different methods to the study of static and dynamic problems.
Prerequisite: ESG 263 Mechanics II.
Mr. F. Chiang
*Spring, 3 credits*

## ESC 361 Applied Aero- and Hydromechanics

The study of applications of fluid dynamics theory to practical devices is undertaken in this course. Both internal flow and external flow are considered. Elements of subsonic and supersonic airfoil design are discussed. The effects of boundary layer growth on design and performance are studied. The stability of hydrodynamics systems is introduced.
Prerequisite: ESG 264 Mechanics III.
Mr. W. Bradfield
*Spring, 3 credits*

## ESC 372 Experimental Fluid Mechanics

Fundamentals of measurements and instrumentation. Operating principles and performance characteristics of instruments for measurement of physical quantities such as velocity, pressure and temperature. Flow visualization in liquids and gases. Optical methods in compressible flow: interferometry, schlieren, shadow. Introduction to analysis and measurement of random variables. Laboratory demonstrations.
Prerequisite: Permission of instructor.
Mr. R. Chevray
*Fall, 3 credits*

## ESC 375 Viscous Fluids

The role of viscosity in the dynamics of fluid flow is explored. The Navier-Stokes equations are developed, some exact solutions obtained, dynamical similarity established and Reynolds number introduced. Low Reynolds number behavior is studied including lubrication theory, percolation through porous media, corner flows, viscosity of dilute suspensions of small particles and flow due to moving bodies. Behavior of flow due to moving bodies at moderate Reynolds number is described as is high Reynolds number behavior including vorticity dynamics, steady, unsteady and detached boundary layers, flow due to steadily moving bodies, jets, free shear layers and wakes.
Prerequisite: ESG 264 Mechanics III.
Mr. E. O'Brien
*Fall, 3 credits*

## ESC 379 Compressible Gasdynamics

One-dimensional gasdynamics and wave propagation, shock waves in supersonic flow, Prandtl-Meyer expansion and hodograph plane. The calculation of supersonic flows by small-perturbation theory and the method of characteristics. Effects of viscosity and conduc-

tivity, and concepts from gaskinetics.
Prerequisites: ESG 101 Thermodynamics I and ESG 264 Mechanics III.
Mr. R. Cess
*Spring, 3 credits*

## ESC 381 Analysis of Structures

The mechanical behavior of engineering structures is studied by choosing topics from the quasi-static and dynamic response of elastic and inelastic beams, bars, columns and shells subjected to mechanical and thermal loading.
Prerequisite: ESG 263 Mechanics II.
Mr. J. Tasi
*Fall, 3 credits*

## ESC 391 Statistical Theory of Fluids

A study of the bulk properties of fluids, especially the equilibrium properties of dense fluids determined through the use of molecular distribution functions and various perturbative procedures. During the latter half of the course one or more particular systems and/or problems (e.g., ionic or polar fluids, critical phenomena) are examined in some detail to illustrate the use of the general methods developed.
Prerequisites: ESG 202 Thermodynamics II and permission of instructor.
Mr. G. Stell
*3 credits*

## ESC 395 Magnetofluid Dynamics

An integration of the concepts of fluid mechanics and electromagnetic theory. The interactions between an electrically conducting fluid and an applied electromagnetic field are studied, and the ramifications of these with respect to engineering applications such as power production, thermo-nuclear confinement, flow control, drag reduction and signal distortion are considered. Special consideration is given to the study of plasmas and magnetohydrodynamics.
Prerequisites: ESG 252 Electrical Sciences II and ESG 263 Mechanics III.
Mr. S. Harris
*Spring, 3 credits*

## ESC 396 Physical Mechanisms of Pollutant Dispersion

Discussion of the role of turbulence in general atmospheric and oceanographic circulations. Kinematics of displacement of fluid points in turbulent velocity fields with applications to translation and diffusion of contaminants in pipes, wind tunnels, jets, wakes and mixing layers. Diffusion in the earth's boundary layer from continuous and intermittent sources. The role of particulate buoyancy and chemical activity in dispersion.
Prerequisite: ESG 264 Mechanics III; or PHY 151, MAT 156 and permission of instructor.
Mr. E. O'Brien
*Spring, 3 credits*

## ESC 398 Advanced Thermodynamics

An introduction to the principles and applications of thermodynamics for systems involving intensive variables besides temperature and pressure. Stability and phase transitions. Onsager's reciprocal relations and its applications.
Prerequisite: ESG 101 Thermodynamics I.
Mr. L-S. Wang
*3 credits*
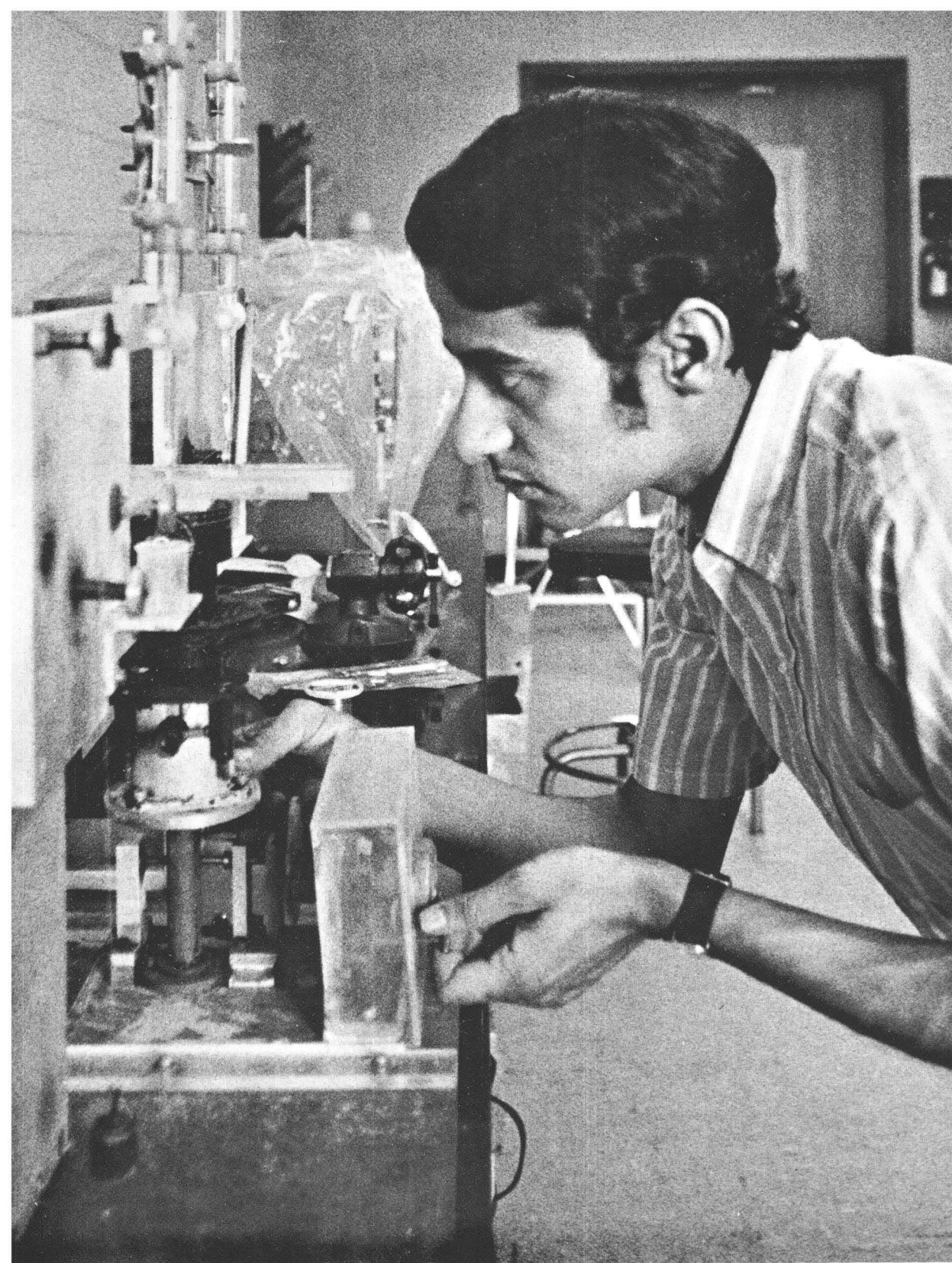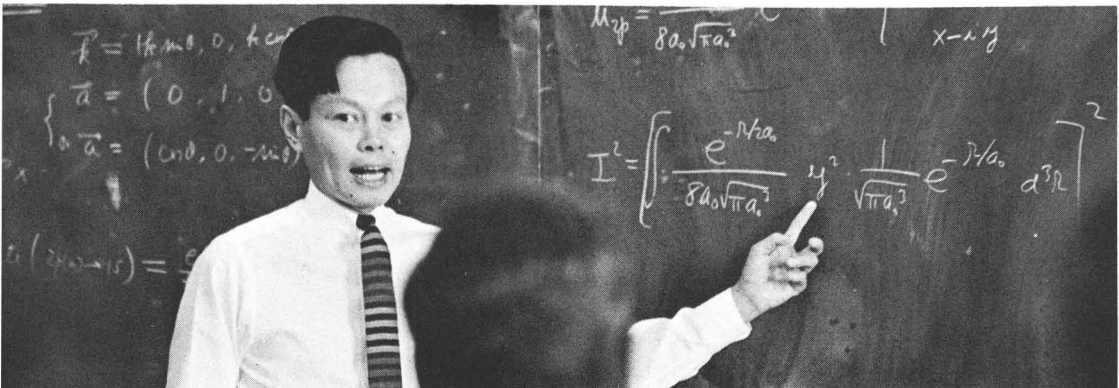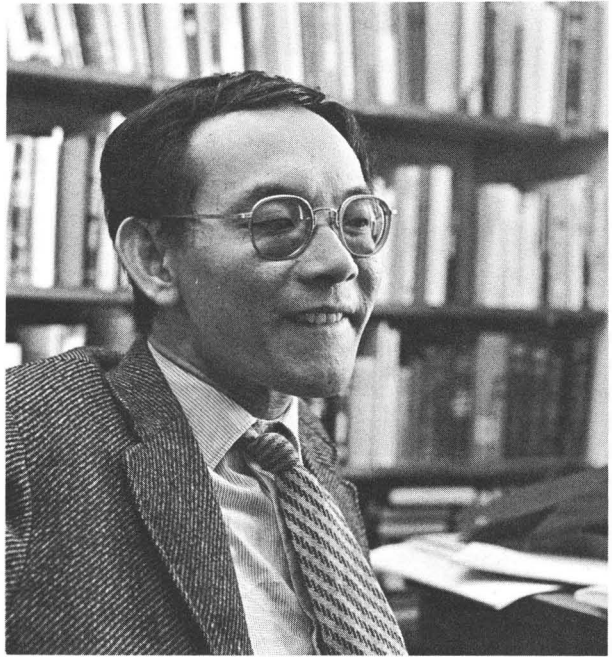
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# StonyBrook

## Building Index

Under Construction

Planned

## DIRECTIONS TO STONY BROOK

**By automobile from west:** Long Island Expressway to Exit 56. Left on Route 111 two miles to Nesconset-Port Jefferson Road (Smithtown By-pass). Right six miles to Nicoll Road. Left two miles to campus entrance.

**By automobile from east:** Nesconset Road or Route 25A to Nicoll Road. Right or left, respectively, to campus entrance.

**By Long Island Railroad:** Take Port Jefferson line from Pennsylvania Station (Manhattan) or Flatbush Avenue Station (Brooklyn). Change at Jamaica for remainder of trip to Stony Brook Station.

# STATE UNIVERSITY OF NEW YORK
## GENERAL DESCRIPTION

The State University of New York, established by the State Legislature in 1948, comprises 70 colleges and centers. At present, 68 conduct classes: four university centers, two medical centers, 13 colleges of arts and science, two specialized colleges, six two-year agricultural and technical colleges, five statutory colleges, and 36 locally-sponsored, two-year community colleges.

Permanent campuses for two of the colleges of arts and science are under construction, the College at Purchase in Westchester County and the College at Old Westbury in Nassau County. Old Westbury conducts classes on a limited enrollment basis in temporary quarters at Oyster Bay, Long Island. Special credit programs are conducted by Purchase, including joint operation of a Cooperative College Center in Mount Vernon. A third arts and science campus, upper-divisional in concept, will serve the Herkimer-Rome-Utica area. Evening courses are being offered in temporary facilities in the West Frankfort Elementary School, with construction of a permanent campus in the Town of Marcy scheduled to begin in 1972.

Three upstate community colleges moved from the planning stage into actual operation in September 1969. They are Schenectady County Community College, Clinton Community College and Columbia-Greene Community College.

Hostos Community College in South Bronx will admit its first students in temporary facilities at 900 Grand Concourse in September. It is the seventh community college sponsored by the New York City Board of Higher Education, with an eighth in the planning and development stage.

The University further comprises the Ranger School, a division of the College of Forestry, which offers a 43-week technical forestry program at Wanakena; the Center for International Studies and World Affairs at Albany; and five urban centers administered by community colleges.

University-wide research programs include the Atmospheric Sciences Research Center with campus headquarters at Albany, Institute for Theoretical Physics and the Marine Sciences Research Center at Stony Brook, and Water Resources and Polymer Research Centers at the College of Forestry. Two research facilities headquartered at State University of New York at Buffalo are the Western New York Nuclear Research Center and Center for Immunology.

Graduate study at the doctoral level is offered by State University at 12 of its campuses, and graduate work at the masters level at 22. The University is continuing to broaden and expand over-all opportunities for advanced degree study.

Graduate study areas embrace a wide spectrum including agriculture, business administration, criminal justice, dentistry, education, engineering, forestry, law, liberal arts and science, library science, medicine, nursing, pharmacy, social work and veterinary medicine.

Four-year programs strongly emphasize the liberal arts and science and also include specializations in teacher education, business, forestry, maritime service, ceramics and the fine and performing arts.

Two-year programs include nursing and liberal arts transfer programs and a wide variety of technical curriculums such as agriculture, business, and the industrial and medical technologies.

The University's urban centers provide training for skilled and semi-skilled occupations and college foundation courses for youths in the inner city areas.

Governed by a Board of Trustees appointed by the Governor, State University of New York comprises all State-supported institutions of higher education, with the exceptions of the senior colleges of City University of New York. Each college and center of State University is locally administered. Although separated geographically, all are united in the purpose of improving and extending numerous opportunities to the youth of New York State.

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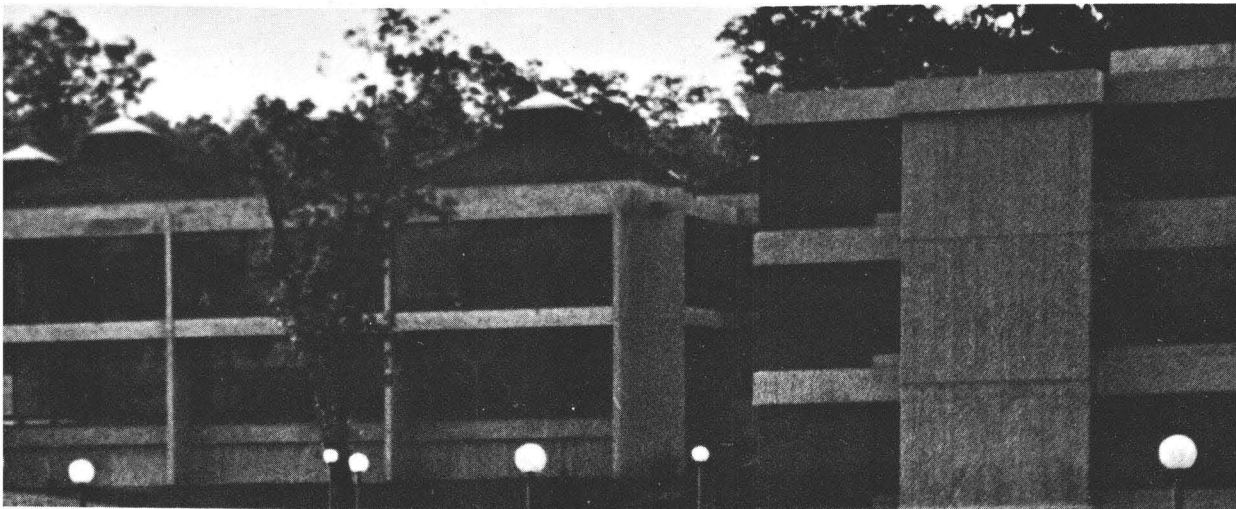
# CAMPUSES

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8 Thurlow Terrace, Albany, N.Y. 12201

## UNIVERSITY CENTERS

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

## MEDICAL CENTERS

Downstate Medical Center at Brooklyn
Upstate Medical Center at Syracuse

## COLLEGES OF ARTS AND SCIENCE

College at Brockport
College at Buffalo
College at Cortland
College at Fredonia
College at Geneseo
College at New Paltz
College at Old Westbury
College at Oneonta
College at Oswego
College at Plattsburgh
College at Potsdam
College at Purchase

## SPECIALIZED COLLEGES

College of Forestry at Syracuse University
Maritime College at Fort Schuyler (Bronx)

## AGRICULTURAL AND TECHNICAL COLLEGES (Two-Year)

Alfred
Canton
Cobleskill
Delhi
Farmingdale
Morrisville

## STATUTORY COLLEGES

College of Ceramics at Alfred University
College of Agriculture at Cornell University
College of Human Ecology at Cornell University
School of Industrial and Labor Relations at Cornell University
Veterinary College at Cornell University

## COMMUNITY COLLEGES

(Locally-sponsored, two-year colleges under the program of State University)
Adirondack Community College at Glens Falls

Auburn Community College at Auburn
Borough of Manhattan Community College
Bronx Community College
Broome Technical Community College at Binghamton
Clinton Community College at Plattsburgh
Columbia-Greene Community College at Athens
Community College of the Finger Lakes at Canandaigua
Corning Community College at Corning
Dutchess Community College at Poughkeepsie
Erie Community College at Buffalo
Fashion Institute of Technology at New York City
Fulton-Montgomery Community College at Johnstown
Genesee Community College at Batavia
Herkimer County Community College at Ilion
Hostos Community College in South Bronx
Hudson Valley Community College at Troy
Jamestown Community College at Jamestown
Jefferson Community College at Watertown
Kingsborough Community College
Mohawk Valley Community College at Utica
Monroe Community College at Rochester
Nassau Community College at Garden City
New York City Community College
Niagara County Community College at Niagara Falls
North Country Community College at Saranac Lake
Onondaga Community College at Syracuse
Orange County Community College at Middletown
Queensborough Community College
Rockland Community College at Suffern
Schenectady County Community College at Schenectady
Staten Island Community College
Suffolk County Community College at Selden
Sullivan County Community College at South Fallsburg
Tompkins-Cortland Community College at Groton
Ulster County Community College at Stone Ridge
Westchester Community College at Valhalla

(An eighth New York City community college, sponsored by the New York City Board of Higher Education, is in development.)

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