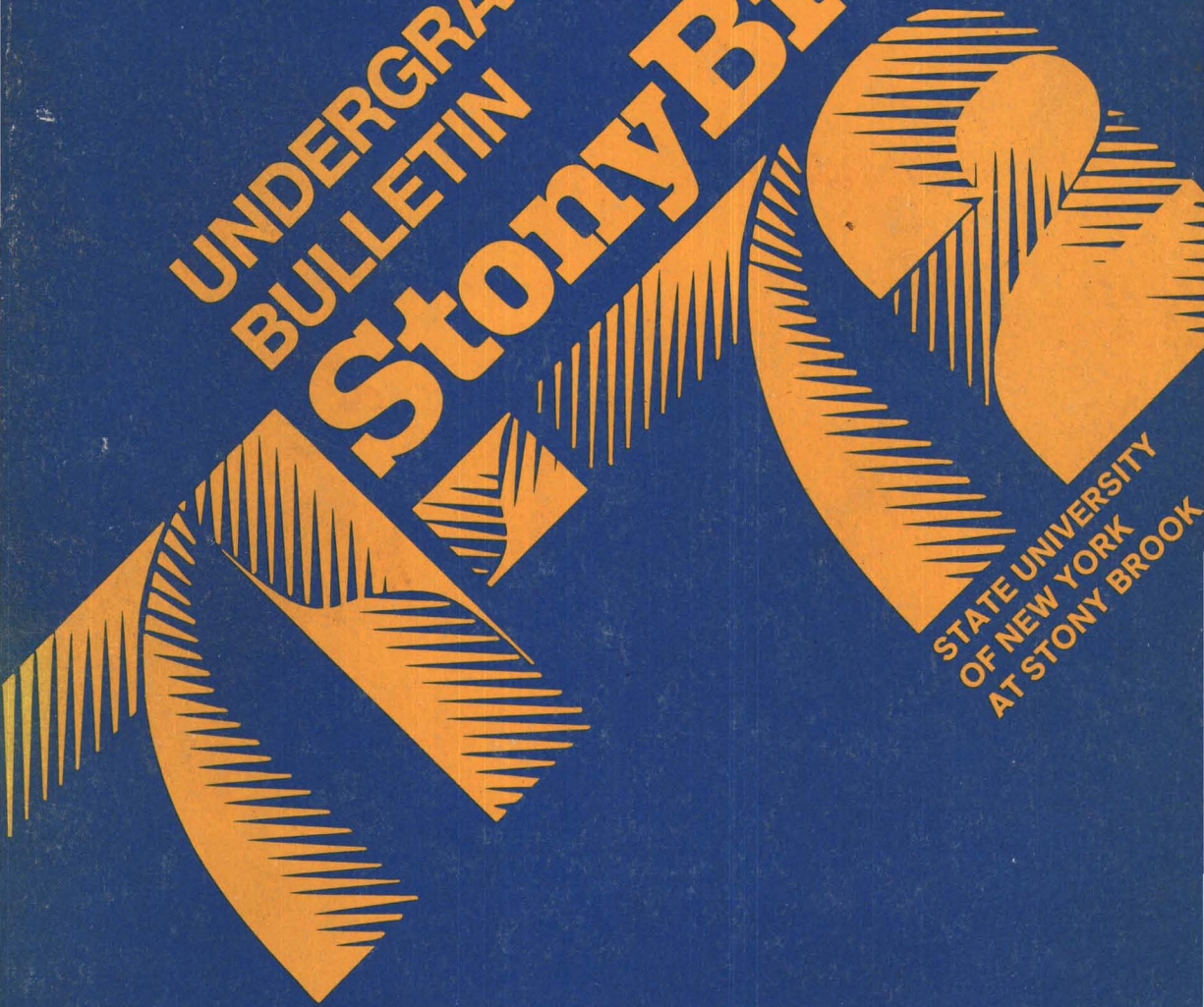


UNDERGRADUATE
BULLETIN

Stony Brook

STATE UNIVERSITY
OF NEW YORK
AT STONY BROOK



Gregory N. Dubac

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**UNDERGRADUATE
BULLETIN**

STATE UNIVERSITY OF NEW YORK AT STONY BROOK

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VOLUME IX

Press Date March 15, 1971
State University of New York
at Stony Brook

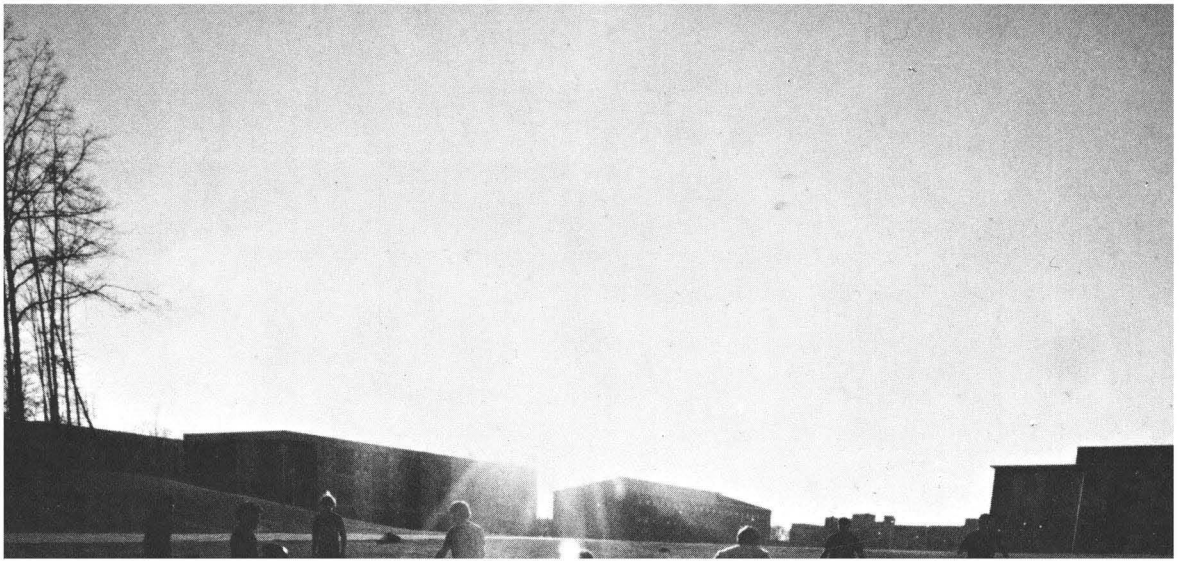
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ACADEMIC CALENDAR

1971-72

Fall Semester 1971

August 30, Monday	All Residence Halls Open
August 30, Monday	Foreign Students Expected to Arrive Before Noon (Transportation Will Be Provided From Kennedy International Airport on Monday Only)
August 30-September 7, Monday-Tuesday	Foreign Student Orientation
August 31-September 1, Tuesday- Wednesday	Graduate Student Registration
September 1-4, Wednesday-Saturday	Orientation and Registration—Undergraduates
September 6, Monday	Labor Day Recess
September 7, Tuesday	Classes Begin
September 20, Monday	Last Day to Add a Course—Undergraduates
September 20, Monday	End of Late Registration Period—All Students
September 20-21, Monday-Tuesday	Rosh Hashanah Recess (No classes from 5 p.m. Sun., Sept. 19 to 5 p.m. Tues., Sept. 21)
September 29, Wednesday	Yom Kippur Recess (No classes from 5 p.m. Tues., Sept. 28 to 5 p.m. Wed., Sept. 29)
October 4, Monday	Last Day for Graduates to Add or Drop a Course
October 29, Friday	Advisory Grades Due

November 1, Monday	Last Day for Removal of Incompletes from Spring Semester and Summer Session for All Students
November 8-12, Monday-Friday	Advance Registration for Spring Semester for Graduates and Undergraduates (except CED Students)
November 24, Wednesday	Thanksgiving Recess Begins at Close of Classes
November 29, Monday	Classes Resume
December 17, Friday	Last Day of Classes
December 20, Monday	Final Examinations Begin
December 24, Friday	Final Examinations End—Fall Semester Ends
December 27, Monday	Final Grades Due in Registrar's Office—12 Noon
January 7, Friday	Last Day for Graduates to Submit Theses and Dissertations for January Graduation

Spring Semester 1972

January 13-14, Thursday-Friday	Final Registration for Graduates
January 13-16, Thursday-Sunday	Orientation and Final Registration for Undergraduates
January 17, Monday	Classes Begin
January 28, Friday	Last Day to Add a Course—Undergraduates
January 28, Friday	End of Late Registration Period—All Students
February 11, Friday	Last Day for Graduates to Add or Drop a Course

March 3, Friday	Advisory Grades Due
March 15, Wednesday	Last Day for Removal of Incompletes from Fall Semester for All Students
March 25, Saturday	Spring Recess Begins at Close of Classes
April 3, Monday	Classes Resume
April 10-14, Monday-Friday	Advance Registration for Fall Semester and Summer Session for Graduates and Undergraduates (except CED Students)
April 21, Friday	Last Day for Graduates to Submit Theses and Dissertations for May Graduation
May 5, Friday	Last Day of Classes
May 6-9, Saturday-Tuesday	Reading and Review Days
May 10, Wednesday	Final Examinations Begin
May 19, Friday	Final Examinations End—Spring Semester Ends
May 23, Tuesday	Final Grades Due in Registrar's Office—12 Noon
May 28, Sunday	Commencement

Summer Session 1972

July 3, Monday	Final Registration
July 5, Wednesday	Classes Begin
August 11, Friday	Classes End—Summer Session Ends
August 18, Friday	Last Day for Graduates to Submit Theses and Dissertations for August Graduation



AN INTRODUCTION TO STONY BROOK

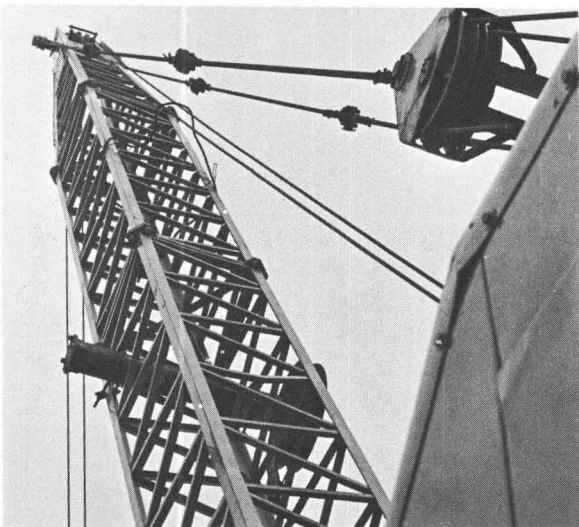
The Stony Brook Campus

Stony Brook is on the North Shore of Long Island, 50 miles east of New York City, in a hilly, North Shore area, partly wooded with oak, maple and dogwood. The area was settled more than three centuries ago by colonists sailing across Long Island Sound from what is now Connecticut and Rhode Island. The campus is minutes away from the Sound's coves and beaches and about 20 miles north of the Atlantic Ocean.

The University was founded in 1957 at Oyster Bay, N.Y. in Long Island's Nassau County as a State University College for secondary school teachers of science and mathematics. Three years later, in the context of a rapidly developing State University system, it was designated a comprehensive university center. The campus was moved in 1962 from Oyster Bay to a 480-acre tract given to the state by Stony Brook conservationist and philanthropist Ward Melville. As one of four university centers in the 70-campus State University of New York, Stony Brook has had 67 buildings erected since 1962 with the campus expanded to 1100 acres.

The campus has a densely developed core of buildings radiating out from the Library's central plaza, where construction activity including expansion of the Library is presently at peak levels. Around the Library are the Administration and Humanities Buildings to the east, the Social Sciences and Biology Buildings to the south, and the Earth and Space Sciences, Physics-Math, and Chemistry Buildings to the west. Northwest of the Library, a new Graduate Chemistry Building is rising, and to the southwest, a new Fine Arts Building is planned. On the outer rim of the core area are the Gymnasium, the Stony Brook Union, the Lecture Center and the Engineering Quadrangle with its three academic buildings and the campus Computing Center.

Beyond the central core campus are 26 residential colleges within five quadrangles that house 6000 students. This area is "suburban"—with buildings separated by more open space and trees than separate core-campus buildings. The residential quadrangles provide dormitory accommodations, optional dining facilities and a variety of lounges and social activities. These activities are largely determined by the students themselves, who, through the legislature of each college, have a substantial voice in their own programs and rules. The residential college system is designed to let students benefit from the diversity of a large university while still identifying with the relatively small residential college units, each of which houses 200 to 400 students.



South of the main campus is a 14-acre natural preserve dedicated to the late Professor Ashley Schiff, and beyond those woods is the South Campus. Set in a hilly, densely wooded area there are 11 single-story buildings that will help bring Stony Brook through its present period of rapid growth. The buildings are attractive, economical, air-conditioned structures. Their walls and furnishings can be quickly rearranged for any configuration of lab, classroom and office space. They are permanent buildings designed for temporary tenants. Much of their space is now used by the Health Sciences Center, while its permanent facilities are under construction.

Expansion

More than \$300 million worth of construction is under way at Stony Brook. The 17-level, permanent home for the Health Sciences Center is being built across Nicolls Road from the main campus and will open for classes in 1973, though all hospital and clinical facilities are not due until 1976. Opposite the new center, on the southeast rim of the core campus, a Graduate Biology Building—with laboratories, lecture halls, a library and a greenhouse—is under construction. In the center of the core campus, work is nearing completion on an addition to the Frank C. Melville, Jr. Memorial Library. The work will quadruple the Library's square footage and permit an increase in its holdings from 500,000 volumes at present to more than 1,000,000 by 1975. The project will also result in a great increase in the number and variety of special study and research areas in the Library. Northwest of the Library, work is well along on a Graduate Chemistry Building and, farther west, on a complex of two new Physics Buildings and a Mathematics Building. The Fine Arts Building, planned just northeast of the Library, will house the Departments of Music, Art, and Theatre Arts. Also planned is the seventh 1000-student residential quadrangle, composed of small, town-house-type units, which is scheduled to be completed by the end of 1972.



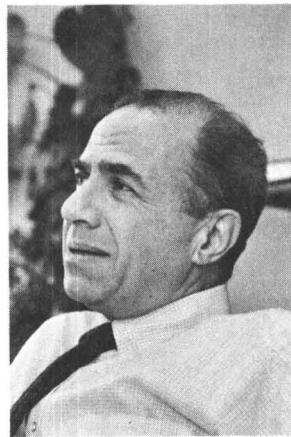
Academic programs also remain in the midst of growth, on the undergraduate, graduate and professional levels. There presently are 23 undergraduate departmental major programs in the College of Arts and Sciences, five departments for engineering majors, 19 graduate departments—including 17 Ph.D. programs—and a growing number of interdisciplinary programs, which afford commonly focused courses from several departments. The Health Sciences Center, serving both undergraduates and graduate students, has six distinct schools—Allied Health Professions, Basic Health Sciences, Dentistry, Medicine, Nursing and Social Welfare. The Dentistry School is scheduled to open in 1972.

Students

Stony Brook's total enrollment in 1971 reached 12,500, including all part- and full-time graduates and undergraduates taking on-campus courses as well as more than 1500 students in the University's Cooperative College Centers. These centers, located in Long Island areas with extensive poverty, provide courses for persons seeking belatedly to enter the college stream.

The undergraduate student body in 1970-71 included 4478 men and 3082 women. Of the full-time undergraduates, 38 percent came from New York City, 40 percent from Long Island, about 15 percent from upstate New York, with the balance coming from other states and foreign countries.

The graduate student enrollment reached 3400, including 1900 men and 1500 women. About 1900 graduate students are in Continuing Education (CED), an evening, masters degree program designed primarily for working professionals.



Faculty

Stony Brook's faculty totals about 850, more than 700 of whom teach full-time. The American Association of University Professors rates the University's salary scale among the nation's highest, and Stony Brook has increasingly attracted scholars of national prominence.

Since 1966, Nobel Prize-winning physicist Dr. C. N. Yang has been 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.

Dr. Yang also holds the academic rank of Distinguished Professor, an honor conferred by the State University Trustees in Albany and shared by four other Stony Brook faculty members. Dr. Bentley Glass, Distinguished Professor of Biology, is a noted geneticist who has served as president of both Phi Beta Kappa and the American Association for the Advancement of Science. Dr. Glass retired last year from the administrative position of Academic Vice President at Stony Brook. Alfred Kazin, Distinguished Professor of English, is a prominent author and literary critic who has lectured at universities around the world and whose writings have appeared in many leading scholarly and general-interest publications. Dr. Lewis Coser, Distinguished Professor of Sociology, has written books on the American Communist Party and the theory of sociology in addition to founding and editing the scholarly magazine *Dissent*. Dr. Justus Buchler, whose impact on 20th century thought has been compared to that of Dewey, Whitehead, and Santayana, is Distinguished Professor of Philosophy. He is the author of several books including four volumes on systematic philosophy.

A team of Stony Brook scientists has 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. Stony Brook's faculty also includes pioneering academic experts in the fields of DDT and water pollution research and two noted Shakespearean scholars. The Music Department includes four composers and a dozen artists-in-residence whose works and performances have been given throughout the world. And the Psychology Department was recently cited by a prominent professional panel as promising to develop one of America's six best graduate psychology programs in the 1970's.

All of Stony Brook's departments are relatively young and unencumbered by any traditional isolationism. In fact, since they all grew up together, the departments maintain an unusual degree of cooperation and communication. Thus, the College of Engineering and the Departments of Economics and Political Science have recently combined resources to create a new graduate program in Urban Science and Engineering, allowing all three disciplines to focus on specific city problems. The Department of Earth and Space Sciences includes the related but formerly separate disciplines of astronomy, petrology, oceanography and geology. And in all areas of the arts and sciences, academic administrators strive to maximize the interdisciplinary approach and avoid rigid separation of fields of study.

Library

Stony Brook's library system is one of the University's fastest growing facilities. New construction now under way will quadruple existing main library space. The first phase of the new building, located in the heart of the campus, will be completed in the fall of 1971, with final occupancy of the entire Library-Humanities Building scheduled for fall, 1972. New volumes are being added to the collection at the rate of 100,000 volumes a year; the present holdings total about 600,000 volumes. The libraries receive approximately 6200 periodical subscriptions. Among specialized departments within the main library building are microforms, consisting of 24,000 reels and 750,000 flat units; the Music Library and listening facility; the United States, United Nations and New York State Documents Section; the Environmental Information Service; and the Department of Special Collections. During the regular semester the main library is open until midnight, except on Saturdays. Separate chemistry, earth and space sciences, mathematics, physics, and engineering departmental libraries, located in their respective academic buildings, fall under the jurisdiction of the main library. The health sciences library is operated independently as a unit in the Health Sciences Center.

Special Centers and Institutes

Center for Curriculum Development: The Center for Curriculum Development

generates new kinds of courses for elementary and secondary education, testing its innovations in the classroom.

Center for Contemporary Arts and Letters: This newly developing campus resource is dedicated to deepening understanding of 20th century arts and letters. It is not intended to be involved directly in instruction but rather to serve as a repository for the works of such artists and to sponsor appropriate activities that would serve to disseminate such contributions to the university community.

Computing Center: The Computing Center has an IBM 360-67 computer available for concurrent batch processing and time-sharing services. With a staff of about 50, the center annually serves some 1500 undergraduates, 175 faculty members and 150 graduate students who, together, work on more than 300 active research projects, computer-training courses, and an endless flow of administrative data processing.

Economic Research Bureau: This bureau conducts research, training, and service activities in applied economic analysis, activities 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. The bureau, closely related to yet distinct from the Economics Department, links the academic community with public and private agencies. Its recent work has included studies of economic problems facing Suffolk County's black youth, the feasibility of a regional corporate-profits tax and the development of a planning model to guide the expansion of secondary education on Long Island.

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, manuscripts and microfilms from the archives of the governments of Mexico and Spain and from the various states and counties of Colonial America. Much of the material has been computerized for fast retrieval. 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: The institute, organized in 1966 and directed by Nobel Laureate C. N. Yang, has a dozen faculty members, doing research in all areas of theoretical physics—including those of high energy, solid state and nuclear physics, the relationship of math and physics, statistical mechanics and astrophysics.

Instructional Resources Center: This center is charged with development of more effective instructional procedures through close cooperation with faculty members of the various departments.

With its IBM 1500 computer and 32 terminals—consisting of TV display screens, typewriter keyboards and light-sensing pencils—the center has one of the most extensive computer-assisted-instruction (CAI) programs in the country. The center has developed CAI courses in areas as diverse as German language, English composition, and dental anatomy; and it is pioneering in developing much more efficient methods of producing CAI computer programs. This effort could have a direct bearing on how rapidly computer technology can be adopted to aid instruction in schools across the country.

Television and radio studios, movie and other film-making facilities, audio-visual equipment, and offices will be located in the new IRC building which is expected to be ready for the 1971-72 academic year.

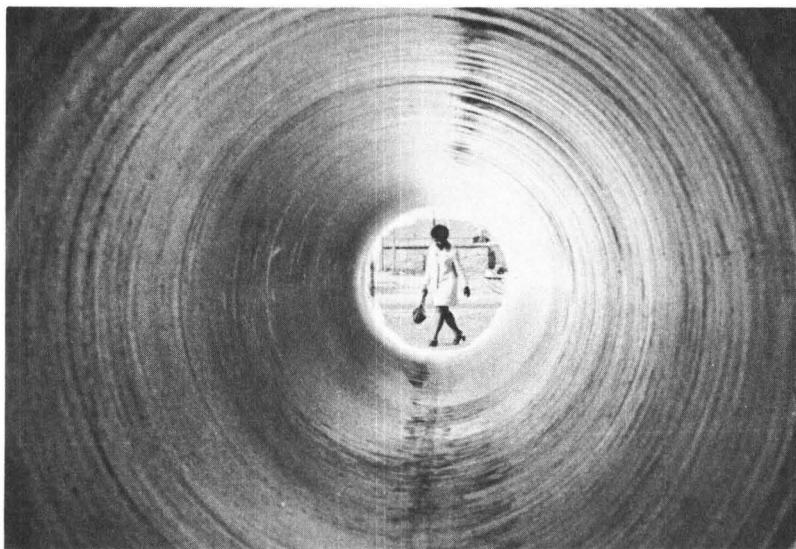
Marine Sciences Research Center: The center, offering research facilities for faculty members and students from all campuses of the State University of New York, serves as a focal point for marine studies involving many different disciplines.

Flax Pond, a tidal salt marsh acquired jointly by the State University and the State Conservation Department, is used for controlled shallow-water experiments. The center's own 40-foot research vessel, docked minutes from the Stony Brook campus, is used regularly for study of Long Island Sound wetlands and other nearby water resources. In cooperation with the National Sea Grant Program, the center sponsors two-week ocean study cruises several times yearly, using a 140-foot oceanographic vessel. The center also cooperates with the University of the West Indies in running a laboratory at Discovery Bay, Jamaica; and, with Cornell University and the University of New Hampshire, it offers a marine sciences summer program at Isles of Shoals, off the Maine coast.

The center offers several masters and doctoral degree programs in marine environmental management and marine biology, the latter in conjunction with the Division of Biological Sciences.

Health Sciences Center: The Health Sciences Center, which admitted its first students in 1970, is the most extensive single undertaking of Stony Brook's first decade and is expected to have profound effects on medical care on Long Island. The center has six separate schools. The center's permanent \$250 million home is under construction across Nicolls Road from the main campus. In temporary quarters on the South Campus, classes began in 1970 for the Schools of Allied Health Professions, Basic Health Sciences, Nursing and Social Welfare. Classes for the Medical School are scheduled to begin in 1971, and for the Dental School in 1972.

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. It 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. The center will serve undergraduates, graduate students and the public. When it is in full operation in the mid-1970's, it is scheduled to include a university hospital and an affiliated Veterans Administration hospital. It will also maintain close cooperation with Long Island hospitals, health professionals, and community groups concerned with health.



ACADEMIC PROGRAMS

Undergraduate Programs

The undergraduate curriculum at Stony Brook is marked by increasingly flexible options in meeting degree requirements.

After the freshman year, during which a student may explore a variety of study areas and complete various university course requirements, most non-engineering students choose one of three degree programs leading to the Bachelor of Arts or Bachelor of Science degree. They may choose the traditional departmental major, an interdisciplinary or interdepartmental major, or, broadest of all, a liberal arts major.

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

Within the College of Arts and Sciences, students may select a departmental major in anthropology, applied mathematics and statistics, art, biochemistry, cellular and comparative biology, chemistry, computer science, earth and space sciences, ecology and evolution, economics, education, English, French, Germanic and Slavic languages and literature, Hispanic languages and literature, Italian, history, mathematics, music, philosophy, political science, psychology, sociology, or theatre arts.

The interdisciplinary or interdepartmental major allows a student to explore a broad study area through a coordinated program of courses given by several different departments. Existing programs are in Asian studies, black studies, comparative literature, elementary education, environmental studies, Ibero-American studies, linguistics, religious studies, and social sciences. Additional interdisciplinary programs are being considered.

The liberal arts major is designed to lead to the baccalaureate degree by means of a study plan developed by the student in accordance with his individual interests. A faculty board of advisors helps the student work out the plan. This degree program requires, after general university requirements are satisfied, completion of 60 credits in courses beyond the introductory level.

Within any of the three degree programs in the College of Arts and Sciences, a student may undertake independent study projects. This option allows the student, in consultation with appropriate faculty members, to develop an individual course of academic investigation and study.

The College of Engineering with five departments—applied mathematics and statistics, computer science, 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 departmental designations such as "civil" or "electrical" engineering are avoided at Stony Brook, with all engineering students considered responsible for mastering broad areas of knowledge which are fundamental to all of engineering science. 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 urban science and engineering.

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, while taking into consideration the economic and social factors.

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 both masters and doctoral degrees are offered in anthropology, applied mathematics and statistics, biological sciences, chemistry, computer science, earth and space sciences, economics, English, Germanic languages, history, mathematics, physics, psychology, and sociology in the College of Arts and Sciences and, within the College of Engineering, in electrical sciences, materials science, and mechanics. Masters degree programs are offered in marine environmental studies, music, Romance languages, and urban science and engineering.

Continuing Education Program

The Center for Continuing Education is one of Stony Brook's fastest growing units. Its growth reflects both public interest and the University's commitment

to education as a lifelong concern. The center makes the resources of the University available to those who can not study full-time. It offers a masters degree in liberal studies—an interdisciplinary, non-thesis, 30-unit degree. A bachelors degree is generally required for admission to the degree program, which is pursued largely by working professionals.

Summer Session

The Summer Session at Stony Brook covers a six-week period usually starting in early July. Graduate and undergraduate courses are offered in arts and sciences and in engineering. Graduate courses are also offered through the Center for Continuing Education.

Students in good standing at Stony Brook and other institutions are eligible. Qualified high school students who have completed their junior year may also enroll in some summer courses.



FACILITIES, SERVICES, AND ACTIVITIES

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. Undergraduates who are studying beyond their fourth year will be granted housing only if beds are available after entering freshmen have been housed. 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 may have 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 26 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 undergraduate 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 may 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, experienced in helping students with personal, emotional, educational, and social 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 *University Health Service* provides emergency health services to the entire campus community on a 24 hour a day, 7 days a week basis. Additionally, students may receive general medical services on an appointment basis. Mental health services are also provided. There are no facilities for dentistry currently available but referrals to dentists in the community are made.

Students requiring short-term infirmary care or supervised bed rest can be accommodated in the Infirmary. Inquiries concerning health problems are always invited.

The *Guidance Services Bureau* consists of the offices of Career Development (Placement) and 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 to 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 here.

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.

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, and speaking engagements.

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 volun-

teer 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 *Stony Brook Union* provides facilities and services for the entire university community. The Union building contains such facilities as a cafeteria-ballroom, restaurant, bookstore, little theatre, post office sub-station, meeting and conference rooms, barber shop, lounges and reading rooms, bowling alleys and game room, craft shop, radio station, photography darkroom, student government and club offices. Commuting students have meeting areas, as well as facilities for eating, study, and recreation in the Union.

Campus Activities

National and international leaders in government, science, education and the arts visit Stony Brook regularly for lectures and seminars. A few recent visitors have included Associate Supreme Court Justice William O. Douglas, author Allen Watts, emigree Polish actress-director Ida Kaminska, former Congressman Allard Lowenstein and architect-ecologist Paolo Soleri.

Recent student theatre productions have included Euripedes' "The Bachae," a traditional production of Shakespeare's "As You Like It," Story Book Theatre pieces, student-developed experimental works such as "The Hunchback of Notre Dame" and performances by the Black Theatre Workshop and Theatre of Movement.

A professional concert series throughout the year brings to the campus renowned groups of musicians. Recent appearances have been made by the Buffalo Philharmonic Orchestra, New York Woodwind Quintet, Creative Associates, New York Pro Musica, Lenox String Quartet, Contemporary Chamber Ensemble, and the Contemporary Music Group at Columbia University. Campus musicians also give periodic public performances.

Continuing art exhibitions feature the work of students and faculty members and other professionals.

The Student Activities Board sponsors a series of programs, which have recently included performances by Miles Davis, Jefferson Airplane, the Grateful Dead, Traffic, B. B. King, the multi-media presentation Groove Tube, and Delaney, Bonnie and Friends.

The Committee on Cinematographic Arts offers weekend showings of foreign and domestic films.

In almost every academic area at Stony Brook a student club supplements course work and arranges social gatherings, field trips and lectures. Any group of 20 students wanting to get financing for a new club may do so by submitting by-laws to Polity, the student government.



Religious organizations serving students include the B'nai Hillel Counselorship, Christian Science Organization, Inter-Faith Forum, Lutheran Students Group and Newman Community.

Black Students United, the Oriental American Society and the International Club meet student interests in varied cultural traditions.

Political organizations on campus include such divergent groups as the Organization for Progressive Thought, Students for a Democratic Society, Young Americans for Freedom, the Young Democratic Club and the Young Republican Club.

Athletics

Athletic clubs offer opportunities to learn about karate, skiing, judo, gymnastics, water polo, squash, and other activities. Intramural sports programs include league play in basketball, soccer, softball, and touch football as well as shorter-duration competition in badminton, bowling, cross country, foul shooting, golf, handball, paddle ball, squash, swimming, table tennis, tennis, volleyball, and wrestling.

Men's varsity teams are fielded in 11 sports: baseball, basketball, bowling, crew, cross country, judo, soccer, squash, swimming, tennis, and track and field. Student-run intercollegiate club teams compete in football, hockey, and karate. Women's intercollegiate teams are fielded in basketball, field hockey, gymnastics, softball, synchronized swimming, and tennis.

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

ADMISSION

Undergraduate Admission to the University

(College of Arts and Sciences, College of Engineering, Health Sciences Center)

A strong, broadly-based academic preparatory program is advised for all applicants to Stony Brook. A high school diploma (academic or college preparatory program), high school equivalency diploma 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 for advanced academic study 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, and a year of chemistry and physics whenever possible. The foregoing secondary school programs are strongly recommended rather than required, since it is felt that a student may develop a similar level of academic competence and intellectual facility in various ways, both within and outside the context of the classroom.

Recognizing that some students acquire academic and intellectual excellence outside their academic experience, the University is prepared to admit up to 30% of freshmen entering the College of Arts and Sciences 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, special academic achievement, leadership potential, and exceptionally strong motivation will be taken into account. Applicants whose academic records have been adversely affected by a physical handicap may also apply in the 30% category. 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.

Financial Aid and Equal Opportunity Program

Students who anticipate financial need and wish to apply to the University for financial assistance must file a Parents Confidential Statement (PCS) at the time of admissions application. PCS forms may be obtained from the secondary school Guidance Office, the Financial Aid Office of your college (if a transfer), or the Financial Aid Office at Stony Brook. The Parents Confidential Statement alone

does not constitute application for aid at Stony Brook. Prospective students must contact the Financial Aid Office at Stony Brook and request an aid application form and the booklet "Financial Aid Programs for Undergraduate Students," which explains aid opportunities.

Applicants who are academically as well as economically disadvantaged according to federal and state eligibility guidelines may apply for the Advancement on Individual Merit (AIM) program. AIM, an Economic Opportunity Program (EOP), is a program designed to assist qualified poverty level students meet the economic and academic requirements for success at the University. Applicants for AIM should contact their school guidance office or the University Admissions Office for detailed application and eligibility information.

Application Procedures for New Freshmen

An application for admission (D-1) may be obtained from your high school if in New York State or 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 application form. The candidate is responsible for following the procedure outlined in this pamphlet. The application form (D-1) must be completed by the student and high school and sent directly to Albany. Upon receipt by the Stony Brook Admissions Office of the D-1, an additional form, the Supplementary Questionnaire (SQ), will be mailed to each applicant.

Applicants are strongly urged to file a completed application during the fall and no later than January 15, 1972.

Applications received after January 15 will be considered for the remaining vacancies, if any exist. It is the student's responsibility to assure that the completed application (D-1) arrives at the Admissions Processing Center, Albany by January 15. The University reserves the right to close application consideration at any time after January 15.

Applications for admission in the spring semester must 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.

Examinations

Applicants (freshmen and transfers with less than 24 semester hours credit) from New York State high schools are required to submit Regents Scholarship

Examination (RSE) scores. Those applicants who are unable to take the RSE, including candidates attending schools out-of-state, may substitute the CEEB Scholastic Aptitude Tests (SAT) or the American College Testing Program (ACT).

Although neither the SAT nor the ACT test is an admission requirement for New York State residents, all applicants who sit for these examinations are urged to have the results forwarded to the Admissions Office as a supplement to other scores.

If the SAT or ACT is used to meet the entrance examination requirement, the test must be taken in sufficient time to assure that the scores are received by Stony Brook no later than January 15.

Interviews

An interview is not required unless requested by the Admissions Office. Candidates may request interviews for purposes of information or clarification. Information from interviews may be used in the decision-making process. Discussions with counselors tend to be of greater usefulness *after* the applicant's academic record has been filed in the Admissions Office. Group discussions led by trained undergraduate students also are utilized, and have been as effective and well received as individual interviews. In addition, student group leaders meet regularly with parents of applicants to discuss mutual concerns. 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. to 4:30 p.m., Monday through Friday. Although the Admissions Office is not open on weekends, student guides frequently are available on schedule in the reception area on weekends during both the school year and summer session. It is best to telephone during the week to confirm weekend tour schedules.

Transfer Students

Any applicant who has been registered previously (summer and part-time study included) at an educational institution since graduating from secondary school must apply as a transfer student. If no grades were earned, a statement of attendance and honorable dismissal is required. A grade point average of 2.5 (A=4.0) is usually the lowest base considered for admission. In addition to completing the application outlined for new freshmen in the "How to Apply" booklet, transfer students must submit an official transcript from *each* post secondary institution attended.

Applicants for the spring semester must file an application by December 15. Applicants for the fall semester are urged to file their applications by

January 1. All applications received by the Admissions Processing Center in Albany by January 1 will be reviewed as a group. Applications received after January 1 will be reviewed on a rolling basis should any space still be available.

The University is committed to offering admission to qualified graduates of university-parallel programs (i.e., A.A., A.S., and A.A.S. 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 career-oriented programs (A.A.S.) will be considered for admission on an individual basis and in competition will all transfer applicants. All applicants interested in further information, particularly regarding Health Science programs, should contact the Admissions Office.

Transfer credit will be considered for all academic work satisfactorily completed (passing grade) at each prior institution. 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 of full-time study at Stony Brook.

Degree recipients of university-parallel programs at State University of New York community colleges or agricultural and technical colleges entering programs in the Arts and Sciences or Engineering College will receive blanket credit for the completion of the freshman and sophomore years (60 semester hours) including all general university requirements. Students who have earned more than 60 semester hours may request a complete course by course evaluation in order to be awarded the maximum advanced standing credit possible.

Students will be classified according to the following schedule of semester hours accepted for credit: freshman, 0-23; sophomore, 24-54; junior, 55-84; senior, 85 or more.

At the time of offer 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 study at an institution outside of the United States, must submit a form for *each* course taken. Courses will be evaluated by the department concerned with applicability to major requirements. The Admissions Office evaluates all courses to determine if general university requirement or elective credit is to be granted. The amount of transfer credit granted will be entered on the official university transcript, with the understanding that neither letter grades nor previous cumulative averages will appear on the Stony Brook official transcript. For advisement purposes, any student contemplating transferring to the University, may request a preliminary, unofficial evaluation from the Admissions Office.

Applicants interested in teacher preparatory programs are urged to contact the Admissions Office prior to filing an application to determine the availability of such programs.

Transfer students should take special notice that admission to Stony Brook

at this time cannot include assurance of admission to the Teacher Preparation program.

Handicapped Students

The academic admissions requirements and procedures for disabled students are in general the same as for all other applicants. A disabled student, however, may apply also under the 30% category as described in the general admission information. In addition, he must observe the following procedure:

1. Forward to the Director of the Student Health Service (c/o the Admissions Office) a medical history sufficient to determine the functional capability of the applicant.
2. Arrange an on-campus interview with the admissions counselor responsible for the admission 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, also, provide the time to work out solutions.

Notification of Admission

Decisions will be mailed in late February and throughout 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 a final high school or college transcript 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 advanced placement courses in secondary school, or who have demonstrated in other ways academic competencies which may entitle them to a waiver of certain course requirements. Advanced placement, however, does not confer semester hour credit toward graduation. Candidates undertaking advanced placement courses in secondary school must take the appropriate CEEB Advanced Placement 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. 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 (special students). Those who are accepted into this program are normally permitted to take up to two courses among the regularly scheduled course offerings. There is no separate undergraduate evening or part-time 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. Registration priority also is given to matriculated students.

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

Summer Orientation for Freshmen

Orientation for the freshman year is conducted during June and July. Orientation involves academic advisement, registration, and help in adapting to university life. Attendance is strongly recommended. Students unable to attend the Summer Orientation Program will be registered just before classes begin in September.

FINANCIAL INFORMATION

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

CHARGE OR FEE	FIRST SEMESTER	SECOND SEMESTER	YEAR
<i>Tuition</i>			
Undergraduate (New York State Resident)	\$275.00	\$275.00	\$ 550.00
Undergraduate (Out-of-State Resident)	450.00	450.00	900.00
Graduate (New York State Resident)	400.00	400.00	800.00
Graduate (Out-of-State Resident)	500.00	500.00	1000.00
Professional (Medicine, Dentistry and Law) (New York State Resident)	600.00	600.00	1200.00
(Medicine, Dentistry and Law) (Out-of-State Resident)	750.00	750.00	1500.00
Special Students:			
Undergraduate (New York State Resident) Per Semester Credit Hour	18.50	18.50	
Undergraduate (Out-of-State Resident) Per Semester Credit Hour	30.00	30.00	
Graduate (New York State Resident) Per Semester Credit Hour	27.00	27.00	
Graduate (Out-of-State Resident) Per Semester Credit Hour	33.50	33.50	

Professional			
(Medicine, Dentistry and Law) (New York State Resident)	40.50	40.50	
(Medicine, Dentistry and Law) (Out-of-State Resident)	50.25	50.25	
College Fee			
Student			
Per Semester	12.50	12.50	25.00
Special Student			
Per Semester Credit Hour	.85	.85	
	FIRST	SECOND	
	SEMESTER	SEMESTER	YEAR
^a <i>Student Activity Fee</i> (Undergraduate)	\$ 70.00		\$ 70.00
<i>Identification Card</i> (On admission or re-admission)	2.00		
^b <i>General University Deposit</i>			
Commuting Student	20.00		
Resident Student	35.00		
^c <i>Orientation</i> (Freshmen only)	30.00		
^d <i>Graduation</i>	15.00		
<i>Room (Includes basic telephone rental charge)</i>			
Double Occupancy	282.50	282.50	565.00
<i>Board—Optional</i>			
Subject To Change	298.00	298.00	596.00

^a This fee is set by the students and billed by Student Polity.

^b To be charged for any damages to property, unpaid telephone charges, unpaid library fines and other charges due.

^c Includes orientation fees and charges for room and board.

^d Required in the year that the candidate will receive his baccalaureate, masters or doctoral degree.

The University requires all full-time students be covered by health insurance. You may obtain coverage at registration, or submit proof of coverage at that time.

All fees must be paid prior to the first day of classes. *The University reserves the right to automatically cancel the registration of any student who fails to meet his obligations at registration.*

Refund Schedule

Request for refund of tuition, room or board must be made in writing to the Bursar's Office, Room 262, Administration Building.

Request for refund of student activity fee must be made in writing to the Polity Office, Stony Brook Union Building.

Request for refund of university deposit, lost I.D. card or graduation fee must be made in writing to the Faculty Student Association Office, Room 138, Stony Brook Union Building.

College fee is non-refundable.

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. A withdrawal card which is obtainable at the Office of Records and Studies, must be completed and returned to that office on the date of withdrawal.

Schedule of Tuition Liability

<i>Liability During</i>	<i>Semester</i>	<i>(Six-Week Term Summer Session)</i>
First Week	0	0
Second Week	30%	70%
Third Week	50%	100%
Fourth Week	70%	
Fifth Week	100%	

Approval of the cancellation with the date it becomes effective must be certified by the chief administrative officer of the college or his duly designated representative. No money shall be refunded unless application for refund is made within one year after the end of the term for which the tuition requested to be refunded was paid to State University. The first day of class session shall be considered the first day of the semester, quarter, or other term and Saturday of the week in which this first class session occurs shall be deemed the end of the first week for refund purposes.

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 of 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.

Room Refunds

Once a student has registered and occupied a room, no refund will be granted for payment made for that quarter.



1972 Summer Session

Expenses for the 1972 Summer Session are as follows:

Tuition

Undergraduate level course (N.Y. State Resident)	\$18.50 per credit hour
Undergraduate level course (Out-of-State Resident)	\$30.00 per credit hour
Graduate level course (N.Y. State Resident)	\$27.00 per credit hour
Graduate level course (Out-of-State Resident)	\$33.50 per credit hour
Professional (Medicine, Dentistry and Law) (N.Y. State Resident)	\$40.50 per credit hour
(Out-of-State Resident)	\$50.25 per credit hour

College Fee

\$.85 per credit hour

** General University Deposit*

Commuting Student	\$20.00
Resident Student	\$35.00

*** Student Service Fee*

\$ 5.00

Room (Includes basic telephone rental charge)

Double Occupancy	\$15.00 per week
Single Occupancy	\$20.00 per week

*Board**A la Carte*

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- * Applies to all students except those registered in the previous spring semester who have an outstanding deposit.
 - ** Funds collected from the service fee will be used to finance extracurricular activities during the summer such as dances, concerts, films, the operation of the Student Union, group trips, and recreational facilities such as intramural softball competition, the use of the swimming pool and all other gymnasium-related activities. Administration of the funds collected will be performed by the Summer Session Student Service Fee Committee, chaired by the Director of the Summer Session and consisting of representatives from Polity, the Graduate Student Council, the CED Student Council, the university administration, faculty and staff. Monies not used for Summer Session activities will be returned on a pro rata basis to Student Polity, the Graduate Student Council, the CED Student Council, and the Office of the Summer Session.

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 15 for first consideration. Most financial aid awards are made during the summer months.

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 \$350 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 \$2000 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 7% 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. These 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.

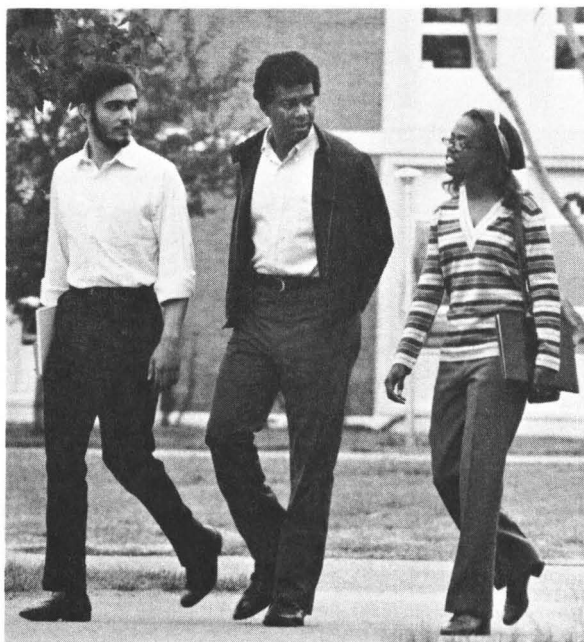
Private Scholarship Programs

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 three \$1000 scholarships annually, one each to outstanding juniors in the fields of music, art and theatre. 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, Art and Theatre Arts.
- 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 six Stony Brook students during the 1971-72 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. Applications for the Republic Aviation Scholarships will be available from the Financial Aid Office at the University.
- C. The residents of Langmuir College will offer four scholarships during the 1971-72 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.
- D. *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.
- E. *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 \$900-1000 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 August 25 for the fall semester, or January 5 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 to 19 hours of credit each semester with the approval of his academic advisor. Normally a student will register for a course load of 15 to 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.

An undergraduate student is defined as a full-time student only if he is registered for 12 or more semester hours of credit. Otherwise, he is considered a part-time student in terms of scholarship awards, the draft, financial aids, lending and other agencies.

Pass/No Credit Option

In September 1970 a Pass/No Credit system was introduced in order to permit students 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/No Credit basis as they see fit. Questions about the applicability of the Pass/No Credit option to individual situations should be discussed with the student's faculty advisor.

- A. Normally all such courses are taken outside the student's departmental major requirements.
- B. Any course not a part of the students' elected major may be taken on a Pass/No Credit basis. Students who have not elected a major, or who may consider changing from one major to another, must assume the sole responsibility for electing the Pass/No Credit option for a course later included in the major.
- C. Unless the faculty of a department responsible for a particular major rules otherwise, every course a student wishes to count as a part of his elected major, whether that course be specifically required or not, must be taken under the letter grade system: A, B, C, D, F.
- D. In calculating grade point averages "Pass" or "No Credit" shall not be used in the calculation.
- E. A student must designate a course for the Pass/No Credit option at time of registration or on or before a closing date for electing such option as set by the registrar with the approval of the Committee on Academic Standing. After that date a student may not change this designation.

Faculty members must report all grades to the registrar in letter grade form: A, B, C, D, F, I. The registrar is responsible for the conversion of letter grades to Pass/No Credit whenever such an option has been elected by a student. The election of the Pass/No Credit option by a student in a course may be communicated to the instructor only after the final grade has been submitted.

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 except in the case of Pass/No Credit options where an NC will be substituted for the WF. 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 (withdraw 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 no credit.

NC (no credit) indicates work in a course for which no credit is given where the evaluation standard is either pass or no credit.

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 except in those cases where the student has elected the Pass/No Credit option when an NC will be recorded. 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 he must 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 except in those cases of the Pass/No Credit option.

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, NC, 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.

Graduation Requirements

All candidates for the Bachelor of Arts or Bachelor of Science degree must satisfy all general university and departmental requirements for the specific degree. For graduation, at least 120 credit hours of passing work must have been completed for the bachelors degree in the College of Arts and Sciences while a bachelors degree in the College of Engineering requires a minimum of 129 credit

hours of passing work. A cumulative grade point average of at least 2.00 is required for all work undertaken after entrance to the junior year or begun after four semesters of registration.

Repeating Courses

With the approval of his advisor, a student may repeat a course in which he has received a grade of D, NC, WP, WF, or F. All grades, except those specifically noted in the paragraph above, 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

Students who have accumulated less than 21 credits during the freshman year will be placed on academic probation; those students who have accumulated less than 16 credits will be suspended from the University.

In subsequent years, less than 24 credits in any single academic year will result in probation while less than 18 credits will result in suspension from the University. Only official acceptance of medical or other approved reasons, fully documented, may be taken into account in granting exceptions to this regulation.

Academic standing of part-time students will be determined by the Committee on Academic Standing in light of the preceding statements.

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.

Premedical Option

For Stony Brook undergraduates intending to enter medicine, dentistry, or other health professions, the Premedical Office is prepared to advise these students on appropriate academic and non-academic preparation. Students who expect to apply for admission to a professional school of medicine, dentistry, or veterinary medicine should register with the "premedical option" as soon as possible. The Premedical 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 since they 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 with the pre-medical option does not commit the registrant to any particular program or career.

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. Transfer and readmitted 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 two weeks 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.

Courses of Instruction

Course designations are abbreviated according to the following scheme:

ANT—Anthropology	IAS—Ibero-American Studies
ART—Art	INT—Interdisciplinary Courses
ANS—Asian Studies	ITL—Italian Language and Literature
BIO—Biological Sciences	LAT—Latin
BLS—Black Studies	LIN—Linguistics
CHE—Chemistry	MSA, ESA—Applied Mathematics and Statistics
CHI—Chinese	MSC, ESR—Computer Science
CLS—Classics	MSI—Interdepartmental Courses in Mathematical Sciences
CLT—Comparative Literature	MSM—Mathematics
ECO—Economics	MUS—Music
EDU—Education	PEC, PEM, PEW—Physical Education
EGL—English	PHI—Philosophy
ENS—Environmental Studies	PHY—Physics
ESS—Earth and Space Sciences	POL—Political Science
FLA—Teaching of Foreign Languages	POR—Portuguese Language and Literature
FRN—French Language and Literature	PSY—Psychology
GER—German Language and Literature	RLS—Religious Studies
HBW—Hebrew	
HIS—History	

RUS—Russian Language and
Literature

SOC—Sociology

SPN—Spanish Language and
Literature

SSC—Social Sciences

SWE—Scandinavian Languages and
Literatures

THR—Theatre Arts

WL—World Literature

YDH—Yiddish Language and
Literature



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 or divisions: biological sciences, chemistry, earth and space sciences, mathematical sciences, and physics 6-8 credits

Note: Not acceptable to satisfy the natural sciences requirement are the following courses in mathematical sciences: MSA 101, 102; MSC 101, 165; MSM 101, 102.

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, Ibero-American studies (IAS), 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, com-

parative literature, English, French, Germanic and Slavic languages, Hebrew, Hispanic languages, Italian, linguistics, music, philosophy, 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 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 1971, nine interdisciplinary programs have been approved: Asian studies, black studies, comparative literature, elementary education, environmental studies, Ibero-American studies, linguistics, religious studies, and social sciences. They are described in more detail in this section of the *Bulletin* under individual headings alphabetically arranged. Additional interdisciplinary 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. At least 36 of these credits must be taken for letter grade. 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 ap-

propriate 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 120 of this *Bulletin*.

Students intending to teach at the secondary school level should plan to complete the requirements of either a departmental major or an interdisciplinary major and should consult the office of teacher preparation for assistance as early as the second semester of the freshman year.

DEPARTMENT OF ANTHROPOLOGY

Professors: ARMILLAS, P. BROWN, CARRASCO (*Director of Graduate Studies*), FARON

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

Assistant Professors: ARENS, HICKS, REGELSON, J. STARR, WEIGAND, WHEELER

Instructor: NEWTON (*Museum Curator*)

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 anthropology. The curriculum emphasizes the fields of cultural and social anthropology. Students interested in pursuing the honors program should consult the departmental director of undergraduate studies or their advisor.

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 Introduction to Social and Cultural Anthropology and ANT 150 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, Political 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.

* Consult advisor if in doubt about the difference between ethnographic area and topical courses.

- 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 structure among simpler societies through an examination of various forms of kinship, marriage, family, age group, voluntary associations and various levels of political, juridical or religious and economic organization.

Fall and Spring, 3 credits

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 fossil and living primates, (2) physical and cultural characteristics of the Pleistocene hominids, with the relevant prehistoric archaeology, (3) a brief survey of a group of living hunters. Current research on human origins, genetics, evolution, race, and primate and human ethology will be discussed.

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.

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 socio-cultural systems are discussed from a structural-functional point of view. Consid-

eration 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.

Fall, 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 102 or permission of instructor.

Fall, 3 credits

ANT 204 Peoples of Africa

The range and distribution of African populations, languages, and socio-cultural 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 socio-cultural 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.

Fall, 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.

Prerequisite: ANT 150 or permission of instructor.

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 102 or permission of instructor.

Spring, 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 102 or permission of instructor.

Spring, 3 credits

ANT 211 Peoples of Southeast Asia and Indonesia

Ethnographic, ethnological and structural-functional analysis of selected tribal, peasant, and changing societies of mainland Southeast Asia and/or Indonesia-Malaysia.

Prerequisite: ANT 150 or permission of instructor.

Spring, 3 credits

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.

Fall, 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, dif-

fusion, 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 102 or permission of instructor.

3 credits. Not offered 1971-72.

ANT 217 North American Archaeology

A survey of the archaeological and historical Indian cultures of North America, excluding ancient Mesoamerica. Northern Mexico, the American Southwest, and the American Southeast (including the Mississippi Valley) will be the areas stressed. Contact situations, including European colonization and conquest patterns, will be discussed.

Prerequisite: ANT 102 or permission of instructor.

Fall, 3 credits

ANT 218 Peoples and Cultures of the Middle East

An introduction to the diverse ethnic groups, languages, religions, and socio-cultural systems of the Middle East. Special attention is given to the ecological and socio-cultural adaptations of nomads, villagers, and urbanites. Turkey, Iran, Afghanistan, the Arab states, and Israel will be considered in terms of their culture history and contemporary development.

Prerequisite: ANT 102 or permission of instructor.

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 102 or permission of instructor.

Fall, 3 credits

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 behavior and the basic religious beliefs of more complex societies will be discussed.

Prerequisite: ANT 150 or permission of instructor.

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 ethnopyschiatry.

Prerequisite: ANT 102 or permission of instructor.

3 credits. Not offered 1971-72.

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 102 or permission of instructor.

Spring, 3 credits

ANT 255 Material Culture, Technology and Primitive Art

This course will introduce various approaches to the study of material culture in its technological and artistic aspects, using ethnographic and archaeological studies from many different cultures. Emphasis will be on viewing artifacts and their associated tech-

nologies within the context of a total culture, and in particular, to see the relationship between material and non-material forms of culture.

Prerequisite: ANT 102 or permission of instructor.

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.

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 102 or permission of instructor.

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 102 or permission of instructor.

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 civilization of Middle America, with emphasis on the reciprocal relations between culture and environment. General trends in the areas of culture history and

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illustrative regional sequences from the establishment of sedentary farming communities to the eve of the Spanish conquest.

Prerequisite: ANT 102 or permission of instructor.

Fall, 3 credits

ANT 260 Archaeological Studies in Society and Culture

Basic concepts and methods of archaeological research applied to the study of socio-cultural processes and to historical interpretation.

Prerequisite: ANT 102 or permission of instructor.

3 credits. Not offered 1971-72.

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 102 or permission of instructor.

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.

3 credits. Not offered 1971-72.

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 102 or permission of instructor.

Fall, 3 credits

ANT 266 Anthropology Museum Workshop

Advanced workshop and projects in material culture, technology, and primitive art. Students will participate in designing and construction of museum exhibits which will entail background study and individual research in this field.

Prerequisite: ANT 102 or permission of instructor.

Spring, 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 102 or permission of instructor.

Fall, 3 credits

ANT 280 Culture and Ecology

Examination of man's adaptations to the wide range of world environments, such as food-gathering, fishing, hunting, farming, and pastoralism. Intensive case studies concerning the selection, use and allocation of resources by human communities will be presented. Consideration will also be given to a variety of theoretical approaches which have focused upon the interaction between environment and cultural behavior.

Prerequisite: ANT 102 or permission of instructor.

Spring, 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.

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 102 and advanced standing or permission of instructor.

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 social, 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.

Spring, 3 credits

ANT 306 Problems in African Ethnology

Research and intensive examination of select problems in African ethnology of both current and enduring interest. Students will present the results of their own directed research on aspects of these problems in the form of oral reports in seminar and term papers. Specific problem areas for consideration will vary from year to year and will be announced at the beginning of the term.

Prerequisites: ANT 150 and advanced standing or permission of instructor.

Spring, 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.

Fall, 3 credits

ANT 310 Readings in Anthropology

Individual advanced readings and research on selected topics in anthropology. Work may be submitted for honors in anthropology.

Prerequisites: ANT 150 and senior standing and permission of department.

Fall and Spring, 1 to 4 credits

ANT 312 Patterns of Empire

A comparative analysis of the social institutions of the early empires will be offered. The evolution of militarism, secular bureaucracies, long-distance trade, land use and tenure, and other topics will be examined. Problems involved in the use of early documents and/or archaeological materials will be discussed.

Prerequisites: ANT 150 and advanced standing or permission of instructor.

Spring, 3 credits

ANT 391, 392 Special Seminar in Anthropology

Discussion of a specific area of current interest in anthropology. Topics will change and will be announced for each semester. Students will write papers on individual research topics.

Prerequisite: Senior standing or permission of instructor.

Fall and Spring, 3 credits each semester

DEPARTMENT OF ART

Professors: ALLOWAY, CASTEDO

Associate Professors: BOIME, COUNTEY, GUILMAIN (*Chairman*), KLEEGER, KORAS,
MALLORY, MORLEY

Assistant Professors: LUSKER, WHITE

Instructor: BERMAN

Lecturers: BARNITZ, 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.

The department recommends that students who intend to do graduate work in art history acquire a reading knowledge of German and/or French as part of their undergraduate training.

Requirements for the Major in Art

In addition to the general university requirements for the Bachelor of Arts degree, a minimum of 39 credits in art or related fields, of which 36 must be taken for letter grade (and three may be taken Pass/No Credit), are required for the major. No student may take more than a total of 60 credits of studio work, as courses or independent studies, to be counted towards degree requirements.

Credits

I. Group A. Art History and Criticism

- | | |
|--|---|
| 1. ART 101, or with permission of the departmental advisor,
ART 201, or ART 203, or ART 204. | 3 |
| 2. ART 102, or with permission of the departmental advisor,
ART 205, or ART 207, or ART 209, or ART 210, or ART
212. | 3 |

3. ART 241, or ART 243, or ART 244.	3
4. Electives in Art History and Criticism (ART 125 may be included in this group).	6
Total	<u>15</u>

II. Group B. Studio Art (or Art History track alternate)

1. Fifteen credits in any combination of studio courses including ART 120, or,	
2. Art History and Criticism track: 15 additional credits in art history/criticism.	
Total	15

III. Electives in related fields

In consultation with the departmental advisor, a group of courses outside the art department related to the student's particular interest or interests are selected.

Total	<u>9</u>
Grand Total	39

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 proposal 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 c. 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.

Fall and Spring, 3 credits

**ART 102 History of Art and Architecture
from c. 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.

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.

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 department.

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: Permission of department.

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: Permission of department.

Fall and Spring, 3 credits

ART 124 Studio IV (Design)

A studio course in the techniques of perspective drawing, isometric projection, multi-phase drawings, motion studies, graphs, and analytical drawings, and their application to a selected project. Six hours studio work.

Prerequisite: Permission of department.

Fall and Spring, 3 credits

ART 125 Applied Theory Studio

A workshop in painting combined with the study of modern art theories. Experimentation with problems of scale, color, structure, and surface will be emphasized. Six hours studio work.

Prerequisite: Permission of department.

Fall and Spring, 3 credits

ART 126 Fundamentals of Photography

An introduction to photography as a graphic medium with experimentation in photographic techniques and materials.

Prerequisite: Permission of department chairman.

Fall and Spring, 3 credits

**ART 201 Ancient Art
(Formerly ART 231)**

The history of art in the ancient world from earliest times through the Roman period.

Prerequisite: ART 101.

Fall, 3 credits

ART 203 The Art and Architecture of the Early Middle Ages, 300-1100

(Formerly ART 233)

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.

Fall, 3 credits

ART 204 The Art and Architecture of the High Middle Ages, 1100-1400

(Formerly ART 234)

The study of Romanesque and Gothic sculpture, architecture, painting (including stained glass and manuscript illumination), metalwork and ivory carving from c. 1100 to the crystallization of the "International Style," c. 1400.

Prerequisite: ART 101.

Spring, 3 credits

ART 205 The Early Renaissance in Italy

Art in Italy in the 15th century, with special emphasis on the major figures of the period: Masaccio, Donatello, Piero della Francesca, Botticelli and the early Leonardo.

Prerequisite: ART 101.

Fall, 3 credits. Not offered 1971-72.

ART 207 High Renaissance and Mannerism in Italy

Art in Italy in the 16th century. The High Renaissance in Florence and Rome studied in the works of Leonardo, Michelangelo and Raphael; in Venice with special emphasis on Bellini and Titian. Mannerism in central and northern Italy.

Prerequisite: ART 101 or 102.

Fall, 3 credits

ART 209 Northern Renaissance Art

(Formerly ART 333)

Renaissance painting, sculpture and architecture in northern Europe.

Prerequisite: ART 101 or 102.

Fall, 3 credits

ART 210 Northern Baroque Art

(Formerly ART 342)

Painting, sculpture and architecture in Holland, Belgium, Germany and France in the 17th and 18th centuries.

Prerequisite: ART 102.

Spring, 3 credits

ART 212 Baroque Art and Architecture in Spain and Italy

(Formerly ART 344)

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.

Spring, 3 credits

ART 214 Ibero-American Plateresque and Baroque Art and Architecture

(Formerly ART 346)

A study of the painting, sculpture and architecture of Ibero-America from the 16th to the 18th centuries.

Prerequisite: ART 101 or 102.

Spring, 3 credits

ART 215 Latin American Art

(Formerly ART 237)

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.

Fall, 3 credits

ART 216 Modern Latin American Art

(Formerly ART 238)

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 215.

Spring, 3 credits

ART 217 Pre-Columbian Art

(Formerly ART 339)

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

Prerequisite: ART 215.

Fall, 3 credits

ART 241 19th Century Art

(Formerly ART 335)

European art of the 19th century.

Prerequisite: ART 102.

Fall and Spring, 3 credits

ART 243 20th Century Art

(Formerly ART 336)

European and American art of the 20th century.

Prerequisite: ART 102.

Fall and Spring, 3 credits

ART 244 American Art Since 1947

A survey of painting and sculpture in New York, including abstract expressionism, "hard edge" painting, pop art, minimal art and earthworks.

Prerequisite: ART 102.

Spring, 3 credits

ART 251 Major Artists

(Formerly ART 236)

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.

Fall and Spring, 3 credits

ART 253 Introduction to the Literature of Art

(Formerly ART 337)

A selection of writings by artists, critics, art historians and theorists will be analyzed through lectures and class discussions.

Prerequisite: ART 101 or 102.

Fall and Spring, 3 credits

ART 260 Sculpture Studio A

Sculpting involving the casting of plaster, plastics and metals; and the carving of stone, wood and other substances.

Prerequisite: Departmental permission through evaluation of the student's work. ART 122 will generally be required.

Fall and Spring, 3 or 6 credits. May be taken up to four times with permission of department.

ART 261 Sculpture Studio B

Metalwork (welding and related techniques).

Prerequisite: Departmental permission through evaluation of the student's work. ART 122 or 124 will generally be required.

Fall and Spring, 3 or 6 credits. May be taken up to four times with permission of department.

ART 262 Sculpture Studio C

Ceramics, terra cotta.

Prerequisite: Departmental permission through evaluation of the student's work. ART 122 will generally be required.

Fall and Spring, 3 or 6 credits. May be taken up to four times with permission of department.

ART 265 Drawing Studio

Work in all drawing media.

Prerequisite: Departmental permission through evaluation of the student's work. ART 121 will generally be required.

Fall and Spring, 3 or 6 credits. May be taken up to four times with permission of department.

ART 270 Painting Studio

Work in all painting media.

Prerequisite: Departmental permission through evaluation of the student's work. ART 123 or 125 will generally be required.

Fall and Spring, 3 or 6 credits. May be taken up to four times with permission of department.

ART 275 Graphics Studio

Engraving, etching, aquatint, messotint, dry point, wood cutting, wood engraving and intaglio color printing.

Prerequisite: Departmental permission through evaluation of the student's work. ART 121 or 123 will generally be required.

Fall and Spring, 3 or 6 credits. May be taken up to four times with permission of department.

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. Students will be expected to submit a report or portfolio to the department upon completion of the project.

Prerequisites: Sponsorship of a faculty member and approval of the department chairman.

Fall and Spring, 3 or 6 credits. May be repeated with permission of department.

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.

Prerequisites: Art major with senior standing and approval of department.

Spring, 3 credits

ART 345 Cubism

The course is conceived in two parts: the first dealing with Cubism proper (Picasso, Braque, Gris, Gleizes, Metzinger, Duchamp, among others); the second surveying the influence of Cubism on 20th century art, up to and including Willem de Kooning.

Prerequisite: ART 243.

Fall, 3 credits

ART 347 Conceptual Art

This course will study the history of the recent international movement known as "conceptual art," following up the esthetic problems raised by such work. Classwork will include historical research and the creation of new art projects.

Prerequisite: ART 243.

Fall, 3 credits

ART 399 Readings in Art History

Qualified art majors will be afforded the opportunity to read selectively under the guidance of a faculty member. The course may be repeated with permission of the department.

Prerequisites: Senior standing and permission of department.

Fall and Spring; 1, 2, or 3 credits

INTERDISCIPLINARY PROGRAM IN ASIAN STUDIES

Professor: HOFFMANN

Associate Professors: R. H. G. LEE (Chairman), VAN ROY

Assistant Professors: DENICOLAS, HICKS, HU, KNIGHT, LAM

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 284 Topics in Area Studies
- **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

* Suggested as an introductory course.

** Course content varies according to the interest of the instructor.

- HIS 261 Intellectual History of China
- HIS 262 Contemporary China
- **ECO 284 Topics in Area Studies
- **ECO 384 Topics in Development and Comparative Systems
- **ECO 386 Topics in Political Economy
- ECO 393, 394 Independent Study or Research
- HIS 391, 392 Senior Honors Project in History
- HIS 399 Independent Readings in History
- *ANT 213 China: The Social and Cultural Background

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 240 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 210 Introduction to Oriental Philosophy
- PHI 238 Indian Buddhism
- PHI 318 The Philosophical Methodology of the Rig Veda
- **PHI 398, 399 Reading and Research in Philosophy
- POL 202 Problems of Marxism
- POL 209 Politics in 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, industrialization, 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.

* Suggested as an introductory course.

** Course content varies according to the interest of the instructor.

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.

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.

DIVISION OF BIOLOGICAL SCIENCES

Acting Provost: R. JONES

Executive Officer: A. CARLSON

Department of Biochemistry

Professors: ^aCIRILLO, M. SIMPSON (*Chairman*)

Associate Professors: FREUNDLICH, MOOS, RILEY, STUDIER (*Adjunct*)

Assistant Professors: ARNHEIM, DUDOCK, ^bGESTELAND, LEICHTLING, S. SIMON, R. STERNGLANZ

Department of Cellular and Comparative Biology

Distinguished Professor: ^aGLASS

Professors: CAIRNS, E. CARLSON, ^aERK, R. JONES

^a On leave academic year 1971-72.

^b Joint appointment with Cold Spring Harbor Laboratory for Quantitative Biology, Cold Spring Harbor, New York.

Associate Professors: BATTLEY, A. CARLSON, ^aEDMUNDS, H. LYMAN, MERRIAM, TUNIK, WALCOTT (*Acting Chairman*)

Assistant Professors: J. FOWLER, HOY, E. KATZ, KERNAGHAN, KRIKORIAN, TENG

Lecturers: M. BAYLOR, FOGG

Department of Ecology and Evolution

Professors: ^cE. BAYLOR, ^cMcHUGH, SANDERS (*Adjunct*), SLOBODKIN (*Chairman*), SOKAL, ^aSQUIRES, ^cG. WILLIAMS

Associate Professors: ROHLF, SMOLKER

Assistant Professors: J. FARRIS, FUTUYMA, HECHTEL, KOEHN, ^{a, c}WURSTER
(*Professors in Health Sciences:* V. FARRIS, LEFEVRE, PELLEGRINO, UPTON)

Programs in the Biological Sciences

The division of biological sciences sponsors programs in two undergraduate majors, biochemistry (BCH) and biological sciences (BIO).

The undergraduate program in biochemistry is designed to provide an introduction to the chemical basis of biological phenomena. The student is prepared primarily for graduate study in biochemistry or other biological sciences and for professional study in the health sciences. The program is based on a core of introductory courses in biology, chemistry, and biochemistry, with pertinent courses in mathematics and physics.

The undergraduate program in 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 Biochemistry Major

In addition to the general university requirements for the Bachelor of Science degree, the following courses are required for the major in biochemistry.

^a On leave academic year 1971-72.

^b Joint appointment with Cold Spring Harbor Laboratory for Quantitative Biology, Cold Spring Harbor, New York.

^c Member, Marine Sciences Research Center.

^d Director, Marine Sciences Research Center.

A. Study within the areas of biology/biochemistry and chemistry

1. Biology and biochemistry

BIO 150 Biology of Plants and Animals

BIO 151 Cell Biology and Chemistry

BIO 152 Adaptation and Evolution

BIO 162 Cell Biology and Biochemistry Laboratory

BIO 361 Biochemistry

At least six additional credits must be chosen by the student, in consultation with his advisor, from among the following courses: BIO 313, 320, 392 (described in this *Bulletin*) or BIO 502, 503, 505, 506, 508, 513, 514, 520, 575 (described in the *Graduate Bulletin*).

2. Chemistry

CHE 101, 102 or 103, 104 Introductory Chemistry

CHE 105, 106 or 109, 110 Introductory Chemistry Laboratory

CHE 153, 154 Physical Chemistry I, II

CHE 201, 202 or 211, 212 Organic Chemistry

CHE 203, 204 or 205, 206 Organic Chemistry Laboratory

(Note: Students planning to continue in biochemistry beyond the undergraduate level should choose CHE 203, 204 and should, wherever other alternatives appear above, take the courses designed for chemistry majors. Premedical students and others who do not intend to continue in biochemistry may substitute CHE 205, 206.)

B. Courses in related fields

MSM 121, 122, 151 Calculus I, II, III

MSA 104 Introduction to Probability

PHY 101, 102, 151 General Physics I, II, III

(Note: PHY 131, 132 may be substituted for PHY 101, 102 only with special permission of the biochemistry departmental undergraduate curriculum committee.)

C. Selection of electives

1. All biochemistry majors, especially those interested in the physical aspects of biochemistry and/or in the mechanism of enzyme action, should consider taking one or more of the following courses: CHE 155 Solution Chemistry Laboratory, CHE 255 Introduction to Quantum Chemistry, CHE 256 Statistical Thermodynamics and

Kinetics, CHE 258 Molecular Structure and Spectroscopy Laboratory, CHE 315 Intermediate Organic Chemistry, CHE 325 Quantum Mechanics and Spectroscopy, MSM 152 Calculus IV, and MSI 201 Advanced Calculus for Scientists I.

2. A course in computer science such as MSC 101 Introduction to Computer Science is highly recommended.
3. Students planning graduate or professional studies should obtain information on specific requirements of particular schools and programs. 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.

D. Changes in program

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

Honors Program in Biochemistry

Departmental majors with a grade point average of 3.0 or better in courses listed in A, 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 department to act as research advisor and must obtain formal permission from the department to enter the honors program.

Honors students must be enrolled in BIO 298, 299 Research Project. The basic requirement for honors is completion of a senior thesis based upon research performed during the senior year. Three copies of the completed thesis or report must be submitted to the student's research advisor no 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 department.

Conferral of honors is contingent upon the recommendation of a reading committee consisting of the research advisor, another member of the department, and a faculty member from another department in a related field. In addition, the student must maintain a grade point average of 3.0 in all courses taken in the senior year which are listed in A, B, or C above.

Requirements for the Biological Sciences 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:

A. Study within the area of the major

BIO 150 Biology of Plants and Animals

BIO 154 Cell Biology and Biochemistry

BIO 152 Adaptation and Evolution

(Note: These courses should be completed as soon as possible, preferably before the junior year.)

At least 16 additional credits in biology or related areas must be chosen by the student in consultation with his advisor. Of these credits, at least 12 must be taken within the division of biological sciences and must include at least two different biology courses with laboratory or biology laboratory courses.

(Note: BIO 101, 102, 103, 104, 107, and 111 are designed for non-majors and cannot be used to satisfy the above requirements.)

B. Courses required in related fields

CHE 101, 102 or 103, 104 Introductory Chemistry

CHE 105, 106 or 109, 110 Introductory Chemistry Laboratory

CHE 201, 202 or 211, 212 Organic Chemistry

CHE 205 or 203 Organic Chemistry Laboratory

PHY 131, 132 or 101, 102 Introductory Physics

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

MSM 121 Calculus I and MSM 123 Calculus II and Probability; or MSM 121, 122 Calculus I, II and MSA 104 Introduction to Probability; or MSM 121 Calculus I and MSA 101 Introduction to Finite Mathematical Structures I

C. Selection of electives

1. The curriculum for biological sciences 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 postcollege 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 specific requirements of particular schools and programs. 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.
3. Students preparing for secondary school teaching should note the new general requirements for provisional New York certification and for certification in science teaching.
4. Students with an interest in molecular or cellular biology are advised to include at least CHE 153 in their program.

D. Changes in program

With the consent of his advisor, a student may petition the undergraduate studies committee in biological sciences 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 A and B 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. Three hours of lecture each week. Primarily intended for non-biology majors. *Fall and Spring, 3 credits each semester*

BIO 103 Seminar in Biology and Values

Seminar on biology and values using reading list of books and articles on social, historical, and controversial topics such as abortion, evolution, race, intelligence, pollution, radiation hazards, drugs, population, and religion. Prerequisite: BIO 101.

Fall, 2 credits. Not offered 1971-72.

BIO 104 Laboratory in Biology for Non-Majors

A supervised, independent project laboratory in biology. Activities include laboratory or field work or special creative projects (plays or films on biological themes). Projects may be carried out individually or in teams. Prerequisite: BIO 101.

Spring, 2 credits

BIO 107 Laboratory in General Biology

Laboratory course in general biology which will explore a wide spectrum of biological phenomena including morphology, genetics, physiology, and animal behavior. Individual and group projects will be integrated into the laboratories. Course includes three hours of lab and one hour of discussion per week. Prerequisite or corequisite: BIO 101 or 150 or 171.

Fall, 2 credits

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.

Fall, 3 credits

BIO 150 Core I: Biology of Plants and Animals

An introduction to the diversity of plants and animals, their genetics, interrelationships, ecological distributions, and evolution.

Spring, 3 credits

BIO 151 Core II: Cell Biology and Chemistry

The cell is studied as the unit of structure, biochemical activity, genetic control, and differentiation. The principles of biochemistry and genetics are applied to an understanding of nutrition, growth, and development.

Prerequisites: BIO 150; CHE 101, 102.

Corequisite: CHE 201.

Fall, 3 credits

BIO 152 Core III: Adaptation and Evolution

Studies of adaptation in organisms, including physiological, behavioral, ecological, and evolutionary aspects. Comparative studies on organ physiology of plants and animals lead to discussions of behavior, community ecology, population ecology, and evolutionary mechanisms.

Prerequisites: BIO 150, 151 and completion of the divisional mathematics requirement.

Spring, 3 credits

BIO 155 General Ecology

(Formerly BIO 113)

Designed to provide a sense of the problems of modern ecology. 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. Open to majors and non-majors.

Fall, 3 credits

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.

Fall, 3 credits

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 150, 151.

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 151.

Spring, 2 credits

BIO 171 General Zoology

An extensive coverage of classical general zoology. The comparative embryology, morphology, physiology, and ecology of animals will be studied from the phylum to the class

level. The last part of the course will be devoted to a consideration of animal genetics. BIO 171 is not a prerequisite to BIO 172 and either may be taken separately. Three hours of lecture per week. Open to majors and non-majors.

Fall, 3 credits

BIO 172 General Botany

An extensive coverage of classical general botany. The comparative embryology (where it exists), morphology, physiology, and ecology of plants will be studied from the division to the class level. The last part of the course will be devoted to a consideration of plant genetics. BIO 172 is not a continuation of BIO 171 and either may be taken separately. Three hours of lecture per week. Open to majors and non-majors.

Spring, 3 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 150, 151, 152.

Prerequisite or corequisite: PHY 131 or PHY 101.

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

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aid of relevant literature, in written reports and discussions.

Prerequisite: BIO 201 or permission of instructor.

Spring, 2 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.

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 171 or permission of instructor.

Fall, 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 172 or permission of instructor.

Fall, 3 credits. Not offered 1971-72.

BIO 293, 294 Special Topics from the Biological Literature

Tutorial reading in the biological sciences. Periodic conferences, final report and examinations arranged with the 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 have permission of the division.

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 agreement of the staff member who will supervise the work and permission of the division.

Fall and Spring, 2 to 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. Not applicable for major credit in biological sciences.

Prerequisite: Attainment of senior status as biology major or permission of instructor.

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 physi-

ology of animal organ systems. Three hours of lectures or discussions per week.

Prerequisite: BIO 201.

Spring, 3 credits

BIO 303 Invertebrate Zoology

(Formerly BIO 237)

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, metamerism 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 171 or permission of instructor.

Fall, 4 credits

BIO 304 Chordate Zoology

(Formerly BIO 238)

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 171 or permission of instructor.

Spring, 4 credits

BIO 305 Statistics for Biologists

(Formerly BIO 231)

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.

Prerequisite: Completion of one of the required math options.

Fall, 3 credits

BIO 306 Marine Invertebrates

The natural history, functional and comparative morphology, classification, and phylogeny of selected marine invertebrates, with an emphasis on benthic groups. The laboratory includes individual projects and study of the local fauna.

Prerequisite: BIO 303.

Summer, 4 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 150, 151, 152.

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: BIO 150, 151, 152 and completion of divisional mathematics requirements.

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.

Prerequisite: BIO 151.

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 150, 151, 152.

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.

Spring, 3 credits. Not offered 1971-72.

BIO 321 Microbiology

An introduction to the study of microorganisms by consideration of the taxonomy, development, structure, physiology, reproduction, and ecology of the simple algal forms, protozoa, fungi, and bacteria. Three hours of lectures or discussions per week.

Prerequisites: BIO 150, 151, 152 and CHE 201, 202; or permission of instructor.

Spring, 3 credits

BIO 323 Microbiology Laboratory

A laboratory designed to acquaint the student with the techniques of culturing and experimenting with algae, protozoa, fungi, and bacteria. Two three-hour laboratories per week.

Prerequisite or corequisite: BIO 321 or permission of instructor.

Spring, 2 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 304.

Spring, 2 credits

BIO 332 Field Ornithology

A series of half- and full-day field trips to provide experience with field techniques for estimating distribution, movement, and abundance of populations; familiarity with selected aspects of breeding and social behavior; and the ability to identify much of the avifauna of Eastern North America.

Prerequisite or corequisite: BIO 330.

Spring, 2 credits

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 150, 151, 152.

Fall, 1 credit. Not offered 1971-72.

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 304.

Spring, 2 credits

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 303.

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. This course is identical with MAR 512 but is open to qualified undergraduates. BIO 303 or 304 is recommended.

Prerequisite: Completion of divisional mathematics requirement.

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.

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.

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 150, 151, 152 and CHE 201.

Spring, 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.

Spring, 4 credits. Not offered 1971-72.

BIO 361 Biochemistry

A survey of the structure of the major chemical constituents of the cell including carbohydrates, 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.

Fall, 4 credits

BIO 371 The Species in Ecology and Evolution

This course will be devoted to examination of field and experimental evidence related to evolutionary and ecological theory, with particular emphasis placed on the speciation process and its ecological and zoogeographical consequences. Consideration of both theory and evidence will be given such topics as modes of selection, mating systems, the genetics of speciation, isolating mechanisms, interspecific interactions, and zoogeographic patterns.

Prerequisite: BIO 386 or permission of instructor.

Fall, 3 credits

BIO 381 Principles of Neurophysiology

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.

Fall, 3 credits

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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 152.

Spring, 3 credits

BIO 383 Evolution and Behavior

Ethology and the ecology and genetics of behavior. Emphasis will be placed on natural selection as a causative factor of behavioral response. A basic understanding of Mendelian genetics and at least freshman college mathematics is recommended.

Prerequisite: BIO 382.

Fall, 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 150, 151, 152 and CHE 201, 202; a basic knowledge of plant and animal physiology is highly recommended.

Spring, 3 credits. Not offered 1971-72.

BIO 386 Ecology

An examination of the interactions of living organisms with their physical and biological environments. Special attention is given to population dynamics and the interactions among organisms that determine the structure, function, and evolutionary development of biological communities. Evolutionary theory, physiological adaptations, and biogeography are discussed insofar as they are relevant to the organization of communities.

Prerequisites: BIO 150, 151, 152 and completion of divisional mathematics requirement.

Spring, 3 credits

BIO 388 Ecology Laboratory

Investigation of the application of general ecological principles to specific populations and communities. Laboratory experiments and field observations will be offered in an effort to understand ecological processes in local biotic communities.

Prerequisite or corequisite: BIO 386.

Spring, 2 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.

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.

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 and permission of division.

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

Associate Professor: HOWIE

Assistant Professors: BETHUNE, ROBINSON, WASSWAS

Lecturer: PARRIS

Students who are majors in the interdisciplinary program in black studies (BLS) will have to demonstrate competence in one of the traditional academic fields. Black studies aims to provide students with the necessary analytical framework for their authentic survival and human development in contemporary Pax Americana. Black studies aims to arm rhetoric with analysis, emotion with reason, action with discipline. Special attention will be devoted to the problems of socialization, social stability, political development and comparative ethnography.

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:

At least ten semester courses chosen from the black studies curriculum, six units of which must constitute independent study 30 credits

COURSES IN BLACK STUDIES

BLS 100, 101 The Black Experience in Transatlantic Perspectives I, II

An historical assessment of the experience and conditions of peoples of African descent in the perspective of time. The course will concentrate on the theme of Black Diaspora. It will attempt to examine and describe the similarities and the differences among the life styles of black peoples in Africa, the Caribbean, and America, with particular emphasis on the United States. This course is required of all potential black studies majors.

Fall and Spring, 3 credits each semester

BLS 102 Socio-Cultural Features and Expressions of the Afro-American Experience, Part I

(Formerly BLS 254)

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.

Fall, 3 credits

BLS 104, 105 Elementary Kiswahili I, II

An introduction to spoken and written Kiswahili, stressing pronunciation, speaking, comprehension, reading and writing. Selected readings from contemporary texts will be included. Practice in the language laboratory supplements class work.

Fall and Spring, 3 credits each semester

BLS 190, 191 Intermediate Kiswahili

An intermediate course in the reading and discussion of selected Swahili texts. An intensive grammar review with practical language laboratory exercises will offer an opportunity to develop conversational ability.

Prerequisite: BLS 105.

Fall and Spring, 3 credits each semester

BLS 200, 201 American Attitudes Toward Race I, II

An historical examination of the growth and development of racism in America. It will focus on the writings of non-black Americans as they have attempted to explain their views of blacks. The course will concentrate on primary materials, using secondary sources only when they shed particularly useful light on social conditions underlying attitudes during a given era.

Prerequisites: Two semesters of introductory BLS courses.

Fall and Spring, 3 credits each semester

BLS 211 Comparative African Religions

A general 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 behavior and the basic religious beliefs of more complex African societies will be discussed.

Prerequisites: BLS 100, 101 and/or 102.

Spring, 3 credits

BLS 230, 231 Pan-African Literature I, II

An examination of the cultural themes of Pan-Africanism and Negritude, drawing on a selection of writers from the U.S., Africa, and the Caribbean. The course will treat

the development, diffusion, and significance of these themes; it will involve intensive consideration of selected literary works of African and Afro-American expression.

Prerequisites: Two semesters of BLS courses chosen from BLS 100, 101, 259.

Fall and Spring, 3 credits each semester

BLS 240, 241 Political History of East Africa I, II

A general survey of the cultural and political history of East Africa, emphasizing Tanzanian, Ugandan, and Kenyan experiences.

Prerequisites: Two semesters of introductory BLS courses.

Fall and Spring, 3 credits each semester

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.

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.

Fall, 3 credits. Not offered 1971-72.

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.

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 102 or permission of the instructor.

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 391.)

Prerequisite: MUS 122 or permission of instructor.

Spring, 3 credits. Not offered 1971-72.

BLS 261 Seminar in Afro-American Anthropology

A research-oriented seminar principally concerned with an examination and re-evaluation of theories and concepts of culture

germane to the Afro-American experience. Open to qualified non-majors.

Prerequisites: Junior or senior standing and permission of instructor.

Spring, 3 credits

BLS 263 Political Analysis of Pan-Africanism

This course is designed to develop a generalized (and in some instances a specialized) understanding of the politics of Pan-Africanism both on the continent of Africa as well as among peoples of African ancestry. However, special emphasis will be on the continent of Africa itself.

Prerequisites: BLS 258, or a course in international relations, international economics, comparative government or BLS 230, 231.

Fall and Spring, 3 credits

BLS 272, 273 Contemporary Political Thought and the Black Community in the U.S.A.

A critical analysis of the major architects of black political consciousness and their movements in the context of their distinctive historical development. Emphasis will be upon the intellectual and ideological ferment of the 1920's (DuBois, Randolph, Garvey, *et al.*) and the 1960's (King, Muhammad, Malcolm, Karenga, Jones, Fanon, Black Panther Party, etc.). Primary materials and documents will be used exclusively.

Prerequisites: Two semesters of introductory BLS courses and/or two semesters chosen from BLS 230, 231, 255.

Fall and Spring, 3 credits each semester

BLS 274, 275 Political Psychology and Social Pathogenesis

A research-oriented seminar focusing on the psycho-dynamics of obedience, social control, racism, power and powerlessness, and genocide. After a firm grounding in analytical frameworks for investigating these contemporary and historical political phenomena, the seminar will emphasize their application to the pathologies of everyday life. Students will be required to submit original research designs in order to test specific hypotheses which emerge from seminar discussion.

Prerequisites: Two semesters of introductory BLS courses and permission of instructor.

Fall and Spring, 3 credits each semester

**BLS 279 Seminar in Classical Islamic
Cosmology**

A critical examination of classical Islamic cosmology with a focus on the evolution of political thought. The seminar will investigate the validity of the classical Islamic world view for many of the problems of contemporary technocratic society.

Prerequisites: Two semesters of introductory courses in philosophy, religious studies or political thought, or permission of instructor.
Spring, 3 credits

**BLS 280 Political Education, Social
Stability and Ecopolitical Change**

An analytical investigation of political, social, institutional stability and social change. Prerequisites: Two semesters of upper level courses in the social sciences.

Fall and Spring, 3 credits

**BLS 290 Legal Process and Social
Structure**

A critical evaluation of the administration of justice, legal institutions, and the legal process in relation to prevailing social structure.

Prerequisite: Two semesters of introductory courses in the social sciences.

Fall and Spring, 3 credits

BLS 299 Readings in Black Studies

Prerequisite: Permission of department.

Variable 1 to 3 credits

BLS 399 Research in Black Studies

Prerequisite: Permission of department.

Variable 1 to 3 credits

DEPARTMENT OF CHEMISTRY

Professors: ALEXANDER (*Chairman*), BONNER, B. CHU, FRIEDMAN, HAIM, HIROTA, KOSOWER, LAUTERBUR, LE NOBLE, Y. OKAYA, PORTER, RAMIREZ, SUJISHI

Associate Professors: GOLDFARB, SCHNEIDER, WEISER, WHITTEN, WISHNIA

Assistant Professors: F. FOWLER, D. HANSON, JESAITIS, P. JOHNSON, KERBER, KRANTZ, KWEI, LLOYD, MUROV, S. SCHWARTZ, SPRINGER, STIEFEL

Director of Chemical Laboratories and Lecturer: CROFT

Coordinator of General Chemistry Laboratories and Lecturer: 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 allows more flexibility in the choice of electives. It 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. It can also accommodate students who wish to obtain a strong undergraduate background in another science or mathematics while earning a degree in 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, 154 Physical Chemistry I, 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. MSM 121, 122, 151, 152 Calculus I, II, III, IV (formerly MAT 102, 103, 155, 156)
The sequence MSM 191-194 may be substituted (formerly MAT 193-196 sequence).
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 Reading 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 Organic Chemistry Laboratory or CHE 257 Instrumental Methods of Physical Chemistry or CHE 258 Molecular Structure and Spectroscopy Laboratory
- CHE 305 Inorganic Chemistry I

B. Courses in related fields

1. MSM 121, 122, 151 Calculus I, II, III (formerly MAT 102, 103, 155)
The sequence MSM 191-193 may be substituted (formerly MAT 193-195 sequence).
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 effec-

tive participation in subsequent departmental courses. Admission by permission of the chairman of the Department of Chemistry.

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 MSM 121 and 122 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.

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, MSM 121.

Prerequisites to CHE 104: CHE 103, 109, MSM 121.

Corequisites to CHE 104: CHE 110, MSM 122.

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.

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.

Fall and Spring, 1 credit each semester

CHE 122 Concepts in Chemistry

Provides a basic knowledge of the concepts of bonding and reactivity that underlie modern inorganic and organic chemistry. Where possible, illustrations of these concepts are made with examples of chemical systems that relate to the environment and to plant and animal physiology. This course satisfies the chemistry requirement for students in the health sciences and is recommended to other students who desire more than a

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cursory knowledge of chemistry. A high school background in chemistry is helpful, but not required. Three lecture hours per week.

Spring, 3 credits

CHE 153 Physical Chemistry I

Introduction to rate laws, mechanisms, and transition state theory of chemical kinetics. Equations of state for ideal gases, real gases, liquids, and solids. Basic concepts of thermodynamics: state variables, the laws of thermodynamics, energy, entropy, free energy functions, and conditions of equilibrium. Application to processes in gases, to chemical reactions, to phase equilibria, to ideal and real solutions, and to electrochemical systems. Three lecture hours per week.

Prerequisite: CHE 102 or 104.

Corequisites: MSM 122 and PHY 101 or 131.

Fall, 3 credits

CHE 154 Physical Chemistry II

Classical kinetic theory of gases; introduction to the quantum theory and statistical mechanics of internal molecular motion; spectroscopic determination of equilibrium constants; interaction of molecules with static electromagnetic fields; ionic bonding; introduction to transport phenomena; electrical conductivity and electrochemistry; introduction to molecular theories of chemical kinetics. Three lecture hours per week.

Prerequisite: CHE 153.

Corequisites: MSM 151 and PHY 102 or 132.

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.

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.

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.

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.

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.

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 thermo-

dynamics. 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.

Fall and Spring, 3 credits each semester

CHE 230 Chemistry in Technology and the Environment

Use of chemical principles in understanding processes that occur in the modern technological world and in the natural environment. Certain ecological problems of a chemical nature are analyzed. Methods of controlling these problems are discussed. Two lecture hours per week.

Prerequisite: CHE 102 or 104.

Spring, 2 credits

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 132 or equivalent.

3 credits

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, MSM 151.

Corequisite: PHY 151 or 241.

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, MSM 152.

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.

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.

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.

Spring, 3 credits

CHE 306 Inorganic Chemistry II

A continuation of CHE 305. Three lecture hours per week.

Prerequisite: CHE 305.

Fall, 3 credits

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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.

Spring, 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.

Fall, 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, acceptance as a research student by a member of

the departmental staff, and permission of department.

Corequisite: CHE 305.

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 department.

Fall and Spring, 1 to 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

Assistant Professor: S. M. HU

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

CHI 221, 222 Advanced Chinese

An advanced course in Chinese Mandarin to increase comprehension and writing ability. Selected reading materials include newspapers, contemporary Chinese literature, and other samples of different writing styles.

Prerequisites: CHI 151, 152 or permission of instructor.

Fall and Spring, 3 credits each semester

COURSES IN CLASSICS AND CLASSICAL LANGUAGES

Professor: HATHORN

Assistant Professor: GODFREY

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.

Fall, 3 credits

CLS 113 Survey of Greek Literature in Translation

A study of the development of classical Greek literature from the beginnings to the decline of the Roman Empire; extensive reading of the Greek classics in English translation.

Fall, 3 credits

CLS 114 Survey of Latin Literature in Translation

A study of the development of classical Latin literature from the beginnings to the decline of the Roman Empire; extensive reading of the Latin classics in English translation.

Spring, 3 credits

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.

Fall and Spring, 3 credits

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.

Fall, 3 credits

CLS 214 Classical Rhetoric and Literary Criticism

A study of the works of Aristotle, Horace, Longinus, and the minor rhetoricians in rhetoric and literary criticism; and of their influence in the rhetorical and literary theory and practice of the Middle Ages, Renaissance, and Neo-Classical Period.

Spring, 3 credits

CLS 350 Greek Life and Thought

An inquiry into the social, political, and psychodynamic relations of Greek thought in its development from Homer to Aristotle. While the historical conditions of this development and the social correlates of ancient Greek creativity are carefully explored, the selected texts are studied in their conceptual relations to each other and as intellectual and expressive human constructions. This course is identical with PHI 202.

Fall, 3 credits

Greek

GRK 111, 112 Elementary Greek

An introduction to the Greek language, including the study of grammar, with reading and writing.

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.

Fall and Spring, 3 credits each semester

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.

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.

Spring, 3 credits

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, Virgil and Livy.

Prerequisite: Three years of high school Latin or the equivalent.

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.

Fall, 3 credits

LAT 154 Literature of the Roman Empire

Selected works of Virgil, 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.

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.

Fall, 3 credits

LAT 156 Renaissance Latin

Translation and discussion of selected Latin works from the Age of Dante to the present, with a survey of Renaissance and Neo-Latin writings.

Prerequisite: Three years of high school Latin or the equivalent.

Spring, 3 credits

INTERDISCIPLINARY PROGRAM IN COMPARATIVE LITERATURE

Chairman: AWOONOR

Assistant Chairman: BENNETT

The 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.

Because additional courses and other revisions are currently under consideration, students should consult the program chairman for details.

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:

	<i>Credits</i>
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 Dis- ciplines	6
II. Tutorial Study	
CLT 201, 202, 301, 302 Tutorials in Comparative Literature, to be taken during two academic years under direct super- vision 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 <i>one</i> 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.	
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COURSES IN COMPARATIVE LITERATURE

CLT 100 Introduction to Comparative Literature

(Formerly GER 338)

This course will introduce the student to an understanding of what comparative literature means and what it involves.

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.

CLT 150 Esthetics and the Black Experience

Details to be announced.

* In certain cases competence may be demonstrated by examination.

DEPARTMENT OF EARTH AND SPACE SCIENCES

Professors: CARTER, ^bH. CHIU, LINDSLEY (*Coordinator, Solid Earth Studies*), A. PALMER, ^aSCHAEFFER (*Chairman*), ^cSTROMGREN

Associate Professors: BENICE, BRETSKY (*Coordinator, Environmental Paleobiology*), ^aDODD, GROSS, G. HANSON, HARDORP, OWEN, PAPIKE, PREWITT, SHU, STROM (*Coordinator, Astronomy and Astrophysics*)

Assistant Professors: GEBEL, GEBELEIN, KNACKE, LEVINTON, M. SIMON

Lecturer and Curator: 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.

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, environmental paleobiology, and marine sciences. Specific recommended course sequences can be obtained from the departmental office.

^a On leave academic year 1971-72.

^b NASA/Goddard Space Studies Institute, part-time at Stony Brook.

^c Distinguished Professor of Astronomy, Royal Danish Observatory, Copenhagen, adjunct at Stony Brook.

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:

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 beyond first-year calculus. At least one year each of chemistry, physics, and mathematics are a minimum requirement. (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

The department offers a B.A. program for those students who plan to use a broad, strong undergraduate science background in post-graduate fields such as teaching, journalism, science administration, library work, or law.

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

A. Study within the area of the major

At least 28 credits of courses in the ESS department, including a minimum of one course from each sub-area below and no more than a total of four 100-level lecture courses.

1. Astronomy

ESS 101 Revolutions in Astronomy

ESS 242, 244 Astronomy: The Observational Approach I, II

ESS 248 Intelligent Life in the Universe

2. Earth Sciences

ESS 102 The Earth and the Moon (with ESS 112 Physical Geology Laboratory)

ESS 106 The Ages Before Man (with ESS 116 Historical Geology Laboratory)

- ESS 201 Mineralogy
- ESS 202 Environmental Geology
- ESS 211 Life and Time
- 3. Marine and Atmospheric Sciences
 - ESS 103 The Atmosphere
 - ESS 104 Oceanography
 - ESS 325 Marine Geochemistry
 - ESS 364 Marine Geology

B. Courses in related fields

One year of study in three of the following: mathematics, chemistry, physics, or biology

Earth Science Teacher Preparation

The department offers a program leading to provisional certification in earth science teaching, grades 7-12. Only students who complete this program and who have at least a 2.5 grade point average at the end of their junior year can be admitted to student teaching.

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 grade point average 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 Revolutions 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. Three one-hour lectures and one one-hour recitation per week.

Fall, 4 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 and four one-hour recitation sessions per semester.

Corequisite: For ESS majors, ESS 112.

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.

Corequisite: For ESS majors, ESS 116.

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 114 Oceanography Laboratory

Simple experiments designed to introduce the student to the techniques of analysis of temperature, salinity, fluid motion, productivity and other parameters of the marine environment. One three-hour laboratory per week.

Corequisite: ESS 104.

Spring, 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 biology, chemistry, physics, and/or mathematics at the university level.

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, 4 credits

ESS 202 Environmental Geology

(Formerly ESS 302)

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 211 Life and Time

Principles and methods in the study of the history of life. The origin of life, premetazoan evolution, principles of evolution illustrated by extinct biotas, analysis of diversity and community structure, morphology and autecology of extinct species, paleobiogeography and dating are considered. Two lectures and one three-hour laboratory session per week.

Prerequisite: ESS 106.

Corequisite: For ESS majors in environmental paleobiology B.S. sequence: BIO 303.

Fall, 3 credits

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

The course emphasizes techniques for the preparation of rocks, fossils, and minerals, especially those from field trips made in the New York, Connecticut and New Jersey area. Field collection, identification, laboratory preparation and classroom display and usage are emphasized. Instruction in the use of classroom equipment and general laboratory equipment is also covered. One three-hour laboratory-lecture per week and four field trips per semester.

Prerequisites: ESS 102 and junior or senior standing.

Fall, 3 credits

ESS 240 Observational Methods and Curriculum Development in Earth Science Education

Sequel to ESS 239, with emphasis placed on recent secondary school curricula, and development of technical aids (i.e., displays, audio-visual materials for the classroom) as they relate to instruction in earth sciences. Two one-hour seminars a week and 3 to 6 all-day observation sessions in elementary, junior, and senior high school classrooms.

Prerequisites: ESS 239 and permission of instructor.

Spring, 3 credits

ESS 242, 244 Astronomy: The Observational Approach I, II

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 H I gas, and star formation. The use of physical principles to interpret the observations is emphasized.

Prerequisites: PHY 102, MSM 122.

Fall and Spring, 3 credits each semester

ESS 243, 245 Undergraduate Research in Astronomy

Student participation in faculty-directed research projects in the areas of theoretical and observational astronomy. Topics may include abundance analysis in stars; instrument design and construction; ionization balance in the interstellar medium.

Prerequisite: Permission of instructor.

Corequisites: ESS 242, 244.

Fall and Spring, 1 credit each semester

ESS 248 Intelligent Life in the Universe (Formerly ESS 348)

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, MSM 121, 122.

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 and X-Ray Mineralogy

Development of methods for the identification of rock-forming minerals using the petrographic microscope and X-ray techniques. Two one-hour lectures and two three-hour laboratory sessions per week.

Prerequisite: ESS 201.

Corequisite: ESS 306.

Spring, 4 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 307 Petrology Laboratory

Study of igneous and metamorphic rocks in thin-section, with emphasis on the application of mineral and textural relations to their genesis. One three-hour laboratory per week.

Corequisites: ESS 301, 306.

Spring, 1 credit

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

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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.

Fall, 4 credits

ESS 312 Stratigraphy

Problems of correlation, facies analysis, graphic representation, stratigraphic nomenclature and paleogeography are analysed using the geology of western United States as a framework. In the last third of the semester, students prepare either written or oral critical reviews of selected modern stratigraphic studies in terms of the principles learned earlier in the semester. Two one-and-one-half hour lectures per week and one weekend field trip.

Prerequisite: ESS 363.

Spring, 3 credits

ESS 317 Marine Ecology

A survey of biotic responses to ecological challenges in different marine realms. Controls of diversity and trophic structure in the marine ecosystem, historical aspects of marine realms, productivity in the oceans, plankton, soft-bottom communities, intertidal habitats, coral reefs, deep sea environments and effects of pollution in the ocean will be discussed. Three one-hour lectures per week.

Prerequisite: Any one of the following: BIO 150, 155, 303 or ESS 211.

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.

Fall, 3 credits

ESS 326 Mineral Equilibria

After a brief introduction, carbonate systems, oxidation potential and pH relations, com-

plex ions and applications to geological processes are discussed. Two one-hour lectures and one four-hour laboratory per week.

Prerequisite: CHE 153.

Spring, 3 credits

ESS 328 Instrumental Methods in Geochemistry

A course of study to familiarize students with the methods used in studying geochemical systems. Students work alone or in pairs, under the close supervision of a faculty member, on a project chosen by the student and the faculty member. Projects will include fission tracks, gamma counting, alpha counting, rare gas mass spectrometry, marine chemistry with ion electrodes and X-ray fluorescence.

Prerequisites: CHE 154 and permission of instructor.

Corequisite: ESS 326.

Spring, 3 credits

ESS 331 X-Ray Mineralogy

Principles of symmetry, single-crystal 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 application of crystallographic techniques to problems in mineral chemistry. Concepts of the crystalline state, order-disorder, atom radii, chemical bonding, atom coordination, solid solutions, and physical properties of minerals. Emphasis on silicate and sulfide crystal structures. Two lectures and one three-hour laboratory per week.

Prerequisite: ESS 331.

Spring, 3 credits

ESS 343, 344 Laboratory Courses 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 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: MSM 152, PHY 152.

Fall, 3 credits

ESS 350 Global Tectonics

The displacement of continents in time and space; mechanisms of sea floor spreading; origin of first order structures on continents and in ocean basins.

Prerequisite: ESS 309.

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 301.

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.

Spring, 3 credits. Not offered 1971-72.

ESS 381 Astrophysical Processes I

(Formerly ESS 341)

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 382 Astrophysical Processes II

(Formerly ESS 342)

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 381.

Spring, 3 credits

ESS 383 Physics of the Interstellar Medium

(Formerly ESS 345)

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 II regions, planetary nebulae and globules will be discussed. Three one-hour lectures per week.

Prerequisite: ESS 381.

Spring, 3 credits

ESS 384 Galactic Structure

(Formerly ESS 346)

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.

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. Prerequisite: Permission of the department.

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: E. AMES (*Chairman*), HOFFMANN, LEKACHMAN, NEUBERGER, STEKLER

Associate Professors: JAMES, KALMAN, KANOVSKY, KRISTEIN, ^aSTALEY, VAN ROY, ZSCHOCK

Assistant Professors: DAWES, DUSANSKY, L. S. MILLER, NORDELL, SAKBANI, SCHOEPFLE, WICHERS, ZWEIG

Lecturers: NIENHAUS, SATTINGER

^a On leave fall semester 1971.

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 MSM 121, 123 and 151, or MSM 121, 122, 151, 152. The first sequence is adapted to the needs of social sciences, whereas 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. Advanced courses in mathematical economics, probability and statistics are offered by the Applied Mathematics and Statistics Department.

Requirements for the Major in Economics

In addition to the general university requirements for the Bachelor of Arts de-

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gree, the following courses are required for the major in economics:

A total of 30 credit hours in courses in economics, consisting of not more than 10 credit hours of 100-level courses and including:

- ECO 100 Introduction to Economics
- ECO 211 or 215 Intermediate Microeconomic Theory
- ECO 212 or 216 Intermediate Macroeconomic Theory

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 in Economics

The honors program in economics consists of a three-semester sequence of seminar courses, ECO 396, 397 and 398, beginning in the second semester of the junior year.

Students in the junior honors seminar will be expected to consider problems of economic theory and policy in a seminar setting, under the supervision of the instructor and each other. Intensive work to develop writing skills and critical ability will be stressed through the preparation of many short papers. These papers will be carefully evaluated by the instructor and other students.

In the senior honors seminar the student will be responsible for preparing a major paper of scholarly article length and quality. This will be the senior honors thesis. The identification of manageable topics, preparation of research designs and regular progress reports will be the work of students in the senior honors seminar. Students will be expected to enroll simultaneously for inde-

pendent study (ECO 393 or 394) with the faculty member in the Economics Department, who will supervise the detailed work of the senior honors thesis. The independent study proposal will be evaluated by the economics faculty directly involved with the honors program as well as by the individual faculty sponsor.

Eligibility. A student will be admitted into ECO 396 Junior Honors Seminar if he has successfully completed ECO 100, 211 or 215, and 212 or 216.

A student will be admitted into the year-long ECO 397, 398 Senior Honors Seminar on the recommendation of the members of the undergraduate program committee and seminar instructors. In exceptional cases, a student with appropriate prerequisites may be admitted to ECO 397, 398 on the basis of non-honors course work and examples of prior written work without having taken ECO 396.

Graduation with honors will be upon the recommendation of the undergraduate program committee and seminar instructors. To graduate with honors, a student must have a grade point average of 3.3 or better in all economics courses including honors seminars and must complete an acceptable honors thesis.

Application. The student should indicate to the undergraduate program committee his intention to enroll in the honors program before the beginning of the semester in which he will enter the program, indicating the preliminary area of his research and the faculty member who has agreed to supervise his honors thesis.

Administration. This program will be supervised by the undergraduate program committee 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.

Fall and Spring, 4 credits

ECO 103 Economic Problems of the Environment

An analysis of the environmental problems associated with economic growth and development such as pollution and conservation and the economic means of affecting these problems.

Fall, 3 credits

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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.

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.

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.

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.

Fall, 3 credits

ECO 211 Intermediate Microeconomic Theory

Economic theory of cost, demand, price, and markets. The application of theory to famil-

iar problems is emphasized.

Prerequisite: ECO 100 or permission of instructor.

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.

Fall and Spring, 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; MSM 121, 151 and either 123 or both 122 and 152; or permission of instructor.

Fall, 3 credits

ECO 216 Intermediate Mathematical Macroeconomic Theory

Same as ECO 212, but developed in mathematical terms.

Prerequisites: ECO 100; MSM 121, 151 and either 123 or both 122 and 152; or permission of instructor.

Spring, 3 credits

ECO 223 Logical Foundations of Quantitative Economics

An inquiry into the logical and semantic problems of quantitative economics with special 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.

Spring, 3 credits

ECO 233 Economics of American Industry

The application and the extension of the theory of the firm to actual firms and industries, emphasizing problems which might call for various sorts of regulation of firms. Topics covered include market concentration, applications of the theories of monopoly and oligopoly, mergers, price discrimination, product variation, advertising, public utility pricing, with illustrations from specific industries.

Prerequisite: ECO 211 or 215 or permission of instructor.

Fall, 3 credits

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.

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.

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 284 Topics in Area Studies

One or more sections of this course will be offered each semester, depending on student and faculty interest, to explore economic characteristics of major world areas, such as China, Southeast Asia, Latin America, the Middle East, the Soviet Union, Eastern Europe, etc.

Section 1: The Economy of Communist China

Section 2: Economic Development of Latin America

Section 3: Economic Development in Southeast Asia

Section 4: Economic Development in the Middle East

Section 5: Soviet and Eastern European Economics

Other sections may be offered at the discretion of the department.

Prerequisite: ECO 100 or permission of instructor.

3 credits, course repeatable for different sections

ECO 300 Monetary Theory and Policy

The influence of the quantity of money in the economic systems and policies employed

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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.

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.

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.

Prerequisite: ECO 211 or 215 or permission of instructor.

Fall, 3 credits

ECO 304 Managerial Economics

Theoretical and empirical analyses of the behavior of business firms. Decision-making under certainty and uncertainty; conflicts between owners and managers; cost curves and pricing policies of the multi-product, multi-plant firm.

Prerequisite: ECO 211 or 215 or permission of instructor.

Spring, 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.

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.

Fall, 3 credits

ECO 314 International Economic Theory

An intensive study of the theory of international trade and finance, emphasizing comparative 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.

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: MSM 151, ECO 216 or permission of instructor.

Spring, 3 credits

ECO 320 Mathematical Statistics

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 dis-

tributions; point and interval estimation. Regular problem sets and occasional projects are required.

Prerequisites: ECO 100; MSM 121 or 123; or permission of instructor.

Note: This course will not be offered by the economics department in the year 1971-72. Students interested in this material should enroll in MSA 251 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.

Fall, 4 credits

ECO 321 Econometrics

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 economic issues and the interpretation of various econometric studies.

Prerequisites: ECO 320, or MSA 251, 252; and MSM 151.

Spring, 4 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.

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.

Spring, 3 credits

ECO 331 Mathematical Economics I

Application of set theory, metric spaces and topology to the theory of consumer choice, utility and production; neo-classical demand and production theory; revealed preference and integrability; input-output models. The notions of set theory, metric spaces and topology will be developed as needed.

Prerequisites: MSM 152 and 201.

Fall, 3 credits

ECO 332 Mathematical Economics II

Convex sets, functions, cones and fixed point theorems and their application to economic theory; general equilibrium theory; concepts of N-person games applied to the core; Lyapunov stability in economics.

Prerequisite: ECO 331 or permission of instructor.

Spring, 3 credits

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.

Prerequisite: MSM 151 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 and MSM 151.

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

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general theories of the state. A limited treatment of United States economic history is included.

Prerequisite: ECO 211 or 215 or permission of instructor.

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.

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.

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.

Spring, 3 credits

ECO 351 Programming and Economic Models

A study of linear and non-linear programming models, presenting some major topics in economic theory and their conclusions in programming terms. Topics include production and cost theory, input-output, activity analysis and game-theoretic models.

Prerequisites: ECO 211 or 215 and MSM 151.

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; MSM 121, 151 and either 123 or both 122 and 152; or permission of instructor.

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.

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.

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.

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 359 or 361 or 362 or permission of instructor.

Fall and Spring, 3 credits each semester

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 quantitative 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.

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: Permission of department.

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: Permission of department.

Credit variable, course repeatable

ECO 396 Junior Honors Seminar

Students will consider problems of economic theory and policy in a seminar setting. Intensive work to develop writing skills and critical ability will be stressed through the preparation of many short papers.

Prerequisites: ECO 100; 211 or 215; and 212 or 216.

Spring, 3 credits

ECO 397, 398 Senior Honors Seminar

The student will be responsible for preparing a major paper of scholarly article length and quality, the senior honors thesis. The identification of manageable topics, preparation of research designs and regular progress reports will be the work of students in the seminar. Each student will be expected to enroll simultaneously for ECO 393, 394 Independent Study with a faculty member in the Economics Department who will supervise the detailed work of the honors thesis.

Prerequisite: Permission of the department.

Fall and Spring, 3 credits each semester

DEPARTMENT OF EDUCATION

Professors: GARDNER, PETERS, STOLUROW

Associate Professors: BIRNS, BLOOM, CARTON, SEIFMAN

Assistant Professors: BASKIN, HEDLEY, HU, McMULLEN, ROTH, WALKER

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 103 Human Development

An examination of the factors affecting human growth and development from conception through the life cycle. Different theoretical approaches, research findings and their implications for schools and teaching will be emphasized.

Fall, 3 credits

EDU 150 Children's Literature

An interpretive and critical study of literature for children in elementary grades.

Fall and Spring, 3 credits. Not offered 1971-72.

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.

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.

Fall and Spring, 3 credits

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 department.

Fall and Spring, 1 to 3 credits

EDU 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 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.

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.

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.

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 non-test evaluation techniques and procedures, and in the use and interpretation of common standardized achievement tests.

Prerequisite: Permission of instructor.

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.

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.

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, micro-teaching, workshops, field trips, and demonstration lessons. Course registration is restricted to students planning to enroll in EDU 352.

Prerequisites: Junior standing and approval of the director of teacher preparation.

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

* 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.

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.

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.

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.

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.

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.

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.

Fall and Spring, 4 credits

EDU 397 Teaching Social Studies

A study of social studies as a subject taught in the secondary schools: the nature of the social studies; curricula models; scope and sequence of topics offered; new programs of social studies instruction, etc. Designed for prospective teachers of social studies in secondary schools.

Prerequisite: A minimum of five social science courses beyond the introductory level.

Fall, 3 credits

EDU 398 Social Studies Teaching Strategies

An examination of the instructional methods and materials for teaching social studies at the secondary school level. Designed for prospective teachers of social studies in secondary schools.

120 EDUCATION / ELEMENTARY EDUCATION

Prerequisite: A minimum of five social science courses beyond the introductory level.
Spring, 3 credits

EDU 399 Independent Research in Education

Individually supervised research in the field of education. The student prepares a pro-

gram 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 department.

Fall and Spring, 1 to 3 credits

INTERDISCIPLINARY PROGRAM IN ELEMENTARY EDUCATION

Program Chairman: 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, 155 are recommended.) | 3-4 |
| ✓ 2. One semester course in the physical sciences, i.e., chemistry, earth and space sciences, and physics (PHY 121 is especially recommended.) | 3-4 |
| ✓ 3. Two semester courses in mathematics which form a sequence (MSA 101, 102 or MSM 111, 112 or MSM 121, 122) | 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, French, Italian, Hebrew, Greek and Latin, Germanic and Slavic or Hispanic), music, theatre arts, and world literature	12-16
D. Linguistics	
One semester course chosen in consultation with an EED program advisor	3
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	39-48

Credits

II. Professional Study in Education

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 I.D. 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
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	36

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
Total	<hr/> 120

(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. The institution is currently considering plans for a five-year program leading to permanent certification at the elementary level. Details concerning the establishment of this program and policies of admission to practice teaching in the program will be announced separately. 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.

ELEMENTARY AND SECONDARY SCHOOL TEACHER PREPARATION FACULTY

Professor: ^aKREUTER

Associate Professor: A. LIPTON

Assistant Professors: BREDDERMAN, ^cM. F. GOLDBERG, LITTKY, T. ROTH, ^dF. SILVER

Instructors: E. GLASS, MASLINOFF

Lecturers: ANNAcone, FARAND, HAGGERTY, HARRISON, HERRON, KLEINMAN, LEDERWAY, LIPSET, R. LIPTON, MECKLOSKEY, ^bA. RAY, SACHS, J. SCHIFFER, R. SCHUMANN, L. STEPHENS, STRASSBERG, WATTERSON, WEDEMEYER

DEPARTMENT OF ENGLISH

Distinguished Professor: KAZIN

Professors: ALTIZER, DICKSON, ERDMAN, GOLDBERG, KRANIDAS, LEVIN, LUDWIG, RIBNER, *L. SIMPSON, STAMPFER, STEVENS, *J. THOMPSON, WEISINGER

Associate Professors: *ABRAMS, DOLAN (*Chairman*), FIESS, FRY, R. A. LEVINE, MARESCA, R. MILLER, NELSON, NEUMEYER, PEQUIGNEY, ROGERS, SEARS, ZIMBARDO

Assistant Professors: ANSHEN, AWOONOR, BAKER, BASHFORD, J. BENNETT, BERGSON, CARPENTER, FORTUNA, HALL, HALPERIN, HARVEY, LINDEMAN, NEWLIN, RASKIN, SCHREIBER, SHAW, WILSON

Instructors: DIBBLE, VANECH

^a Director, Office of Teacher Preparation.

^b Coordinator, Elementary School Student Teaching.

^c Coordinator, Secondary School Student Teaching.

^d Supervisor, Counseling Services of Teacher Preparation Office.

* On leave academic year 1971-72.

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:

	<i>Credits</i>
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 junior year. Prerequisites: EGL 238, 239. . .	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
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
	36
5. One year of college study of a foreign language beyond the introductory level.	

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 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.

Prerequisite: EGL 101.

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. Recommended for potential English majors.

Fall and Spring, 3 credits

EGL 105 Writing Workshop: Fiction

A workshop in the development of writing skills through practice supplemented by readings.

Prerequisite: Permission of instructor.

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.

Prerequisite: Permission of instructor.

Fall and Spring, 3 credits

EGL 107 The Exposition of Ideas: Journalism I

Training in journalistic exposition through practical application supplemented by readings.

Prerequisite: Permission of instructor.

Fall and Spring, 3 credits

EGL 108 The Exposition of Ideas: Journalism II

Advanced instruction in journalistic techniques with emphasis upon how make-up influences opinion and creates reader impact.

Prerequisite: EGL 107.

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.

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.

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.

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.

3 credits

III. INTRODUCTION TO LITERATURE

EGL 191 Introduction to 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 Introduction to 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 Introduction to 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

IV. 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 and permission of department.

Fall and Spring, 3 credits each semester

V. 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.

For each course the prerequisite is sophomore standing or permission of instructor.

EGL 200 Old English Literature

The study of English literature from its beginnings to the Middle Ages.

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.

Fall and Spring, 3 credits

EGL 204 Renaissance Literature in English

The study of English literature of the Renaissance.

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.

Fall and Spring, 3 credits

EGL 208 The Age of Dryden

The study of the English literature of the Restoration period.

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.

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.

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.

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.

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.

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.

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.

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.

Fall and Spring, 3 credits

EGL 238 Survey of British Literature

The study of British literature from the Old English period to Milton.

Fall, 3 credits

EGL 239 Survey of British Literature

The study of British literature from Dryden to the present.

Spring, 3 credits

VI. 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.

For each course the prerequisite is sophomore standing or permission of instructor.

EGL 240 Chaucer

Fall and Spring, 3 credits

EGL 241 Shakespeare

Fall and Spring, 3 credits

EGL 242 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

VII. 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.

For each course the prerequisite is sophomore standing or permission of instructor.

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

VIII. LANGUAGE AND LINGUISTICS*

EGL 280 The English Language: Introduction to Syntax

An introduction to transformational-generative grammar. Special attention will be given to the grammar of 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

EGL 282 Nonstandard 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: EGL 280/LIN 211.

Fall and Spring, 3 credits

EGL 284 Phonology

An introduction to general phonetics, both articulatory and acoustic, and to phonologi-

* For additional offerings in linguistics, see the section of this *Bulletin*, "Interdisciplinary Program in Linguistics."

cal 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

IX. 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 permission of the department.

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 and director of undergraduate studies required.

Fall and Spring, 1 to 3 credits

INTERDISCIPLINARY PROGRAM IN ENVIRONMENTAL STUDIES

Program Chairman: COLLVER

The interdisciplinary program in environmental studies (ENS) is designed to provide students with a basic understanding of man's interdependence with his environment and to prepare them to take part as informed citizens in environmental planning. The program can serve as the basic preparation for students intending to pursue professional studies in any of a variety of fields dealing with problems of the environment. In addition to taking a core sequence of courses, each student will be expected to begin developing competence in a specialty and gain some practice in applying it to environmental problems as a member of an interdisciplinary team. Courses for the specialty need not be all in one department, as long as they comprise a coherent set. The specialty requirement may be satisfied by completing a regular departmental major with an emphasis on courses relevant to environmental studies.

Requirements for the Major

While fulfilling the general university requirements for the Bachelor of Arts degree, a student majoring in this program must complete the following courses:

Credits

I. Basic Concepts and Skills

Group A. Four courses in three of the following disciplines for a minimum of 12 credits 12

BIO 150 Biology of Plants and Animals

BIO 155 General Ecology

CHE 101/105, 102/106 or 103/109, 104/110 Introductory Chemistry

ESS 102 The Earth and the Moon (ESS 112 lab optional)

ESS 103 The Atmosphere (ESS 114 lab optional)

ESS 104 Oceanography

PHY 101, 102 or 131, 132 Introductory Physics

Note: A laboratory course such as CHE 105 or ESS 112 may not be counted as one of the four required courses.

Group B. Four courses in three of the following disciplines for a minimum of 12 credits 12

ECO 103 Economic Problems of the Environment (or ECO 100 Introduction to Economics)

ECO 211 Intermediate Microeconomic Theory

PHI 303 The Surrounding World

POL 110 Power

POL 200 Political Analysis

SOC 205 Principles of Sociology (or SOC 103 Introduction to Sociology)

SOC 201 Research Methods in Sociology

Group C. Two courses in mathematics, applied statistics, or computer science, for a minimum of 6 credits. MSC 101 may not be offered toward satisfaction of this requirement 6

II. Interdisciplinary Courses 11

ENS 201 Man and His Environment

ENS 251, 252 Environmental Studies Colloquium

ENS 391, 392 Senior Project Seminar

III. Specialty Requirement 12

A minimum of four courses beyond the introductory level in a specialty to be approved by the chairman of environmental studies.

COURSES IN ENVIRONMENTAL STUDIES

ENS 201 Man and His Environment

How population growth and technological change under existing institutions affect man's environment and its capacity to sustain human life. Studies of selected environmental problems. Examination of proposed policies for achieving a balance between man and the environment.

Spring, 3 credits. For elective credit only.

ENS 251, 252 Colloquium in Environmental Studies

A weekly series of lectures and discussions dealing with the interdisciplinary approach

to environmental problems and devoted to planning for senior year projects.

Prerequisites: ENS 201 and junior standing.

Fall and Spring, 1 credit each semester

ENS 391, 392 Senior Projects Seminar

Interdisciplinary team projects devoted to analysis of environmental problems and study of policy alternatives. Includes field observations and work with local people actually concerned with the problems.

Prerequisites: Senior standing and permission of chairman.

Fall and Spring, 3 credits each semester

DEPARTMENT OF FRENCH AND ITALIAN

Professors: BIEBER, BRUGMANS, HAAC, LAIDLAW, WHITNEY

Associate Professors: ALLENTUCH, F. BROWN, MILLS, TURSI

Assistant Professors: BLUM, CAPUTO, PETREY, RIZZUTO, WILKINS

Instructors: BECKER, MIGNONE, POULIN, RIGGS, SCLAFANI, SMYLEY

At present the department offers major programs leading to the Bachelor of Arts degree in French and Italian, as well as a variety of courses of interest to non-majors. Students wishing to major in French or Italian should examine the requirements below and consult the appropriate departmental advisors for help in choosing 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:

	<i>Credits</i>
I. Required courses for a minimum total of 15 credits:	
A. Language courses	
FRN 221 Conversation and Composition	3
FRN 321 Phonetics and Diction	3
FRN 322 Stylistics	3
B. Literature courses	
FRN 295, 296 Readings in French Literature: Analysis and Interpretation	6
II. Elective courses:	
Twenty-one additional credits of work in courses which must be at the 300 level and should be chosen in consultation with the departmental advisor. It is strongly recommended that the student select a diversified program.	21
	36

Placement

Entering students who wish to continue study of French 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 FRN 115 Elementary French, if the student has had three years of high school preparation.

Teacher Training Program

Students who wish to prepare for certification as secondary school teachers of French should consult appropriate departmental advisors concerning requirements and procedures of the teacher preparation program.

Requirements for the Major in Italian

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

	<i>Credits</i>
I. Language courses	
A. For the prospective major without prior training	
1. ITL 111, 112 Elementary Italian <i>OR</i>	6
2. ITL 115 Intensive Elementary Italian	5
3. ITL 191, 192 Intermediate Italian	6
B. For all majors	
1. ITL 221 Italian Conversation	3
2. ITL 222 Readings and Discussion	3
	17 or 18
 II. Literature courses	
At least 24 credits above ITL 222 (other than ITL 321, 322 Advanced Conversation and Composition I, II).	24
It is strongly recommended that one course be taken from each of the following areas:	
A. 14th Century, Dante	
B. 15-16th Centuries	
C. 19th Century	
D. Contemporary Prose or Poetry	
E. Italian Civilization and Culture*	
F. History of the Italian Language*	
	41 or 42

Teacher Certification

Students who wish to prepare for certification as secondary school teachers of Italian must take ITL 321, 322 Advanced Conversation and Composition. They must also take ITL 240 Curriculum Development (as of spring 1972) as well as FLA 239 and six other credits in education. Before receiving permission to student teach, these students must take and pass, with a minimum score of 200, the MLA Proficiency Examination in Italian.

* These courses are being prepared.

COURSES IN FRENCH

FRN 115 Elementary French (An Intensive Course)

An introduction to spoken and written French, stressing pronunciation, speaking, comprehension, reading, and writing. Language laboratory will supplement class work.

Fall, 5 credits

FRN 195 Intermediate French (An Intensive Course)

Review of grammar and discussion of simple French texts through reading, writing, and discussion. Language laboratory will supplement class work.

Prerequisite: FRN 115 or equivalent.

Fall and Spring, 5 credits

FRN 197 Intermediate French Conversation

This course may be taken separately or to supplement FRN 195.

Prerequisite: FRN 115 or equivalent.

Fall and Spring, 2 credits

FRN 221 Conversation and Composition

A course in the active use of spoken and written French. Language laboratory will supplement class work.

Prerequisite: FRN 195 or equivalent.

Fall and Spring, 3 credits

FRN 295, 296 Readings in French Literature: Analysis and Interpretation

The course will teach literary analysis and its application to representative texts chosen from various periods of French literature. This work will be supplemented in FRN 295 by complete works from the 19th and 20th centuries, and in FRN 296 by complete works from the 17th and 18th centuries. A required course for majors.

Prerequisite: FRN 195 or equivalent.

Fall (295) and Spring (296), 3 credits each semester

FRN 321 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 laboratory weekly will be required.

Prerequisites: FRN 221, FRN 295, 296, or special permission.

Fall, 3 credits

FRN 322 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: FRN 221, FRN 295, 296, or special permission.

Spring, 3 credits

FRN 323 Advanced French Conversation

A course designed to develop and maintain complete fluency in the language.

Prerequisites: FRN 221, FRN 295, 296, or special permission.

Fall, 3 credits

Studies in French Literature

Prerequisites for the following five courses: FRN 221, FRN 295, 296, or special permission.

FRN 333 Studies in 16th Century Literature

Fall, 3 credits

FRN 344 Studies in 17th Century Literature

Spring, 3 credits

FRN 351 Studies in 18th Century Literature

Fall, 3 credits

FRN 361 Studies in 19th Century Literature

Spring, 3 credits

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FRN 373, 374 Studies in 20th Century Literature

Fall and Spring, 3 credits each semester

FRN 389 French Civilization

A history of French civilization with emphasis on contemporary France. The course is designed for students who plan to teach French in secondary schools.

Prerequisite: Permission of instructor.

Fall, 3 credits

FRN 393, 394 Free Seminar

A detailed description of this seminar may be obtained from the department.

Prerequisite: Permission of department.

Fall and Spring, 3 credits each semester

FRN 399 Directed Readings in French

Individually supervised readings in selected topics of French language and literature.

Prerequisite: Permission of department.

Fall and Spring, 1 to 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 class work.

Fall and Spring, 3 credits each semester

ITL 115 Intensive Elementary Italian

An intensive course covering the elementary Italian program (ITL 111, 112) in one semester.

Fall and Spring, 5 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 115 or equivalent.

Fall and Spring, 3 credits each semester

ITL 195 Intensive Intermediate Italian

An intensive course covering the intermediate Italian program (ITL 191, 192) in one semester.

Prerequisite: ITL 112 or 115 or equivalent.

Fall and Spring, 5 credits

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 195 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 195 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 195 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 321 Advanced Conversation and Composition I

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: ITL 222.

Fall, 3 credits

ITL 322 Advanced Conversation and Composition II

A course designed to acquaint students with the subtleties of Italian grammar and style. Extensive practice in composition and in translation from English to Italian.

Prerequisites: ITL 221, 222 or equivalent.

Spring, 3 credits

ITL 324 History of the Italian Language

A survey of the development of the Italian language from its origin to the present day.

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 330 Humanism and Modern Man

The crisis of the Middle Ages in Italy: the growth of humanism, its revolutionary view of the role of the individual and society, its influence on western values and attitudes, through a study of significant works of literature and art. The course will be offered in Italian.

Prerequisites: ITL 191, 192 or 195.

Fall and 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

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

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

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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

acter of the nation. This course will be taught in Italian.

Prerequisites: ITL 191, 192 or 195 or equivalent.

Fall, 3 credits

ITL 390 The Italian Scene

The reality of Italy and the Italian people through a study of the evolution of the historical, cultural, political, and social char-

ITL 399 Directed Readings in Italian

Individually supervised readings in selected topics of Italian language and literature.

Prerequisite: Permission of department.

Fall and Spring, 1 to 4 credits

DEPARTMENT OF GERMANIC AND SLAVIC LANGUAGES AND LITERATURES

Professors: CZERWINSKI, KARST, KOTT

Associate Professors: RUPLIN, SJÖBERG, A. WHITE

Assistant Professors: R. BROWN, HIPPISEY, HORL, O'NEIL, RUSSELL (*Executive Officer*), STENGEL, VOGEL

Instructors: ELLING, REGAN

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:

	<i>Credits</i>
(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

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.

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 Introduction to 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	<i>Credits</i>
(I) RUS 111, 112 Elementary Russian	12
(II) RUS 151 Intermediate Russian	3
(III) RUS 153, 154 Russian Conversation and Composition I ..	6
(IV) RUS 221, 222 Conversation and Composition II	6
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	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
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	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 III
- (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 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.

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.

Teacher Certification

Students wishing to prepare for certification as secondary school teachers of German or Russian should plan to take either GER 240 or RUS 240 in addition to education courses required for certification. For further information, consult the staff of 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 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).

Fall and Spring, 4 credits each semester

GER 115, 116 Reading German

This course is designed to teach the student to read and translate German prose of moderate difficulty. Practice in translating from German into English and in transferring ideas into the appropriate 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.

Prerequisite: GER 112 or equivalent.

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: GER 152 or permission of instructor.

Spring, 3 credits

GER 221, 222 German Conversation and Composition

This course consists of the active use of spoken and written German.

Prerequisite: GER 152 or permission of instructor.

Fall and Spring, 3 credits each semester

GER 240 Curriculum Development: German

The course is designed to train language teachers in the development of clearly defined and articulated German language programs which will satisfy not only their own standards but also those of state and local educational systems. Course work will include frequent visits to cooperating public schools.

Prerequisite: FLA 239.

Spring, 3 credits

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. Open also to non-

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majors with permission of instructor.

Prerequisite: GER 181 or permission of instructor.

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.

Fall and Spring, 3 credits each semester

GER 321, 322 Advanced German Conversation and Composition

A course designed to develop mastery of spoken German. Students will learn to express themselves idiomatically and fluently and become acquainted with the subtleties of German grammar and style.

Prerequisites: GER 221, 222 or permission of instructor.

Fall and Spring, 3 credits each semester

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.

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: GER 152 or permission of instructor.

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. Taught by tutorial methods and/or seminars.

Prerequisite: Senior status or permission of instructor. Open to non-majors by permission of instructor.

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.

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.

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.

Fall and Spring, 3 credits

**COURSES IN SCANDINAVIAN LANGUAGES
AND LITERATURES**

SWE 111, 112 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.

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.

Prerequisite: SWE 112 or equivalent.

Fall and Spring, 3 credits each semester

SWE 311 Modern Scandinavian Drama in Translation

(Formerly GER 367)

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 Lagerkvist will be considered. This course is open to all undergraduates.

Fall, 3 credits

SWE 312 Modern Scandinavian Novel in Translation

(Formerly GER 312)

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.

Spring, 3 credits

**COURSES IN SLAVIC LANGUAGES
AND LITERATURES**

RUS 111, 112 Elementary Russian

An introduction to Russian. Class work will be supplemented by practice in the language laboratory.

Fall and Spring, 6 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 151 Intermediate Russian

An intermediate course in Russian stressing an active command of the language.

Prerequisite: RUS 112 or equivalent.

Fall, 3 credits

RUS 153, 154 Russian Conversation and Composition I

A course in the active use of spoken and written Russian. This course is conducted in Russian.

Prerequisite: RUS 112 or equivalent.

Fall and Spring, 3 credits each semester

RUS 181, 182 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. Readings and lectures are in English.

Fall and Spring, 3 credits each semester

RUS 221, 222 Conversation and Composition II

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.

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.

Spring, 3 credits

RUS 240 Curriculum Development: Russian

The course is designed to train language teachers in the development of clearly defined and articulated Russian language programs which will satisfy not only their own standards but also those of state and local educational systems. Course work will include frequent visits to cooperating public schools.

Prerequisite: FLA 239.

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.

Fall and Spring, 3 credits each semester

RUS 299 Directed Study in Slavic Languages

Selected readings upon demand in minor Slavic languages, e.g. Serbo-Croatian, Czech, and Polish.

Variable and repetitive credit

RUS 321, 322 Conversation and Composition III

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 or equivalent.

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.

3 credits

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.

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.

Spring, 3 credits

RUS 339, 340 Comparative Slavic Literature I, II

The course is designed to cover significant works in all the Slavic languages. The works will be read in translation. Certain themes and motifs which have appeared in almost all of the literature of the Slavic countries will be evaluated and explored. The following authors will be included in this two-semester course: Andrić, Mrozek, Solzhenitsyn, Bulgakov, Čapek, Hašek, Różewicz, Karpowicz, Gombrowicz, Witkiewicz, Havel, Popović, Vazov, Ukrainka, and others. The courses are open to all students. The course material and lectures are in English.

Fall and 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.

Fall, 3 credits

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.

Prerequisite: RUS 151 or permission of instructor.

Spring, 3 credits

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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.

Fall and Spring, 3 credits

COURSES IN YIDDISH LANGUAGE AND LITERATURE

YDH 111, 112 Elementary Yiddish

An introduction to spoken and written Yiddish, stressing pronunciation, speaking, comprehension, reading, writing, and culture.

Fall and Spring, 3 credits each semester

YDH 151, 152 Intermediate Yiddish

The reading and interpretation of Yiddish texts, with a review of Yiddish grammar, composition, and conversation.

Prerequisite: YDH 112 or permission of instructor.

Fall and Spring, 3 credits each semester

COURSES IN HEBREW AND CIVILIZATION OF ISRAEL

Instructor: SPERLING

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HBW 111, 112 Elementary Hebrew

An introduction to modern Hebrew as currently spoken and written in Israel, stressing pronunciation, speaking, listening comprehension, reading, and writing.

Fall and Spring, 3 credits each semester

HBW 151, 152 Intermediate Hebrew

An intermediate course in conversation, composition, and the reading of texts in modern Hebrew.

Prerequisites: HBW 111, 112 or permission of instructor.

Fall and Spring, 3 credits each semester

HBW 221 Advanced Hebrew I

A course in the active use of spoken and written Hebrew. Reading of classics in the Hebrew language. Discussion conducted mainly in Hebrew.

Prerequisite: HBW 152 or permission of instructor.

Fall, 3 credits

HBW 222 Advanced Hebrew II

Readings in modern Hebrew authors. Oral and written reports. Discussion conducted mainly in Hebrew.

Prerequisite: HBW 221 or permission of instructor.

Spring, 3 credits

HBW 295 Readings in Talmud

An introduction to Talmud. Reading of selected passages in the original. Modern and medieval Hebrew commentaries will be referred to.

Prerequisite: HBW 221 or permission of instructor.

Spring, 3 credits

INT 150 Civilization of Israel I

History of Israel from its origins until the Bar-Kochba revolt. Emphasis will be placed upon Israel in its ancient Near Eastern background. Topics covered include origins of Israelite religious, political, and social institutions.

Fall, 3 credits. For elective credit only.

INT 151 Civilization of Israel II

A cultural history of Israel from the rise of Islam until the formation of the state of Israel. Particular emphasis will be placed on Jewish-Gentile relations and on those currents in Jewish thought which culminated in the Zionist movement.

Spring, 3 credits. For elective credit only.

DEPARTMENT OF HISPANIC LANGUAGES AND LITERATURE

Professors: LASTRA, SCHULMAN (*Chairman*), SOBEJANO

Associate Professors: GIORDANO, MCKENNA, SILVER, ZAVALA

Assistant Professors: DAVIS, MERMALL

Instructors: GREENFIELD, PERISSINOTTO

At present the department offers a variety of courses in Portuguese and a major program leading to the Bachelor of Arts degree in Spanish. Students wishing to major in Spanish should examine the requirements listed below and should consult with a departmental advisory committee member to choose individual programs.

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:

	<i>Credits</i>
I. Required courses for a minimum of 12 or 15 credits:	
A. Either SPN 221, 222 Conversation and Composition I, II or SPN 227 Spanish Composition for Students of Spanish- Speaking Background	6
B. SPN 290 Hispanic Culture and Civilization	3
C. SPN 297, 298 Introduction to Hispanic Literature I, II ..	6
II. Elective Courses	
Eighteen additional credits of work which must be in courses above the 200 level, to be chosen in consultation with the departmental advisory committee.	18
	30-33

Note: Requirements for fulfilling the major will be determined on an individual basis by the faculty advisory committee, thus affording the student more flexibility in his individual course study. The advisory committee will consist of three faculty members—two for the departmental majors, one for the non-majors. A program will be devised for each student and periodically updated and reevaluated through consultations between members of the committee and the student. Deviations or changes in the planned course of study will need to be approved by a faculty advisor of the committee prior to registration.

Placement

Entering students who wish to continue study of Spanish 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 SPN 115 Elementary Spanish, if the student has had three years of high school preparation.

Teacher Training Program

Students who wish to prepare for certification as secondary school teachers of Spanish should consult appropriate departmental advisors concerning requirements and procedures of the teacher preparation program.

COURSES IN PORTUGUESE

POR 115 Elementary Portuguese

An intensive course to present the fundamentals of Portuguese grammar and to provide practice in reading, writing, and speaking.

Fall and Spring, 5 credits

POR 195 Intermediate Portuguese

An intensive course to develop competence in reading, writing, and speaking Portuguese through the interpretation of selected literary texts.

Prerequisite: POR 115 or equivalent.

Fall and Spring, 5 credits

POR 299 Directed Readings in Portuguese

Individually supervised readings in selected topics of Portuguese language and literature.

Prerequisite: Permission of department.

Fall and Spring, 1 to 4 credits

COURSES IN SPANISH

SPN 109 Masterpieces of Spanish Literature in Translation

Readings from *El Cid*, the picaresque novel, Cervantes, Golden Century drama, and significant contemporary authors.

3 credits

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. Spanish language skills are helpful but not required.

3 credits

SPN 115 Elementary Spanish

An intensive course to present the fundamentals of Spanish grammar and to provide practice in reading, writing, and speaking.

Fall and Spring, 5 credits

SPN 195 Intermediate Spanish

An intensive course to develop competence in reading, writing, and speaking Spanish through the interpretation of selected literary texts.

Prerequisite: SPN 115 or equivalent.

Fall and Spring, 5 credits

SPN 196 Reading Spanish

Readings in Spanish from the social and natural sciences, designed to enable the specialist student to handle difficult material in his field. This course is intended for undergraduates majoring in other disciplines and for graduate students who are preparing for proficiency examinations.

Prerequisite: SPN 115 or equivalent.

Spring, 5 credits

SPN 197 Spanish for Students of Spanish-Speaking Background

A formal study of the fundamentals of Spanish grammar. This course is designed

to develop the native speaker's competence in reading and writing the language.

Prerequisite: SPN 115 or equivalent.

Fall and Spring, 5 credits

SPN 221 Conversation and Composition I

A course in the active use of Spanish, with emphasis on precision and fluency in the spoken form.

Prerequisite: SPN 195 or equivalent.

Fall, 3 credits

SPN 222 Conversation and Composition II

A course in the active use of Spanish, with emphasis on excellence in the written form.

Prerequisite: SPN 195 or equivalent.

Spring, 3 credits

SPN 227 Spanish Composition for Students of Spanish-Speaking Background

A course intended for native speakers of the Spanish language and designed to improve their competence in written Spanish.

Prerequisite: SPN 197 or equivalent.

Spring, 3 credits

SPN 290 Hispanic Culture and Civilization

The evolution of Hispanic civilization as seen through its history, art, and literature.

Prerequisite: Permission of instructor.

Spring, 3 credits

SPN 297 Introduction to Hispanic Literature I

Readings in Hispanic literature chosen from various periods and from all parts of the Spanish-speaking world. This course is designed to develop the students' competence in reading literary texts through a thorough analysis of works of some difficulty.

Prerequisite: SPN 195 or 197 or equivalent.

Fall, 3 credits

SPN 298 Introduction to Hispanic Literature II

Readings in Hispanic literature chosen from various periods and from all parts of the Spanish-speaking world. This course is designed to introduce the students to the main currents of Hispanic literature through analysis of literary texts.

Prerequisite: SPN 195 or 197 or equivalent.

Spring, 3 credits

***SPN 301, 302 Studies in Hispanic Linguistics**

SPN 311, 312 Studies in Medieval Literature

SPN 321, 322 Studies in Literature of the Renaissance (15th and 16th Centuries)

SPN 323, 324 Studies in Literature of the Golden Age (16th and 17th Centuries)

SPN 331, 332 Studies in Literature of the 18th Century

SPN 341, 342 Studies in Modern Literature

SPN 343, 344 Studies in Contemporary Literature

SPN 351 Studies in Antillean Literature and Culture

SPN 352 Studies in Puerto Rican Literature

SPN 361, 362 Studies in Portuguese and Brazilian Literature

SPN 391, 392 Free Seminars

SPN 395, 396 Directed Individual Studies

Prerequisite: Permission of department.

* The specific content of courses 301 to 396 will be announced annually and printed in the registrar's class schedule as a subtitle each semester.

DEPARTMENT OF HISTORY

Professors: ANGRESS, CHINCHILLA-AGUILAR, ^bLAMPARD, MAIN, ^bSEMMEL, TAYLOR, TRASK (*Chairman*)

Associate Professors: ALIN, BOTTIGHEIMER, BURNER, CLELAND, KUISEL, H. LEOVICS, R. LEE, PRATT, ^aJ. ROSENTHAL, F. WEINSTEIN, WELTSCH, WILDMAN, J. A. WILLIAMS (*Director of Graduate Studies*)

Assistant Professors: COWAN, ^aHAMNETT, KAVENAGH (*Documents Collector*), ^bKNIGHT, LAM, LEMAY, R. M. LEVINE, MARCUS, MCCARTHY, RAPP, TURNER

Instructor: DEMUTH

Lecturer: SCHUYLER

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

^a On leave academic year 1971-72.

^b On leave fall semester 1971.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

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.
Fall, 3 credits

HIS 107 America in the 1960's

An introduction to the study of history 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.

Spring, 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. This course is identical with IAS 121.

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. This course is identical with IAS 122.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

Spring, 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.

Spring, 3 credits. Not offered 1971-72.

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.

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.

Fall, 3 credits. Not offered 1971-72.

HIS 138 Perspectives in European History

A study of selected topics and debates in European history with special reference to a specific national case. Attention is given to the derivation and quality of generalizations in history and their usefulness in particular applications. Problems span the period from the rise of urban centers in the Middle Ages to the rise of fascism in the 20th century.

Fall, 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."

Fall, 3 credits. Not offered 1971-72.

HIS 140 Perspectives of World History

A study of the processes and problems of global history. In the course, a narrative summary of information is subordinate to a consideration of those historical authors who have attempted to analyze and interpret the recent period of world history.

Prerequisite: Freshman standing.

Spring, 3 credits

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.

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.

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

Fall and Spring, 3 credits. Not offered 1971-72.

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.

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.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits

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.

Spring, 3 credits

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.

Spring, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits

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.

Fall, 3 credits

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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.

Spring, 3 credits

HIS 204 Medieval History, 300-1100

European history is surveyed from the decline of Rome up to the Renaissance of the 12th century. Special attention is paid to the Carolingian Empire, feudalism, the early Church and monasticism and the investiture struggle.

Fall, 3 credits

HIS 205 The High Middle Ages, 1100-1400

The High Middle Ages: The expansion of Europe (particularly the Crusades), the re-development of an urban civilization, and the origins of national states, secularism, and individualism are among the topics considered.

Spring, 3 credits

HIS 206 Humanism and Renaissance

(Formerly HIS 205)

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.

Spring, 3 credits. Not offered 1971-72.

HIS 207 The Age of Reformation

(Formerly HIS 206)

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.

Fall, 3 credits. Not offered 1971-72.

HIS 208 Europe in the 17th Century

(Formerly HIS 207)

A comparative examination of the societies of western Europe in a period of marked stress and change.

Spring, 3 credits. Not offered 1971-72.

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.

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.

Spring, 3 credits

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.

Fall, 3 credits. Not offered 1971-72.

HIS 212 American Colonial Society

Political, economic, social, and cultural characteristics of the colonies during the 18th century.

Spring, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits

HIS 214 The Early National Era

Political, economic, social, and cultural developments, from the American Revolution to the rise of Jackson.

Spring, 3 credits

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.

Spring, 3 credits

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.

Fall, 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.

Fall, 3 credits. Not offered 1971-72.

HIS 218 Recent U.S. History, 1929-1962

The Great Depression and the impact of Keynesian 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.

Fall, 3 credits

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.

Spring, 3 credits

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.

Fall, 3 credits

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.

Spring, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

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.

Spring, 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.

Spring, 3 credits. Not offered 1971-72.

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 instructor.

Spring, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits

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.

Fall, 3 credits

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.

Prerequisite: HIS 196 or permission of instructor.

Fall, 3 credits. Not offered 1971-72.

HIS 241 Kievan and Muscovite Russia

A survey of Russian history from 10th century origins through the 17th century. Particular attention will be centered in Kievan civilization, the Tatar yoke, the rise of the Muscovite service state, and the Time of Troubles.

Spring, 3 credits

HIS 242 Imperial Russia (Formerly HIS 241)

The political, social, and cultural developments from Peter the Great to the Russian Revolution with emphasis on the unique in-

stitutional structure of Tsarist Russia and the problem of its relations with the West.

Fall, 3 credits

HIS 243 Soviet Russia (Formerly HIS 242)

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.

Spring, 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.

Spring, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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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.

Fall and Spring, 3 credits each semester. Not offered 1971-72.

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.

Fall, 3 credits. Not offered 1971-72.

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 varieties of existential thought.

Spring, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

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.

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 Darwin-

ism, 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.

Fall, 3 credits

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.

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.

Spring, 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.

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.

Spring, 3 credits

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.

Fall, 3 credits

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.

Spring, 3 credits

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits

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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.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits. Not offered 1971-72.

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.

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 movement.

Fall, 3 credits

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.

Spring, 3 credits

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 instructor.

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.

Spring, 3 credits

HIS 281 France Under the Old Regime, 1598-1787

An examination of the development of French society under Bourbon absolutism from the end of the religious wars to the final crisis of the Old Regime. The interaction between the royal government and

changing social values will be emphasized.

Fall, 3 credits

HIS 282 The Revolutionary Era in France, 1787-1815

An examination of the Revolution of 1789 and its transformation under Napoleonic dictatorship. Although external factors will be considered, emphasis will be upon the political and social impact of the Revolution in France.

Prerequisite: HIS 281 or permission of instructor.

Spring, 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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

HIS 287 History of Italy, 476-1960

The development of Italian civilization from the fall of Rome through the age of the city-states, the centuries of foreign domination, industrialization and the Risorgimento, fascism, and the "economic miracle."

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.

Fall and Spring, 3 credits each semester. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

HIS 292 Population and the Family in Europe

Studies in population trends and the history of the family unit in Europe from the Middle Ages to the 20th century. Topics include the control of family size, family wealth, child-rearing, determinants of fertility and mortality, plagues and famines, social class characteristics, the "quality of life," and the causes and consequences of general population movements.

Fall, 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 between state and national affairs.
Spring, 3 credits. Not offered 1971-72.

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.
Spring, 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.
Spring, 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.
Fall, 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.
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.

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.

Spring, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

HIS 317 Topics in U.S. History, 1877-1920

Selected topics in late 19th and early 20th century America with emphasis on the progressive era. Primarily reading, discussion, and independent research.

Prerequisite: HIS 192 or 217 or permission of instructor.

Spring, 3 credits

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 permission of instructor.

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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

HIS 330 Topics in Modern Latin America

A topical examination of 19th and 20th century Latin America emphasizing social and political institutions and their receptivity or resistance to change. Two or three topics will be chosen from among the following: land tenure, the Church, education, population growth, the role of the middle sectors, race, immigration, industrialization, urbanization, nationalism, the military, guerilla warfare, and counter-insurgency. This course is identical with SSC 330.

Prerequisite: Nine hours of Latin American history or its equivalent.

Spring, 3 credits

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 242 or 243, or permission of instructor.

Fall, 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.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 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.

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.

Spring, 3 credits

HIS 371 Topics in American Constitutional History

A study in depth of selected topics in the constitutional history of the United States

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from 18th century origins to the present.

Prerequisite: HIS 271 or 272 or permission of instructor.

Fall, 3 credits

HIS 373 Topics in American Social and Intellectual History

A study of selected topics in American social and intellectual history through reading, discussion, and independent research. Topics, which will vary in different years, will include such subjects as American liberalism and the history of American historical writing.

Prerequisite: HIS 273 or 274 or permission of instructor.

Fall, 3 credits

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: HIS 277 or 278, or HIS 269 or HIS 270, or permission of instructor.

Fall, 3 credits. Not offered 1971-72.

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 permission of instructor.

Fall, 3 credits. Not offered 1971-72.

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.

Spring, 3 credits. Not offered 1971-72.

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.

Fall and Spring, 3 credits each semester

HIS 397 The Teaching of History

A study of history as a subject taught in the secondary schools; the nature of the discipline; curricula models; scope and sequence of topics offered; new programs of history instruction, etc. Designed for prospective teachers of history in secondary schools.

Prerequisite: Five courses in history above Level I.

Fall, 3 credits

HIS 398 History Teaching Strategies

An examination of the instructional methods and materials for teaching history at the secondary school level. Designed for prospective teachers of history in secondary schools.

Prerequisite: HIS 397.

Spring, 3 credits

HIS 399 Independent Readings in History

Qualified juniors and seniors may read independently in an approved program under the supervision 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.

Fall and Spring, 1 to 3 credits

Colloquia in History

Readings and reports on selected topics of political, social, intellectual or economic his-

tory. 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 410 Colloquium in American History

Fall, 3 credits

HIS 411 Colloquium in American History

Fall, 3 credits

HIS 412 Colloquium in American History

Spring, 3 credits

HIS 413 Colloquium in American History

Spring, 3 credits

HIS 421 Colloquium in Latin American History

Fall, 3 credits

HIS 422 Colloquium in Latin American History

Spring, 3 credits

HIS 430 Colloquium in European History

Fall, 3 credits

HIS 431 Colloquium in European History

Fall, 3 credits

HIS 432 Colloquium in European History

Spring, 3 credits

HIS 433 Colloquium in European History

Spring, 3 credits

HIS 461 Colloquium in Asian History

Fall, 3 credits. Not offered 1971-72.

HIS 462 Colloquium in Asian History

Spring, 3 credits. Not offered 1971-72.

INTERDISCIPLINARY PROGRAM IN IBERO-AMERICAN STUDIES

Chairman: SCHUYLER

Faculty Advisory Committee:

ANTHROPOLOGY—CARRASCO

ART—CASTEDO

ECONOMICS—ZSCHOCK

HISTORY—TRASK, LEVINE

POLITICAL SCIENCE—ERICKSON

ROMANCE LANGUAGES—SCHULMAN

The program in Ibero-American studies (IAS) is designed to introduce students to the culture and civilization of Latin America, Spain, and Portugal, and to provide initial preparation for careers in education, business, and government. In consultation with his advisor, the student may select a coherent program of at least ten courses (30 credits) from the wide variety of approved offerings, combining courses in two or more related fields with integrated disciplinary core courses at the introductory and upper levels required of all students in the program. Students are encouraged to combine the Ibero-American studies major with a disciplinary major and in most cases, approved courses will also satisfy departmental requirements. Every effort will be made to assist qualified students majoring in Ibero-American studies to spend at least one semester abroad but this will not be a specific requirement.

Requirements for the Major in Ibero-American Studies

In addition to the general university requirements for the Bachelor of Arts degree, students majoring in Ibero-American studies must complete the following requirements:

I. Courses in Ibero-American Studies		<i>Credits</i>
A. IAS 121, 122 Introduction to Ibero-American Civilization		6
(These courses are identical with HIS 121, 122)		
B. IAS 401, 402 Colloquium in Ibero-American Studies (Senior standing and permission of instructor)		6
II. Related Courses		
Six courses chosen in consultation with the student's academic advisor from among the approved courses. (See list below.)		18
		<hr style="width: 10%; margin: 0 auto;"/> 30
III. Language		
Demonstrated proficiency in Spanish or Portuguese. No specific course work is required but the student is expected to pass a proficiency test, under normal circumstances prior to beginning his senior year, measuring his ability in oral and written Spanish or Portuguese. Regular or special intensive courses will be made available to enable students to acquire or improve their language skills.		

Courses Approved for Ibero-American Studies

In addition to the courses listed below, and after consultation and approval by advisors, students would also be able to take "Topics" courses, colloquia, and directed reading courses that deal with Ibero-America.

Anthropology

- ANT 201 Peoples of South America
- ANT 207 Indians of Middle America
- ANT 209 Ancient Civilizations of Middle America
- ANT 257 The Past of the New World
- ANT 258 Ways to Civilization
- ANT 259 Archaeology of Mexico and Central America
- ANT 308 Seminar in Latin American Cultures

Art

- ART 212 Baroque Art and Architecture in Spain and Italy
- ART 214 Ibero-American Plateresque and Baroque Art and Architecture
- ART 215 Latin American Art
- ART 216 Modern Latin American Art
- ART 217 Pre-Colombian Art

Economics

- ECO 284 Topics in Area Studies (Latin America)
- ECO 325 Economic Development
- ECO 386 Topics in Political Economy (Latin America)

History

- HIS 127 The Culture and Conflict of Colonial Societies
- HIS 221 History of Central America
- HIS 222 Modern Andean Republics
- HIS 223 Latin America and the Outside World
- HIS 224 Modern Mexico
- HIS 225 Social and Economic History of Colonial Spanish America
- HIS 227 Colonial and Neo-Colonial Brazil
- HIS 228 Modern Brazil
- HIS 229 Argentina Since 1810
- HIS 289, 290 History of Spain, 711-1808
- HIS 325 Cultural History of Latin America I
- HIS 326 Cultural History of Latin America II
- HIS 330 Topics in Modern Latin America
- HIS 355 Topics in the Expansion of Europe
- HIS 421 Colloquium in Latin American History I
- HIS 422 Colloquium in Latin American History II

Linguistics

LIN 251 History of the Spanish Language

Political Science

POL 209 Politics in Developing Areas

POL 214 Politics of Latin America

POL 215 Contemporary Political Systems in Latin America

POL 223 Latin America and the United States

POL 226 Problems of Politics and International Relations in Latin America

POL 392 Seminar in Advanced Topics (Latin America)

*Hispanic Languages and Literature**

SPN 290 Hispanic Culture and Civilization

SPN 297 Introduction to Hispanic Literature I

SPN 298 Introduction to Hispanic Literature II

SPN 321, 322 Studies in Literature of the Renaissance (15th and 16th C.)

SPN 323, 324 Studies in Literature of the Golden Age (16th and 17th C.)

SPN 331, 332 Studies in Literature of the 18th Century

SPN 341, 342 Studies in Modern Literature

SPN 343, 344 Studies in Contemporary Literature

SPN 351 Studies in Antillean Literature and Culture

SPN 352 Studies in Puerto Rican Literature

SPN 361, 362 Studies in Portuguese and Brazilian Literature

SPN 391, 392 Free Seminars

Further information may be obtained from the director or from members of the faculty advisory committee.

* The specific content of courses will be announced annually and printed in the registrar's class schedule as a subtitle each semester.

INTERDISCIPLINARY COURSES

INT 150, 151 Civilization of Israel I, II

(For course description, see alphabetical listing: Courses in Hebrew and Civilization of Israel.)

INT 211 Science and the Future of Man

An examination of man in relation to his environment and to scientific evolution. Lecture topics will include the population explosion, hazards of nuclear radiation, air and water pollution, man and the soil, educational obsolescence.

Fall and Spring, 3 credits. For elective credit only.

INT 298, 299 Practicum in Newspaper Journalism

In a series of twice-monthly seminars, the course will examine basic journalistic skills and their practical applications in the publishing of a newspaper. The impact a newspaper has on the community for which it publishes will also be discussed.

Prerequisite: EGL 107 or permission of instructor.

Fall, 1 to 3 credits

INTERDISCIPLINARY PROGRAM IN LINGUISTICS

Chairman: ANSHEN

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. Seven additional courses to be selected after consultation with the student's advisor
4. Two years of a modern foreign language

For further information about the linguistics program, consult the program chairman.

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 252 Comparative Semitic Grammar

Introduction to the characteristics and the classification of the Semitic languages with special attention to Hebrew, Aramaic, Ugaritic, Akkadian, and Arabic. Analysis of phonology and phonetic changes, analysis of morphology with special emphasis on tenses and moods in the verbal system as well as on patterns of noun-formation.

Prerequisite: One linguistic course or one year of any Semitic language.

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, 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 between 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 studied 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.

Prerequisite: Permission of department.

Fall and Spring, variable credit

DIVISION OF MATHEMATICAL SCIENCES

The Division of Mathematical Sciences consists of three departments: applied mathematics and statistics, computer science, and mathematics. Undergraduate studies in the division are centered around the three independent programs under the direction of the departments in the division. Each department encourages its majors to take courses in the other two departments of the division as well as in related fields in the social and the physical sciences.

The faculty of the Department of Mathematics is in the College of Arts and Sciences while the faculties of the Departments of Applied Mathematics and Statistics and Computer Science are in the College of Engineering. Students majoring in the programs of the division are academically in the College of Arts and Sciences. Upon graduation they receive Bachelor of Science degrees.

The three programs follow in alphabetical order, together with a list of faculty and a description of course offerings for each department. Course descriptions for interdepartmental courses in mathematical sciences appear after the program of the Department of Mathematics.

DEPARTMENT OF APPLIED MATHEMATICS AND STATISTICS

Professors: BELTRAMI, DICKER, DOLEZAL, GERST (*Chairman*), TEWARSON, ZEMANIAN

Associate Professors: CHEN, KIM, LEIBOWITZ, SRIVASTAV, THAMPURAN

Assistant Professors: GRAN, JOSEPH, LENT, TUCKER

The Department of Applied Mathematics and Statistics offers an undergraduate program leading to the B.S. degree. The program is intended to prepare the student for graduate study in applied mathematics or for certain positions in

industry and government. It also provides a relevant and meaningful background for those planning to specialize professionally in the mathematical aspects of medicine, economics, urban science, and engineering.

The course offerings in applied mathematics are designed with a view towards their utilization in the physical, social, biological, and behavioral sciences. The last several decades have been witness to the increasing use of mathematical methods in nearly all fields of endeavor and the consequent need for trained applied mathematicians who can play an important role in the development of quantitative models and solution techniques for a broad array of challenging problems. To cite just a few examples of diverse areas where applied mathematics is now playing a crucial role, one can mention: space flights and ecology, where non-linear differential equations are important tools; computer design and the allocation of urban resources, where use is made of linear programming optimization techniques and combinatorial methods; genetics and communication systems, where probabilistic and algebraic methods are employed; economic theory which employs systems analysis and operations research.

Requirements for the Major in Applied Mathematics and Statistics

In addition to the general university requirements for the Bachelor of Science degree, the following courses are required for the major in applied mathematics and statistics:

1. MSM 121, 122 and MSM 151, 152
2. MSC 101
3. Twenty-four additional credits in courses designated MSA or MSI and numbered 200 and above. (A maximum of six of these credits may be replaced by an equal number of credits to be taken from MSM and MSC courses numbered 200 and above. Recommended but not required are MSM 201, 211, 216, 301; MSC 201.)

It is recommended that students also take some basic courses in the natural and social sciences. In particular, those students having an interest in the physical sciences are advised to take PHY 101, 102 and 151. These courses should reflect, to some extent, the use of mathematical techniques. The faculty advisor of each student will be in a position to suggest courses of this type.

COURSES IN APPLIED MATHEMATICS AND STATISTICS

MSA 101, 102 Introduction to Finite Mathematical Structures I, II

(Formerly ESA 325)

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 will be illustrated by problems from these areas. Topics to be covered include matrix algebra, linear programming, game theory, probability theory (including Markov chains), finite graph theory, and optimization.

Fall and Spring, 3 credits each semester

MSA 104 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.

Prerequisite: MSM 121.

Corequisite: MSM 122.

Fall and Spring, 1 credit

[MSI 155 Mathematics for Engineers II]

(See description under Interdepartmental Courses in Mathematical Sciences.)

MSA 201, 202 Finite Mathematical Structures I, II

Boolean structures and logical relations, elementary combinatorial analysis and graph theory, with applications to such topics as linear programming, network flows, block designs, and coding theory.

Corequisite: MSM 151.

Fall and Spring, 3 credits each semester

[MSI 201, 202 Advanced Calculus for Scientists I, II]

(See description under Interdepartmental Courses in Mathematical Sciences.)

MSA 216 Special Functions of Applied Mathematics

(Formerly ESA 316)

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 to be considered. Topics include: orthogonal sets of functions, recursion formulas, series solution of linear differential equations, Fourier-Bessel expansions, asymptotic expansions, functional equations, application to boundary value and initial value problems.

Prerequisite: MSM 152.

Fall, 3 credits

MSA 217 Ordinary Differential Equations

(Formerly ESA 317)

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 non-oscillation theorems; asymptotic behavior of linear systems; non-linear autonomous systems; focal, nodal, and saddle points; cycles; stability; Lyapunov functions; the van der Pol, Liénard, and Duffing equations; approximate solutions.

Prerequisite: MSM 151.

Fall and Spring, 3 credits

MSA 226 Numerical Analysis

(Formerly ESA 326)

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.

Prerequisites: MSC 101, MSM 151.

Spring, 3 credits

MSA 227 Approximation Theory

Smoothing of data, least squares methods, interpolation, polynomial approximation, and quadrature formulas.

Prerequisite: MSM 152.

Fall, 3 credits

MSA 251, 252 Probability and Statistics I, II

(Formerly ESA 320, 321)

Finite, discrete, and continuous probability distributions; random variables; conditional probability; multivariate distributions; laws of large numbers; central limit theorem. Statistical application: random sampling, estimation, significance testing, hypothesis testing, regression correlation. Further topics.

Prerequisite: MSM 121.

Fall and Spring, 3 credits each semester

MSA 301, 302 Principles and Techniques of Applied Mathematics I, II

Linear operators and spectral theory applied to differential operators. Eigenfunction expansions, Green's functions and distributions: integral transforms.

Prerequisites: MSM 152 and permission of instructor.

Fall and Spring, 3 credits each semester

MSA 316 Mathematical Programming (Formerly ESA 330)

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 computers.

Prerequisites: MSC 101, MSM 152.

Fall, 3 credits

MSA 321 Mathematics of Networks (Formerly ESA 342)

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 net-

works. 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.

Prerequisite: MSM 152.

Spring, 3 credits

MSA 325 Introduction to Operations Research

Methods and techniques for stochastic modeling and optimization, with applications to queueing theory, Markov chains, inventory theory, games, and decisions.

Prerequisites: MSA 251, MSM 151.

Fall, 3 credits

MSA 331 Mathematical Models in the Social Sciences

Methods of mathematical modeling with particular emphasis given to areas such as ecology, sociology, economics, and psychology. Topics chosen will depend on the background and interest of the class.

Prerequisites: MSA 251 and permission of instructor.

Spring, 3 credits

MSA 333, 334 Mathematical Foundations of Economics I, II

An extensive survey of mathematical economics both from a contemporary axiomatic viewpoint (Debrew-type) and from a neo-classical viewpoint (Samuelson-type). Topics include utility theory, input-output models, and general equilibrium theory.

Prerequisites: MSM 152 and MSM 201.

Fall, 3 credits

MSA 351, 352 Mathematical Models in the Physical Sciences I, II

Methods of mathematical modeling with particular emphasis given to such areas as particle mechanics, continuum mechanics, and wave propagation. Topics chosen will depend on the background and interests of the class.

Prerequisite: MSI 202.

Fall and Spring, 3 credits each semester

MSA 371 Optimization Theory

Multiplier rules and constrained minimization. An introduction to the calculus of variations and control theory.

Prerequisite: MSI 201.

Spring, 3 credits

MSA 390 Research in Applied Mathematics
(Formerly ESA 301)

A course which will give the student an

opportunity to be involved in an independent research project with supervision by the faculty. Permission to register will require that the student have an average grade of B in his courses and that he obtain the agreement of a faculty member to supervise the research.

Prerequisite: Permission of instructor and department.

Fall and Spring, 3 credits

DEPARTMENT OF COMPUTER SCIENCE

Professors: FINERMAN, GELERNTER, HELLER, KIEBURTZ (*Acting Chairman*), TYCKO

Associate Professors: BERNSTEIN, D. R. SMITH

Assistant Professor: AKKOYUNLU

Undergraduate Program in Computer Science

The undergraduate major in computer science is designed to combine a liberal arts program with sufficient pre-professional education in computer science to prepare the student for graduate study or for a career in the computing field. The intent is to offer the breadth of education which will enable students to place computing in the perspective of an extension of man's intellectual power, while offering the depth of education required to understand how to utilize the power of computing.

Students will learn concepts and skills needed for designing, programming, and applying computing systems while learning the theoretical foundation of computer science. They will also have sufficient freedom in the program to pursue other academic interests in the liberal arts, sciences, and engineering to complement their study of computer science. Many students will be able to utilize the flexibility of the program to satisfy the requirements of a second major for the baccalaureate degree.

Requirements for the Major in Computer Science

In addition to the general university requirements for the Bachelor of Science degree, the following courses are required for the major in computer science:

I. Required courses

- A. MSC 101, 102, and three courses from among MSC 201, 302, 303, and 304
- B. MSM 121, 122, 151 (or MSM 191, 192, 193) and MSM 211
- C. MSA 201, 226, and 251
- D. ESE 318

II. Additional requirements

To achieve the necessary breadth in various fields, a minimum of 12 additional credits shall be chosen from among the course offerings in the natural sciences and in engineering, and a minimum of 30 credits shall be chosen from among the course offerings in the social and behavioral sciences and in the arts and humanities.

Note: To achieve the necessary depth in specific fields students are encouraged to elect their remaining credits from the course offerings in no more than two disciplines chosen according to their secondary interests.

Pass/No Credit Option

A student may, with permission of his advisor, register for a Pass/NC grade in any course not used to satisfy the requirements of I or II above.

Sample Program (Required courses only)

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
MSM 121	MSM 151	MSA 201	MSA 251
MSM 122	MSM 211	MSA 226	ESE 318
MSC 101	MSC 201*	MSC 303*	
MSC 102	MSC 302*	MSC 304*	

* Three of these four courses are required.

COURSES IN COMPUTER SCIENCE

MSC 101 Introduction to Computer Science

An introduction to programming and the solution of problems by computational algorithms. Students will gain experience by designing programs to solve a variety of problems chosen from scientific and non-scientific applications. This course is identical to ESG 162.

Fall and Spring, 3 credits

MSC 102 Computer Organization and Programming

(Formerly ESA 335)

The course explores the logical basis of computer structures, machine representation of numbers and characters, arithmetic and logical operations, input and output communication, and introduces the student to systems programming techniques.

Prerequisite: MSC 101.

Fall and Spring, 3 credits

MSC 201 Advanced Programming

A comprehensive survey of several high-level programming languages and their applications, such as ALGOL for algebraically oriented problems; LISP for list processing; SNOBOL for processing textual information.

Prerequisite: MSC 101.

Spring, 3 credits

MSC 302 Structure of Digital Computers

Design of computer sub-systems such as memories, storage devices, control units, input-output facilities, and arithmetic units. Microprogramming and overall system design problems. Other advanced topics and alternative machine organizations.

Prerequisites: MSC 102, ESE 318.

Spring, 3 credits

MSC 303 Introduction to the Theory of Computation

Finite state machines and regular expressions, Turing machines, the halting problem, computable numbers, recursive functions, complexity problems.

Prerequisite: MSC 102.

Fall, 3 credits

MSC 304 Introduction to Systems Programming

Topics studied include elementary data structures, including arrays and linked lists, pushdown stacks, trees and transfer vectors. Basic computer programming systems such as loaders, assemblers, compilers, and simple monitors will be investigated.

Prerequisite: MSC 102.

Fall, 3 credits

DEPARTMENT OF MATHEMATICS

Professors: ADLER, AX, BARCUS, CHARLAP (Director of Graduate Studies), DOSS, DOUGLAS, GROMOLL, KUGA, LISTER, PINCUS, RAPAPORT, SAH, SIMONS (Acting Director, Division of Mathematical Sciences), Szűsz

Associate Professors: CHEEGER, EBIN, FARKAS, W. FOX, FRIED, KRA (Acting Chair-

man), LAUFER, MEYER, OSHER, PHILLIPS, SCHANUEL, THORPE (*Director of Undergraduate Studies*), ZAUSTINSKY

Assistant Professors: FRANK, HELTON, HOWE, KUMPEL, RALLIS, ROITBERG

Research Instructors: AKIBA, BAK, KIREMIDJIAN

Lecturer: AUCHMUTY

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. The department has designed two tracks for its majors: a standard track especially appropriate for students preparing for a Ph.D. program in pure mathematics and a track for students preparing for a career in high school teaching.

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:

1. Either MSM 121, 122, 151, 152, 201 *OR*
MSM 191, 192, 193, 194
2. MSM 211 Algebra I
3. Twenty-one additional credits in courses designated MSM or MSI and numbered 200 and above. (A maximum of six of these credits may be replaced by an equal number of credits to be taken from MSA and MSC courses numbered 200 and above.)

Note: All courses in the division of mathematical sciences used to fulfill the requirements for the major in mathematics must be taken for letter grade.

Recommendations for Students Majoring in Mathematics

The department encourages students majoring in mathematics to begin advanced work in the sophomore year, by enrolling for MSM 211 in the second semester of that year, for example. Prospective graduate students are encouraged to take graduate courses in mathematics during the junior and senior years.

For entering students with above average interest and ability in mathematics, the department directs attention to its honors calculus sequence MSM 191, 192, 193, 194. In particular, students entering with advanced placement in mathematics are encouraged to consider this sequence.

All students majoring in mathematics are encouraged to include in their program:

1. Introductory computer science courses MSC 101 and 102
2. Two years of a foreign language, preferably French, German, or Russian
3. A year or more of physics (for example, the sequence PHY 101, 102, 151, 152)
4. The following advanced mathematics courses:
 - a. For students in the standard track: MSM 202 (unless student took MSM 194), 212, 301, 302, 312, 323
 - b. For students in the high school teacher preparation track: MSM 213, 237, 238, 239, 241; MSI 201, 202; MSA 251

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 Senior Seminar.

A student interested in the honors program should apply formally to the director of undergraduate studies of the Mathematics Department during the junior year. The director of undergraduate studies 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: MSM 391 (or 392) and 301, 302, 312, 323, 212.

Every honors program must include either MSM 391 or 392, and must consist of six courses selected from among MSM 212 and MSM 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 MSM 522 instead of MSM 301, and MSM 512 in place of MSM 302. Other programs must be formally approved by the director of undergraduate studies. Conferral of honors is contingent upon:

1. Achieving a 3.5 grade point average in the courses that constitute the student's honors program
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.

Old Students and New Program

The program described above is for students in the class of 1974 and in subsequent classes. Other students may choose between the program described here and the program described in the *1970-71 Undergraduate Bulletin*. A course will be considered a mathematics course for students electing to follow the old program if it is currently offered by the Department of Mathematics (all MSM and MSI courses) or if it was previously offered by the Department of Mathematics (MSA 251 and 252).

COURSES IN MATHEMATICS

MSM 101, 102 Elementary Functions (Formerly MAT 100)

Functions, graphing, algebraic operations on functions; analysis of rational, trigonometric, and exponential functions. Solutions of first and second degree equations. Systems of equations. 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 MSM 121, 122, 151, 152. It may not be counted toward the general university requirement in natural science.

Prerequisites: MSM 101 may be taken only by students who have *at most* three years of secondary school mathematics, except by permission of instructor. Permission of instructor is always required for MSM 102. Some students who complete MSM 101 may not be allowed to continue with MSM 102, but will be advised to take a more advanced mathematics course, for example, MSM 121.

Fall and Spring, 3 credits each semester. (For elective credit only.)

MSM 111 Introductory Mathematics I (Formerly MAT 107)

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. MSM 111 and MSM 112 are intended primarily for those who do not plan to take more advanced courses in mathematics and may be taken in any order.

Fall, 3 credits

MSM 112 Introductory Mathematics II (Formerly MAT 108)

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. MSM 111 and MSM 112 may be taken in any order.

Spring, 3 credits

MSM 121 Calculus I (Formerly MAT 102)

The derivative and integral: fundamental properties, interpretations and computations for elementary functions. Introduction to techniques of integrations.

Fall and Spring, 4 credits

MSM 122 Calculus II (Formerly MAT 103)

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: MSM 121 or MSM 191. May not be taken for credit in addition to MSM 123.

Fall and Spring, 4 credits

MSM 123 Calculus II and Probability (Formerly MAT 104)

Taylor's formula with remainder. Partial derivatives. Multiple integrals. Continuous and discrete probability: density; expectation; binomial, Poisson, uniform, exponen-

tial 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 MSM 122.

Prerequisite: MSM 121 or MSM 191.

Fall and Spring, 4 credits

MSM 151 Calculus III
(Formerly MAT 155)

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: MSM 122 or MSM 123.

Fall and Spring, 3 credits

MSM 152 Calculus IV
(Formerly MAT 156)

Differential and integral calculus in 2- and 3-space: directional derivatives, differential, Jacobian matrix, chain rule, multiple integrals, line and surface integrals, applications.

Prerequisite: MSM 151.

Fall and Spring, 3 credits

MSM 154 Mathematics for Engineers I

Partial derivatives and multiple integrals. Vector analysis, including theorems of Green, Gauss, and Stokes. Introduction to functions of a complex variable: Cauchy-Riemann equations, Cauchy's theorem, Taylor and Laurent series, calculus of residues.

Prerequisite: MSM 151.

Spring, 4 credits

**MSM 191, 192, 193, 194 Honors
Calculus I-IV**
(Formerly MAT 193, 194, 195, 196)

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 MSM 121, 122, 151, 152, 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 MSM 191, which satisfies the prerequisites for MSM 122. Students taking this honors sequence may not take for credit MSM 121, 122, 123, 151, 152, 201 or 202.

Fall (MSM 191, 193) and Spring (MSM 192, 194), 4 credits each semester

MSM 201 Analysis I
(Formerly MAT 201)

The topology of metric spaces, limits, continuity, mean value theorems. The operations of differentiation and integration and their interchange with limits.

Prerequisite: MSM 151.

Fall and Spring, 3 credits

MSM 202 Analysis II
(Formerly MAT. 202)

Calculus of several variables: inverse and implicit function theorems, differential forms, submanifolds of n -space, Stokes' theorem.

Prerequisites: MSM 152 and MSM 201.

Fall and Spring, 3 credits

**[MSI 201, 202 Advanced Calculus for
Scientists I, II]**

(See description under Interdepartmental Courses in Mathematical Sciences.)

MSM 211 Algebra I
(Formerly MAT 232)

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: MSM 151 or MSM 192.

Fall and Spring, 3 credits

MSM 212 Algebra II
(Formerly MAT 331)

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: MSM 211.

Fall and Spring, 3 credits

MSM 213 Theory of Polynomials
(Formerly MAT 332)

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: MSM 211.

Fall and Spring, 3 credits

MSM 216 Linear Algebra
(Formerly MAT 234)

Vector spaces over fields, linear transformations, the orthogonal and unitary groups, canonical forms for matrices, the spectral theorem, multilinear algebra.

Prerequisite: MSM 151 or MSM 192.

Fall and Spring, 3 credits

MSM 221 Number Theory
(Formerly MAT 233)

Congruences, quadratic residues, quadratic forms, continued fractions, Diophantine equations, number-theoretical functions, and properties of the prime numbers.

Prerequisite: MSM 151 or MSM 192.

Fall, 3 credits

MSM 237, 238 Foundations of Elementary Mathematics I, II

A study of some of the general ideas which provide a means for organizing and understanding mathematics, directed particularly to number systems and geometries.

Corequisites (for 237): MSM 201 and 211.

Prerequisite (for 238): MSM 237.

Fall (237) and Spring (238), 3 credits each semester

MSM 239 Elements of Secondary School Mathematics

(Formerly MAT 239)

The relation between the college mathematics curriculum and mathematics taught in high schools as illustrated by examining topics chosen from: number systems from the natural numbers to the real numbers, numeral systems and algorithms, polynomial algebra and field extensions, coordinate systems, and elementary functions.

Corequisites: MSM 201 and 211.

Spring, 3 credits

MSM 241 Geometric Structures
(Formerly MAT 321)

Formal geometries, their relationship and interpretations; projective, affine, Euclidean and non-Euclidean geometries.

Prerequisite: MSM 211.

Spring, 3 credits

MSM 291, 292 Junior Seminar
(Formerly MAT 291, 292)

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.

Prerequisite: Permission of instructor, which may be contingent upon completion of certain courses, for example, MSM 201 or MSM 211.

Fall and Spring, 3 credits each semester

MSM 301 Introduction to Complex Analysis
(Formerly MAT 301)

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: MSM 201 or MSM 193.

Fall and Spring, 3 credits

MSM 302 Introduction to Real Analysis
(Formerly MAT 302)

Lebesgue and Lebesgue-Stieltjes measures and integrals and their fundamental properties. Comparison with Riemann integration. Basic properties of L_p .
Prerequisite: MSM 202 or MSM 194.
Spring, 3 credits

MSM 303, 304 Non-Linear Ordinary Differential Equations
(Formerly MAT 303, 304)

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: MSI 201 and either MSI 202 or MSM 301.

Fall and Spring, 3 credits each semester

MSM 305, 306 Partial Differential Equations
(Formerly MAT 305, 306)

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: MSI 201, MSI 202 or MSM 301, and PHY 102; or permission of instructor.

Fall and Spring, 3 credits each semester

MSM 312 Introduction to Topology
(Formerly MAT 312)

Introduction to point set topology: connectedness, compactness, continuity, etc. The

fundamental group and covering spaces.
Prerequisites: Either MSM 201 or MSM 193, and MSM 211.

Fall and Spring, 3 credits

MSM 323 Introduction to Differential Geometry
(Formerly MAT 323)

Geometry of curves and surfaces in 3-space. Introduction to manifolds and to Riemannian geometry.
Prerequisite: MSM 202 or MSM 194.

Fall and Spring, 3 credits

MSM 331 Logic
(Formerly MAT 351)

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: MSM 211.

Fall, 3 credits

MSM 341, 342 Independent Study in Special Topics
(Formerly MAT 341, 342)

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.

Fall and Spring, 3 credits each semester

MSM 391, 392 Senior Seminar
(Formerly MAT 391, 392)

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 department.

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.

MSM 502 Algebra I

MSM 503 Algebra II

MSM 504 Homological Algebra

MSM 505 Group Theory

MSM 506, 507 Theory of Numbers

MSM 508, 509 Algebraic Geometry

MSM 512 Real Analysis I

MSM 513 Real Analysis II

MSM 514, 515 Functional Analysis

MSM 516, 517 Partial Differential Equations

MSM 518, 519 Harmonic Analysis

MSM 522 Complex Analysis I

MSM 523 Complex Analysis II

MSM 524, 525 Riemann Surfaces and Automorphic Functions

MSM 532 Algebraic Topology I

MSM 533 Algebraic Topology II

MSM 534 Differential Topology

MSM 540, 541 Student Seminar in Geometry

MSM 542, 543 Introduction to Differential Geometry

MSM 546, 547 Lie Groups and Homogeneous Spaces

MSM 548, 549 Complex Manifolds

MSM 552, 553 Logic

MSM 598 Independent Study

MSM 602, 603 Topics in Algebra

MSM 612, 613 Topics in Analysis

MSM 622, 623 Topics in Complex Analysis

MSM 632, 633 Topics in Topology

MSM 642, 643 Topics in Geometry

MSM 644 Characteristic Classes

MSM 645 Comparison Theorems in Riemannian Geometry

MSM 646, 647 Analysis on Manifolds

MSM 648 Minimal Varieties

MSM 652, 653 Topics in Logic

INTERDEPARTMENTAL COURSES IN MATHEMATICAL SCIENCES

MSI 155 Mathematics for Engineers II

Methods for the solution of the partial differential equations of physics and engineering, including Fourier series and Fourier transforms. Introduction to numerical methods.

Prerequisite: MSM 154.

Fall, 4 credits

MSI 201 Advanced Calculus for Scientists I

(Formerly ESG 222 and MAT 203)

Ordinary differential equations; integration by power series; Bessel and Legendre functions. Expansion in series of orthogonal functions, including Fourier series. Introduction to partial differential equations of

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mathematical physics. Laplace's equation.
Calculus of variations.

Prerequisite: MSM 152 or MSM 192.

Fall and Spring, 3 credits

MSI 202 Advanced Calculus for Scientists II

Functions of a complex variable; calculus of

residues, conformal mappings. Dirichlet problem. Review of orthogonal curvilinear coordinates. The divergence theorem. Solutions of classical partial differential equations of mathematical physics including applications of conformal mappings and the Laplace transform.

Prerequisite: MSI 201.

Fall and Spring, 3 credits

DEPARTMENT OF MUSIC

Professors: AREL, LAYTON (*Chairman*), NEMIROFF, ^aC. ROSEN

Associate Professors: BONVALOT, LESSARD, LEWIN

Assistant Professors: EKWUEME, FULLER, WINKLER

Instructors: KRAMER, LAWTON, L. STARR

Director of Choral Music: G. SMITH

Director of the University Band: KARASICK

Performing Artists in Residence: ADDISON, ANDERSON, BARON, BREHM, CANIN,
DES ROCHES, DUPOUY, EDDY, FROELICH, GLAZER, GREENHOUSE, G.
KALISH, KREISELMAN, ROSEMAN, WEISBERG, 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.

^a On leave fall semester 1971.

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.

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

I. Courses Primarily for Students Majoring in Other Fields

MUS 101 Introduction to Music

The factors which create form and coherence in music will be studied from the listener's point of view. Concepts such as melody, harmony, counterpoint, and rhythm will be illustrated by examples representing diverse historical periods and musical styles. No previous musical training is assumed.

Fall and Spring, 3 credits

MUS 109 Rock Music

A study of the development of Rock from the end of World War II to the present. Emphasis will be upon the music and its connection with earlier folk and popular styles, with special attention to various syntheses of African and European traditions.

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.

Fall, 3 credits

MUS 114 University Chorus

Study and performance of a repertory from the Middle Ages to the present. More than four unexcused absences from rehearsals eliminates credit.

Prerequisite: Auditions.

Fall and Spring, 1 credit

MUS 115 University Orchestra

Study and performance of works from the repertory of the concert orchestra. More than four unexcused absences from rehears-

als eliminates credit.

Prerequisite: Auditions.

Fall and Spring, 1 credit

MUS 116 University Band

Study and performance of works from the repertory of the concert band. More than four unexcused absences from rehearsals eliminates credit.

Prerequisite: Auditions.

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.

Fall and Spring, 3 credits

MUS 231 Music in the Romantic Era

(Formerly MUS 103)

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, Shumann, Liszt, Wagner and Verdi.

Prerequisite: MUS 101 or permission of instructor.

3 credits. Not offered 1971-72.

MUS 232 Music and Drama

(Formerly MUS 104)

The ritual and dramatic uses of music from antiquity to the modern lyric theatre, with emphasis upon the operatic repertory from Mozart to Berg.

Prerequisite: MUS 101 or permission of instructor.

3 credits. Not offered 1971-72.

MUS 233 The Music of Beethoven

(Formerly MUS 105)

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.

Prerequisite: MUS 101 or permission of instructor.

Spring, 3 credits

MUS 234 Music of the 20th Century*(Formerly MUS 106)*

An introduction to the variegated and rapidly changing trends of the present century, including impressionism, expressionism, neoclassicism, 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.

Prerequisite: MUS 101 or permission of instructor.

Spring, 3 credits

MUS 243, 244 The Structural Principles of Music I, II*(Formerly MUS 123, 124)*

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. MUS 243 may be taken alone. Prerequisite: MUS 119 or permission of instructor.

Fall and Spring, 3 credits each semester

II. Courses Primarily for Music Majors

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.

Fall and Spring, no credit

MUS 114 University Chorus

Study and performance of a repertory from the Middle Ages to the present. More than four unexcused absences from rehearsals eliminates credit.

Prerequisite: Auditions.

Fall and Spring, 1 credit

MUS 115 University Orchestra

Study and performance of works from the repertory of the concert orchestra. More

than four unexcused absences from rehearsals eliminates credit.

Prerequisite: Auditions.

Fall and Spring, 1 credit

MUS 116 University Band

Study and performance of works from the repertory of the concert band. More than four unexcused absences from rehearsals eliminates credit.

Prerequisite: Auditions.

Fall and Spring, 1 credit

MUS 121 Foundations of Musicianship 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. Consult department as early as possible concerning dates.

Fall and Spring, 3 credits

MUS 122 Foundations of Musicianship 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.

Fall and Spring, 3 credits

MUS 125 Modal Counterpoint I

Counterpoint in 16th century style for two voices.

Prerequisite or corequisite: MUS 122.

Fall and Spring, 3 credits

MUS 127, 128 Tonal Harmony I, II

Practice in homophonic writing, including the harmonization of chorales.

Prerequisite: MUS 125.

Fall and Spring, 3 credits each semester

190 MUSIC

MUS 143 Western Music Before 1600

The history of western music from antiquity to the late 16th century.

Prerequisite: MUS 122.

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.

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.

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.

Fall and Spring, 1 credit

MUS 161 to 199 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

MUS 167 Violin

MUS 168 Viola

MUS 169 Cello

MUS 170 String Bass

MUS 174 Flute

MUS 175 Oboe

MUS 176 Clarinet

MUS 177 Bassoon

MUS 183 Horn

MUS 184 Trumpet

MUS 185 Trombone

MUS 186 Tuba

MUS 191 Percussion

MUS 199 Voice

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.

Fall and Spring, 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.

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.

Spring, 3 credits

MUS 211 Modal Counterpoint II

Counterpoint in 16th century style for three or more voices.

Prerequisite: MUS 125.

3 credits. Not offered 1971-72.

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.

Fall, 3 credits

MUS 215 Advanced Harmony

Techniques and practices beyond those studied in MUS 127, 128.

Prerequisite: MUS 128.

3 credits. Not offered 1971-72.

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.

Fall, 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
- MUS 267 Violin
- MUS 268 Viola
- MUS 269 Cello
- MUS 270 String Bass
- MUS 274 Flute
- MUS 275 Oboe
- MUS 276 Clarinet
- MUS 277 Bassoon
- MUS 283 Horn
- MUS 284 Trumpet
- MUS 285 Trombone
- MUS 286 Tuba
- MUS 291 Percussion
- MUS 299 Voice

MUS 301 Homophonic Forms

Composition in Classical and Romantic styles, proceeding from individual phrases to large movements.

Prerequisite: MUS 128.

Fall, 3 credits

MUS 303 Fugue

Application of the skills of tonal counterpoint to fugal composition.

Prerequisite: MUS 213.

Spring, 3 credits

MUS 305 Orchestration

The possibilities and limitations of the commonly used instruments. Conventions of notation. Practice in scoring for various ensembles.

Prerequisite: MUS 128.

3 credits. Not offered 1971-72.

MUS 313 Composition

Open only to students demonstrating sufficient aptitude and capacity for original work.

Prerequisite: Permission of instructor.

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.

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 repertoires 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.

Fall and Spring, 2 credits

MUS 321 Piano Literature I

Performance and analysis of representative works for the solo keyboard repertory be-

ginning 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.

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.

Spring, 2 credits

MUS 323, 324 Violin Repertory I, II

A weekly forum for student performances of pertinent repertory from c. 1700 to c. 1940. For advanced violinists enrolled in MUS 267 or MUS 571.

Prerequisite: Permission of instructor.

Fall (323) and Spring (324), 2 credits each semester

MUS 344 Secular Music of the Renaissance

A survey of secular vocal music from the songs of Dufay through the airs of Dowland. The 16th century Italian madrigal and the French chanson will receive particular attention. A central concern will be shifting relationships between music and poetry.

Prerequisite: MUS 143.

Fall, 3 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.

3 credits. Not offered 1971-72.

MUS 347 Johann Sebastian Bach

A study of selected vocal and instrumental works.

Prerequisites: MUS 128, 144.

Spring, 3 credits

MUS 348 Dramatic Music of the Baroque

Opera and oratorio of the 17th and early 18th centuries with emphasis on specific works by Monteverdi and Handel. Topics for discussion will include changing operatic conventions and relationships between opera and oratorio in the period.

Prerequisites: MUS 128, 144.

3 credits. Not offered 1971-72.

MUS 351 Beethoven

Works of differing scope and medium drawn from every period of his life will be studied.

Prerequisites: MUS 128, 144.

3 credits. Not offered 1971-72.

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.

Spring, 3 credits

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.

3 credits. Not offered 1971-72.

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 1971-72.

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.

Fall, 3 credits

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 1971-72.

MUS 363 Stravinsky

The changing stylistic manners adopted by a pivotal composer of the 20th century.

Prerequisites: MUS 128, 249.

Spring, 3 credits

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.

3 credits. Not offered 1971-72.

MUS 367 Major 20th Century Composers

An intensive study of one or more of those composers who have shaped the musical

language of our epoch. The topic for 1972-73 will be Bartok.

Prerequisites: MUS 128, 249.

3 credits. Not offered 1971-72.

MUS 391 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.

Prerequisite: MUS 122 or permission of instructor.

3 credits. Not offered 1971-72.

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

Distinguished Professor: BUCHLER

Professors: GELBER, HEELAN (*Chairman*), ^cSTERNFELD, ZANER, ^aZYSKIND

Associate Professors: IHDE, SLOTE, SPECTOR, TEJERA, WATSON, ^bZEMACH

Assistant Professors: BONJOUR, DE NICOLAS, ERWIN, HILL, LANGO

Instructor: BENFIELD

^a On leave fall semester 1971.

^b On leave academic year 1971-72.

^c On leave spring semester 1972.

Requirements for the Major in Philosophy

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

A. Study within the area of the major	<i>Credits</i>
Philosophy courses distributed among five categories. (Eligible courses are identified by a category number I through V which appears in parentheses after the title of the course.)	
Category I. Two courses in the history of philosophy, each devoted to a different historical period. (PHI 200 and 206 are recommended.)	6
Category II. Two courses defined in terms of topics or skills basic to all disciplines and common to various philosophic styles.	6
Category III. One course defined in terms of a particular style, approach, movement, or tradition.	3
Category IV. Two courses relating philosophy to particular disciplines.	6
Category V. One course devoted to a single philosopher or text.	3
Two additional courses chosen from any of the five categories.	6
Senior seminar, PHI 395 Seminar X.	1
	<hr style="width: 10%; margin-left: auto; margin-right: 0;"/> 31

B. Study in related areas

Three courses in disciplines related to the philosophy courses chosen from Category IV above.

Note: No more than three philosophy courses below the 200 level may be used to meet the above requirements. Students who expect to pursue graduate study in philosophy should include in their programs PHI 161 and one senior reading course chosen from PHI 397, 398, or 399.

Honors Program in Philosophy

To qualify for the honors program, a student must have an overall average of at least 3.0 and an average in philosophy courses of at least 3.5. To seek honors, he must plan a program not later than the registration period of his senior

year which meets with the approval of a departmental advisor. The program shall consist of three courses at the 300 level or higher, concentrated on related aspects of a central problem, and leading to a senior paper which will become the focus of an oral examination. Honors will be awarded upon passage of the examination.

Philosophical Retreat

A weekend long, off-campus gathering of junior and senior level philosophy majors and the philosophy faculty in which the philosophical dimensions of a theme will be explored, and the pursuit of wisdom celebrated appropriately in noninstitutional surroundings.

COURSES IN PHILOSOPHY

For details of staffing, specific content, and reading lists, the student should consult schedules posted by the Philosophy Department before registration each semester.

Introductory Courses

These courses offer the student many ways to become acquainted with the nature and variety of philosophical inquiries. There are no prerequisites for any of these courses.

The Philosophy Department will offer a few of the introductory courses as seminars in which registration will be limited to 15 underclassmen. (These courses will be designated by an 'S' following the course number in the registrar's schedule of classes.)

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.

Fall and Spring, no credit

PHI 101 Ancient and Medieval Philosophic Classics (I)

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.

Fall and Spring, 3 credits

PHI 102 Modern Philosophic Classics (I)

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.

Fall and Spring, 3 credits

PHI 103 Philosophic Problems (II)

Introductory inquiry into one or more of the basic problems of philosophy.

Fall and Spring, 3 credits

PHI 104 Contemporary Morality (IV)

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.

Fall and Spring, 3 credits

PHI 106 Radical Thought (IV)

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).

Schedule to be announced, 3 credits

PHI 108 Contemporary Philosophical Sensibilities (III)

A range of philosophic problems will be presented through contemporary philosophers representing different sensibilities or styles of philosophic reasoning. The focus of interest will be the diverse ways in which philosophic problems are raised and treated. The course will be organized around a set of appropriate readings.

Fall, 3 credits

PHI 110 Historical Introduction to Philosophy (I)

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.

Schedule to be announced, 3 credits

PHI 113 Concepts of Man (II)

Readings and discussions on three topics concerning man: man's identity; man's understanding; man's values.

Fall, 3 credits

PHI 114 Introduction to Metaphysics (II)

An introduction to some of the main topics of metaphysics—for example, mind and matter, appearance and reality, freedom and determinism.

Fall and Spring, 3 credits

PHI 118 The Uses of Philosophy (IV)

Introductory study of the bearing of philosophic considerations on the special arts and sciences.

Schedule to be announced, 3 credits

PHI 141 Concepts of Equality (IV)

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.

Fall, 3 credits

PHI 161 Introduction to Symbolic Logic (II)

The emphasis in the first course in logic is on the development of systematic techniques for assessing the validity of arguments: truth tables and truth value analysis; Venn circles, elementary quantification theory, and deduction in both the propositional calculus and quantification theory.

Fall and Spring, 3 credits

Intermediate Level Courses

PHI 200 History of Ancient Philosophy (I) (Formerly PHI 111)

Study of the major thinkers from Thales to Aristotle; some attention may be given to Hellenistic and Roman thinkers.

Fall, 3 credits

PHI 202 Greek Life and Thought (I)

An inquiry into the social, political, and psychodynamic relations of Greek thought in its development from Homer to Aristotle. While the historical conditions of this development and the social correlates of ancient Greek creativity are carefully explored, the selected texts are studied in their conceptual relations to each other and as intellectual and expressive human constructions. This course is identical with CLS 350.

Fall, 3 credits

PHI 204 History of Medieval Philosophy (I)

Study of the writings of major thinkers from Augustine to William of Ockham.

Spring, 3 credits

PHI 206 History of Modern Philosophy (I) (Formerly PHI 112)

Study of the writings of major thinkers from Descartes to Kant; some attention may be given to post-Kantian thinkers.

Spring, 3 credits

PHI 210 Introduction to Oriental Philosophy (III) (Formerly PHI 109)

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 and/or one course in philosophy.

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.

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.

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.

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.

Spring, 3 credits each semester

PHI 217 Philosophy of the Social Sciences (IV)

A study of the philosophical foundations of the social sciences, focusing on questions concerning the structures of social reality and the methodological and epistemological status of the social sciences.

Prerequisites: Sophomore standing, one course in philosophy, and one in the social sciences.

Fall, 3 credits

PHI 218, 219 Innovation and Tradition (II)
(Formerly PHI 116, 117)

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: Sophomore standing.

Fall and Spring, 3 credits each semester

PHI 220 Philosophy of History (IV)

A critical examination of theories on 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 and one course in philosophy.

Spring, 3 credits

PHI 222 Philosophical Foundations of Feminism (IV)

The course deals with a representative range of textual selections, from Plato, Aristotle, J. S. Mill, Hegel, Kierkegaard, and Schopenhauer to Freud, Sartre, DeBeauvoir, Kate Millet, and certain representative fictional texts in order to bring out the problematic of feminism in its experiential and its philosophic dimensions. Students will be expected to do work in the outlining of solutions which philosophy can contribute to the human and conceptual dilemmas suggested by these texts.

Prerequisite: Sophomore standing.

Spring, 3 credits

PHI 228 Philosophy of Religion (IV)

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.

Fall, 3 credits

PHI 231 Philosophy of Perception (IV)
(Formerly PHI 201)

An inquiry into the philosophical problems pertaining to the sensing, perceiving, and observing of the world. Various historical 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.

Prerequisite: Sophomore standing.

Fall, 3 credits

PHI 234 Search for a Perfect Science in the West (IV)

(Formerly PHI 205)

A historical study of the reciprocal relationships that have existed between natural science and philosophy in the west from ancient Greece to modern times. An understanding will be sought of the character of scientific and philosophical explanation through the study of various cosmological models of man, nature, and God, especially the mechanistic models and the collapse of this model in the first half of the 20th century.

Prerequisite: Sophomore standing or permission of instructor.

Fall, 3 credits

PHI 235 Philosophy of Science: Concepts (IV)

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: Two semesters of philosophy (PHI 161 is recommended) or permission of instructor.

Fall, 3 credits

**PHI 236 Philosophy of Science:
Structure (IV)**

A systematic study of some central problems in the methodology of the sciences. The focus is on the general structure of scientific knowledge.

Prerequisites: Two semesters of philosophy (PHI 161 is recommended) or permission of instructor.

Spring, 3 credits

PHI 237 Theories of Knowledge (II)

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.

Spring, 3 credits

**PHI 238 Indian Buddhism: Its Essence
and Development (III)**

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 210.

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.

Fall, 3 credits

PHI 246 Nihilism and Problems of Evil (III)

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?

Prerequisite: Sophomore standing.

Fall, 3 credits

PHI 247 Existentialism (III)

(Formerly PHI 313)

Study of the origins and relevance of contemporary existentialist philosophers. The implications for modern thought of Kierkegaard, Nietzsche, Buber, Marcel, Jaspers, and Sartre will be examined.

Prerequisites: Sophomore standing and one course in philosophy.

Schedule to be announced, 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.

Fall, 3 credits

PHI 252 Ethical Inquiry (IV)

(Formerly PHI 152)

An investigation of selected ethical problems.

Prerequisites: Sophomore standing and one course in philosophy.

Spring, 3 credits

PHI 274 Metaphysics of Literary Art (IV)

Philosophic considerations relevant to inquiry concerning the nature of poetry, literary meaning and perspective, the relation between literature and "reality," and the foundations of criticism.

Prerequisites: Sophomore standing and one course in philosophy.

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 Aquin-

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nas, Austin, Hart, Locke, Mill, Kelsen, Rousseau and others.

Prerequisite: Sophomore standing.

Fall, 3 credits

PHI 291, 292 Individual Systems of the Great Philosophers (V)

(Formerly PHI 350)

A detailed study of the works of a single great philosopher, with some reference both to the enduring contributions of his philosophy and to its place in the history of thought.

Prerequisites: Sophomore standing and one course in philosophy or permission of instructor.

Fall and Spring, 3 credits each semester

PHI 293, 294 Analysis of Philosophic Texts (V)

(Formerly PHI 393, 394)

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: Sophomore standing and one course in philosophy or permission of instructor.

Fall and Spring, 3 credits each semester

Advanced Level Courses

PHI 301 Metaphysics (II)

An inquiry into the first principles of all science, art, and action as these are treated in representative classical and modern authors.

Prerequisite: PHI 114, or 200, or 206, or permission of instructor.

Fall, 3 credits

PHI 302 Ontology (II)

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 exis-

tence of matter, souls, God, etc. It uses both classical writings (Plato, Berkeley, etc.) and contemporary writings (Whitehead, Quine, etc.).

Prerequisite: PHI 114, or 200, or 206, or 301, or permission of instructor.

Spring, 3 credits

PHI 303 The Surrounding World: Philosophy and Environment (IV)

A philosophical study of the impact of science and technology upon man and his relations with the environment with a focus upon alternative systems, values and possibilities, open and closed models of nature, and changes within man's conception of himself. Prerequisites: One course in social science and one course in natural science.

Spring, 3 credits

PHI 310 Contemporary Philosophies of Experience (II)

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 206.

Spring, 3 credits

PHI 311 Contemporary Philosophies of Language (II)

A discussion of current topics in the philosophy of language.

Prerequisite: One course in philosophy.

Spring, 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.

Prerequisites: At least two courses in philosophy.

Spring, 3 credits

PHI 315 American Philosophy (III)

An evaluation of the major contributions made in the golden age of American philosophical 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 206 or permission of instructor.

Spring, 3 credits

PHI 316 The Structure of Controversy (II)

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: PHI 108, or 110, or 218, or 219, or 234, or 241; or junior standing and three courses in philosophy.

Fall, 3 credits

PHI 317 Philosophy of Myth (IV)

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.

Prerequisites: Any combination of at least two courses in classics, anthropology, literature, psychology, sociology, or religious studies plus at least one course in philosophy.

Fall, 3 credits

PHI 318 The Philosophical Methodology of the Rig Veda (V)

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.

Prerequisites: PHI 210 or two courses in philosophy, Oriental history, anthropology, psychology, or sociology.

Fall, 3 credits

PHI 320 Philosophical Psychology (IV)

A philosophical examination of the traditional and contemporary accounts of psychological concepts, such as: belief, hope, fear, pain, intention, learning, and reason.

Prerequisite: One course in philosophy.

3 credits. Not offered 1971-72.

PHI 321 Philosophic Bases of Argument (II)

An 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.

Prerequisites: PHI 218 or 219 or 241 or 316 or three courses in philosophy.

Schedule to be announced, 3 credits

PHI 322 The Philosophy of Modern Physics (IV)

Investigation of the historical development, logical structure, and interpretation of quantum mechanics; its relation to classical physics; the Indeterminacy Principle; context and sentential logic; measurement and the subject-object relation. Also the investigation of the historical development, logical structure and interpretation of the special theory of relativity; simultaneity; causality; group invariances.

Prerequisites: One philosophy course and two years of college level physics.

Spring, 3 credits

PHI 345, 346 History and Philosophy of Education (IV)

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

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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.

Schedule to be announced, 3 credits each semester

PHI 362 Advanced Symbolic Logic (II)

(Formerly PHI 162)

This course covers such topics as: a natural deduction system of quantification theory including consistency and completeness proofs; axiomatic formal systems and associated concepts of consistency, completeness, and decidability; elementary modal logic; and introductory set theory.

Prerequisite: PHI 161.

Spring, 3 credits

PHI 370 Advanced Ethical Theory (IV)

The course will examine current ethical and meta-ethical theory and develop such problems as the relationship between ethics and the philosophy of rhetoric or between ethics and science.

Prerequisites: Two courses in philosophy and permission of instructor.

Fall, 3 credits

PHI 389 Mysticism and Humanism in Western Philosophy (III)

The tensions in the western tradition between such tendencies as "this-worldliness" and "other-worldliness," between "existence" and "essence," between "immanence" and "transcendence," between naturalistic and super-naturalistic conceptions of "spirituality" and "piety," between the appeal to reason and the appeal to sensibility are examined in their development through selected periods from the early medieval thinkers to Blake and Romanticism. This allows us to pursue systematically both the analysis and the phenomenology of the appeal to sensibility and the appeal to reason.

Prerequisites: PHI 101 (or 200) and 102 (or 206).

3 credits. Not offered 1971-72.

PHI 395 Seminar X

An informal seminar conducted in connection with the Philosophy Club for majors only. The seminar will bring to focus the philosophical interests which the students have acquired and will develop the students' capacity for philosophical discussion. Neither the form nor the content of the seminar is determined in advance, but will be a function of the interests of the participants from whom the principal initiatives will come.

Prerequisites: Philosophy major standing, with at least five successfully completed philosophy courses.

Fall and Spring, 1 credit

PHI 397 Readings and Research in Methodology (Normally III)

Advanced level inquiry with individualized instruction in one particular philosophical style of reasoning. Consult undergraduate advisor for specific details.

Prerequisites: Senior philosophy major standing and permission of department.

Fall and Spring, 1 to 3 credits

PHI 398 Readings and Research in the Uses of Philosophy (Normally IV)

Advanced level inquiry with individualized instruction in the application of philosophical tools to one of the special disciplines. Consult undergraduate advisor for specific details.

Prerequisites: Senior philosophy major standing and permission of department.

Fall and Spring, 1 to 3 credits

PHI 399 Readings and Research in the History of Philosophy (Normally V)

Advanced level inquiry with individualized instruction in the great philosophies of the past. Consult undergraduate advisor for specific details.

Prerequisites: Senior philosophy major standing and permission of department.

Fall and Spring, 1 to 3 credits

Graduate Courses

Qualified seniors may take 500-level courses with the permission of the department chair-

man. Please consult the bulletin boards outside the departmental offices for course descriptions and prerequisites.

PHYSICAL EDUCATION

Associate Professors: L. THOMPSON (*Chairman*), VON MECHOW

Assistant Professors: DESCH (*Acting Director, Women's Division*), K. LEE, MASSIMINO, RAMSEY (*Director, Men's Division*), SMOLIAK

Instructors: COVELESKI, DUDZICK, DUQUIN, HIGASHI (*Part-time*), HUTTON, IVERSON, LUKEMIRE (*Part-time*), MORI (*Part-time*), E. SIEGEL (*Part-time*), SNIDER, VAN WART (*Part-time*), 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 No Credit. The Pass or No Credit grade is determined 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, weightlifting, trampolining and tumbling.

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
 PEW 106 Volleyball/Archery
 PEC 106 Basic Karate
 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
 PEW 115 Tennis/Volleyball
 PEC 115 Archery/Badminton
 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 106 Weight Training

A basic course in weight training using aerobic and anaerobic activities to improve physical strength, appearance and range of movement through the use of various types of weight training equipment and individualized counseling.

PEM, PEW 107 Self-Defense

Separate courses for men and women in the instruction and practice of basic self-defense techniques of judo, aikido and jujitsu. PEW 107 is adapted to the special needs and capacities of young women.

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.

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.

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

A basic course in bowling including rules, scoring and basic techniques of the game. Bowling fees will be paid by the students at the conclusion of each class.

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.

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.

PEC 124 Synchronized Swimming

Synchronized swimming individual and group techniques including routine composition and participation.

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.

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.

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.

PEC 130 Beginning 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: PEC 130 or permission of instructor.

PEC 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.

PEC 136 Archery

A comprehensive course in the history, nomenclature of equipment, basic rules, and fundamental skills of archery for men and women.

PEC 137 Tennis

A comprehensive course in the basic rules, fundamentals, and playing strategy in the sport of tennis for men and women.

PEC 139 Tumbling and Trampolining

Basic through intermediate tumbling and trampolining, including dual stunts, balancing, and pyramid building for men and women.

PEW 140 Basic Gymnastics

A basic course covering the four olympic pieces: free exercise, uneven 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: ARIMA, BALAZS, ^aG. E. BROWN, ^eCHIU, ^{a, f}COURANT, ^bDRESDEN, EISENBUD, FEINGOLD (*Director of Graduate Program*), FINOCCHIARO, D. FOX, ^aM. GOLDBERGER (*Adjunct*), M. L. GOOD, ^gLAMBE, ^aB. W. LEE, ^eL. L. LEE, MUETHER, NATHANS, POND, SILSBEE, STRASSENBURG, SWARTZ, TOLL, WILCOX, ^aC. N. YANG (*Einstein Professor*)

Associate Professors: O. AMES (*Chairman*), BLIEDEN, DEZAFRA, FOSSAN, ^aFREEDMAN, GRANNIS, JACKSON, KAHN (*Director of Undergraduate Program*), KAO, KIRZ, KUO, LEE-FRANZINI, MOULD, PAUL, STROM

^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.

Assistant Professors: J. COLE, FEIBELMAN, FOSTER, ^aA. GOLDBABER, GRAF, LUKENS, ^aMCCOY, McGRATH, METCALF, ^aNIEH, PALDY, RISKI (*Visiting*), ^aJ. SMITH, SPROUSE, ^aJ.-M. 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 pre-medical 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.

In addition, with the cooperation of the Department of Earth and Space Sciences, a new joint astrophysics-physics degree program will be initiated in the fall of 1971.

Minimum Requirements for the B.S. in Physics

All of these courses must be taken for a letter grade. In addition, we strongly recommend that majors take all physics and math courses for letter grade only.

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; MSM 121, 122, MSM 151, 152 or MSM 191-194 (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 General Physics I

PHY 102 General Physics II

MSM 121 or 191 Calculus I or Honors Calculus I

MSM 122 or 192 Calculus II or Honors Calculus II

CHE 101 or 103 Introductory Chemistry

CHE 102 or 104 Introductory Chemistry

(Chemistry may be taken equally well in the sophomore year.)

Sophomore Year

PHY 151 General Physics III

PHY 152 Electromagnetic Theory

MSM 151 or 193 Calculus III or Honors Calculus III

MSM 152 or 194 Calculus IV or Honors Calculus IV

Junior Year

PHY 203 Optics and Waves

PHY 205 Mechanics

PHY 206 Thermodynamics, Kinetic Theory, Statistical Mechanics

PHY 208 Quantum Physics

At least one semester of Junior Lab (PHY 235, 236)

MSI 201* Advanced Calculus for Scientists I

MSI 202** Advanced Calculus for Scientists II

* Prerequisite for PHY 208, 336 and 343; corequisite for PHY 205.

** Corequisite for PHY 208; prerequisite for PHY 343.

Senior Year

PHY 343 Methods of Mathematical Physics I

PHY 345 Senior Laboratory I

Two selections from courses listed below:

PHY 305 Advanced Quantum Physics

PHY 331 Nuclear and Particle Physics

PHY 336 Topics in Electrodynamics

PHY 344 Methods of Mathematical Physics II

PHY 346 Senior Laboratory II

PHY 372 Solid State Physics

PHY 391, 392, 393, 394 Research: Tutorial in Advanced Topics

ESS/PHY 381 Astrophysical Processes I

ESS/PHY 382 Astrophysical Processes II

ESS/PHY 383 Physics of the Interstellar Medium

ESS/PHY 384 Galactic Structure

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 Introductory Physics

PHY 141, 142 Topics in Intermediate Physics

MSM 121, 122 and 151, 152 *or* MSM 191-194

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.

The Astrophysics Program

A student electing the astrophysics track would take a program of study which satisfies the requirements for a B.S. in physics. In addition, he would take a concentration in those courses offered by the Earth and Space Sciences or Physics Department which satisfies his educational goals. Those seeking to pursue a grad-

uate or research career are strongly advised to take ESS 121 or ESS 242 and ESS/PHY 381, ESS/PHY 382, ESS/PHY 383 and ESS/PHY 384 in partial fulfillment of the course requirements for the bachelors degree.

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, II

The first semester will be largely a study of mechanics. Emphasis is on the conservation laws and topics will include kinematics and vectors; momentum, force, and energy; rotational motion; gravitation and planetary motion; oscillations, wave motion, and sound. Use of the calculus will be introduced concurrently with its exposition in MSM 121. 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 electrical 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. Two lecture hours, two recitation hours (one for the laboratory), and two laboratory hours per week.

Corequisites: MSM 121, 122.

Fall and Spring, 4 credits each semester

PHY 117 Physics and Biological Systems

This course consists of an introductory survey of physics with emphasis on applications to biological systems. Topics studied will include the mechanics of particles; solids and fluids; thermodynamics; optics; electricity, magnetism, and radiation phenomena. Familiarity with algebra and trigonometry is required. This course is designed to satisfy the physics requirements for students in the nurses' training and allied health programs. It is a one semester course in elementary physics and the applications of physics to the health sciences. Three class hours per week.

Fall, 3 credits

PHY 121 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 relationship 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, 4 credits

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 and MSM 121, 122 or permission of the director of the undergraduate program in 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: MSM 151.

Fall, 4 credits

PHY 152 Electromagnetic Theory

Electromagnetic phenomena and the elementary equations describing them are re-

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viewed. 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: MSM 152.

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. Not offered 1971-72.

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, MSM 151.

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: MSI 201.

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 MSM 151, 152.

Spring, 3 credits

PHY 207 Celestial Mechanics

An intermediate course in mechanics focused on astronomical applications. Topics to be covered include: review and further development of basic Newtonian mechanics; central forces and gravitational potential theory; the two-body problem with applications to planetary orbits and double star systems; the determination of orbits from observational data; the three-body problem; satellite of multiple stellar systems; and motion of artificial satellites. Three class hours per week.

Prerequisites: PHY 101, 121, or 131, 132; and MSM 122.

Fall, 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, MSI 201.
Fall and Spring, 3 credits

PHY 235, 236 Junior Laboratory I, II

This course aims at providing a thorough introduction to modern electronics. It begins with a review of D.C. and A.C. circuits, diode and FET characteristics. This is followed by a study of the transistor in both the linear and saturation region. The differential amplifier, because of its fundamental importance in present day electronics, will be studied in detail. The concepts of negative and positive feedback will be introduced and demonstrated. The circuits used in digital computers (elementary logic circuits, storage registers, shift registers, adders) will be studied also.

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 director of the undergraduate program in physics.

Fall and Spring, 3 credits each semester

PHY 301, 302 Contemporary Physics from an Elementary Viewpoint

The basic purpose of this course is to provide a qualitative understanding of the ideas, methods, and experimentation of contemporary physics. Extensive use will be made of dimensional arguments, order of magnitude estimates, and pictorial descriptions. The subjects to be discussed will be chosen from super-conductivity, masers, Mossbauer effect, strong and weak interactions, quasars, and turbulence. This course is intended primarily for students in the general degree program.

Prerequisites: MSM 152, PHY 151, or 242.

Fall and Spring, 3 credits each semester

PHY 303 Selected Studies of Urban and Environmental Problems

The seminar is designed to provide the physics major with an overview of a number of outstanding urban and environmental problems and the mathematical and physical methods being currently applied to such problems. Speakers will include a number of physicists, mathematicians, and engineers now working in these areas. Subjects to be discussed are solid waste and water resource management, fire and police protection, transportation, health delivery systems, and nuclear safeguards. In addition to attending the lectures, a term paper on one of the subjects covered, or a related topic, will be a course requirement.

Prerequisites: Mathematics through differential equations and two years of physics and/or chemistry.

Fall and Spring, 2 credits

PHY 305 Advanced Quantum Physics

This course offers further development and extension of the principles introduced in PHY 208. Topics will include the quantum

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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

PHY 307 Physics of Continuous Media

Topics to be covered include the response of non-ideal solids to stress, the properties of compressible fluids, viscosity, momentum transfer in fluid motion, irrotational flow, wave motion in gases, acoustics, conducting fluids, magneto-hydrodynamics waves, the physics of fully ionized gases, dynamics of degenerate fluids, application to magnetic plasmas, etc. This course is of interest to, among others, potential astrophysicists, plasma physicists, low temperature physicists, and geophysicists.

Prerequisites: PHY 205, 206.

Fall, 3 credits

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 symme-

try 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 MSI 201.

Spring, 3 credits

PHY 343, 344 Methods of Mathematical Physics I, II

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, 205, and MSI 201, 202 or permission of the director of the undergraduate program in physics.

Fall and Spring, 3 credits each semester

PHY 345, 346 Senior Laboratory I, II

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 director of the undergraduate program in physics.

Fall and Spring, 3 credits each semester

PHY 347 Senior Seminar on the Design of Experiments in Physics

The course will cover analysis of experiments in physics, including problems of planning, execution, and interpretation. Examples will be drawn from nuclear, high energy, and classical physics. Various experimental techniques will be discussed, and some treatment of statistical errors will be given. The course will be tailored to some extent to the tastes of the students.

Spring, 3 credits

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 director of the undergraduate program in 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. Applications to semi-conductors, superconductors, para- and ferromagnetism, magnetic resonance. Three class hours per week.

Prerequisites: PHY 152, PHY 206, PHY 208, or permission of instructor.

Spring, 3 credits

PHY 381, 382, 383, 384 are identical with ESS 381, 382, 383, 384. See Department of Earth and Space Sciences for course descriptions.

PHY 391, 392 Research

With the approval of the faculty, a student 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 director of the undergraduate program in physics.

Fall and Spring, 2 to 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 director of the undergraduate program in physics.

Fall and Spring, 2 to 4 credits each semester at discretion of instructor

Graduate Courses

Qualified seniors may take 500-level courses with the permission of the department chair-

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man. 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: DOGAN, PESONEN, SCARROW, TANENHAUS (*Chairman*), TRAVIS, WAHLKE
(*Director of Graduate Studies*), WILDENMANN, J. C. WILLIAMS

Associate Professor: LODGE

Assistant Professors: CIMBALA, FRIEDLAND, GROFMAN, JACKNIS, MULLER, MUNK,
MYERS, POOL

Lecturers: ACKERMAN, KOPPELMAN, KOTTLER, REICHLER, STIEFBOLD

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 to 15 credits in related courses in other departments, usually at the 200 level.

COURSES IN POLITICAL SCIENCE

POL 109 Political Man

This course focuses on the nature of men committed to public affairs and on their careers. Class will be devoted to watching and discussing taped or live, in-depth interviews with political leaders in this country

and abroad. In the interviews, political leaders will reflect on their careers, their work and role as they see it, and on the nature of political leadership. The readings will consist of biographies and autobiographies of past political leaders.

Spring, 3 credits

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. The course will emphasize the interaction of political structures and processes in democratic systems. Examples will be drawn from a variety of political settings, primarily Western Europe and the United States.

3 credits

POL 190 Political Cinema: Ideology and Propaganda

The general purposes of this course are: to discover the ideology in the "agitational," "polemical," and "didactic" film as well as in films with simply political themes and characters; and to generalize on the nature of the appeals of these films.

Prerequisite: Sophomore standing.

3 credits

POL 191 Political Behavior

Survey of the types, modes, and conditions of political activity (political participation, apathy, alienation); political consensus and cleavages (aggression, violence, war); political socialization and recruitment of political elites; psychological and social bases of uniformities and variations in political behavior. Laboratory periods are devoted to formulating and seeking answers through analysis of data from a number of contemporary political systems.

Fall and Spring, 4 credits

POL 192 Workshop in Political Science

This course is designed to introduce the beginning student to the study of political science, with examples drawn from American national and state politics, as well as comparative politics and international relations. Instructional guidance will be through the means of cassette tapes and weekly seminars. (Each student should have access to a cassette player.)

3 credits

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POL 200 Political Analysis

The major purpose of this course is to introduce the student to the nature of social science inquiry. Subjects covered will include the structure of scientific knowledge, concept formation, and strategies of theory construction and confirmation. 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.

3 credits

POL 207 Language and Politics

Several countries have had their stability or existence threatened by conflicts among language groups. Some governments have attempted to reform drastically their peoples' languages. Social, racial, and occupational dialects function as mobility barriers and rhetoric makes language a tool for political persuasion and control. Language differences make cross-national political analysis problematic. Explanations for these phenomena will be sought by asking: (a) What can one learn about politics from language? (b) What can one do about language through politics?

3 credits

POL 208 Revolution in 20th Century Latin America

Examination of the basic concepts of revolution and analysis of the relationship of social revolution to political, social, and economic development. Examples will be drawn from the successful revolutions of Mexico, Bolivia, and Cuba, as well as from frustrated revolutions such as that of Guatemala. Rural and urban insurgency movements will also be studied.

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.

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.

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 212 Soviet Politics

A systematic examination of the political culture and political institutions of the USSR, with special attention to the changing functional and compositional characteristics of the Communist Party in the process of economic and social modernization.

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.

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.

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.

3 credits

POL 216 Politics in France and Italy

Examination of the political process in France and Italy. 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 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.

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. POL 151 is advised but not required.

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.

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.

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.

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.

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.

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.

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 234 Comparative Political Analysis

This course brings together the analytical concepts and the methodological techniques that are associated with comparative political analysis, both at the cross-national level and the level of cross-subunit comparison. Examples are drawn from representative writings, with the emphasis placed upon identifying conceptual problems and the limitations of various methodologies.

Prerequisites: POL 151, plus an additional course in comparative politics.

3 credits

POL 235 Regional Organizations in Europe

Analysis of structure and policies of European organizations: EEC, EFTA, Comecon, etc. Problems of European unity and integration, peace settlement, and crisis management. Emphasis is given to empirical phenomena in the light of economic, social, and political theories.

Prerequisite: POL 151 or permission of instructor.

3 credits

POL 238 Politics in Scandinavia

Analysis of the governmental institutions and political powers and of the functions of democratic political systems in Northern Europe. The course will emphasize cross-national research. Comparisons are made within Scandinavia as well as with other smaller European democracies.

Prerequisite: POL 151 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.

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.

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 245 The Politics of Community Action

Demands for "community control," "decentralization," and "participation of the poor" have been prominent in the community politics of recent years. The course examines the theoretical and practical implications of these concepts within the general framework of political participation and their impact on local political institutions. Among the specific areas studied are health, housing, welfare, police, and anti-poverty programs.

3 credits

POL 246 Urban Politics

Emphasizes both the formal and informal political institutions and processes in American cities, including governmental structures, political parties, interest groups, and service systems. Special attention will be given to community "power structures," political participation, and a comparative approach to the study of urban politics.

3 credits

POL 247 Student Politics

A focus on student politics in a comparative (cross-national and cross-temporal) perspective in which contemporary events will be

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examined in light of models drawn from organizational theory, conflict theory, social psychology, class analysis, etc.

3 credits

POL 248 Politics of Poverty and Welfare

Consideration of the governmental policy-making process in welfare; poverty and welfare as problems for governmental action and public policy; poverty as a phenomenon for political analysis; national, state, and local programs to deal with poverty (particularly welfare programs); political behavior which results from poverty and the current welfare system.

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.

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.

Prerequisites: POL 254 and senior standing.

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 253 New York State Internship

Advanced students travel to Albany in a group once a week to work a full day as staff members for legislators. Staff assignments will be made so as to insure the compatibility of the student's and legislator's interests, while guaranteeing the students meaningful work.

Prerequisites: Senior standing and permission of instructor.

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 275 Political Psychology

Focuses on the relevance of psychological phenomena and the application of general theories of individual human behavior to the study of politics. Consideration of theories of: obedience and influence; political concept and issue formation; perceptual, learning, and motivational phenomena as they apply to political behavior.

Prerequisite: Permission of instructor; PSY 219 is helpful but not required.

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: MSM 122.

3 credits

POL 299 Directed Readings in Political Science

Individually supervised reading in selected topics of the discipline.

Prerequisites: Permission of department chairman and instructor.

Fall and Spring, 1 to 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.

Prerequisite: Permission of department.

3 credits each semester

DEPARTMENT OF PSYCHOLOGY

Professors: BRAMEL, GARCIA, KALISH (*Chairman*), ^bKRASNER (*Director, Clinical Training*), M. LEVINE, MERLIS (*Visiting Clinical Professor*), ^cF. PALMER, ROSS, SINGER, STAMM, WYERS

Associate Professors: DAVISON, D'ZURILLA, GEER, GOLDFRIED, KAYE, LIEBERT, ^dMORRISON, O'LEARY, ^aPOMERANZ (*Director, Psychological Services*), RACHLIN, SCHVANEVELDT, M. SMITH, VALINS

Assistant Professors: BRANSFORD, CALHOUN, ^eDOLL, EMMERICH, FEHMI, FRIEND, M. JOHNSON, KESTENBAUM, F. LEVINE, NEALE, S. STERNGLANZ, TWEEDY, WEINTRAUB, WHITEHURST, WINKLER (*Visiting*), YOUNG

Clinical Associate: 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 in Psychology

PSY 199 Experimental Methodology

PSY 200 Experimental Methodology Lab

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.

^a On leave fall semester 1971.

^b On leave academic year 1971-72.

^c Provost for Educational Research and Training.

^d Associate in Instructional Resources.

^e Member, Institute for Research in Learning.

B. Study in related areas

1. MSM 121 Calculus
2. Courses in biological sciences
 - a. BIO 101 and 102; or 150 or 171
 - b. BIO 107
 - c. One additional BIO course (BIO 103, 104, 111, 303, 304, 381, 382, 383 are recommended.)
3. Two courses in anthropology or in sociology or one course in each

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: computer 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.

Fall and Spring, 3 credits each semester

PSY 162 Statistical Methods in Psychology

Designed to provide the student with a knowledge of the use and interpretation of

elementary statistical techniques in research. Emphasis is placed on descriptive statistics, correlational analysis, and inferential statistics, including chi-square, critical ratio, t, F, and certain selected non-parametric techniques. Two lecture sessions and a one-hour laboratory each week.

Prerequisites: PSY 101, 102, and MSM 121.

Fall and Spring, 3 credits

PSY 199 Experimental Methodology

An introduction to the problems of experimental psychology: the design and execution of experiments, and the relation of experiments and theories. Representative experiments in the area of perception, learning and memory, decision making and group interaction will be presented and discussed.

Prerequisites: PSY 101, 102, 162.

Corequisite: PSY 200.

Fall and Spring, 2 credits

PSY 200 Experimental Methodology Laboratory

Coordinated with PSY 199, this laboratory provides an introduction to experimental

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methodology as applied to psychological processes.

Prerequisites: PSY 101, 102, 162.

Corequisite: PSY 199.

Fall and Spring, 2 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.

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.

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.

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.

Fall and 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.

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.

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.

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.

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.

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.

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.

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.

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.

Fall and Spring, 3 credits

PSY 220 Motivation

A view of the theories of motivation and how they apply to human behavior. The theories will range from biological to existential.

Prerequisites: PSY 101, 102.

Spring, 3 credits

PSY 244 Comparative Psychology

The nature of human nature: man's biological heritage. The phylogenetic distribution and evolution of both learned and unlearned behavioral patterns with an empha-

sis 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.

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.

Fall, 3 credits

PSY 313 Behavioral Tutoring

Application of psychological principles to reduction of psychological disorders of children. After an intensive review of the principles studied in PSY 213 Behavior Deviation, students are given the opportunity to apply these principles under close supervision to children with such behavior problems as specific learning disabilities or social skill deficits.

Prerequisite: PSY 213.

Fall, 3 credits

PSY 315 Behavior Modification

The principal purpose of the course is to familiarize the student with the philosophical and experimental foundations of behavior modification. While not designed for specific training in clinical techniques, the seminar will consider issues related as well to clinical application.

Prerequisites: PSY 101, 102, 162, 200, 215, and at least junior standing.

Fall and Spring, 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.

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.

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, permission of the faculty supervisor, and of the department.

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.

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.

Prerequisite: PSY 340.

Spring, 3 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.

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 370 The Psychology of Language

An introductory examination of language and a consideration of its implications for cognitive psychology.

Prerequisites: PSY 101, 102, 219, or permission of instructor.

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 MSM 122 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 six credits from this series may be offered toward the major requirement.

Prerequisites: PSY 200, permission of instructor, and permission of department.

Fall and Spring, 3 credits each semester

INTERDISCIPLINARY PROGRAM IN RELIGIOUS STUDIES

Chairman: ALTIZER

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.

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:

	<i>Credits</i>
I. At least two semester courses in each of three areas:	24
A. Religious literature	
B. Theory of religious thought	
C. Socio-historical studies of religion	
II. Two semester courses in <i>either</i> of the following:	6
A. Symposium in religious studies OR	
B. Directed study in a special area	

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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 207 The Age of Reformation
 PHI 210 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 un-

derstanding of religion and the situation of religion in the modern world.

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.

Spring, 3 credits

RLS 220 Spanish Mystics in Translation

A study of representative figures in the Spanish mystical tradition, such as St. John of the Cross, St. Teresa of Avila, and Miguel de Unamuno with special attention to the doctrinaire foundations, philosophical tenets, psychological matrix, and religious symbolism of mystical experience.

Spring, 3 credits

INTERDISCIPLINARY PROGRAM IN SOCIAL SCIENCES

Chairman: ROSENTHAL (Department of History)

This recently established interdisciplinary degree program (SSC) is designed for students with broad interests in the findings, questions, 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, courses sponsored directly by the interdisciplinary program in social sciences (e.g., SSC 101, 102, 301, etc.) may be used to satisfy *one* of the requirements for a departmental concentration (as in A or B or C 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:

Courses in at least four different social sciences departments distributed as follows:

	<i>Credits</i>
A. Two courses in <i>each</i> of any two departments	12
B. Four courses in <i>each</i> of any two <i>other</i> departments	24
(At least two of the courses in each department must be beyond the introductory level.)	
C. Four additional courses beyond the introductory level in any social sciences department or departments	12
(With permission of the advisor, two of these courses may be chosen from appropriate offerings in black studies, environmental studies or social welfare.)	
	<hr style="width: 10%; margin: 0 auto;"/> 48

Further information about the SSC major may be obtained in the Office of the Vice President for Liberal Studies.

INTERDISCIPLINARY COURSES IN THE SOCIAL SCIENCES

The following 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, to

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the concept of "social determinism," and to various forms of social bond and constraint. Readings will be drawn from the various social sciences.

Prerequisite: Freshman standing or permission of instructor.

Fall, 3 credits

SSC 102 Social Change

An examination of the nature of change in society. Both planned and unplanned, individual, small group, and national level social change will be studied. Readings will be drawn from the various social sciences.

Prerequisite: Freshman standing or permission of instructor.

Spring, 3 credits

SSC 301 Methods in the Social Sciences

This course is designed for social science students who want an introduction to the premises, modes of inquiry, and methods of the social sciences. Special emphasis is placed on giving a brief introduction to the empirical or quantitative methods now being used by social scientists (among others, statistics, demographic analysis, and economic analysis). Various faculty members will give guest lectures.

Prerequisites: Junior or senior standing and 18 hours of social sciences credit.

Spring, 3 credits

SSC 302 Interdisciplinary Problems in the Social Sciences

This course is designed to treat a problem that has been tackled by a number of the social sciences. It illustrates the different natures of approach, method, and findings. The actual problem chosen will vary from semester to semester.

Prerequisites: Junior or senior standing and 18 hours of social sciences credit.

Fall, 3 credits

SSC 330 Topics in Modern Latin America

A topical examination of 19th and 20th century Latin America emphasizing social and political institutions and their receptivity or resistance to change. Two or three topics will be chosen from among the following: land tenure, the Church, education, population growth, the role of the middle sectors, race, immigration, industrialization, urbanization, nationalism, the military, guerilla warfare, and counter-insurgency. This course is identical with HIS 330.

Prerequisite: Nine hours of Latin American history or the equivalent.

Spring, 3 credits

DEPARTMENT OF SOCIOLOGY

Distinguished Professor: L. COSER

*Professors: R. COSER, DOGAN, GAGNON, ^aLANG, PERROW, H. SELVIN, WEINSTEIN
(Chairman)*

^a On leave spring semester 1972.

Associate Professors: S. COLE, COLLVER, FELDMAN, GOODE, GOODMAN, MOLOTCH
(*Visiting*), POLSKY, STREET, SUTTLES

Assistant Professors: BERGER, BRYSON, FARBERMAN, HUDSON, D. PHILLIPS, M.
SCHWARTZ, TUCHMAN, S. WEITMAN

Instructor: HARRISON

Lecturer: TANUR

Requirements for the Major in Sociology

In addition to the general university requirements for the Bachelor of Arts degree, the following are required for the major in sociology:

- I. Study within the area of the major for a total of 30 credits:
 - A. SOC 103 Introduction to Sociology
 - B. SOC 201 Research Methods in Sociology (to be taken in sophomore year)
 - C. *Either* of the following sequences:
 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 chosen should be taken in the junior or senior year. The SOC 396, 397 sequence is intended for majors who wish to participate in the departmental honors program, which is described below.
 - D. Additional credits in sociology courses to total 30:
SOC 202 is strongly recommended but is not required. Qualified seniors may register for graduate courses with the approval of the departmental advisor.
Note: Six of these additional credits required for the major may be taken for a Pass/No Credit grade.

- II. Study in related areas
 - A. MSM 121 Calculus I or *two* other courses in mathematics chosen in consultation with the departmental advisor
 - B. At least three appropriate courses chosen from a single social science in consultation with the advisor
Note: Any of these courses may be taken for a Pass/No Credit grade.

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 103 Introduction to Sociology

A survey of the main concepts in sociological analysis. This course is the prerequisite for all further courses in sociology.

3 credits

SOC 121 American Society

Important characteristics of American social structure; power and patterns of inequality; emphasis on economic and political institutions.

Prerequisite: SOC 103 or permission of instructor.

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.

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.

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.

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.

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.

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.

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.

3 credits

SOC 208 Poverty and Social Welfare

Consideration of the historical and contemporary social definitions, distribution, and status of the poor in the United States; analysis of alternative explanations for their situation; and study of the effects of social welfare institutions upon the poor.

Prerequisite: SOC 103 or permission of instructor.

3 credits

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.

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.

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.

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.

3 credits

SOC 236 Social Change

The impact of technological, generational, and cultural forces on social organization from a historical and comparative perspective.

Prerequisite: SOC 103 or permission of instructor.

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.

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.

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.

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.

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.

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.

3 credits

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.

3 credits

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.

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.

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.

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.

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.

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.

3 credits

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.

3 credits

SOC 291, 292 Lectures on Special Topics

Lectures on topics of current sociological interest which will be announced before the start of the term. Fall 1971: The Sociology of Women—An examination of sex roles in contemporary society stressing the norms governing occupational distribution of women, the social meaning of biological phenomena, and the division of labor within the family. Comparative sociology will be stressed, including the examination of class, race, and the role of women in various socio-economic systems.

Prerequisite: SOC 103 or permission of instructor.

Fall and Spring, 3 credits each semester

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.

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.

3 credits

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.

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.

3 credits

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.

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.

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 department.

3 credits each semester

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 department.

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 empirically tested. This course is intended primarily for students planning to do graduate or professional work in the social sciences; it is *required* 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 department.

6 credits each semester

DEPARTMENT OF THEATRE ARTS

Professor: NEWFIELD

Associate Professors: BRUEHL (*Chairman*), DYER-BENNET; R. HARTZELL

Assistant Professors: DELL, NEUMILLER

Instructor: BOND

Lecturer: 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:

	<i>Credits</i>
A. Any three of the following two semester course sequences: . . .	18
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	
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
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COURSES IN THEATRE ARTS

THR 101 Introduction to the Theatre

An introduction to, and analysis of, the forms of theatre. Classes will include films, lectures by specialists within and outside the University community, and live and electronic demonstrations. All presentations will be followed by discussion.

Fall, 3 credits

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.

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.

Fall, 3 credits

THR 132 Fundamentals of Technical Theatre

The planning, construction, and handling of stage scenery and properties.

Prerequisite: Permission of instructor.

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.

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.

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.

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.

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.

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.

Fall and Spring, 3 credits

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THR 143 Stage Design I

Introduction to the esthetics, history, and theory of stage design with special emphasis on perspective and mechanical drawing for the stage.

Fall, 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.

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.

Fall and Spring, 3 credits

THR 237 Acting II

Continued training in basic techniques. Advanced work in character analysis and development. Emphasis is on scene study and introduction to styles of acting.

Prerequisite: THR 136 or permission of instructor.

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.

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.

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.

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 132 or permission of instructor.

Fall and Spring, 3 credits

THR 243 Stage Design II

Principles of design for the theatre including color composition and rendering techniques. These techniques are related to the esthetics both of dramatic composition and the flexibility of modern staging.

Prerequisite: THR 143 or permission of instructor.

Fall, 3 credits

THR 251 Mime

A course in mime theory and history, with tutorial and practicum, available to beginning and continuing students interested in mime. Mime is used as a medium to explore further acting skills and further possibilities of performance in relationship to space.

Prerequisite: Permission of instructor.

Fall, 3 credits

THR 252 Film-Making Workshop

Instruction in planning short films and experience in executing the plans. A student may make his own film or assist a more ad-

vanced film-maker according to the discretion of the instructor. Such technical skills (lighting, sound recording, editing) as are required by the films being made will be taught.

Prerequisites: THR 234 and permission of instructor.

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.

Spring, 3 credits

THR 322 Ensemble Acting

Development of a craft for the experiments now being carried on in post-Stanislvskian 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.

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.

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.

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.

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.

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.

Fall and Spring, 1 to 3 credits

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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.

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.

Fall and Spring, 1 to 3 credits

THR 344 Projects in Directing

An opportunity for advanced work in individual projects in stage and cinema directing.

Prerequisites: Junior-senior standing and permission of instructor.

Fall and Spring, 1 to 6 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.

Fall and Spring, 1 to 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.

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, French, Germanic and Slavic languages, Hispanic languages, Italian, 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

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 preromanticism. 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 108, 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. Each course may be taken independently of the other.

Fall and Spring, 3 credits each semester

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.

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, computing, 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 urban science and engineering.

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.

Requirements for the Bachelor of Engineering Degree

All candidates for the Bachelor of Engineering degree must satisfy the following requirements, normally by attaining a passing grade in appropriate courses and

An engineering student interested in a later medical degree should participate in the pre-medical advisement program.

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 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 Asian studies, black studies, economics, education, history, Ibero-American studies (IAS), 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, French, Germanic and Slavic languages, Hebrew, Hispanic languages, Italian, linguistics, music, philosophy, 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 or CHE 103, 109, 104, 110. 10 credits
- B. Mathematics: MSM 121, 122, 151 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 151 Graphic Arts 3 credits
- ESG 162 Introduction to Computer Science 3 credits
- ESG 101, 202 Thermodynamics 6 credits
- ESG 161, 263, 264 Mechanics 9 credits
- MSM 154, MSI 155 Mathematics for Engineers I, II 8 credits
- ESG 211, 212 Engineering Laboratory I, II 4 credits
- ESA, ESR, ESE, ESM or ESC 213 Engineering Experimentation 2 credits
- ESG 232, 233 Materials Science I, II 8 credits
- ESG 251, 252 Electrical Sciences I, II 8 credits
- ESG 340, 341 Engineering Design I, II 6 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 courses listed as technical electives or subsequently approved as technical electives.

- b. Any courses appropriate to the student's program, which have been recommended by his faculty advisor and approved by the College of Engineering curriculum committee.
- 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 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.

Recommended Undergraduate Sequence

Freshman Year

EGL 101
ESG 151 and ESG 162
MSM 121 and MSM 122
PHY 101 and PHY 102

Sophomore Year

CHE 101, 105, 102, 106 or CHE 103, 109, 104, 110
MSM 151 and MSM 154
PHY 151
ESG 101 and ESG 161

Junior Year

ESG 211, ESG 212, ES- 213
MSI 155

Senior Year

ESG 340 and ESG 341

It is also recommended that a student consult with an academic advisor when preparing a program for his junior and senior years. This program must include: ESG 202; ESG 232, 233; ESG 251, 252; ESG 263, 264*; and four technical electives.

The following courses may be taken in any semester:

- 2 arts and humanities courses
- 2 social and behavioral sciences courses
- 2 non-technical elective courses (one must be beyond introductory sequence)
- 2 open elective courses

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.

* May be taken in sophomore year.

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.

Pass/No Credit Option

The only courses which may be taken on a Pass/No Credit option basis by engineering majors are those fulfilling the arts and humanities, social and behavioral sciences, technical elective, non-technical elective, and open elective requirements.

Courses of Instruction

Course designations are abbreviated according to the following scheme:

ESG: Required engineering courses for program of concentration

ESI: Interdepartmental courses offered by the College of Engineering

ESA and MSA: Courses offered by the Department of Applied Mathematics and Statistics

ESR and MSC: Courses offered by the Department of Computer Science

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

ESU: Courses offered by the Interdisciplinary Program in Urban Science and Engineering

Courses are numbered in accordance with the following general pattern:

101-199 freshman-sophomore courses

200-399 junior-senior courses

500-699 graduate courses

REQUIRED ENGINEERING COURSES FOR PROGRAM OF CONCENTRATION**ESG 101 Thermodynamics**

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: MSM 151.

Fall and Spring, 3 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

ESG 161 Particle 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: MSM 154.
Prerequisite: MSM 151.

Spring, 3 credits

ESG 162 Introduction to Computer Science

An introduction to programming and the solution of problems by computational algorithms. Students will gain experience by designing programs to solve a variety of problems chosen from scientific and non-scientific applications. This course is identical to MSC 101.

Fall and Spring, 3 credits

ESG 202 Statistical Thermodynamics

Topics include introduction to probability, statistics, and combinatorial analysis; the concept of choice, information, and entropy; distribution of large physical systems with energy constraint, partition function, and Maxwell distribution. Applications: ideal gas, microscopic interpretation of temperature and pressure, Bose-Einstein systems, specific heat of solids, and black body radiation; Fermi-Dirac systems, Fermi distribution, electrical, thermoelectrical and photo-voltaic properties of semi-conductors; noise and random processes in physical systems, noise temperature.

Prerequisite: ESG 101.

Spring, 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, ESR, ESE, ESM, or ESC 213 Engineering Experimentation.

Spring, 2 credits

ESA, ESR, 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

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 multi-component 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, ESG 101.

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: MSM 154.

Fall and Spring, 4 credits each semester

ESG 263 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

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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.

Fall, 3 credits

ESG 264 Mechanics of Fluids

Fundamental principles and methods of fluid dynamics for Newtonian fluids with applications to problems of current interest. Fluid continua and their properties. Stress at a point is considered and the concept of pressure is explored in the statics and uniform rotation of fluids. The basic laws of fluid motion—continuity, momentum, and energy equations—are presented. Flows in rotating systems are studied with examples drawn from geophysical phenomena. Introduction to stream functions and velocity potentials. Viscous flows and boundary layers. Introduction to heat transfer and compressible flow. Prerequisites: PHY 101, MSM 121, 122.

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

MSM 154 Mathematics for Engineers I

Partial derivatives and multiple integrals. Vector analysis, including theorems of Green, Gauss, and Stokes. Introduction to functions of a complex variable: Cauchy-Riemann equations, Cauchy's theorem, Taylor and Laurent series, calculus of residues.

Prerequisite: MSM 151.

Spring, 4 credits

MSI 155 Mathematics for Engineers II

Methods for the solution of the partial differential equations of physics and engineering, including Fourier series and Fourier transforms. Introduction to numerical methods.

Prerequisite: MSM 154.

Fall, 4 credits

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 ad-

vising 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/No Credit 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 Engineering 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/No Credit 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 248.

Fall and Spring, variable up to 18 credits each semester, repetitive

INTERDEPARTMENTAL TECHNICAL ELECTIVES

ESI 290 Engineering and Managerial Economics

The application of engineering involves at every turn careful consideration of economic factors. The purpose of this course is to give the engineering student a sound introduction to the applications of economic and system analysis to decision-making problems

arising in engineering and industry. Topics covered include nature of the business enterprise, cash flow and financial statement analysis, the cost of capital, economic life, taxes, analysis under risk and uncertainty, return on investment and the evaluation of engineering alternatives, budgeting techniques, inventory and critical path techniques, corporate financing and patent aspects of engineering.

Fall, 3 credits

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; 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 regional planning, pollution, housing, air traffic control, among others.

Prerequisite: Permission of instructor.

Fall, 3 credits

DEPARTMENT OF APPLIED MATHEMATICS AND STATISTICS

Professors: BELTRAMI, DICKER, DOLEZAL, GERST (*Chairman*), TEWARSON, ZEMANIAN
Associate Professors: Y. M. CHEN, KIM, LEIBOWITZ, SRIVASTAV, ^aTHAMPURAN
Assistant Professors: BODIN, GRAN, JOSEPH, LENT, TUCKER

DEPARTMENTAL TECHNICAL ELECTIVES

MSA 390 Research in Applied Mathematics and Statistics

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 (MSA 390, ESR 301, ESE 301, ESM 301, ESC 301, ESU 301) may be counted towards fulfillment of technical elective requirements.

Fall and Spring, 3 credits, repetitive

MSA 201, 202 Finite Mathematical Structures I, II

Boolean structures and logical relations, elementary combinatorial analysis and graph theory, with applications to such topics as linear programming, network flows, block designs, and coding theory.
 Corequisite: MSM 151.

Fall and Spring, 3 credits each semester

^a On leave academic year 1971-72.

MSA 216 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 to be considered. Topics include: orthogonal sets of functions, recursion formulas, series solution of linear differential equations, Fourier-Bessel expansions, asymptotic expansions, functional equations, application to boundary-value and initial-value problems.

Prerequisite: MSM 152 or MSM 154.

Fall, 3 credits, alternate years

MSA 217 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 non-oscillation theorems; asymptotic behavior of linear systems; non-linear autonomous systems; focal, nodal, and saddle points; cycles; stability; Lyapunov functions; the van der Pol, Lienard, and Duffin equations; approximate solutions.

Prerequisite: MSM 151.

Fall and Spring, 3 credits

MSA 226 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.

Prerequisites: MSC 101, MSM 151.

Spring, 3 credits

MSA 227 Approximation Theory

Smoothing of data, least squares methods, interpolation, polynomial approximation, and quadrature formulas.

Prerequisite: MSM 152 or MSM 154.

Fall, 3 credits

MSA 251, 252 Probability and Statistics I, II

Finite, discrete, and continuous probability distributions; random variables, conditional probability; multivariate distributions; laws of large numbers; central limit theorem. Statistical applications: random sampling, estimation, hypothesis testing, regression analysis, and correlation. Further topics.

Prerequisite: MSM 121.

Fall and Spring, 3 credits each semester

MSA 301, 302 Principles and Techniques of Applied Mathematics I, II

Linear operators and spectral theory applied to differential operators. Eigenfunction expansions, Green's functions and distributions; integral transforms.

Prerequisites: MSM 152 and permission of instructor.

Fall and Spring, 3 credits each semester

MSA 316 Mathematical 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 the computer. An introduction to non-linear programs, with particular emphasis on algorithmic procedures.

Prerequisite: MSC 101, MSM 152 or MSM 154.

Fall, 3 credits

MSA 321 Mathematics of Networks

A review of the mathematical techniques which are fundamental in the analysis and synthesis of electrical networks and of other network structures. The course is mainly centered around the properties of certain classes of analytical functions. However, various algebraic and topological properties of networks may also be introduced depending on the interests of the instructor.

Prerequisite: MSM 152 or MSM 154.

Spring, 3 credits, alternate years

MSA 325 Introduction to Operations Research

Methods and techniques for stochastic modeling and optimization, with applications to queuing theory, Markov chains, inventory theory, games, and decisions.

Prerequisites: MSA 251, MSM 151.

Fall, 3 credits

MSA 331 Mathematical Models in the Social Sciences

Methods of mathematical modeling with particular emphasis on areas such as ecology, sociology, economics, and psychology. Topics chosen will depend on the background and interest of the class.

Prerequisites: MSA 251 and permission of instructor.

Spring, 3 credits

MSA 351, 352 Mathematical Models in the Physical Sciences I, II

Methods of mathematical modeling with particular emphasis on such areas as particle mechanics, continuum mechanics, and on wave propagation. Topics chosen will depend on the background and interests of the class.

Prerequisite: MSI 202.

Fall and Spring, 3 credits each semester

MSA 371 Optimization Theory

Multiplier rules and constrained minimization. An introduction to the calculus of variations and control theory.

Prerequisite: MSI 201.

Spring, 3 credits, alternate years

DEPARTMENT OF COMPUTER SCIENCE

Professors: FINERMAN, GELERNTER, HELLER, KIEBURTZ (*Acting Chairman*), TYCKO
Associate Professors: BERNSTEIN, D. R. SMITH
Assistant Professor: AKKOYUNLU

DEPARTMENTAL TECHNICAL ELECTIVES

ESR 301 Research in Computer 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 (MSA 390, ESR 301, ESE 301, ESM 301, ESC 301, ESU 301) may be counted towards fulfillment of technical elective requirements.

Fall and Spring, 3 credits, repetitive

MSC 201 Advanced Programming

A comprehensive survey of several higher level programming languages and their applications. Topics include general purpose and algebraically oriented applications using a language such as ALGOL; list structures and list processing, applications using a language such as LISP; string structures and processing of alphanumeric information using a language such as SNOBOL.

Prerequisites: MSC 101 and MSC 102.

Spring, 3 credits

MSC 302 Computer Organization

Design of computer sub-systems such as memories, storage devices, control units, input-output facilities, arithmetic units. Micro-programming and overall system design problems. Description and simulation techniques. Features needed for multiprogramming, multiprocessing, and real-time systems. Other advanced topics and alternative organizations.

Prerequisite: MSC 102.

Spring, 3 credits

MSC 303 Introduction to Theory of Computation

Finite state machines and regular expressions, Turing machines, the halting problem, computable numbers, recursive functions, complexity problems.

Prerequisite: MSC 102.

Spring, 3 credits

MSC 304 Introduction to Systems Programming

Topics include elementary data structures—including pointers, lists, pushdown stacks, trees and transfer vectors—loaders, assemblers, compilers, operating systems and sorting.

Prerequisite: MSC 102.

Spring, 3 credits

DEPARTMENT OF ELECTRICAL SCIENCES

Professors: CHANG, ^aMARSOCCI (*Acting Chairman*), STROKE

Associate Professors: C. T. CHEN, DOLLARD, D. R. SMITH, THOMAS, ^bTUAN

Assistant Professors: BARRY, CARROLL, HARRISON, RAPPAPORT

Instructor: SHORT

DEPARTMENTAL TECHNICAL ELECTIVES

ESE 301 Research in Electrical Sciences

A course which will give the student an opportunity to be involved in an independent research project with supervision by the faculty. Permission to register will require 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 (MSA 390, ESR 301, ESE 301, ESM 301, ESC 301, ESU 301) may be counted towards fulfillment of technical elective requirements.

Fall and Spring, 3 credits, repetitive

ESE 303 Electronic Circuits and Instrumentation

A course that will present 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 in-

dustrial 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.

Prerequisite: Senior standing or permission of instructor.

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 feed-

^a On leave fall semester 1971.

^b On leave academic year 1971-72.

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back control systems is covered in an introductory manner.

Prerequisites: ESG 251, 252, Electrical Sciences I, II, ESG 161.

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 318 Digital Systems Design

A course intended to be of use to non-specialists who require the use of digital equipment in connection with their experiments, and in addition to be part of the digital-circuits and systems sequence. It starts from a description of digital circuits regarded as functional blocks and leads to a consideration of the more commonly-encountered systems. The material is presented from an applied point of view, utilizing demonstrations and laboratory experiments. Topics included are: basic Boolean algebra, gate types, counters, registers, arithmetic circuits, data communication.

Prerequisite: Junior or senior standing or permission of instructor.

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.

Prerequisite: ESG 252 Electrical Sciences II, or permission of instructor.

3 credits

ESE 360 Introduction to Coherent Optics and Holography

A course introducing the field of modern optics and electro-optical science, together with all required mathematics. Particular emphasis is placed on generally applicable

fundamentals, as well as on similarities with electrical sciences and radio-astronomy techniques. The theory is developed and illustrated with examples drawn from the most recent applications of holography (3-D laser imaging) including optical computing, image deblurring, optical correlators, holographic

interferometry (vibration and stress analysis), microwave, radar, and acoustical imaging.

Prerequisite: Senior standing or permission of instructor.

Fall, 3 credits

DEPARTMENT OF MATERIALS SCIENCE

Professors: JONA, S. LEVINE, NATHANS, SEIGLE, THOMSON (*Chairman*)

Associate Professors: CARLETON, HERMAN, JACH, MOSS, R. SIEGEL, F. WANG

Assistant Professors: BILELLO, STROZIER

DEPARTMENTAL TECHNICAL 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 (MSA 390, ESR 301, ESE 301, ESM 301, ESC 301, ESU 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 mea-

surements, 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 prin-

ciples 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: BERLAD, BRADFIELD, CESS, IRVINE, R. S-L. LEE (*Chairman*), O'BRIEN, STELL, C. H. YANG

Associate Professors: CHIANG, HARRIS, TASI, L-S. WANG

Assistant Professors: CHEVRAY, VARANASI

Certain subgroups of the departmental electives listed below are recommended for students with particular professional goals. They are as follows:

Energy Engineering—ESC 305, ESC 322, ESC 323, ESC 398

Engineering Fluid Mechanics—ESC 361, ESC 372, ESC 375, ESC 379, ESC 391

Environmental Engineering—ESC 323, ESC 392, ESC 393*, ESC 397

Geophysical Fluid Mechanics—ESC 372, ESC 375, ESC 392, ESC 393*

Structural Engineering—ESC 342, ESC 361, ESC 381.

Students who wish to undertake study in one of these standard sequences or in an improvised sequence are urged to consult the instructor listed for a course in their area of interest.

DEPARTMENTAL TECHNICAL 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 (MSA 390, ESR 301, ESE 301, ESM 301, ESC 301, ESU 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 in-

volving 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/No Credit)

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 and ESG 264.

Mr. L-S. Wang

Fall, 3 credits

* A course in planetary atmospheres to be offered in the spring semester. Details are available from the department of mechanics.

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.

Mr. F. Chiang

Spring, 3 credits

ESC 361 Vehicular Dynamics

Structural load bearing phenomena. Static and dynamic lifters. Fluid mechanical thrusters, including foils, propellers, windmill propulsion systems, and jets. Fluid dynamic drag. The prediction of vehicle recti-

linear performance. The fluid mechanics of maneuvering. Static and dynamic stability. Hydrodynamic and structural applications to vehicles of current and future interest.

Prerequisite: ESG 264.

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.

Prerequisites: ESG 264, MSM 154.

Mr. E. O'Brien

Fall, 3 credits

ESC 379 Compressible Gas Dynamics

One-dimensional gas dynamics 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 conductivity, and concepts from gas kinetics.

Prerequisites: ESG 101, ESG 264, and MSM 154.

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.

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 and permission of instructor.

Mr. G. Stell

3 credits

ESC 392 Dynamical Oceanography

The hydrodynamic equations in rotating systems; status and dynamics of functionless ocean currents; thermohaline circulations and frictional coupling between wind and

water; radiation budget of the Northern Hemisphere; windwaves, gravitational, and tidal forces, turbulent diffusion at the surface, and the role of density stratification in dynamical oceanography.

Prerequisites: ESG 101 or equivalent, and ESG 264.

Mr. E. O'Brien

Spring, 3 credits

ESC 397 Air Pollution and Its Control

Air pollution is studied from the standpoint of causes, effects, and controls. This includes a study of air resources, climatology, and meteorological considerations in air pollution studies. The causes of our pollution are stressed, with consideration being given to variations in characteristics in different parts of the country. Physical, chemical, and physiological effects of air pollution on man, plants, animals, and structures are considered. Social costs are also reviewed to determine an economic basis for control in addition to esthetic and health bases. The scientific principles of controlling gaseous and particulate air pollution are discussed, and related to engineering practices in the control of air pollution.

Prerequisite: Senior standing or permission of instructor.

Mr. S. Harris

Fall, 3 credits

ESC 398 Intermediate Thermodynamics

The transformations of heat into mechanical work; the principle of the conservation of energy; the limitations involved in the transformation of heat into work. The role of energy in the biosphere and the role of the environment as the (sink)reservoir will also be discussed.

Prerequisite: ESG 101.

Mr. L-S. Wang

Spring, 3 credits

INTERDISCIPLINARY PROGRAM IN URBAN SCIENCE AND ENGINEERING

Professors: BELTRAMI, NATHANS (*Chairman*)

Associate Professors: ALTMAN, BLUM

Assistant Professor: BODIN

TECHNICAL ELECTIVE

ESU 301 Research in Urban Science and Engineering

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 (MSA 390, ESR 301, ESE 301, ESM 301, ESC 301, ESU 301) may be counted towards fulfillment of technical elective requirements.

Fall and Spring, 3 credits, repetitive

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.

Now underway, the Health Sciences Center encompasses six schools: Medicine, Dental Medicine, Basic Health Sciences, Nursing, Social Welfare, and Allied Health Professions, as well as a University Hospital and a Veterans' Administration Hospital, a Division of Laboratory Animal Resources, a Division of Health Sciences Communication, and a 500,000 volume Health Sciences Library. The academic plan of the total Health Sciences Center has been developed in a way that will insure to students in all the 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, include a number of "clinical campuses" being developed in cooperation with several outstanding patient care facilities on Long Island.

The following table shows the opening dates of each school and the degrees to be conferred:

	DATE OF OPENING	DEGREES
Allied Health	1970	B.S., M.S.
Nursing	1970	B.S., M.S.
Social Welfare	1970	B.S.W., M.S.W. D.S.W., Ph.D.
Basic Sciences	1971	M.S., Ph.D.
Medicine	1971	M.D.
Dental Medicine	1972	D.D.S., M.S.

In 1975-76 when the first phase of construction will be completed, it is anticipated that the Health Sciences Center will have approximately 2800 students and 620 faculty members. In addition, in 1975-76, about 2000 to 2500 part-time students in the field of continuing education in all of the health professions will be accommodated.

At the completion of the second phase of the construction, sometime in 1978-79, the total number of full-time students accommodated will increase to 3500 and the part-time students to more than 3000.

The *Health Sciences Center Bulletin*, describing the complete program offerings of the six schools, is available from the Health Sciences Center dean for students, State University of New York at Stony Brook, Stony Brook, N.Y. 11790.

The following is a brief description of the three schools which accept undergraduates.

SCHOOL OF ALLIED HEALTH PROFESSIONS

The School of Allied Health Professions, which accepted its first students in 1970, has established several programs which lead to professional qualification in specific health fields, as well as to academic degrees. In 1971-72, programs leading to the degree of Bachelor of Science will be offered in the following fields:

- Community and School Health (Health Education)*
- Medical Technology
- Cardiopulmonary Technology/Respiratory Therapy
- Physical Therapy

In addition, an academic program leading to a Certificate will be offered for Physician Associates.

All baccalaureate programs are upper division programs which require two years of college credit, with specific prerequisites in some cases, for admission. The Certificate program does not require prior college credit, but students must demonstrate ability to carry the program, which is conducted at an upper division level. Some graduate programs are also offered by the school.

All programs of the School of Allied Health Professions are professional in nature, with limited capacity. All students who wish to declare a major in the school, or to register for courses offered by the school, must have permission of the dean, program director, or instructor.

* Approved for teacher certification.

Faculty members are available to serve as advisors to students in the lower division at Stony Brook who plan to apply for any of the above programs. Individuals interested in discussing the potentials of a career in any of the allied health professions are welcome to contact the Office of the Assistant Dean to make arrangements to meet with a faculty member for this purpose.

SCHOOL OF NURSING

The School of Nursing which admitted its first students in the fall of 1970, offers an undergraduate program designed for entrance at the sophomore and/or junior year. This program leads to a Bachelor of Science degree and prepares the student to take the Registered Nurse Licensure Examination upon successful completion of the senior year.

All students who want to major in nursing or wish to register for courses in nursing should secure academic advisement prior to requesting permission to enter the program. Faculty are available at the School of Nursing to serve as advisors. *All students in the School of Nursing must satisfy all general university requirements for the B.S. degree.*

Completion at a junior college of lower division general education requirements is accepted for transfer as well as completion of two years of undergraduate work at other four-year institutions.

Registered nurses seeking their B.S. degree are also admitted to the program at the undergraduate level with advanced standing.

Graduate programs in clinical specialties will be offered in 1973.

SCHOOL OF SOCIAL WELFARE

The School of Social Welfare evolves out of the tradition of the profession of social work and characterizes itself as an institution committed to education for social change. Its educational objectives are to provide a learning environment for those individuals who wish to deepen and extend their knowledge and experience in bringing about directed social change. The school structure is geared to facilitate the development of committed and knowledgeable social welfare practitioners who are interested in engaging themselves in shaping society.

Ideas and action are seen as the two major components of the educational experience. The school provides the setting and a range of resources for the exploration and development of those ideas and patterns of action which are related to the social problems of a complex post-industrial society.

The undergraduate program is a two-year (junior and senior years) program leading to the degree of Bachelor of Social Welfare. One hundred students

who are beginning their junior year will be admitted to the program. The following year another 100 juniors will be admitted bringing the undergraduate enrollment of the school to 200 full-time students by 1972.

The purpose of the program is to allow students the opportunity to develop a beginning understanding of those conditions in American society which have led to discriminating forms of social organization, debilitating communities, and inequities in the distribution of human rights, power, and resources. Students will be expected to develop systematic analyses of the society and concentrated knowledge about one social problem area of particular concern to them.

The curriculum developed by four faculty and 12 undergraduates tentatively projects two primary learning modes for students: (1) classroom-based learning through courses, seminars, learning internships, research, etc., focused on the substantive range of ideas which form the core of the curriculum, and (2) community-based learning, probably in the areas of health, ethnicity and social class, youth and community, social service/social control systems, and urban sprawl; a wide range of social issues and problems will be confronted in each of these concentrations of faculty and student resources.

A two-year graduate program leading to the degree of Master of Social Work will begin in September 1971 with a Ph.D. program planned for 1973.

DIRECTORIES

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STATE UNIVERSITY OF NEW YORK

General Description

Campuses

CAMPUS MAP

TRANSPORTATION TO STONY BROOK

STATE UNIVERSITY OF NEW YORK

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Don J. Wickham, B.S.	Hector

<i>Chancellor of the University</i>	Ernest L. Boyer, A.B., M.A., Ph.D.
<i>Deputy Vice Chancellor of the University</i>	Merton W. Ertell, B.S., M.A., Ph.D.
<i>Provost</i>	Harry W. Porter, A.B., M.S., Ph.D.
<i>Secretary of the University</i>	Martha J. Downey, B.S., M.A.

STATE UNIVERSITY OF NEW YORK AT STONY BROOK

MEMBERS OF THE COUNCIL

Subject to powers of the State University trustees defined by law, the operations and affairs of the State University at Stony Brook are supervised locally by a Council appointed by the Governor. Members of the Council at time of printing are listed below:

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Bellport

GEORGE B. COSTIGAN
Long Beach

SAMUEL G. EASTERBROOK
Dix Hills

DONALD J. LEAHY
Douglaston

JERALD C. NEWMAN
North Woodmere

J. KEVIN MURPHY
Garden City

WILLIAM H. MURPHY
Woodbury

PETER J. PAPADAKOS
St. James

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Smithtown

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Stony Brook

OFFICERS OF ADMINISTRATION

All positions listed are as of January 15, 1971.

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*Vice President for Liberal Studies and
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JOSEPH DIANA, A.B.
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Coordinator of Research

CLIFFORD DECKER, B.S.
Director of Physical Plant

DANIEL DICKER, B.C.E., M.C.E., Eng.Sc.D.
Associate Dean, College of Engineering

MYRON DOUCETTE, S.B. in M.E., M.B.A.,
Ph.D., P.E.

*Assistant to the President for Scientific
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*Assistant Vice President for
Academic Affairs*

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Director of the Computing Center

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*Assistant Vice President for Finance and
Management; Business Manager*

JOSEPH HAMEL, B.B.A.
*Assistant Vice President for Finance
and Management; Controller*

KARL D. HARTZELL, A.M., Ph.B., Ph.D.
Administrative Officer

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*Assistant Vice President for
Academic Affairs*

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Dean, College of Engineering

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Acting Provost, Biological Sciences

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Director of Instructional Resources Center

LEWIS LUSARDI, B.A.
*Administrative Associate, Research
Foundation, Office of the President*

JAMES MCKENNA, B.A., M.A., Ph.D.
Assistant Vice President for Liberal Studies

WILLIAM E. MORAN, A.B., M.B.A., Ph.D.
Assistant Executive Vice President

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*Provost for Educational Research
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*Executive Dean of Students; Acting
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*Acting Dean of New Student Affairs;
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CHARLES R. WAGNER, A.B. Arch.
Director of Facilities Planning

HERBERT WEISINGER, A.B., M.A., Ph.D.
Dean of the Graduate School

RUBEN WELTSCH, A.B., B.S., M.A., Ph.D.
Director of Libraries

DAVID WOODS, B.A., M.A.
Director of University Relations

FACULTY

This faculty listing contains the teaching faculty and their academic positions as of March 15, 1971.

- ^aKENNETH T. ABRAMS
Associate Professor of English
B.A., Washington and Jefferson College;
Ph.D., Cornell University
- ADELE ADDISON
Performing Artist in Residence
B.M., Westminster Choir College, New
England Conservatory of Music
- ALFRED ADLER
Professor of Mathematics
S.B., Massachusetts Institute of Tech-
nology; Ph.D., University of California at
Los Angeles
- TADATOSHI AKIBA
Lecturer in Mathematics
S.B., M.S., University of Tokyo; Ph.D.,
Massachusetts Institute of Technology
- ERALP A. AKKOYUNLU
Assistant Professor of Engineering
B.S.E.E., M.S.E.E., Ph.D., Columbia Uni-
versity
- JOHN M. ALEXANDER
*Professor and Chairman, Department of
Chemistry*
B.S., Davidson College; Ph.D., Massachu-
setts Institute of Technology
- PER A. ÅLIN
Associate Professor of History
B.A., University of Stockholm; M.A., Uni-
versity of Chicago; Ph.D., University of
Vienna
- ^bHARRIET R. ALLENTUCH
Associate Professor of French
B.A., University of Rochester; M.A., Rad-
cliffe College; Ph.D., Columbia University
- LAWRENCE ALLOWAY
*Professor of Art and Director of Art
Gallery*
Art Critic, and Former Curator of Solo-
mon R. Guggenheim Museum
- THOMAS J. J. ALTIZER
Professor of English
B.A., A.M., Ph.D., University of Chicago
- STANLEY M. ALTMAN
Associate Professor of Engineering
B.E.E., City College of New York; M.S.E.E.,
Purdue University; Ph.D., Polytechnic In-
stitute of Brooklyn
- DONNA AMARIGLIO
Assistant Librarian, Reference
A.B., Cornell University; M.L.S., Columbia
University
- EDWARD AMES
*Professor and Chairman, Department of
Economics*
B.A., A.M., M.P.A., Ph.D., Harvard Uni-
versity
- OAKES AMES
*Associate Professor and Chairman, Depart-
ment of Physics*
B.A., Harvard University; Ph.D., Johns
Hopkins University
- RONALD ANDERSON
Performing Artist in Residence
B.M.E., Central Missouri State College;
B.S., M.S., Juilliard School of Music; M.A.,
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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-division 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

Office of the Chancellor
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

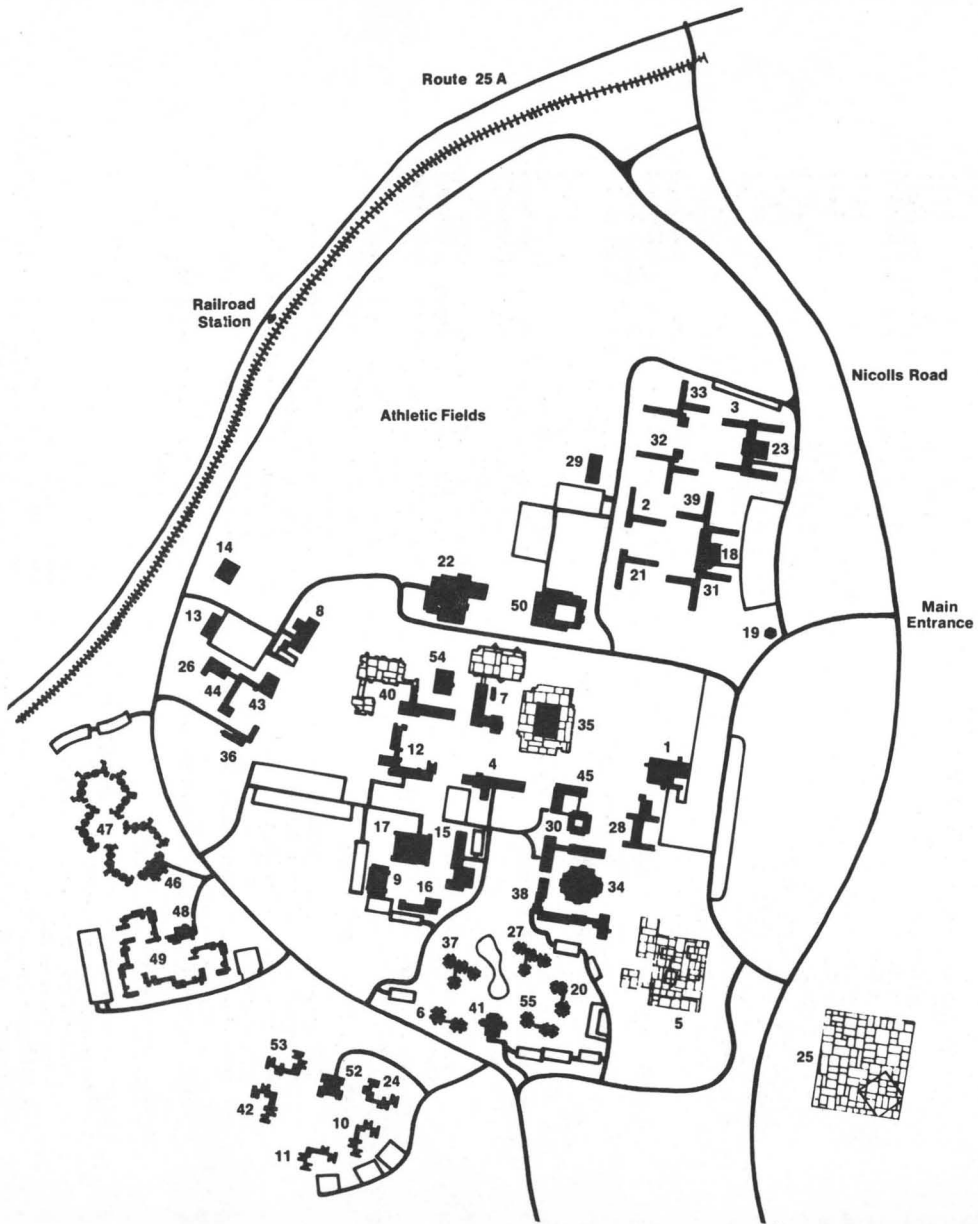
COMMUNITY COLLEGES

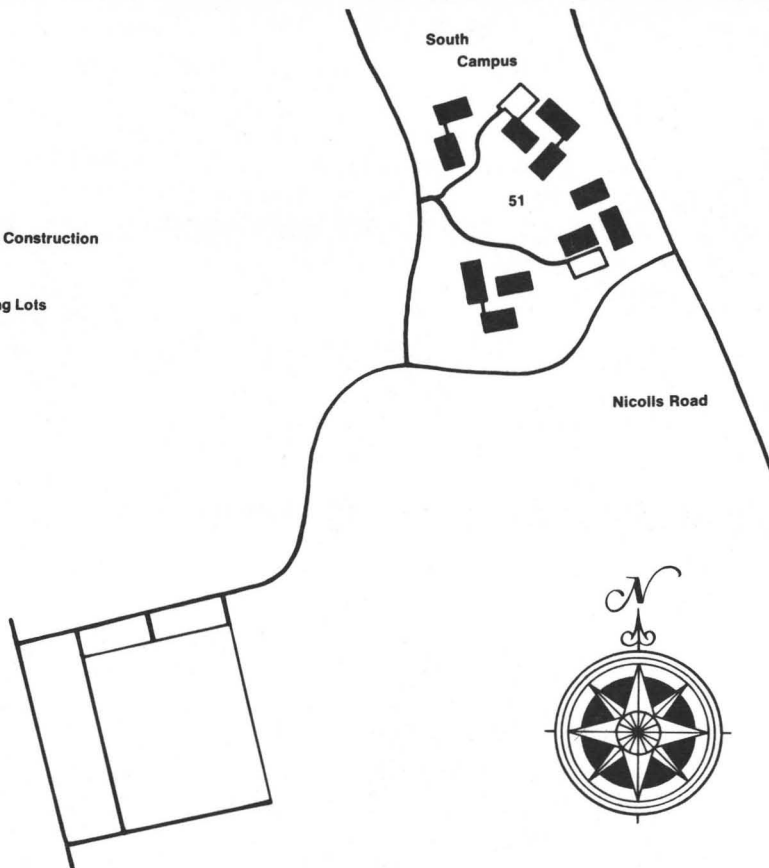
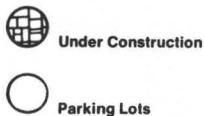
(Locally-sponsored, two-year colleges under the program of State University)

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
Eric 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.)

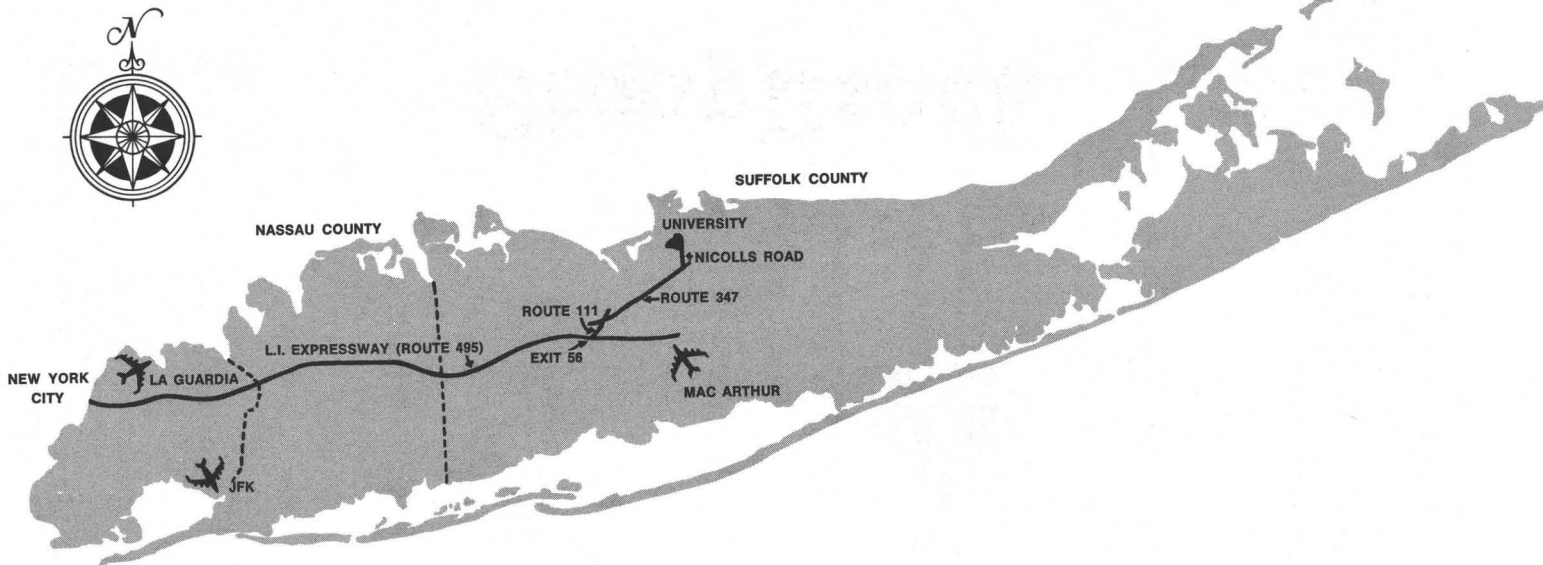




STATE UNIVERSITY OF NEW YORK
at
Stony Brook

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TRANSPORTATION TO STONY BROOK

BY AIR

Stony Brook is located ten miles from Long Island-MacArthur Airport and 50 miles from Kennedy International and LaGuardia Airports.

BY CAR

Take the Long Island Expressway (Route 495) east from the Queens-Midtown Tunnel in Manhattan. Leave Expressway at Exit 56 and follow Route 111 north for two

miles. Turn right onto Route 347. After six miles, turn left onto Nicolls Road and continue two miles to the main entrance. Stop at gatehouse for parking permit.

BY RAILROAD

Take the Long Island Railroad's Port Jefferson line from Pennsylvania Station (Manhattan) or Flatbush Avenue Station (Brooklyn), change trains at Jamaica for the Stony Brook Station. Inquire for free campus bus.

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