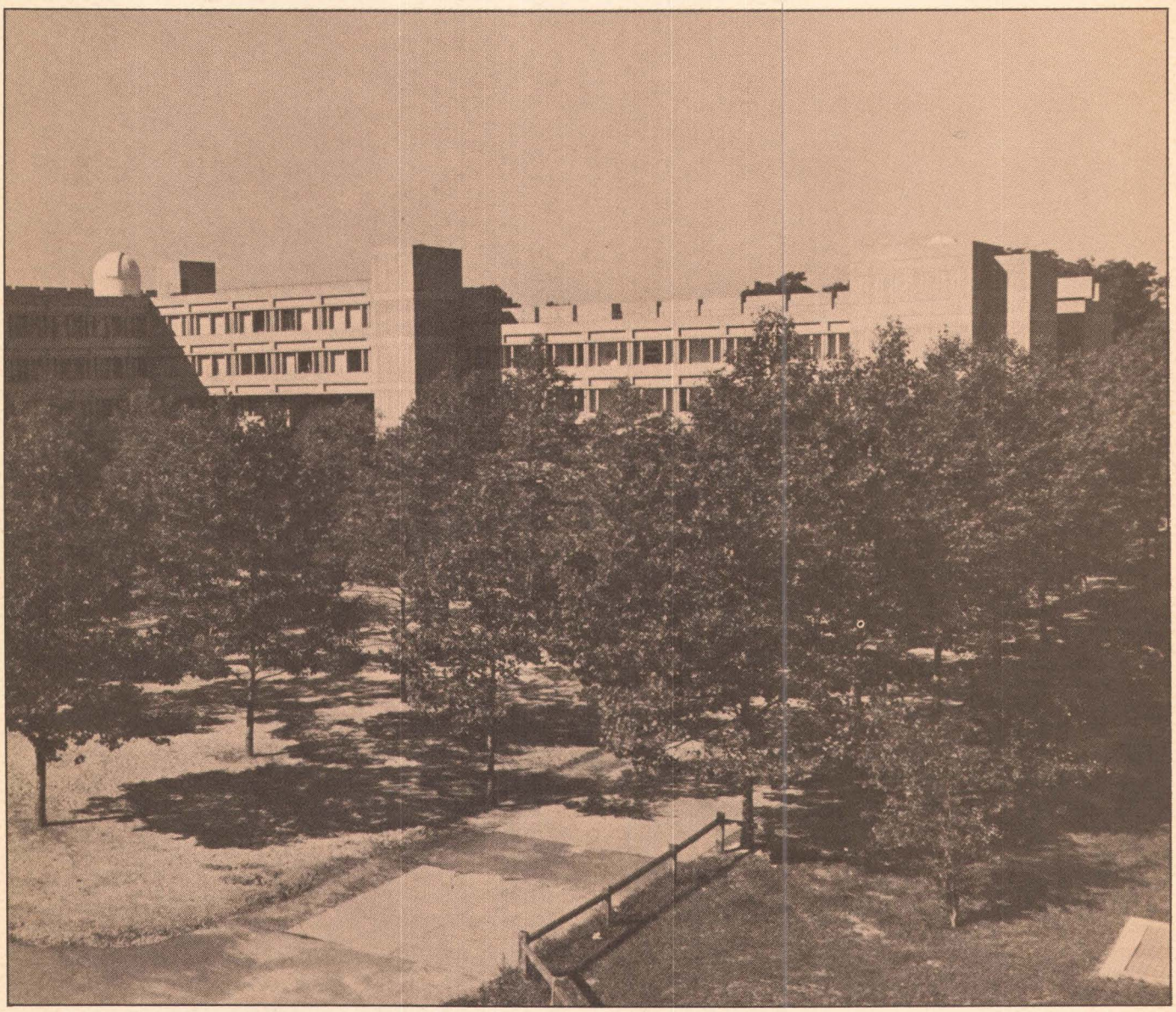
1982-84 Graduate Bulletin

State University of New York at Stony Brook



StonyBrook

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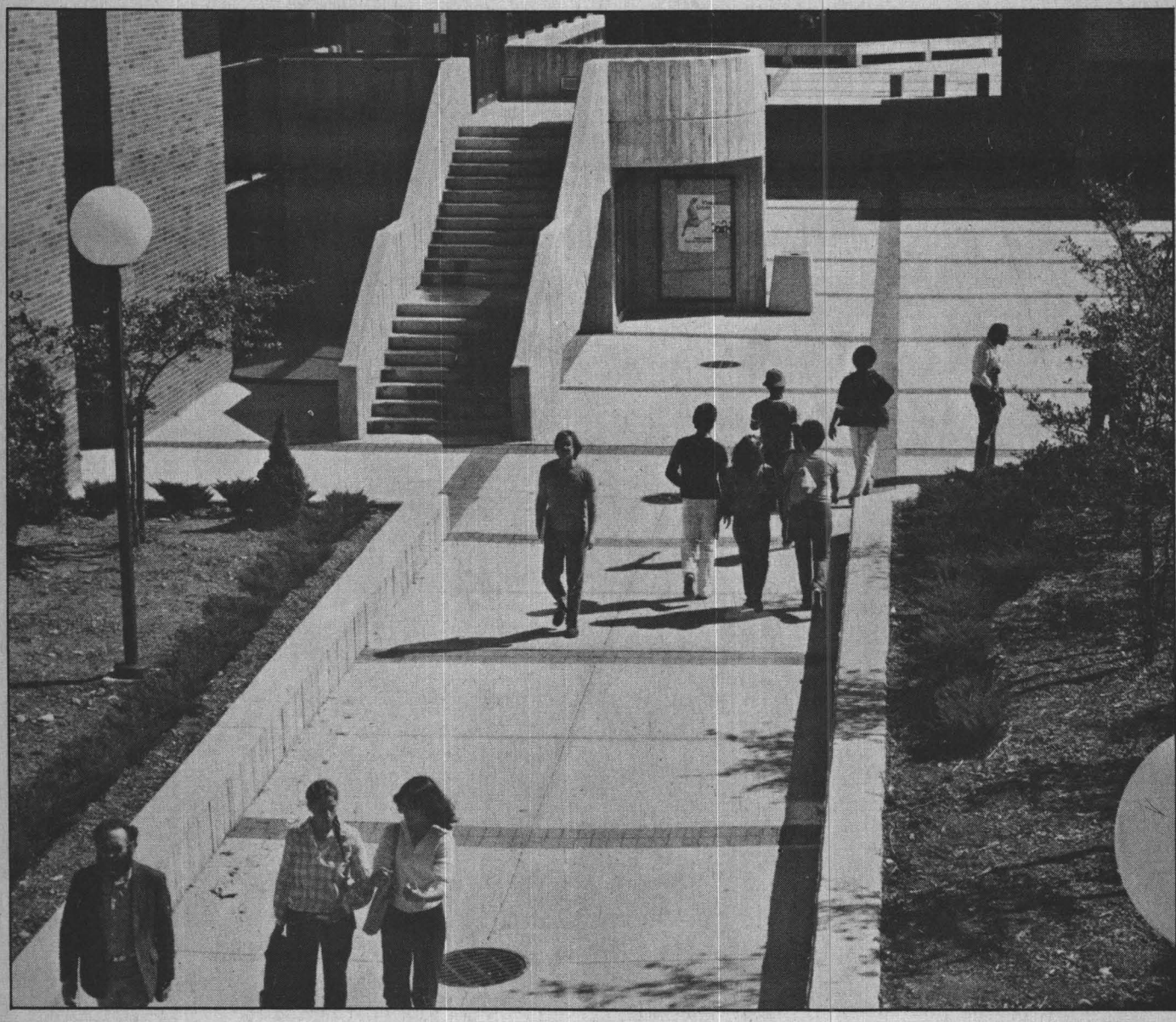

StonyBrook

Graduate Bulletin
Volume XVII

Press Date: January 29, 1982

Photos by D. Ann Carvalho, Dan Cornish, Michael Petroske, Bob Klein, HSC Photography Service, and University Affairs.

The University represents that the information in this publication is accurate as of the press date. Circumstances may require that a given course be withdrawn, or that alternative offerings be made. Names of instructors for courses, and days and times of class sessions are given in the Class Schedule, available to students at registration. All applicants are reminded that the State University of New York at Stony Brook is subject to the policies promulgated by the Board of Trustees of the State University of New York. Fees and charges are set forth in accordance with such policies and may well change in response to alterations in policy or actions of the legislature, during the two-year period covered by this publication. The University reserves the right to change its policies without notice.

Additional bulletins are published and made available for undergraduate and Continuing Education (CED) students.

Contents

Areas of Specialization

StonyBrook

HEGIS code numbers have been included where appropriate.

Graduate curricula at the State University of New York at Stony Brook are grouped into three classes that differ in the amount of formal recognition and independence. **Program** refers to a graduate degree program approved by the central administration of the State University of New York, and registered with the State Education Department. The degree is awarded with the name of the program attached. Each degree program has a distinct faculty, a distinct formal curriculum, and separate requirements for admission and graduation. **Graduate Studies** refers to a distinct formal curriculum within a graduate program, separate from other graduate studies subsumed under the same degree program. Graduate studies have distinct faculties, formal curricula, and separate admissions and graduation requirements. **Concentration** refers to a curriculum within a program or graduate studies that may have considerable overlap in curriculum and admission and graduation requirements with other concentrations in the same higher unit. Note that the name of the graduate degree obtained by a student is that of the degree program sponsoring the particular graduate studies or concentration and not that of the graduate studies or concentration selected by the student.

Academic Calendar

Fall Semester 1982

Monday, August 23: Foreign students arrive.

Monday-Friday, August 23-27: Final registration and payment (or proper deferral) of fees for all students not previously registered (schedule announced prior to registration). Foreign student orientation.

Wednesday-Friday, August 25-27: Residence halls open for new student check-in.

Friday-Sunday, August 27-29: Residence halls open for returning student check-in.

Monday, August 30: Classes be gin; late registration begins with $20 late fee assessed.

Monday, September 6: Labor Day (no day or evening classes).

Monday, September 13: End of late registration period. Last day for all students to drop a course without tuition liability.

Friday, September 24: Last day for graduate students to add or withdraw from a course. Last day to file for December graduation; graduate students (except CED) file at Graduate School Office; CED students file at CED Office.

Monday, September 27: Yom Kippur (no day or evening classes).

Tuesday, October 12: Columbus Day (classes in session).

Thursday, October 14: Last day for payment of deferred fall semester fees.

Wednesday, October 27: Fall quarter housing period ends.

Monday, November 1: Last day for removal of Incomplete and NR (No Record) grades from spring semester and summer session.

Tuesday, November 2: Election Day (classes in session).

Monday, November 15: Advance registration for spring semester 1983 begins (schedule announced prior to registration).

Tuesday, November 23: All classes will follow Thursday's schedule.

Wednesday, November 24: Thanksgiving recess begins at close of classes.

Monday, November 29: Classes resume.

Friday, December 10: Bills for spring 1983 semester mailed to preregistered students.

Wednesday, December 15: Last day of classes; last day to withdraw from the University.

Thursday, December 16: Reading day.

Friday, December 17: Final examinations begin; final grades due in Registrar's Office 72 weekday hours after last class meeting or scheduled examination. Last day for graduate students to submit theses and dissertations to Graduate School for December graduation.

Thursday, December 23: Final examinations end; fall semester ends; residence halls close for fall semester; winter recess begins at close of examinations.

Friday, December 24: Intersession housing begins.

Spring Semester 1983

Monday, January 3: Last day for mail payments of spring semester fees for preregistered students.

Friday, January 7: Last day for departments to submit Completion Statements for December master's and doctoral degree candidates.

Monday, January 10: Last day for preregistered students to pay spring semester fees in person without late payment penalty.

Tuesday, January 11: Foreign students arrive.

Thursday-Tuesday, January 13-18: Final registration and payment (or proper deferral) of fees for all students not previously registered (schedule announced prior to registration).

Friday, January 14: Intersession housing ends.

Monday-Tuesday, January 17-18: Residence halls open for returning students.

Wednesday, January 19: Classes begin; late registration period begins with $20 late fee assessed.

Tuesday, February 1: End of late registration period; last day for all students to drop a course without tuition liability.

Tuesday, February 15: Last day for graduate students to add or withdraw from a course.

Friday, February 18: Last day for graduate students to file for May graduation; graduate students (except CED) file at Graduate School Office; CED students file at CED Office. Mid-winter recess begins at close of classes.

Wednesday, February 23: Classes resume.

Thursday, March 3: Last day for payment of deferred spring semester fees.

Tuesday, March 15: Last day for removal of Incomplete and NR (No Record) grades from the fall semester.

Friday, March 18: Spring quarter housing period ends.

Friday, March 25: Spring recess begins at close of classes.

Monday, April 4: Classes resume.

Monday, April 11: Advance registration for fall semester 1983 begins (schedule announced prior to registration). Bills for fall semester to be mailed approximately June 1 with payment due during latter part of July.

Monday, April 18: Registration begins for summer session 1983 with fees payable at time of registration.

Friday, April 22: Last day for graduate students to submit theses and dissertations to Graduate School for May graduation.

Thursday, May 12: Last day of classes; last day to withdraw from the University.

Friday, May 13: Reading day.

Monday, May 16: Final examinations begin; final grades due in Registrar's Office 72 weekday hours after last class meeting or scheduled examination.

Friday, May 20: Final examinations end; spring semester ends. Residence halls close for all except graduating seniors and summer residents.

Sunday, May 22: Commencement; all residence halls close.

Friday, May 27: Last day for departments to submit Completion Statements for May master's and doctoral degree candidates.

General Information

StonyBrook

Background

Established little more than two decades ago as New York's comprehensive State University Center for the downstate-metropolitan area, the State University of New York at Stony Brook is recognized as one of the nation's finest universities. Stony Brook offers excellent programs in a broad spectrum of academic subjects, and conducts major research and public service projects. Over the past decade, externally funded support for Stony Brook's research programs has grown faster than at any other university. Internationally renowned faculty members offer courses from the undergraduate to the doctoral level for more than 16,000 students through 71 undergraduate and graduate departmental and interdisciplinary majors. Extensive resources and expert support services help foster intellectual and personal growth.

In 1960, the State Board of Regents and the late Governor Nelson Rockefeller established Stony Brook's mandate as a comprehensive University Center, to "stand with the finest in the country." The quality of Stony Brook's programs was praised by a distinguished national team of scholars in the last Middle States Association of Colleges and Secondary Schools reaccreditation report, which recognized Stony Brook's spectacular achievements in so quickly becoming "an institution of national stature. The University is in an excellent position to make major contributions in policy and problem oriented research of regional, as well as national, importance."

Founded in 1957 at Oyster Bay, Long Island as a State University College to prepare secondary school teachers of mathematics and science, the young school moved in 1962 to its present location on Suffolk County's north shore.

Since then, Stony Brook has grown to encompass 98 buildings on 1000 acres. The faculty has grown from about 175 to 1100, the student body from 1000 to over 16,000 and the annual operating budget from about $3 million to $120 million.

The University serves the region through research into area problems; through cooperative programs with governmental agencies at the federal, state and local levels; through response to the extraordinary demand for higher education opportunity from the region; and as one of Long Island's largest employers. Stony Brook strives to develop programs of the highest quality in areas of great public need, including the health sciences, engineering and applied sciences, public policy, marine and environmental sciences and the arts.

Location

Stony Brook is located about 60 miles east of Manhattan on the wooded north shore of Long Island, convenient to New York City's cultural life and Suffolk County's tranquil, recreational countryside and seashores. Brookhaven National Laboratory and the Cold Spring Harbor Laboratory are nearby. Located near the restored village of Stony Brook at the geographical center of Long Island, the campus is some 60 miles west of Montauk Point. It is within minutes of New York State's richest farmland and clam beds, its spectacular Atlantic beaches along Fire Island, the craggy coastline and cliffs of Long Island's north shore and its picturesque village greens and gracious country homes. Long Island's hundreds of miles of magnificent coastline attract many swimming, boating and fishing enthusiasts from around the world.

Degree Opportunities

Graduate study is offered in 24 of Stony Brook's present 29 academic departments, as well as in the five Schools of the Health Sciences Center, and the Center for Continuing Education. The doctoral degree is offered through 21 departments, the M.A. through 15 and the M.S. through nine. There are also two interdisciplinary M.S. programs, an M.Mus. (Master of Music), a D.M.A. (Doctor of Musical Arts), a D.A. (Doctor of Arts) in foreign languages and a terminal M.A. designed specifically for teachers in biology, chemistry, English, French, history, mathematics, philosophy, physics, sociology or Spanish. In the Health Sciences Center, the M.D. and Ph.D. degrees are offered by the School of Medicine; the D.D.S. by the School of Dental Medicine; the M.S.W. degree by the School of Social Welfare; and the M.S. degree by the School of Alied Health Professions and the School of Nursing. Evening Center programs of the Center for Continuing Education, primarily for working adults, offer the degree of Master of Arts in Liberal Studies (MA/LS). At the undergraduate level, many departmental major programs and interdisciplinary programs leading to the B.A., B.S. and B.E. (engineering) degrees are offered by the College of Arts and Sciences, the College of Engineering and Applied Sciences and the Health Sciences Center.

Campus

Stony Brook's bustling academic community is situated within a thousand acres of fields and woodland. Bicycle paths, an apple orchard, park benches, a duck pond and spacious plazas complement modern laboratories, classroom buildings and the Fine Arts Center, giving Stony Brook spirit and cultural vitality.

Surrounding the Frank Melville, Jr. Memorial Library at the center of the campus (see map at the back of this book) are the major academic buildings for arts and sciences and engineering, the Van de Graaff nuclear accelerator, the Administration Building, Lecture Center, Laboratory-Office Building, Educational Communications Center, Computing Center, Stony Brook Union, Gymnasium and other service and activities buildings. Stony Brook's Fine Arts Center, situated between the Library and the Administration Building, provides superb performing arts facilities and houses the Departments of Theatre Arts, Music and Art. A spacious outdoor plaza in which concerts may be held connects the Library, Stony Brook Union and Fine Arts Center in the middle of the campus. The Social and Behavioral Sciences Building houses five departments as well as the Center for Continuing Education.

Encircling the academic buildings are six residential quadrangles with living space for 1000 students each. They are the basic social units for on-campus students, providing residence halls, dining rooms and a diversity of student-sponsored enterprises and social facilities. Each quadrangle consists of 3-5 coeducational "colleges," or residence halls, housing 200-400 students each. A 240-unit complex of one-, two- and three-bedroom apartments was opened in the fall of 1980.

South of the Main Campus is the 26-acre Ashley Schiff nature preserve. Beyond these woods and linked to the Main Campus by a shuttle bus service is the South Campus, where 11 functionally adaptable single-story buildings provide flexible space for emerging University programs.

The Health Sciences Center, east of Nicolls Road, includes Long Island's tallest building. The 540-bed University Hospital admitted its first patients early in 1980. Preliminary authority has been granted for construction of the permanent facility for the School of Dental Medicine. Parking facilities are provided for

9100 cars, including a 2000-car surface parking lot for commuting students, two 970-car parking structures for the Health Sciences complex and the main campus, and a 980-car structure completed in 1981.

Students

Stony Brook's recent enrollment was about 16,000 (11,000 undergraduates and 5000 graduate students, including about 2000 part-time graduate students enrolled in continuing education programs). Foreign students from some 75 countries represent about 9% of the total student body. Graduate students come from all over the country and the world.

Faculty

The vast majority of Stony Brook's 1100 faculty members hold doctoral degrees and 90% or more are engaged in active research leading to publication, much of it supported by external grants and contracts. The faculty-student ratio is about one faculty member for every 15 students.

Eminent faculty members include Einstein Professor C.N. Yang, the Nobel Laureate in physics; Distinguished Professors Lewis Coser and Justus Buchler in sociology and philosophy respectively; Pulitzer Prize-winning poet Louis Simpson in English; musician-scholars Charles Rosen and Richard Dyer-Bennett; art critic Lawrence Alloway; and author Thomas Flanagan in English, winner of the 1979 National Book Critics Circle fiction award for "The Year of the French." Stony Brook's distinguished faculty is also proud to include nine members of the National Academy of Sciences and one member of the National Academy of Engineering.

Research

In fiscal year 1981, Stony Brook's sponsored project expenditures exceeded $30 million. The bulk of these funds, over 80%, derive from grants and contracts with the federal government. The remaining funds come from private foundations, non-federal governments, voluntary medical agencies and industrial organizations. Over 500 sponsored projects are actively being pursued, including scientific studies, training programs, public service projects, educational activities and library support. Many departments prepare brochures describing their sponsored activities in detail.

All campus projects which involve human subjects, whether they are conducted as part of a research program or in conjunction with course activities (including graduate research), must receive prior review and approval by the campus-wide Committee on Research Involving Human Subjects (CORIHS). (It is SUNY policy that the campus may not require the participation of students as subjects in human research.) If such prior approval has not been obtained for degree-related work, delays may occur in the award of a graduate degree. Questions regarding human subjects should be addressed to the Staff Officer of CORIHS in the Office of Research Administration.

Academic publications edited or published at the University include: *Anthropology, Archives of Sexual Behavior, Art Criticism, Biological Psychiatry, Bulletin of Research in the Humanities, Evolution, Gradiva, Heat Transfer—Japanese Research, Journal of Applied Behavior Analysis, Journal of College Science Teaching, Marine Biology Letters, Mental Retardation and Developmental Disabilities, The Physics Teacher, Previews of Heat and Mass Transfer, Quarterly Review of Biology* and *Transplantation Proceedings.*

University Libraries

The Stony Brook campus is endowed with a number of libraries established to meet the information needs of students and faculty. The Frank Melville, Jr. Memorial Library, the main library building, provides both an intellectual and physical focal point for the campus and is among the largest academic libraries in the nation. Within the architecturally distinctive Melville building are collections serving the social sciences, humanities, fine arts and music. These collections are particularly strong in English, Western European and Latin American literature, as well as in modern Western history and Latin American history. Special departments in the library provide ready access to current fiction and non-fiction, current periodicals, government documents, maps, microforms and legal materials. Other facilities of note are a music listening center, a student lounge and a variety of individualized study carrels. The full range of library services, including open stack privileges and data base searches, are available to all students.

There are five branch science libraries. Four of these—chemistry, earth and space sciences, engineering and mathematics/physics—are located in departmental buildings. The fifth, biology, is located in its own building. There is also a Health Sciences Library in the Health Sciences Center. Collectively, the University Libraries contain over 1,300,000 bound volumes and 1,700,000 publications in microformat.

Other library facilities of note are the William Butler Yeats Archives and the Institute for Advanced Studies of World Religions, a privately endowed foundation which assists the study and teaching of world religions, particularly Asian systems.

Library Hours

During the academic year, the library is generally open Monday through Thursday, 8:30 a.m. to 12 midnight; Friday, 8:30 a.m. to 10 p.m.; Saturday, 10 a.m. to 6 p.m.; and Sunday, 2 p.m. to 12 midnight.

During intersession and other vacation periods, hours are generally 8:30 a.m. to 5:00 p.m., Monday through Friday, and closed weekends. The library is usually closed on those major holidays when classes are not held.

Note: Library hours are subject to change from year to year, and even within the year, depending on constraints imposed by budgetary limitations. Students are urged to check the posted hours of operation at the various branch libraries, as well as at the main library.

Computing Center

Stony Brook's Computing Center, located at the west side of the Engineering Quadrangle, is a major centralized facility to service the computing needs of instruction, research and administration. By supporting both local and remote batch access and a large network of interactive terminals, the Computing Center makes extensive computing capabilities available to the campus community.

The central computer complex consists of a UNIVAC 1100/82A system with 8 million characters of main memory, 2 billion characters of on-line disk storage and a peripheral complement of tape drives, printers and card processing equipment. More than 200 remote devices are located on the campus and are connected via a communication network. A tape library of more than 7000 magnetic tapes provides for storage of users' programs and data in machine accessible form.

The Computing Center operates three shifts each day, five days a week, plus one shift on Saturday. There are usually unattended operations (no operators present) for the remainder of the weekend. The Center is open for authorized student access each weekday from 8:30 a.m. to 11:30 p.m. and from 9 a.m. to 4 p.m. on Saturdays. The Center also normally expands its hours shortly before finals week to accommodate increased demand for the facilities during that time.

Special Centers and Institutes

The *Center for Contemporary Arts and Letters* develops campus art and letters holdings in print and electronic media, and sponsors visits by practitioners and critics of the arts; the *Center for Industrial Cooperation* links the research resources of the University to the needs of Long Island industry, especially in areas of high technology; the *Center for Photographic Images of Medicine and Health Care* collects, catalogs and disseminates slide duplicates of historical photographs relating to medicine and health care, develops curriculum materials based on photographic images and promotes research; the *Economic Research Bureau,* in cooperation with other University units and community agencies, conducts research in policy problems in health economics, public finance and regional economics; the *Educational Communications Center* helps develop more effective teaching methods through the use of media and other technical aids; the *Educational Products Information Exchange Institute* is a non-profit consumer agency for educational materials and equipment, chartered by the Board of Regents of the State of New York; Stony Brook's branch of *Empire State College,* the State University of New York's non-traditional learning arm, offers study towards associate and bachelor's degrees without formal class attendance; the *Horizon Center* concerns itself with the production and presentation of experimental theater and music; the *Institute for Advanced Studies of World Religions,* a private, non-profit educational foundation, located a major part of its informational facilities at Stony Brook in 1972. It fosters international cooperation in religious studies and assists the study and teaching of world religions, particularly Asian faiths, through its library containing over 50,500 volumes (in 31 Asian and 10 non-Asian languages) and nearly 590 periodical titles, bibliographical information services, and microform resource, translation, book publication and research programs.

The *Institute for Energy Research* is an organized research unit of the State University which works with U.S. and international agencies and developing country counterpart groups to develop new analytic methods to evaluate energy alternatives and to train individuals from developing countries in these techniques. This training is done through a number of training programs such as the Energy Management Training Program supported by USAID and offered in cooperation with Brookhaven National Laboratory; the *Institute for Theoretical Physics* has a faculty of thirteen and has guest scientists and visitors numbering about 100 every year, working in various aspects of elementary particle theory and nuclear theory; the *Institute for Urban Sciences Research,* the research arm of the W. Averell Harriman College for Urban and Policy Sciences, organizes and carries out research projects and programs on public policy problems and issues; the privately endowed *Institute of American Studies* conducts a summer graduate program for outstanding high school social studies teachers; the non-profit *International Art of Jazz, Inc.* provides concerts, workshops and an arts-in-education program for elementary and secondary schools throughout New York State, utilizing the art form in non-traditional ways as a medium of communications for intercultural awareness and understanding; the *Laboratory for Behavioral Research* houses 11 experimental, computer-controlled laboratories for the study and analysis of political judgment; the *Laboratory for Energy Technology* performs research on energy conversion, energy conservation and energy storage systems; the *Long Island Regional Advisory Council on Higher Education* is a consortium of colleges and universities on Long Island dedicated to improved educational effectiveness through inter-institutional cooperation.

The *Long Island Research Institute,* which is funded by the New York State Office of Mental Health, works closely with the Department of Psychiatry and Behavioral Science in mental health and behavioral sciences research; the *Marine Sciences Research Center* (MSRC) is the center for research, graduate education and public service in the marine sciences for the entire SUNY system. The MSRC concentrates on the Coastal Ocean and conducts studies in coastal environments throughout the world. The MSRC operates a fleet of coastal vessels with frequent research cruises in New York's coastal marine waters. The MSRC manages, jointly with the New York Department of Environmental Conservation, a 146-acre salt marsh preserve, the Flax Pond, and operates the Flax Pond Laboratory; the *Museum Computer Network,* headquartered on campus, works to help many of the world's major museums and other institutions make their collections and related information more accessible by computerizing museum files and archives; the *Museum of Long Island Natural Sciences,* which houses permanent and special temporary exhibits and has the largest collection of natural history objects on Long Island, is engaged in research and provides programs in Long Island's geological and ecological developments for both adults and schoolchildren; the *National Coordinating Center for Curriculum Development's* Minorities in Engineering Project contributes to the nationwide effort to bring the number of minority engineering students up to parity with the population distribution in the college ages; members of the *Nuclear Structure Laboratory* have recently completed construction of a superconducting linear heavy ion accelerator which is unique among university-based facilities and provides beams for a wide variety of nuclear experiments; the *Poetry Center* maintains a collection of poetry as well as video and audio cassette recordings of poets reading from their own works, and sponsors readings by established and younger poets, lectures and symposia on the relationships of the humanities to the other disciplines.

The *Research Group for Human Development and Educational Policy* studies the academic and non-academic functioning of Stony Brook and other educational institutions across the nation and participates in the implementation of its recommendations; the *Research Foundation* administers grants and contract funds supporting sponsored research, training and related programs carried out by, or supervised by, University faculty; the *Science and Mathematics Teaching Center* assists Long Island math and science teachers in curriculum planning and the development of special resource materials; the *Stony Brook Foundation, Inc.,* a not-for-profit corporation formed to encourage and accept gifts and endowments in support of University programs as well as scholarship and loan programs for needy students, also seeks support for University programs which cannot otherwise be supported by the State budget; the *Stony Brook Radiation Laboratory* is an organized research unit in which members work primarily on a variety of problems on the frontiers of nuclear physics and elementary particle physics; the *Sudden Infant Death Syndrome Information and Counseling Center* is a federally funded program through the Division of Maternal and Child Health to assist parents who lose a child to sudden infant death syndrome and to provide community awareness and education about this disease; *Taproot Workshops, Inc.,* a non-profit, county-wide center supported by grants from the New York State Council on the Arts and the Suffolk County Legislature, teaches creative writing to elderly people in congregate centers and nursing homes.

Community Ties

As the public university center for the bi-county-metropolitan New York region, Stony Brook plays a major role in the Long Island community. With more than 6000 people (full-time and part-time) on a campus payroll which exceeds $100,000,000 annually, Stony Brook is Long Island's sixth largest employer. It is estimated that the University generates close to a half-billion dollars annually in direct and indirect economic impact on the region. In addition to its function as a major regional research

facility and source of advanced and specialized instruction, the University provides a social and cultural center for Long Island, a uniquely sophisticated health care facility, recreational opportunities, and a broad range of other services for individuals and groups in both the public and private sectors.

Several hundred concerts, lectures, films, theater productions, art exhibits and sports events on the campus are open to the public each semester, many at no charge, and it is estimated that hundreds of thousands of persons annually attend these events or visit the campus to take advantage of other facilities and services. Through its Center for Industrial Cooperation, the University makes technical and academic resources available to serve the high technology and other industries which form Long Island's economic base; the W. Averell Harriman College for Urban and Policy Sciences and the Marine Sciences Research Center play a similar role in providing services for the public sector and on a wide variety of marine-related subjects to help solve the problems. The Economic Research Bureau serves a similar function. A unique range of health care services is offered through the sophisticated facilities of the University Hospital and the specialized clinics, centers and institutes operated by the School of Dental Medicine, the Department of Psychology, the Department of Psychiatry and Behavioral Science and other academic units.

In addition to the University's many degree programs, there are broad opportunities for credit-bearing and non-credit instruction for individuals pursuing specific, limited objectives or seeking personal enrichment. A thousand or more Stony Brook students annually participate in community volunteer programs in tutoring, recreation, health care and other areas. The University's ties with the community are strengthened by a number of community-university organizations, including the Association for Community-University Cooperation, the Friends of the Fine Arts Center, the Friends of Sunwood, the University Hospital Auxiliary and the Stony Brook Foundation.

Campus Activities

A wide variety of lectures, seminars, concerts, exhibits, theatrical performances, movies and sporting events are scheduled regularly during the academic year. Some recent well-known speakers at Stony Brook have included Frank Press, president of the National Academy of Sciences; Susan Gubar and Sandra Gilbert, authors of *Madwoman in the Attic;* Gil Noble, TV commentator; Abby Hoffman, ex-Yippie leader; Ralph Nader, consumer advocate; and environmentalist Barry Commoner.

Art galleries in the Fine Arts Center, in the Library, in the Chemistry Building, in the Administration Building and in the Stony Brook Union offer regularly changing exhibitions of works by on- and off-campus artists. The Museum of Long Island Natural Sciences, located in the Earth and Space Sciences Building, houses a continuous showing of dioramas depicting natural Long Island scenes, as well as special temporary exhibits. An average of five films are shown weekly on campus, including vintage and current productions; often admission is free for students. The campus enjoys an average of one classical music concert per day, including student recitals and performances by faculty and visiting artists.

The Fine Arts Center's pre-inaugural and inaugural concert series in the 1978-79 and 1979-80 seasons brought internationally acclaimed performers to Long Island, including Rudolph Serkin, the Bartok Quartet, Isaac Stern, Andre Watts, Itzhac Perlman and the Alvin Ailey Repertory Ensemble. Recent campus fine arts productions have included violinist Nathan Milstein, the Cincinnati Symphony Orchestra, the Ballet Fantasio of Romania, the Los Angeles Ballet, the American premier performance of Verdi's opera "Il Corsaro."

Stony Brook fields varsity teams in 17 intercollegiate sports competing through the NCAA, the ECAC and the Association for Intercollegiate Athletics for Women. The 1981 women's volleyball team won the New York State Division III AIAW championship. The 1981-82 women's swimming team had an All-American swimmer and the 1981-82 men's swimming team boasted a Metropolitan Conference freshman record-setter. The men's squash team is nationally ranked every year.

The campus student newspaper, *Statesman,* is published three times weekly during the academic year with a circulation of 10,000 on campus and in the local community. Other student publications include the *Stony Brook Press,* a student weekly; *Black World,* a newspaper focusing primarily on news of interest to the black community on campus; *Fortnight,* a feature magazine; *Soundings,* a literary magazine; and *Specula,* the campus yearbook.

Campus ministries serve student religious concerns through the Interfaith Center, offering regularly scheduled Jewish, Catholic and Protestant services and activities which are open to all. Religious and personal counseling services for students of these and other denominations are also provided through the Interfaith Center. The Catholic ministry offers a Newman Club for students, and religious and social services and activities in a Catholic "parish" atmosphere for the campus community. United Ministries in Higher Education on Long Island, the ministry of six Protestant denominations, conducts a project-oriented ministry which seeks to promote a creative, reciprocal interaction between campus, church and community-at-large in the service of human needs from the perspective of the communities of faith it represents. The B'nai B'rith Hillel Foundation offers religious social and cultural services as well as personal counseling for students and faculty. It is the umbrella organization for all the Jewish activities at Stony Brook.

The International Student Organization meets student interests in various cultural traditions, as do other groups including the Asian Student Association, India Association, African Students Association, Latin American Student Organization and Caribbean Association.

Graduate Student Organization

The GSO (Graduate Student Organization), the graduate student governing body at Stony Brook, is affiliated with other state and other national graduate student groups. It provides many special social, cultural and athletic events of interest to graduate students. The organization distributes a monthly newsletter and represents the graduate student body on issues of importance with the University administration. The GSO Graduate Center is presently located on the first floor of the Old Chemistry Building, Room 135. The GSO operates a lounge in the Graduate Center. For further information, call 246-7756.

Stony Brook Union

The Stony Brook Union is the campus center for social, recreational and cultural activities at Stony Brook. It was designed to provide space for activities which enhance the academic environment. It is open to all students, faculty and staff members.

The Union is a place to relax, to gather with friends. It is a place to take in a film or a concert, or to watch TV. You can take a craft or photography course, browse through the Barnes and Noble bookstore, buy records at discount prices, have your hair cut, bowl, play billiards, eat a quick snack or enjoy a leisurely meal.

The Union has space for all kinds of events. There are ten meeting and conference rooms. The auditorium seats 365, and the ballroom can accommodate up to 600. The Art Gallery displays the works of campus and community artists, and is open weekdays for browsing.

The Union has hosted China Week, Caribbean Week, Handicapped Awareness and Career Development symposiums, activity and club fairs, and more.

The University Information Center, located in the Union lobby, is a campus-wide resource center. Campus directory information, campus maps, bus and train schedules, and concert, film and other events information are available. The Information Center's phone number is 246-3636.

In the Office of Student Activities in Room 271, professional staff members will assist you with the programming and staging of campus events.

The Faculty-Student Association (FSA) is located in Room 282. FSA operates many Union services—check cashing, SCOOP Records, food service, the meal plan office—and several eating places in the Union: the main cafeteria, the Union Station Deli, the FSA Snack Bar, Dale's Ice Cream Pub and the End of the Bridge Restaurant and Cocktail Lounge.

The Rainy Night House, a student-run cafe, serves specialty teas, beer, brownies and other delights. Often, campus talent is booked to entertain patrons.

The Union Craft Center offers workshops in ceramics, photography, silk-screening, leatherwork and many other crafts. The non-credit classes are taught by professional and student staff, and are open to all. Fees are nominal. For information, call 246-3657.

The Union provides headquarters for many student groups such as Polity (the undergraduate student government), the Womyn's Center, the Gay Student Union, ENACT (Environmental Action) and NYPIRG (a consumer interest group).

The major student publications (*Statesman,* the student newspaper; *Specula,* the yearbook; *Black World;* and *Fortnight*), the University radio station WUSB-FM (90.1), and the SCOOP audio-visual service all operate from the Union.

Further information about the Stony Brook Union or its services can be obtained by calling the Information Center at 246-3636, or the Union Director's Office at 246-7101.

Hours of Operation

During the fall and spring semesters, the Union is open Monday through Wednesday, 8 a.m. to 1 a.m.; Thursday and Friday, 8 a.m. to 2 a.m.; Saturday, 10 a.m. to 2 a.m.; and Sunday, 10 a.m. to 1 a.m. During recesses or intersession it is open Monday through Friday, 8:30 a.m. to 5 p.m., and is closed Saturday and Sunday.

Summer session hours are Monday through Wednesday, and Friday, 8 a.m. to 12 midnight; Thursday, 8 a.m. to 2 a.m.; and Saturday and Sunday, 11 a.m. to 10 p.m. The Union is closed New Year's Day, Easter Sunday, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas Day.

Note: Union hours are subject to change from year to year and even within the year. For building hours information, call 246-3636.

Gymnasium

The gymnasium building, which includes a swimming pool, large and small gyms, squash and handball courts, exercise and universal gym rooms and a dance studio, is open seven days a week from 8 a.m. to midnight except on the eve of a major holiday, when it closes at 4 p.m. The gymnasium is also closed on major holidays.

Other physical education facilities include tennis courts, a quarter-mile track and separate fields for baseball, softball, soccer and intramural football.

Most facilities may be used for recreational purposes when they are not scheduled for classes, intramural or intercollegiate events or special events. Current schedules of recreation hours may be obtained in the Physical Education Office. Hours are subject to change depending on availability of staff.

Services

Health Service

The University Health Service, located in the Infirmary, primarily concerns itself with student health needs. (It is available to faculty and staff on an emergency basis only.) There is a registered nurse on duty in the Infirmary 24 hours a day. During the week there are scheduled hours for physicians; a physician is on call at other times. Specialty services, such as for gynecological or dermatological problems, are also available. For further information or help, call the Infirmary at 246-2273 (6-CARE).

Counseling Center

The University Counseling Center, located on the second floor of the Infirmary, provides individual, group, family and marital counseling and psychotherapy for students experiencing psychological difficulties. The Center also offers programs for personal growth and enrichment. For information, please call the Center at 246-2280, 2281 or 2282.

Veterans Affairs

The Office of Veterans Affairs provides counseling for veterans and veterans' dependents eligible to receive educational benefits. These students are urged to contact that office concerning their eligibility as soon as possible.

Foreign Student Affairs

The Office of Foreign Student Affairs assists students from other countries with finances, housing, government regulations (including immigration and tax matters), and problems related to cross-cultural differences. Questions relating to academics 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 access to a varied program of activities during the year, including tours and trips, discussion groups, home hospitality, speaking engagements and other events.

English as a Second Language

This program includes diagnosis and testing as well as classes aimed at raising students' ability to understand, speak, read and write standard English to the level of United States college students. An intensive full-time program, the Summer Institute for American Living, is offered in July and August.

American Living Institute

Stony Brook offers a "Summer Institute for American Living," a program of courses and activities in American languages and culture designed to meet the separate and special needs of foreign scholars. Participants in the Institute attend classes, visit American homes and join excursions to urban, suburban and rural places of cultural and historic interest. Admission is open to all foreign students who have attained a high school education or its equivalent and to spouses accompanying them.

Office of the Disabled

The Office of the Disabled coordinates services to disabled students and will assist them in application to the University, admission and orientation procedures. (The academic admission requirements and procedures for disabled students are the same as for all other applicants.) The Office will also help in the following areas: housing, meals, medical assistance (coordination with the Director of the University Health Service), recreation, academic needs and progress, special parking permits, facilities, financial aid and transportation.

A small Center for the Disabled, located in the Reserve Room of the Melville Library, emphasizes service to visually and

physically disabled students and faculty. The Library also offers extra services such as special study carrels and a paging service in the stacks for disabled students.

It is strongly recommended that after admission, students who are disabled identify themselves prior to the start of classes. These students should call 246-6051. An early start will permit the evaluation of possible problems and will provide time to work out solutions.

Child Care Services

The University has day care services for children ranging in age from two months to five years. There are three on-campus facilities staffed with professionals who are assisted by students enrolled in coursework practice. Each of the three centers specializes in a particular age group and curricular approach. The centers are open from 7:30 a.m. to 5:30 p.m., and fees are charged on a sliding scale.

Career Development Office

The Career Development Office assists all students and alumni with career planning and acts as a resource for information on full-time permanent employment. Individual and group consultation with students is emphasized while periodic critical self-examination assists students in relating academic expertise to aspirations for future professional involvement and advancement.

An on-campus recruitment program permits interested seniors and graduate students to meet with prospective employers and graduate schools, and a credentials service is provided to support students in their application for jobs or advanced study. These records are maintained permanently.

Students are encouraged to participate in the Student Volunteer Service Program (VITAL), in which experience in specific career areas is received by working with agencies and institutions seeking student volunteers.

Group discussions are held to assist students and alumni in writing resumes and to develop individual systems for applying for employment. As part of the Career Development Office's Out-Reach Program, visits are made by the career counselors to residence halls and campus departments in order to provide a broad exposure to career-related information.

The Career Development Resource Library has information pertaining to employment opportunities in business, government, social service and education. Relevant materials are available on career planning, teaching certification, health careers, graduate and professional school admissions testing, graduate school and financial aid information and recruitment options.

Other services available include information and applications for examinations required by various graduate and professional programs (i.e., the GRE, LSAT, GMAT, DAT, NTE, Actuarial Exam, MCAT, TOEFL, OAT, AHPAT and Pharmacy Test) and a library of taped descriptions of various careers as given by people who are actually doing the work being discussed.

It is suggested that students visit the Career Development Office and become familiar with the services it provides. The office, located in the Library Building, Room W-0550, is open weekdays from 8:30 a.m. to 5:00 p.m. Its telephone number is (516) 246-7023, 7024.

Honorary Societies

At Stony Brook, local chapters of national honorary societies provide recognition for outstanding academic performance. The New York Alpha Beta Chapter of *Phi Beta Kappa* is devoted to the promotion of excellence in liberal arts and sciences. The *Sigma Xi* Chapter honors achievement in pure or applied scientific research. The New York Omicron Chapter of *Tau Beta Pi* recognizes academic excellence in and service to the engineering profession.

Various disciplines have chapters on campus to foster scholarship in specific academic fields. These chapters include the Phi Chapter of *Alpha Kappa Delta* (sociology), Theta Mu Chapter of *Eta Kappa Nu* (electrical engineering), Xi Chapter of *Omicron Delta Epsilon* (economics), Sigma Tau Chapter of *Omicron Kappa Upsilon* (dentistry), Stony Brook Chapter of *Phi Alpha Theta* (history), Sigma Mu Chapter of *Phi Sigma Iota* (foreign languages), Delta Chapter of *Phi Sigma Tau* (philosophy), Eta Theta Chapter of *Pi Sigma Alpha* (political science) and Delta Nu Chapter of *Sigma Gamma Epsilon* (earth sciences).

Two additional groups at Stony Brook are *Chi Epsilon Delta,* continuing education honor society, and *Sigma Beta,* freshman honor society.

Equal Opportunity and Affirmative Action

The State University of New York at Stony Brook does not discriminate on the basis of race, religion, sex, color, national origin, age, disability, marital status, or status as a disabled or Vietnam-era veteran in its education programs or employment.

Discrimination is unlawful. If you are a student or an employee of SUNY at Stony Brook and you consider yourself to be the victim of illegal discrimination, you may file a grievance in writing with the Affirmative Action Office within forty-five (45) calendar days of the alleged discriminatory act. If you choose to file a complaint within the University, you do not lose your right to file with an outside enforcement agency such as the State Division of Human Rights or Equal Employment Opportunity Commission.

Any questions concerning this policy, or allegations of noncompliance, should be directed to:

Dr. Beverly E. Harrison
Special Assistant to the President for Equal Opportunity and Affirmative Action
Administration Building 438
SUNY at Stony Brook
Phone: (516) 246-3462

Parking and Traffic

Regulations have been established to govern vehicular and pedestrian traffic and parking on highways, streets, roads and sidewalks owned, controlled or maintained by the University. These regulations apply to students, faculty, employees, visitors and all other persons upon such premises. The detailed regulations and appeal procedures are available in the Department of Public Safety, Room 144, Administration Building.

Maintenance of Public Order

The University wishes to maintain public order appropriate for a university campus, without limiting or restricting the freedom of speech or peaceful assembly of the students, faculty or administration. The University has, therefore, issued the Rules for the Maintenance of Public Order to ensure that the rights of others are protected and to set forth prohibited conduct. For a copy of the Rules, contact the Office of Student Affairs, Room 355, Administration Building.

Planned Assembly and Demonstrations

All groups using University buildings and grounds for planned assembly and demonstrations should submit a Facilities/Space Use Request Form to register their activities.

Student Conduct Code

The University recognizes that students have, within the law,

rights of free expression and advocacy, and seeks to encourage and preserve these freedoms within the entire University. Inherent within this broad policy is the obligation of all students to conduct themselves lawfully, maturely and responsibly. To this end, the University has established the University Student Conduct Code which sets forth detailed regulations for conduct and disciplinary proceedings. These regulations recognize the need for due process and procedural fairness prior to the imposition of disciplinary action. For further information and written requirements, contact the Office of Student Affairs, Room 355, Administration Building.

Telephone Directory

It is the policy of the State University at Stony Brook to publish a Student Telephone Directory including student name, campus address, home address, telephone number, major and level. If a student does not wish to be listed in the Directory, or, in the case of a minor student, if a parent does not wish such listing, he or she will be required to so indicate at the time of registration by filing SUSB Form #503-B.

Financial and Residential Information

StonyBrook

Registration is not complete until a student has paid all fees and charges which are due and payable by the first day of classes unless properly deferred. All fees and charges are subject to change without further notice.

Charge or Fee

Tuition	First *Semester*	Second *Semester*	*Year*
Full-time graduate student			
N.Y. State resident	$ 850.00	$ 850.00	$1700.00
Out-of-state resident	1092.50	1092.50	2185.00
Part-time graduate student (11 credits or less)			
N.Y. State resident, per semester credit hour	71.00	71.00	
Out-of-state resident, per semester credit hour	91.50	91.50	
Professional schools (Medicine, Dental Medicine)			
N.Y. State resident	2150.00	2150.00	4300.00
Out-of-state resident	3150.00	3150.00	6300.00
Fifth Pathway	3000.00	3000.00	6000.00
College Fee			
Full-time graduate student	12.50	12.50	25.00
Part-time graduate student, per credit	.85	.85	
Housing			
Advance room deposit[1]			75.00
Double occupancy, per person	550.00	550.00	1100.00
Board	Fee to be announced		
Activity Fee[2] (Full-time students, except professional)	12.50	12.50	25.00
Cooking Fee[3] (Residents not on Board Plan)	50.00	50.00	100.00
Lost Identification Card			3.00
Late Registration Fee[4]			20.00
Transcript Fee			Each 3.00
Returned Check Charge			5.00
Late Payment Fee			20.00
Drop-Add Fee			10.00

The above fees are subject to change without notice.

[1] Applied to first-semester housing charges; apartment complex deposit is $100.00

[2] CED students pay a $7-per-semester fee

[3] Does not apply to the apartment complex

[4] Paid by students registering after the close of the official registration

Payment

All fees and charges for a given academic session must be paid in full or properly deferred prior to the first day of classes. All checks should be payable to "SUNY at Stony Brook." Post-dated checks are not acceptable. Visa or MasterCard payments may be made in person or by mail. Mail payments must include an Authorization for Use of Visa/MasterCard form. Students with approved tuition waivers, room waiver or activity fee waiver forms should submit those forms in lieu of payment. Graduate teaching assistant tuition waivers may be reduced by the amount of the Tuition Assistance Program Award (TAP).

Students making payment on or after the first day of classes or during the late registration period, or pre-registered students making payment after pre-billing due date shall be required to pay a late registration fee of $20.00. This fee may not be waived, and is non-deferrable. The late registration period ends at the close of the second week of classes.

Deferments

Students receiving awards provided by the State of New York, managed by the University or payable to the University, may utilize deferment equal to the amount of the award. Award checks will be applied to outstanding balances owed to the University and any excess funds will be refunded to the student. Documented proof of the award and the amount must be presented at time of payment to apply to deferment to the account.

Deferment may be granted to students for the following types of awards:

1. Tuition Assistance Program (TAP): All eligible New York State residents are required to file for Tuition Assistance Awards. Incoming students and students who have not received their application form by April 1 should immediately obtain the application form from the Financial Aid Office. (Students should apply for all awards at the earliest possible date, preferably no later than May 1, if they expect to receive award certification from the Higher Education Services Corporation prior to the beginning of classes in the fall. Students are reminded that failure to file an application in a timely manner can preclude their receiving award credit or deferment.)

2. National Direct Student Loan: Students who have filed applications prior to the specified deadlines and who qualify for awards receive award letters from the Financial Aid Office prior to registration. Acceptance of these awards must be returned to the Financial Aid Office promptly. The Financial Aid Office will return the deferment copy of the award letter, which should be presented along with a notarized power-of-attorney form to the Bursar's Office. Deferment will be granted upon presentation of the award letter and a notarized power-of-attorney form to the Bursar's Office.

3. Veterans' Education Benefits: Students who are eligible for veterans' benefits should obtain an application from the Veterans Affairs Office. Incoming students who are veterans are advised to contact the Veterans Affairs Office concerning veterans' benefits as soon as possible.

The 1972 G.I. Bill amendments provide for advance payment of up to two months of G.I. benefits to be available for the veterans upon registration, but in no case earlier than 30 days prior to the beginning of the enrollment period. The advance payment check will be mailed directly to the University and held there for the veteran. Veterans will be notified directly by the Veterans Administration.

Deferment based upon veterans' benefits may be obtained by submitting to the Bursar's Office a copy of the Deferment Form prepared and signed by the Stony Brook Office of Veterans Affairs. Veterans whose educational benefits are paid directly to the University should present an Eligibility Award Certificate from the Veterans Administration to the Bursar's Office.

4. Private, public or industrial scholarships, grants, internships and loans (including foreign student government scholarships and Vocational Rehabilitation Grants): All students who can present notification of awards payable to the University or jointly payable to the University and the student in the above categories are eligible for deferment of payment equal to the amount of the award. In cases where the award is payable to the student or to the University and the student, the student will be required to submit a notarized power-of-attorney form to the Bursar's Office in order to receive an award credit.

5. University Employment: Graduate students employed as teaching assistants, graduate assistants or research assistants may defer charges up to one-half of their semester stipend. Only tuition, room and board charges may be deferred. All deferments expire six (6) weeks after the first day of classes and must be supported by a notarized power-of-attorney and deferment form.

Transcripts

Students who wish to have transcripts of their academic records at Stony Brook forwarded to another institution or agency, or to themselves for their own use, must submit their requests in writing at least two weeks before the transcripts are needed, except at the end-of-semester peak period when additional time should be allowed. If making the request by mail, address a letter to the Bursar's Office, State University of New York at Stony Brook, Stony Brook, NY 11794. Include 1) your full name, 2) your I.D. (Social Security) number, 3) your complete current address, 4) your dates of attendance at Stony Brook, 5) the exact name, office, institution and complete address, including zip code, to which the transcript is to be sent and 6) the required fee of $3.00 for each transcript. Make checks payable to SUNY at Stony Brook.

If making the request in person, obtain a Transcript Request Form from the Office of Records/Registrar in the Administration Building and follow the instructions on the form.

All financial obligations to the University must be satisfied before a transcript can be released. A request for a transcript must be made by the student himself/herself, and must be made in writing. Students who have both an undergraduate and a graduate transcript and wish only one of them sent should so specify in their request. Partial transcripts of either the undergraduate or graduate academic records are not issued.

Housing

Apartment Complex

State XVI, the new apartment complex, is designed to house graduate and married students. Two- and three-bedroom apartments will be available with the opportunity for students to share bedrooms. A limited number of one-bedroom apartments will be available.

The apartments have two full bathrooms, a kitchen, dining area and living room. All apartments are furnished. The apartment rental rates vary and may be obtained by contacting the apartment complex at (516) 246-8240.

Main Campus Housing

A limited number of both single- and double-occupancy rooms are available for unmarried graduate students. Stage XII has been designed to house graduate students in addition to the International College, which integrates foreign and American graduate and undergraduate students.

Housing Charges

Main Campus

The rent for each person sharing a double-occupancy room is $1100.00 per academic year, payable on a semester basis. A $75.00 advance room deposit is required and should be paid as soon as possible, as housing of all types is limited. This amount is applied to the first semester's payment. The advance room deposit is refundable by an application in writing, which must be received by the Office of Residence Life before July 1.

Apartment Complex

The rates for the apartment complex vary according to the size of the apartment and the number of occupants. Rates may be obtained by contacting the apartment complex at (516) 246-8240. A $100.00 advance room deposit is required. The advance room deposit is refundable by an application in writing, which must be received by the Office of Residence Life by July 1.

Advance Housing Deposit Refunds

Request for refund of the $75.00 main campus housing deposit or the $100.00 apartment complex deposit will be granted if an application is made in writing to the Department of Residence Life. This request must be received by July 1.

Off-Campus Housing

The Off-Campus Housing Office provides information concerning rentals of rooms, apartments and houses within a fifteen-mile radius of the University. All landlords listing property with the University must sign a statement assuring nondiscriminatory practices; listings do not become available until such assurance is received. The Off-Campus Housing Office and the University may not become parties to landlord-tenant disputes.

The common price per month for a furnished room is $140-$200. Kitchen privileges are sometimes included in this price. Rooms available in houses rented by other students are also listed. That is, arrangements can sometimes be made to share a complete house for $125-$250 per month plus a percentage of the utilities cost.

Apartment listings cover those available in standard apartment building complexes and those available in private homes. The usual rental rate of a studio apartment (one large room, bathroom, closets, kitchenette) in a house is approximately $250-$300 per month. A studio apartment in one of the apartment facilities is usually $300-350. Apartments in housing complexes usually provide more space and privacy. A conventional one-bedroom apartment, including living room, dining room, kitchenette, bathroom and closet space, usually ranges in price from $325-$400 per month. Utilities costs, except electricity, are often included in the price.

There are also listings for house rentals in the area. These rentals range from $300-$900 per month, not including utilities. The price depends on the number of rooms in the house and the distance from the campus.

For more specific information, feel free to contact the Off-Campus Housing Office, located in the Administration Building. Telephone: (516) 246-5979.

Student Health Insurance

Student Health Insurance is available on a 12-month (September through August) basis. Students should contact the Student Health Insurance Office in the Infirmary for further information on coverage and payment.

Refund Schedule

All requests for refund of tuition, room, cooking fee and activity fee must be made in writing to the Office of Student Accounts, 254 Administration Building, State University of New York at Stony Brook, Stony Brook, NY 11794. College fee, late registration fee and lost ID card fee are nonrefundable. 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. (Because campus offices are not open for business on Saturday, cancellations and withdrawals must be effected during the Monday through Friday office working hours.)

Schedule of Tuition Liability

A student who withdraws from the University shall be liable for payment of tuition in accordance with the following schedule:

Liability during	*Semester*	*Six-Week Term (Summer Session)*
First week	0	0
Second week	30%	70%
Third week	50%	100%
Fourth week	70%	
Fifth week	100%	

A student who does not attend any class sessions after Saturday of the first week and who notifies the University of any intent to cancel registration on or before the second Saturday following the first day of classes shall be deemed to have cancelled registration during the first week.

Certification of the effective date of withdrawal must be made by the Office of Records/Registrar. A withdrawal card available at the Registrar's Office must be completed and returned to the office on the date of withdrawal. To expedite a refund, the Student Accounts copy of the withdrawal card should be submitted with the refund request.

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 the State University.

Exception

Students who withdraw to enter military service prior to the end of an academic term will not incur a tuition or fee liability for those courses in which they do not receive academic credit. Proof of military service must be submitted.

Refund of Room and Cooking Fee

Once a student has registered and occupied a room, no refund will be granted for room payment made for that *quarter.* Refund requests for room payment must be accompanied by verification of the move-out date by the University Office of Residence Life. Cooking fee will be refundable if the student has enrolled in the Meal Plan. The amount of such refund is to be determined by University policy in effect at the time.

Refund of Student Activity Fee

As determined by the CED Student Government and the Graduate Student Organization, full refunds will be granted if the student withdraws within the first two weeks of classes. No refund will be granted for withdrawals after the second week of classes.

Meal Plan Refunds

Meal Plan refund requests must be made in writing to the Office of Student Accounts, Administration Building, State University of New York at Stony Brook, Stony Brook, NY 11794.

Advance Housing Deposit Refunds

See the appropriate section under housing.

Refund of College Fee, Late Registration Fee, Lost ID Card Fee and Drop-Add Fee

These fees are not refundable.

Refunds Caused by Overpayment or Processing Errors

Refunds of amounts paid will be made when a student overpays University fees or when the student erroneously pays fees which are not required.

Financial Assistance

Financial assistance is available to graduate students at the State University of New York at Stony Brook through a program of assistantships, fellowships, scholarships and traineeships. *The awards described below are available only to full-time matriculated students* through the Graduate School or Office of Financial Aid, or from the appropriate government or state agency. An applicant seeking financial assistance is strongly advised to make sure that all application materials, including letters of recommendation and transcripts, have been received by the University no later than February 1 of the calendar year *prior* to their entrance. In addition, students seeking other financial aid must submit a College Scholarship Service financial aid application and the Stony Brook Institutional Application for Financial Aid (for further information on forms and dates see section on "Loans and Work Study Programs"). If a student receives a stipend from the University and also from an outside source, the University contribution will be adjusted so that the total of these stipends in 1982 will not exceed a set limit ($6293) for the academic year. If a student receives tuition assistance from an outside source, the maximum tuition waiver available will be limited to the unpaid portion of the tuition.

Graduate School Traineeships

Graduate traineeships are awarded on a competitive basis (judged by such criteria as academic achievement, financial need and potential for professional growth and societal contribution) by the Graduate School on recommendation of the department for one year, but may be renewed for up to but not more than four years. Traineeships carry stipends of up to $6293 in 1982 for the academic year. Normally all trainees qualify for a tuition waiver in addition to the stipend.

Graduate Council Fellowships

A limited number of Graduate Council Fellowships is available to incoming students. These fellowships carry a stipend of at least $5500 in 1982 per academic year and do not require any services. They are awarded as a result of Graduate School-wide competition and, funds permitting, may be renewed for two additional academic years by those students who maintain superior academic standing. Graduate Council fellows normally qualify for full tuitions waivers.

Jessie Smith Noyes Fellowship

Fellowships are available for support of outstanding graduate students wishing to pursue careers in coastal zone management, marine environmental studies or coastal oceanography. Fellowships will be restricted to students with adequate preparation, who have demonstrated potential to pursue innovative and independent research on some critical environmental problem of the coastal zone. The awards carry stipends of $9000 for the calendar year and a full tuition waiver. Applications and additional information may be obtained from the Fellowship Committee, Marine Sciences Research Center.

William W. and James W. Catacosinos Fellowship in Computer Sciences

The Catacosinos Fellowship is awarded annually to the graduate student at the State University of New York at Stony Brook who

has made the most outstanding contribution during the preceding year in the field of computer sciences, including applications of techniques of computerization in any academic discipline or in business.

The fellowship carries a stipend of $7000 for 12 months and is open to new and continuing full-time graduate students enrolled in any of the University's Ph.D. programs. The fellowship is administered by the Stony Brook Foundation.

Intercampus Doctoral Fellowships
The Intercampus Doctoral Fellowship Program was established by the SUNY Doctoral Council in the 1977-78 academic year to encourage doctoral students within SUNY to take advantage of faculty and special program opportunities available at the other University Centers and cooperating institutions in the State of New York. The fellowships are funded at $5000 for the academic year (or $2500 for one semester) plus full waiver of tuition.

Applications are open to graduate students who hae been formally admitted to a doctoral program and have completed at least two full semesters of graduate study at Stony Brook as of the beginning of the proposed period of study. Applications are not encouraged from students who will already have completed all coursework for the Ph.D. degree, who have already passed comprehensive examinations and who are engaged solely in the research and writing of the dissertation.

Friends of Sunwood Graduate Music Award
The Friends of Sunwood Graduate Music Award is sponsored by the Friends of Sunwood, a non-profit organization, and is open to any full-time graduate students in music at the State University of New York at Stony Brook. The award is given in recognition of excellence in solo performance and will carry with it a monetary award and an opportunity to perform in the Friends of Sunwood Sundays at Five concert series.

Mildred and Herbert Weisinger Fellowship Award
The Stony Brook Foundation annually presents the Mildred and Herbert Weisinger Fellowship Award in the amount of $250. This award is made to a graduate student in financial need so that he or she may complete a dissertation which otherwise would be delayed. The dissertation must bear scholarly promise.

Graduate Editorial Fellowship
Graduate Editorial Fellowships, sponsored by the Quarterly Review of Biology and the Stony Brook Foundation, are available for graduate students in the Division of Biological Sciences who have completed their first year of graduate work. The fellowships will provide students with training in the management and editorial work of the publication of a scientific journal, from manuscript stage to subscription/circulation and advertising. The awards carry stipends equivalent to a full teaching assistantship in the Division of Biological Sciences and waivers of tuition for the academic year, for approximately ten hours of work per week. Applications and additional information may be obtained from Mrs. Smolker, Quarterly Review of Biology Office, Graduate Biology, Library, Room 110.

President's Award for Excellence in Teaching
The Stony Brook Foundation, a not-for-profit educational corporation affiliated with the University, presents the President's awards of $500 each for excellence in teaching. These awards are made in recognition of excellence in teaching by graduate students. Each candidate for the award must be recommended by his or her department. The recipients of these awards are selected by a committee chaired by the Vice Provost for Research and Graduate Studies or a designee and consisting of members of the University faculty and of the Stony Brook Foundation.

National Science Foundation Graduate Fellowships
Fellowships, including a special program for minorities, are available in various fields. They are awarded directly by the National Science Foundation (NSF). Recipients of these awards are exempt from payment of tuition. Applicants must be citizens or nationals of the United States. Closing date for applications is established by the NSF, usually late November or early December. For further information, write: Fellowship Office, National Academy of Sciences, National Research Council, 2101 Constitution Avenue, N.W., Washington, DC 20418.

National Science Foundation Minority Graduate Fellowships
The National Science Foundation sponsors three-year Minority Graduate Fellowships to minority individuals who have demonstrated ability and special aptitude for advanced training in science or engineering. These fellowships are awarded for study or work leading to the master's or doctoral degrees in the mathematical, physical, biological, engineering and social sciences and in the history of philosophy of science. Recipients of these awards are exempt from payment of tuition and fees. Candidates must be citizens or nationals of the United States. Closing date for applications is established by the NSF, usually late November or early December. For further information write: Fellowship Office, National Research Council, 2101 Constitution Avenue, N.W., Washington, DC 20418.

Brookhaven National Laboratory Junior Research Associate
Full-time graduate students who have completed all course requirements and are ready to begin dissertation research in the areas of biological and medical sciences are eligible to apply for a Brookhaven National Laboratory Research Associate award. These awards carry stipends of $6000 for the calendar year with waiver of tuition.

Loans and Work Study Programs

Both the State of New York and the federal government offer low-cost loan programs to help graduate students finance their education. In addition, there are federally funded Work Study Programs which help students earn money through campus employment. Such aid is based on students' financial need, which is established by filing financial disclosure forms with the Financial Aid Office. Graduate students must file the Financial Aid Form (FAF) and the Stony Brook Institutional Application for Financial Aid (SBIA). The deadline for continuing students to submit applications is February 19, for new students it is 30 days after their acceptance to the University.

National Direct Student Loan Program (NDSL)

Under the federal National Direct Student Loan Program graduate students may borrow through this program at 5% interest rate with repayment beginning 6 months after graduation. For eligible graduates, the average NDSL is $1250 per academic year.

Application Procedures
Application for NDSL is made on an FAF and SBIA submitted to the College Scholarship Service and the Financial Aid Office respectively. Deadlines for both are February 19th. All applications, as well as specialized information on loan cancellation provisions for borrowers who go into certain fields of teaching or specified military duty, are available from the Financial Aid Office.

Selection of Recipients and Allocation of Awards
Loans are available to full-time matriculated graduates.

Responsibilities of Recipients
Continued eligibility is dependent on maintenance of satisfactory academic progress. The current interest rate, payable during the repayment period, is 5% on the unpaid principal. Repayment begins 6 months after graduation or leaving school and may extend over a 10-year period.

Guaranteed Student Loan Program

The New York State Guaranteed Student Loan Program is administered by the New York State Higher Education Services Corporation (HESC) through the Financial Aid Office and a participating bank. It is available to New York State residents only. Out-of-state students may apply through their home State Guaranteed Loan Association. The maximum amount available through this program is $5000 per year to an aggregate maximum of $25,000, including what the student borrowed as an undergraduate, subject to financial need. There is a 1/2% loan fee charged at disbursement, plus a 5% origination fee. Repayment at 9% begins 6 months after the student leaves school.

Application Procedures
The student should obtain a loan application from a participating New York State lending institution (bank, credit union, etc.) in his/her area of permanent residence. The completed application is presented to the financial aid officer at the postsecondary institution being attended. The application is then routed by the University to the lending institution and the Higher Education Services Corporation.

A counseling session or an interview, or both, may be required. When the loan is approved, a promissory note is signed by the student. For the school year beginning in the fall, funds may not be disbursed earlier than August 1.

Selection of Recipients and Allocation of Awards
To be eligible for a guaranteed loan a student must be: (1) a U.S. citizen or permanent resident alien, a paroled refugee, or an asylum applicant (I-94 permit); and (2) enrolled in or admitted in an approved program, at least half-time, at an approved college, university or other postsecondary institution in any of the United States or in a foreign country.

Loan Schedule
An undergraduate may borrow up to $2,500 per class year, up to a total of $12,500.

A graduate student may borrow up to $5,000 per class year, up to a combined total of $25,000 *including* any loans for undergraduate study.

A student enrolled in a vocational school approved by the U.S. Office of Education may borrow up to $2,500 per school year. A student enrolled in a vocational school not approved by the U.S. Office of Education may borrow up to $1,500 per school year provided that the vocational school has been approved by the Regents of The University of the State of New York and the school has made a loan agreement with the New York State Higher Education Services Corporation.

Students enrolled in programs of medicine, dentistry, veterinary medicine, podiatry, optometry and pharmacy may receive a State-guaranteed loan of up to $7,500 annually, for a total of $30,000. An annual insurance premium of one-half percent of the loan amount is payable in full at the time the check is issued. This information is shown in the following table.

Every student is eligible for a full interest subsidy during the time he/she is in school, and for the following 6-month grace period.

Maximum Amounts a Student May Borrow Through Guaranteed Student Loans

Level and Type of Program	*Annual Amount*	*Aggregate*
Undergraduate	$2,500	$12,500
Graduate & Professional	5,000	25,000*
Selected Health Professional	7,500	30,000**
Vocational, USOE Approved	2,500	7,500
Vocational, NYSED Approved	1,500	7,500

*Including undergraduate loans
**Including National Direct Student Loans

Responsibilities of Recipients
A student may borrow at a relatively low interest rate (currently 9%) with no repayment as long as he/she remains enrolled at least half-time, and for 6 months after he/she ceases to be at least a half-time student. Payment of principal may further be deferred during study under a graduate fellowship program approved by the U.S Commissioner of Education, during up to three years of active U.S. armed forces service, during up to three years as a full-time Peace Corps or VISTA or similar national program volunteer, or during up to 12 months of unsuccessful search for full-time employment.

If a student applies for an additional loan, application should be made to the original lending institution.

Four months after ceasing to be at least a half-time student, the borrower must make formal arrangements with the lending institution to begin repayment. The following regulations apply:

1) Depending on the amount of the loan, the minimum monthly payment will be $30 plus interest. Under unusual and extenuating circumstances the lender, on request, may permit reduced payments.

2) The maximum repayment period is 10 years.

3) The maximum period of a loan from date of the original note may not exceed 15 years, excluding authorized deferments of payments.

4) Repayment in whole or part may be made at any time without penalty.

5) Students may consult their individual lender to arrange a schedule for repayment.

Auxiliary Loans to Assist Students (ALAS) Program

Like GSL, ALAS is administered by HESC through the Financial Aid Office and a participating bank. ALAS loans are in addition to any aid an independent graduate may receive from GSL. The annual interest rate is 14% and students will be billed quarterly for

interest payments while they are in school. Repayment begins as soon as the student is no longer enrolled full-time. Independent graduates may borrow up to $3,000 per year to an aggregate maximum of $15,000.

College Work-Study (CWS) Program

Application Procedures
Application is made through the postsecondary institutional financial aid office. Eligibility is determined and work arrangements made at this point.

Selection of Recipients and Allocation of Awards
The applicant must be a full-time matriculated student.

An institution must make employment reasonably available to all eligible students in the institution who are in need of financial aid. In the event that more students are eligible for CWS than there are funds available, preference is given to students who have great financial need and who must earn a part of their educational expenses.

Award Schedule
The postsecondary institution arranges jobs on campus or off campus, with public or private nonprofit agencies, such as hospitals. The average CWSP position entails 15-20 hours of work per week.

Factors considered by the financial aid office in determining whether, and how many hours, the recipient may work under this program are financial need, class schedule, academic progress and health status.

Responsibilities of Recipients
Satisfactory academic progress must be maintained.

Note
Eligibility is determined on the basis of information provided by the student on his or her FAF and SBIA. Eligibility is also based on the timely submission of these applications.

Further Information on Financial Assistance

Students seeking more detailed information on the above-mentioned and other programs of financial assistance may refer to *Standard Current Descriptions of State and Federal Student Financial Assistance Programs.* This booklet is available from the office of the Deputy Commissioner for Higher and Professional Education, The University of the State of New York, State Education Department, Albany, NY 12230. (Telephone: 518/474-5091)

New York State Tuition Assistance Program (TAP)

The Tuition Assistance Program is an entitlement program based on New York State net taxable income for the previous year.

Eligibility
1. Graduate students enrolled full-time (12 credit hours or more for students who have earned fewer than 24 graduate credits, or 9 credit hours for students who have earned 24 or more graduate credits and who hold teaching, graduate or research assistantships) and making satisfactory academic progress, as defined by the State Education Department, towards an advanced degree. (All full-time students in FRN, MAR and UPS must be registered for a minimum of 12 credits regardless of the number of earned graduate credits.)

2. Students taking 6 credits or more in the summer session providing the student will be enrolled full-time in an approved school in New York State for the remainder of the academic year (or for all terms following summer required to complete the program);

or

Students who will complete their program of graduate study during the summer term.

3. Legal residents of New York State (persons who have been residents for a minimum of one year), who are citizens of the United States, permanent resident aliens (I-151 or I-551 card), or refugees, paroled refugees or conditional entrants (I-94 permit).

TAP awards are applied directly toward the payment of tuition. Applications are available at the Office of Financial Aid or by contacting the Higher Education Service Corporation, Tower Building, Empire State Plaza, Albany, NY 12255. Renewal applications are automaticaly mailed to current recipients. Students need only apply for TAP once a year. Students must indicate on their application whether or not they desire a TAP payment for the summer.

Students receiving a tuition waiver, who are eligible for Tuition Assistance, are *required* to apply for it at the earliest possible date (usually the beginning of May) but, in any case no later than 45 days after the beginning of the semester. If notification of approval does not arrive within 8 weeks after filing, the student is advised to follow up. Students who fail to apply or do not receive notification of award will be responsible for their tuition.

Graduate Award Schedules
The maximum annual award is $600 and will be reduced according to family income level as shown in the tables below.

TAP provides an income credit for other family members enrolled in postsecondary education on a full-time basis. If a graduate student has other family members so enrolled, the award may be increased.

No award will be less than $100 per year. TAP may be received for 8 semesters (or the equivalent) of graduate study.

Schedule B
Graduate students who are financially dependent on their parents; *or* who are financially independent of their parents and are married or have tax dependents.

Net Taxable Income	*Reduction In Award*
$ 2000 or less	0 reduction
$ 2001–$9500	6.67% of the excess over $2000
$ 9501–$20,000	$500
$20,001 or more	No Award

Schedule D
Graduate students who are financially independent of their parents and are single with no tax dependents.

Net Taxable Income	*Reduction In Award*
$1000 or less	0 reduction
$1001–$3000	25% of the excess over $1000
$3001–$5666	$500
$5667 or more	No Award

Other Expenses

Food
The University, through a food service contractor, provides several meal plan options. Meals are served at three dining halls located in the residential areas. The options currently include a Six-Meal, a Ten-Meal, a Fifteen-Meal and a Nineteen-Meal Plan,

offered for 13 weeks. For spring 1982, costs ranged from $417 for the minimal plan to $595 for the maximal plan. Similar plans will be offered in coming years but prices cannot now be predicted. It is expected, however, that future price ranges will not vary greatly from those now in effect, barring unforeseeable inflationary effects.

The residence dining halls also offer meals on a cash basis at prices, depending on the meal and the selection, currently ranging from about $2.50 to $6 per meal. Dining halls are open daily but hours of operation vary from year to year. The student is urged to consult dining hall staff for hours applicable during his/her residence.

In addition to the dining halls, the food service contractor operates a restaurant and several cafeterias. The End of the Bridge restaurant in the Stony Brook Union is open for lunch 11:30 a.m. to 2:30 p.m., Monday to Friday; prices range from $2.50 to $5.50 per meal. The Union Cafeteria is open Monday to Friday, from 8 a.m. to 7:15 p.m. Prices range from $1.50 to $3.50 per meal.

There are other eating establishments on campus, some student operated, that offer everything from snacks to complete meals. Prices are generally comparable to those given above. Hours of operation vary from place to place and it is best to inquire at orientation or after arriving on campus.

Resident students who do not sign up for a meal plan are required to pay a cooking fee of $50 per semester. Students who elect to do this may expect to spend between $30 and $40 a week for food.

The area immediately around the campus has several eating places, of differing quality and degree of accessibility. Most are reasonably priced.

Books and Supplies

The average estimated expense is $450 for 9 months (September-May). This figure is included in the basic student aid budget.

Miscellaneous Expenses

The average estimated personal expense is $700 for 9 months. This figure is used for the basic student aid budget.

Travel Expenses

The average estimated expense is $190 for 9 months on campus for a student residing in a dorm. The average estimated expense is $1700 for 9 months for a student residing with parents and commuting to the campus.

Admission Requirements

StonyBrook

Applicants may be admitted to the Graduate School to pursue the M.A., M.M., M.S., D.A., D.M.A., or Ph.D. degree. (For the MA/LS degree see the section on Continuing Education.) To be considered for admission, all students must complete and submit the following:

A. An application fee of $20.00
B. An official graduate application form.
C. Three letters of recommendation.
D. Two official copies of all previous college transcripts. (Transcripts of both undergraduate and graduate work must be submitted. If a student attended a junior college and these credits are not listed on the senior college transcript with grades, a separate junior college transcript is required.) If transcripts are in a foreign language, certified English translations are required.
E. Scores from the Graduate Record Examination Aptitude Test (some programs also require the advanced test).
F. Proficiency of English for international students (see "Foreign Students" section).

To be admitted to the Graduate School, an applicant must have the preparation and ability which, in the judgment of the department and the Graduate School, are sufficient to enable him or her to progress satisfactorily in a degree program. A baccalaureate degree is required, with a minimum overall grade point average of 2.75, and the student must present evidence that such a degree will be awarded by the time he or she begins graduate work.

The undergraduate major will ordinarily be in the chosen field of graduate study with an average grade of B in coursework in the major and related areas. In exceptional cases in which these requirements are not met or if the undergraduate preparation is inadequate, an applicant, if considered to have a reasonable probability of making satisfactory progress in graduate studies, may be admitted provisionally.

Provisional Admission

Departmental recommendation and Graduate School approval are required for provisional admission. The departments may set conditions which the provisionally admitted student must satisfy during the early period of graduate work. Normally these conditions include at least two graduate courses in which the student must obtain grades of B or better in the first semester.

Additional Admission Requirements

Additional admission requirements are listed in each departmental section of this *Bulletin*. Admission application forms and additional information may be obtained by writing to the appropriate department or to: Office of the Graduate School, State University of New York at Stony Brook, Stony Brook, NY 11794.

Students interested in applying to the Center for Continuing and Developing Education's Master of Arts in Liberal Studies program should consult the information described later in this *Bulletin*.

Foreign Students

English Proficiency

Students from non-English-speaking countries are expected to read, write and speak English and comprehend the spoken language. Applicants whose first or native language is not English or who have pursued their higher education in a non-English-speaking country must demonstrate proficiency in English. This is required as part of the application process. Proficiency can be demonstrated by presenting acceptable scores on the Test of English as a Foreign Language (TOEFL). This test is given at centers throughout the world on several dates each year. The testing schedule and registration information may be obtained by writing to TOEFL, Educational Testing Service, Princeton, New Jersey 08540. Admission to the Graduate School is contingent upon satisfactory fulfillment of the English proficiency requirement. A student must have a minimum score of 500 for admission and 550 for most forms of support. Exceptions to these requirements are rare, and require the approval of the Vice Provost for Research and Graduate Studies.

Financial Verification

Non-United States applicants who are not citizens or permanent residents of the United States must also provide the University with verification that the necessary funds are available to finance their education at Stony Brook. The University Form SUSB 1202 must be submitted for this purpose before 1-20 documents are sent to the student.

1-20 and 1-94 Documents

Government regulations require that every foreign student attend the institution issuing the 1-20 used for entry into the United States. Transfers are possible, but only if a student can show that he or she has been enrolled at the original institution and then only with the appropriate clearance from Immigration and the institutions concerned. Foreign students on student visas must register as full-time students.

Student Status

Part-Time Students

Part-time students admitted to the Graduate School will register for no more than eleven credit hours per semester. Departments may, in consultation with the Vice Provost for Research and Graduate Studies, regulate the proportion of part-time students in their graduate programs. Part-time students are classified as either 91 code (fewer than 24 graduate credits earned) or 92 code (more than 24 graduate credits earned). Students in programs in which the highest degree offered is the master's may not be classified as 92 code.

Full-Time Students

Students admitted for full-time study to the Graduate School will normally register for twelve or more credit hours per semester. Responsibility for certifying the full-time status of graduate students rests with the Office of Records/Registrar. A graduate traineeship is considered part of the academic program; a student holding such an appointment is expected to be registered full time. Registration for twelve or more credit hours may include credits for supervised teaching and research. Full-time graduate students are classified as either 91 code (fewer than 24 graduate

credits earned) or 92 code (more than 24 graduate credits earned). Students in programs in which the highest degree offered is the master's may not be classified as 92 code.

Graduate Record Examination

The Graduate Record Examination Aptitude Test is required of all prospective graduate students, except part-time master's candidates. Several departments also require the Advanced Area Tests. Please refer to the admission requirements of the specific department of interest. Students who have taken the GRE should request the Educational Testing Service to forward their scores directly to the Graduate School or to the departments or schools to which they are applying. Students who are admitted provisionally without the GRE must take the examination during the first semester of registration at Stony Brook in order to continue as a student. Part-time master's students who change their status to full-time or enter a doctoral program will be required to take the examination.

Admission of Undergraduates to Graduate Courses

Undergraduates of exceptional ability, upon the request of the graduate program director of a department and of the instructor to the Vice Provost for Research and Graduate Studies, may be admitted to graduate courses but are not permitted to earn graduate credit. Graduate courses taken while an undergraduate remain part of the undergraduate record, except in *approved* combined five-year bachelor's/master's programs.

Academic Regulations, Procedures and Degree Requirements

StonyBrook

Academic Regulations, Procedures

All programs, regulations and schedules of dates are offered subject to change or withdrawal depending on the availability of funds and the approval of programs by appropriate State authorities. For academic regulations and procedures for the MA/LS degree, see the section on "Continuing Education" in this *Bulletin.*

Organization of the Graduate School

Under the direction of the Office of the Provost, the Graduate School administration rests with the Vice Provost for Research and Graduate Studies and the administrative staff of that office in conjunction with the Graduate Council, composed of faculty, students and administrators. The chairperson and the secretary of the Graduate Council are elected by the Council. The membership of the Council includes the Provost, *ex officio*; the Vice Provosts for Graduate Studies; two faculty members elected by the SUSB Senate from each of the following groups: Arts and Humanities, Behavioral Sciences, Biological Sciences, Engineering Sciences, Mathematical Sciences, Social Sciences; two faculty members from the Health Sciences; a member from the Center for Continuing Education; one faculty member of the Library elected by the Library faculty; one member elected by core campus non-teaching professionals; and a graduate student representative chosen by the Graduate Student Organization. Elected faculty members serve for three years with staggered terms. Among other duties detailed in the "Faculty By-Laws," the Council must approve all graduate programs before their submission to the SUNY Central Office and the State Department of Education.

Each department exercises a large measure of responsibility for its graduate program. Under the general responsibility of the department chairperson, each department has a departmental committee on graduate students and a graduate program director who administers departmental graduate activities. Under the guidance of the Graduate Council, individual departments select graduate applicants and recommend them for admission to the Vice Provost for Research and Graduate Studies. The departments are responsible also for the nomination of students and applicants for fellowships, traineeships and assistantships, as well as for the administration of graduate programs, including coursework, supervised research, teaching apprenticeships and graduate examinations. It is the departments which certify to the Graduate School that the student has completed all degree requirements. Some graduate programs are not housed in specific departments. Such interdepartmental programs are governed by faculty committees and are chaired by a director of graduate studies. For purposes of graduate education they function as do departments in other disciplines.

Registration

All candidates for graduate degrees, whether in residence or *in absentia,* must complete registration each semester for at least one credit. This ruling includes those who are using the library, laboratories or computer facilities; those who are consulting with the faculty while working on their dissertations; and those who are preparing for or taking qualifying or oral examinations at the master's or doctoral level. Students who hold graduate traineeships, research assistantships or predoctoral fellowships must be registered as full-time students. Departments or individual faculty members do not have the authority to waive these rules.

Late Registration

Registration after the close of the announced final registration period in the academic calendar requires the payment of a late registration fee of $20. 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 Office of Records/Registrar and arrangements regarding tuition and fees have been made with the Bursar's Office.

Course Changes

During the first four weeks of classes (as noted in the Academic Calendar) graduate students may add or drop courses by completing the request form available from the Office of Records/Registrar provided the proposed change does not alter the student's status as defined in "Student Status." Courses dropped in this period are deleted from the student's semester registration record. For courses dropped during the first four weeks, tuition is charged at the rates specified in "Schedule of Tuition Liability" in this *Bulletin.* After the fourth week of classes no course may be added or dropped. Should it become impossible for a student to complete a course for a reason such as illness or accident, he or she may petition the Vice Provost for Research and Graduate Studies for a waiver of the drop deadline. Such petitions must be approved by both the chairperson and the graduate program director of the department. If a petition is approved, a charge of $10.00 is assessed, courses remain on a student's record and a withdrawal grade of W is recorded.

Maintaining Matriculation

Students must register for at least a one-credit course in thesis or dissertation research each semester or session for which they are maintaining matriculation and must do so at the regular times

designated for graduate registration by the Office of Records/ Registrar. Students failing to do so either at advance or final registration may register during the first two weeks of the semester and will be charged a $20 late registration fee. After the first two-week period, no student will be permitted to register. Students do not maintain matriculation during the summer session unless they plan to graduate in August.

To be eligible to receive a degree, a student must maintain matriculation for *each* semester prior to and including the semester in which the degree is awarded. Students on approved leaves of absence do not register for those semesters for which a leave has been granted; however, they must register for the semester in which the degree is awarded.

Students who complete all degree requirements *after* the deadline for any degree date but *before* the first day of classes of the next term or session are eligible for graduation, the next time degrees are awarded, without additional registration. Students who complete all degree requirements during the summer session may graduate in December provided they were registered in the preceding spring semester and *all* requirements were completed before classes began in the fall semester. Students who wish an August degree and do not complete all requirements before summer session begins must register for the summer session to be eligible for the August degree.

Dissertation Research Away from Campus

It is expected that a graduate student's dissertation will normally be conducted at Stony Brook under the direct guidance of the faculty of the department or program in which the degree is sought and with the facilities available here or close by, as, for example, at Brookhaven, Cold Spring Harbor, the hospitals and institutions on the Island or the libraries of New York City. However, there may be circumstances in which the student's work would be facilitated at an off-campus location such as another institution or research facility. In such cases, the department may petition the Vice Provost for Research and Graduate Studies for permission for the student to carry on work away from campus. The petition must contain the following information:

1. The reasons for the request.
2. The conditions under which the student's work away from campus is to be performed, supervised and evaluated.
3. That the student is registered as a graduate student at Stony Brook and has paid the necessary fees. If the student is supported by a stipend or grant from State funds or from University-monitored federal and private sources, he or she must be registered as a full-time student. If the student is employed elsewhere, in a position not under the University's jurisdiction, matriculation may be maintained by registering for at least one credit of research each semester providing all degree requirements have been fulfilled except for the writing of the thesis or dissertation.
4. For students with financial support, a statement by the chairperson of the department attesting that permission for the student to do work away from campus will not diminish the department's capability to fulfill its instructional commitments.
5. A statement from the institution where the student's work is to be performed in which acceptance of responsibility for its supervision is made. In the case of archival research or fieldwork, a statement of authorization for the student to use such resources must be submitted.
6. The petition must have the approval of the Graduate Program Committee and the chairperson of the department concerned.

Exchange Credits

When the special educational needs of a doctoral student at one SUNY institution or the graduate center of CUNY can be served best by taking courses at another unit of the SUNY system or at the graduate center of CUNY, he or she should obtain an application from the chairperson of his or her department to apply for admission to take the desired courses at the host institution. The recommendation from the department should state that the student has the prerequisities for the courses and that, if the courses are successfully completed, credit for them will be accepted toward the degree. The statement from the department chairperson should be approved by the Vice Provost for Research and Graduate Studies of the student's institution. It should be sent to the Dean of the Graduate School of the host institution, who will clear it with the department concerned. When approval is obtained, the student will be admitted to take the courses requested. The student will pay appropriate tuition and fees at the host institution. If the student has a waiver of tuition at his or her home institution, that waiver will be recognized by the host institution. At the completion of the courses, the host institution will, on request, send a transcript to the student's home institution.

Transfer Credits

A. From Other Universities

1. A candidate for the master's degree may petition to transfer a maximum of six graduate credits from another institution toward his or her master's degree.
2. These credits must be from an institution that is authorized to grant graduate degrees by recognized accrediting commissions.
3. Credits must not have been used to fulfill the requirements for either a baccalaureate or another advanced degree.
4. Credits must not be more than five years old at the time the student is admitted to graduate study at Stony Brook. Courses older than five years will be accepted only in rare circumstances.
5. Credits must clearly be graduate level. A course listed as both graduate and/or undergraduate level will not be considered for transfer.
6. Credits must carry the grades of A or B. "Pass" or "Satisfactory" grades are not transferrable unless these grades can be substantiated by the former institution as actually B or better.
7. Work from one master's degree is not transferrable to a second master's degree.
8. A candidate for the doctoral degree may transfer those graduate credits which are allowed by the appropriate departmental committee.

B. From Stony Brook

1. A maximum of twelve graduate credits from non-degree graduate status to matriculated graduate degree status at Stony Book can be transferred at the discretion of the academic department and with the approval of the Graduate School. A maximum of six credits of CED courses or CED crosslisted courses may be transferred.
2. If a student transfers six graduate credits from another institution, only six graduate credits from the non-degree graduate status at Stony Brook can be transferred to matriculated graduate degree status.

Students who wish to petition for transfer credit should submit the Transfer Credit Request Form (SUSB 1343) along with an official copy of the transcript to their departmental committee for review. Departmental recommendation is needed before submission to the Graduate School for final approval.

Policies concerning the transfer of credit into the Center for Continuing Education can be found in that section of this *Bulletin*.

Grading System

The following grading system will be used for graduate students in both graduate and undergraduate courses: A(4.0), A–(3.7), B+(3.3), B(3.0), B–(2.7), C+(2.3), C(2.0), C–(1.7), F(0.0). Pass/No Credit and grades of D are not approved grades for graduate students. Plus and minus are not applicable for courses taken before fall 1981.

In addition, the following marks may be awarded at the end of the semester:

I (Incomplete): This is an interim grade. It may be given at the discretion of the instructor but only at the student's request and upon evidence that good cause, such as serious, protracted illness, prevented the student's completion of course requirements. The grade of "I" must be resolved by the following dates: March 15 for courses of the preceding fall semester; November 1 for courses of the preceding spring semester. However, the instructor may require that the work be completed at any time prior to the end of the Incomplete extension period. In granting a grade of "I" the instructor signifies a willingness to receive student work and prepare grades in accordance with these deadlines. If final grades are not reported to the Office of Records/Registrar by the specified dates, the grade of "I" will automatically be changed to "F." Extension to the end of the succeeding term may be requested by written faculty petition to the Office of Records/Registrar; any subsequent exception must be appealed by the student with a written letter of support or denial by the faculty member addressed to the Graduate Council.

Each student's permanent academic record must reflect a final grade or a withdrawal grade for each course in which he or she was enrolled. If a final grade has not been reported by the scheduled deadlines or appropriately extended, the grade of F will be recorded.

S (Satisfactory): Indicates passing work in those courses, so designated by the department and approved by the Graduate Council, where the normal mode of evaluation is impracticable.

U (Unsatisfactory): Indicates unsatisfactory work in those courses, so designated by the department and approved by the Graduate Council, where the normal mode of evaluation is impracticable.

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.

NR (No Record): An instructor may assign a temporary grade of NR only for students who have never, to the instructor's knowledge, participated in the course in any way. An NR report is not to be interpreted as a grade but only as a temporary indication of a state of affairs which requires prompt resolution, leading either to removal of the course from a student's program (whenever it turns out to have appeared as a result of an error in recording the registration information submitted by the student), or to the assignment of a grade. If a final grade is not reported by the deadline date appearing in the Academic Calendar, the grade of F will be recorded.

Grades appearing on a student's academic record may not be changed after one calendar year from the end of the term in which the grade was incurred.

Auditing

Auditing is permitted by special arrangement between student and instructor. No record is kept of courses audited.

Student Educational Records

The Family Educational Rights and Privacy Act permits current or former students to inspect and review their educational records. Students are also accorded the right to a hearing in order to question the contents of their educational records. Written consent of students may be required before personally identifiable information about them will be released from their educational records as provided by law.

Specific guidelines and procedures are contained in PR-106, "Compliance with Family Rights and Privacy Act," contained in the Administrative Organization, Policies, and Procedures Manual of the University. A copy of this manual is available in the Reference Room of the Melville Library.

After administrative remedies available at the University have been exhausted, inquiries or complaints may be filed with the Family Educational Rights and Privacy Act Office, Department of Health, Education and Welfare, 330 Independence Avenue, S.W., Washington, DC 20201.

Applicants or students may waive their rights to inspect confidential letters or statements of recommendations.

Equivalent Opportunity/Religious Absences

Some students may be unable to attend classes on certain days because of religious beliefs. Section 224-a of the Education Law provides that:

1. No person shall be expelled from or be refused admission as a student to an institution of higher education for the reason that he or she is unable, because of religious beliefs, to attend classes or to participate in any examination, study or work requirements on a particular day or days.

2. Any student in an institution of higher education who is unable, because of religious beliefs, to attend classes on a particular day or days shall, because of such absence on the particular day or days, be excused from any examination or any study or work requirements.

3. It shall be the responsibility of the faculty and of the administrative officials of each institution of higher education to make available to each student who is absent from school, because of religious beliefs, an equivalent opportunity to make up any examination, study, or work requirements which he or she may have missed because of such absence on any particular day or days. No fees of any kind shall be charged by the institution for making available to the said student such equivalent opportunity.

4. If classes, examinations, study or work requirements are held on Friday after four o'clock post-meridian or on Saturday, similar or makeup classes, examinations, study or work requirements shall be made available on other days, where it is possible and practicable to do so. No special fees shall be charged to the student for these classes, examinations, study or work requirements held on other days.

5. In effectuating the provisions of this section, it shall be the duty of the faculty and of the administrative officials of each institution of higher education to exercise the fullest measure of good faith. No adverse or prejudicial effects shall result to any students because of their availing themselves of the provisions of this section.

6. Any student who is aggrieved by the alleged failure of any faculty or administrative officials to comply in good faith with the provisions of this section shall be entitled to maintain an action or proceeding in the supreme court of the county in which such institution of higher education is located for the enforcement of his or her rights under this section.

7. As used in this section, the term "institution of higher education" shall mean schools under the control of the Board of Trustees of the State University of New York, or of the Board of Higher Education of the City of New York, or any community college.

Academic Standing

A student may be dismissed if his or her overall average falls below B(3.0) at any time. Additional minimum grade requirements may be imposed by individual departments. Graduate students may be dismissed upon proof of violation of professional standards and academic honesty.

Academic Dishonesty

Intellectual honesty is the cornerstone of all academic and scholarly work. Therefore, the University views any form of academic dishonesty as a serious matter. Detailed procedures for hearings and other functions of the judiciary processes are available in the Graduate School Office.

Withdrawal from the University

A student finding it necessary to withdraw from the University must obtain a withdrawal card from the Office of Records/ Registrar. This card must be approved by the appropriate offices indicated on the card and by the Graduate School. The effective date of withdrawal is the date upon which the completed withdrawal card is returned to the Office of Records/Registrar. The process of withdrawing from the University is a formal procedure and the student has the responsibility for initiating it if, of necessity, he or she must leave graduate study. Students may withdraw from the University up to the last day of classes.

Students are urged to discuss all withdrawals with the director of graduate studies of their department and with their academic advisor before such an action is taken.

Unauthorized Withdrawal

A student who leaves the University without obtaining an official withdrawal may forfeit the privilege of honorable withdrawal and endanger his or her prospects of readmission to the Graduate School. Such students will be reported as having failed all courses.

Leave of Absence

Leaves are granted for a maximum of one year at a time, renewable upon request for the second year. In order to request a leave, the student must have been registered for the preceding semester. Students who are admitted to graduate study but never register are not eligible for leaves. Requests for leaves of absence should be made on the Request for a Leave of Absence Form (SUSB 1341) and submitted to the director of graduate studies of the individual department. If the director of graduate studies and the chairperson of the department approve the request for leave, they recommend approval to the Vice Provost for Research and Graduate Studies.

Students who have either preregistered or are currently registered must also submit a withdrawal card as described n the section above.

Military leave of absence will be granted for the duration of obligated service to students in good standing.

Students planning to return from leaves should inform their departments and the Graduate School of their intention, preferably three months in advance of the term for which they wish to register. A current address should be given to the department and to the Graduate School.

Degree Requirements

Admission to the Graduate School does not automatically qualify a student as a candidate for the Ph.D. degree. Formal recommendation of advancement to candidacy for the Ph.D. degree must be made to the Graduate School by the department after a review of the student's performance in courses, independent study and departmental examinations. A candidate for the Ph.D. degree engages in research leading to a dissertation. For the master's degree a less formal procedure is followed, and a department may substitute a comprehensive examination for the research and thesis.

The granting of the master's degree is based upon the completion of a minimum of 30 graduate credits, residence, examination, supervised teaching thesis, special departmental requirements and the recommendation of the student's department.

The granting of the doctoral degree is based upon residence, examination, supervised teaching, dissertation, special departmental requirements and the recommendation of the student's department. Ordinarily, however, certain courses should be taken in preparation for comprehensive examinations and research. The student will follow an approved program of courses, seminars and individual study, determined to meet his or her needs and to satisfy departmental requirements.

The requirements listed below are the minimal ones mandated by the Graduate School. Additional requirements may be set by the individual departments or graduate programs.

The Degrees of Master of Arts, Master of Music and Master of Science

1. Language proficiency: Through the Graduate School itself does not require proficiency in a foreign language for the master's degree, departments have the responsibility for their foreign language requirement and the evaluation of any stated proficiency. Students must comply with their departmental requirements.

2. Practicum in teaching under supervision is required.

3. A student must achieve a 3.0 grade point average for a minimum of 30 credits of graduate work to receive a master's degree. The department recommending the degree will indicate which 30 credits will be averaged for this computation.

4. The requirement for thesis and comprehensive examination varies from department to department. Some departments require a thesis and others require a comprehensive examination, while some only require a master's paper. For specific requirements, refer to each departmental section of this *Bulletin.* If a thesis is required, it must be prepared in accordance with the guidelines presented in the booklet entitled "Guide to the Preparation of Theses and Dissertations" available from the Graduate School. The State University of New York at Stony Brook does not allow multiple authorship for a thesis.

5. The submission of a signed degree card to the Graduate School in accordance with published deadlines.

6. Departmental recommendation: When all departmental requirements are completed, the chairperson may recommend to the Vice Provost for Research and Graduate Studies that the master's degree be granted.

7. Time limit: All requirements for the master's degree must be completed within three years of the student's first registration as a matriculated full-time graduate student. For matriculated part-time students, the degree must be completed within five years. In rare instances, the Vice Provost for Research and Graduate Studies will entertain a petition bearing the endorsement of the chairperson of the department for an extension of this time limit. In such instances, the student may be required to repeat certain examinations or present evidence that he or she is still prepared for the thesis or the final examination.

The Master of Arts (Liberal Studies) Degree

This is a terminal, non-research degree offered by the Center for Continuing Education (CED). Details of the program and degree requirements may be found in this *Bulletin's* chapter describing the Center for Continuing Education. Additional information is available from the CED Office.

The Ph.D. Degree

1. Minimum residence: At least two consecutive semesters of full-time graduate study beyond the baccalaureate are required. The purpose of the residence requirement is to ensure that the graduate student participates in the professional life of the department beyond class attendance. Owing to the difference in the means by which this requirement can be satisfactorily met, departmental residence requirements may vary from the Graduate School norm and are described in the individual departmental requirements for the degree; the Graduate School regulation pertains unless otherwise specified.

2. Language proficiency: Though the Graduate School itself does not require proficiency in a foreign language for the Ph.D. degree, departments have the responsibility for their foreign language requirement and the evaluation of any stated proficiency. Students must comply with their departmental requirements. The proficiency examination must normally be passed before permission is given to take the preliminary examination.

3. *Preliminary examination:* The purpose of the preliminary examination is to ascertain the breadth and depth of the student's preparation and to appraise readiness to undertake a significant original investigation. At the discretion of the department, the preliminary examination may be oral or written or both and may consist of a series of examinations. The examining committee is appointed by the Vice Provost for Research and Graduate Studies on recommendation of the department chairperson, must include at least two faculty members from the program and may include one or more members from outside the program. Results of the preliminary examination will be communicated to the student as soon as possible and to the Graduate School within one week of the completion of the exam. A repetition of the preliminary examination, upon failure, may be scheduled at the discretion of the department. A second repeat must be approved by the Vice Provost for Research and Graduate Studies.

4. *Advancement to candidacy:* The student may be advanced to candidacy when he or she has completed all Graduate School and departmental requirements for the degree other than the dissertation. Advancement to candidacy is granted by the Vice Provost for Research and Graduate Studies upon recommendation of the department.

5. *Practicum in teaching* under supervision is required.

6. *Research and dissertation:* A dissertation is required for the Ph.D. degree. It must convey in a clear and convincing manner the results of an original and significant scholarly investigation. Depending upon the character of the student's research, the department chairperson will appoint an appropriate supervisor or supervisory committee, in consultation with whom the student will conduct an investigation and write a dissertation. The dissertation must be prepared in accordance with the guidelines presented in the booklet entitled "Guide to the Preparation of Theses and Dissertations" available from the Graduate School. The State University of New York at Stony Brook does not allow multiple authorship for a dissertation.

The dissertation must be approved by a dissertation examining committee of at least four members of the faculty, appointed by the Vice Provost for Research and Graduate Studies. This committee may include the dissertation supervisor(s) and must include at least one person from outside the department or graduate program who may not serve as supervisor. There must be at least two faculty members from the department or program on the committee. At the discretion of the department, approval of the dissertation may or may not involve a formal oral defense. If a formal defense is required, it will be conducted by the dissertation committee and will not be chaired by the supervisor of the dissertation. The formal defense is open to all interested faculty members and graduate students.

In the absence of a formal defense, the student will present the results of dissertation research at an informal dissertation colloquium convened for that purpose by the department and open to interested faculty members and graduate students.

Evaluation (approval or disapproval) of the dissertation will be indicated by the Dissertation Examining Committee on a form to be submitted to the Graduate School.

7. *The submission of a signed degree card* to the Graduate School in accordance with published deadlines.

8. *Time limit:* The candidate must satisfy all requirements for the Ph.D. degree within seven years after completing twenty-four credit hours of graduate courses in the State University of New York at Stony Brook department or program in which he or she is to receive the degree. In rare instances, the Vice Provost for Research and Graduate Studies will entertain a petition to extend this time limit, provided it bears the endorsement of the chairperson of the department or graduate program. The Vice Provost or the department may require evidence that the student is still properly prepared for the completion of work. In particular, the student may be required to pass the preliminary examination again before being permitted to continue work.

Award of Degree

When all requirements have been completed, the department chairperson will so certify to the Vice Provost for Research and Graduate Studies and recommend that the degree be awarded. Degrees are awarded three times a year: May, August and December. Formal investiture, however, will only be at the spring commencement. To be eligible for a degree a student must have completed all University requirements, satisfied any provisional admission requirements, submitted the appropriate manuscripts, obtained all University clearances and have maintained matriculation according to the regulations outlined under the section entitled "Registration for Maintaining Matriculation," elsewhere in this *Bulletin.*

Waiver of Regulations

Specified requirements may be waived by the Vice Provost for Research and Graduate Studies in individual instances. A petition for such a waiver must be endorsed by the chairperson of the department and the graduate program director, who shall append their reasons for believing that the requested waiver would not result in a breach of the spirit of the regulations.

The University reserves the right to alter these regulations without notice.

The Arts and Humanities

StonyBrook

Department of English

The Graduate Programs

The Department of English offers programs leading to the degrees of Master of Arts and Doctor of Philosophy. Additional Graduate Studies in Comparative Literature are offered leading to the degrees of Master of Arts and Doctor of Philosophy in English, and in Creative Writing leading to a Master of Arts in English. Part-time students are encouraged at the master's level, and a number of graduate courses are offered in the late afternoon hours. A few graduate courses are offered in the summer session.

Admission to the M.A. Program

Applicants for entrance to the master of arts program at mid-year should submit all their materials by October 31; applicants for entrance in September should submit theirs by March 1. Applicants who cannot meet these deadlines should seek the guidance of the appropriate Director of Graduate Studies.

The following are ordinarily required for admission:

A. A bachelor's degree from a recognized institution.

B. An average of at least B in the last two years of undergraduate work.

C. An official transcript of undergraduate record.

D. Letters of recommendation from three previous instructors.

E. The applicant's score on the Graduate Record Examination Aptitude Test, required by the Graduate School of full-time applicants in all departments and of all doctoral applicants.

F. Samples of the applicant's creative work (in the case of those applying for entrance to Graduate Studies in Creative Writing).

G. Acceptance by both the Department of English and the Graduate School.

Applicants to Graduate Studies in Comparative Literature are ordinarily required to hold a bachelor's degree from a recognized institution. The degree should be in one of the following:

1. English or American literature
2. Foreign languages and literatures
3. The fine arts: art history, theater, music, etc.
4. History or philosophy

Furthermore, applicants to Graduate Studies in Comparative Literature are expected to demonstrate competence in one foreign language, as well as in English. Adequate reading knowledge of a second foreign language is also highly desirable.

Any deficiencies in these requirements shall not automatically bar admission, but it is understood that inadequacies in undergraduate preparation will normally require the student to take additional work, the amount to be determined by the appropriate graduate advisory committee, and not to be used to fulfill any specific M.A. degree requirements.

In all cases, admission is by action of the Graduate Admissions Committee of the Department under guidelines established by the Graduate School. Applicants are admitted on the basis of their total records, and there are no predetermined quantitative criteria which by themselves ensure a positive or a negative decision.

The M.A. Program in English

In broad outline, a master's degree requires ten three-credit graduate courses. Of these one must be a course in Shakespeare and another a course in Chaucer or Milton, although such courses previously taken on the undergraduate level may be accepted as fulfilling the requirement upon special application to the Director of Graduate Studies. In addition, a master's candidate must complete two graduate courses in the literature of the periods before 1800 and one graduate course in American literature. Only one course numbered EGL 599, Independent Studies, willl be permitted to count toward the total courses required for the degree of Master of Arts in English. EGL 599 cannot be elected during the student's first semester of work toward the master's degree. EGL 599 may be elected during the second semester only if the student has a B+ average the first semester and only if he or she has no Incompletes at the time of registering for EGL 599. A proposal for a 599 course should be submitted in writing before the end of the first semester to that member of the faculty under whose direction the student plans to study. The proposal must be approved in writing by both that faculty member and the Graduate Program Committee of the Department before the student registers for EGL 599.

Each master's program is organized around a "cluster" or central group of interrelated courses determined by the student's major interest. For example, many of those pursuing the degree are either engaged in, or preparing themselves for, careers as teachers on the elementary, secondary, or community college levels; they will therefore frequently choose the "teaching cluster," which comprises the following three courses: Problems in Teaching Writing and Composition, Problems in Teaching Literature, and Contexts of Literary Study.

Although this program as outlined above is directed toward teaching, changing vocational conditions today require innovative approaches in addition to the more basic coursework. To that end other clusters or programs are offered; for example, a cluster in the drama will include courses in that area. Likewise, other groupings may bring together such areas of study as literature and social attitudes or literature and its relation to other disciplines. Furthermore, courses for the teacher have regularly included, although not as requirements, such options as Problems in Teaching Open Admission Students and Problems in Teaching Remedial Composition. Further information may be obtained from the Director of Graduate Studies in English.

Graduate Studies in Creative Writing (Master's Level)

Those admitted to Graduate Studies in Creative Writing must take three literature courses designated from our present traditional offerings. In addition, the candidate will take four writing courses, ordinarily two in each semester, from workshops in the following subjects: poetry, fiction, drama and nonfiction. Each candidate must take workshops in at least two areas.

Finally, students in Graduate Studies in Creative Writing are required to submit an extended work of substantial literary merit—for example, eight or ten short stories, a novella, a novel, two one-act plays, a full-length play, a volume of poems, a filmscript—to be determined by the candidate and his or her committee. One distinction of this curriculum is that the candidate begins the project under close supervision in the first rather than in the second year.

Graduate Studies in Comparative Literature (Master's Level)

A. Course requirements: The minimum course requirement for the M.A. degree is 30 graduate credit hours. An M.A. candidate is expected to take CLT 500 and CLT 501 (Literary Theory I and II), CLT 502 (Problems in Translation) and one Interdisciplinary Seminar (CLT 602). The candidate is also expected to enroll in two 500-level courses in English and in *at least* two literature courses, at the 500 level, conducted in a foreign language. The remaining coursework may be distributed among graduate courses in foreign language and literature, in English, in philosophy, in history or in music.

B. Foreign language requirement: The student will demonstrate *professional* competence in one foreign language by successful completion of CLT 502 (Problems in Translation). Competence in a second language may be demonstrated by the successful completion of a graduate literature course in a second foreign language, or by the passing of an appropriate examination.

C. M.A. examination: After the completion of coursework, the candidate will be asked to sit for a four-hour written examination. The examination will cover these three areas:

1. An elected area of speciality. This may be a specific literary period or genre, an area involving literature and some related field, or a comparative problem involving a cluster of national literatures.

2. Textual commentary. The candidate will be asked to analyze critically a poem or a short prose passage. The text will be in the foreign language in which the candidate has demonstrated *professional* competence.

3. Literary criticism and theory. The candidate will have the choice of writing on a specialized topic in literary theory (mimesis, the ontology of the literary work, etc.), or on a problem in the history of criticism.

Transfer Credit and Standards of Performance in English and Comparative Literature at the M.A. Level

Mindful that many applicants may have interrupted an earlier graduate career, the Department permits the transfer of six hours of credit in suitable graduate work done elsewhere that resulted in a grade of B or better. The student must, however, make special application after admission. In all coursework done at Stony Brook an average grade of B is the minimum required, but no more than two C's will be permitted.

Admission to the Ph.D. Program in English

For applicants to the Ph.D. program, who may be admitted if they have done no previous graduate work, the following are required:

A. A bachelor's degree from a recognized institution.

B. An average of at least B in the last two years of undergraduate work.

C. An official transcript of undergraduate record, and of any graduate work that may have been done.

D. Letters of recommendation from three previous instructors.

E. The applicant's score on the Graduate Record Examination Aptitude Test, required by the Graduate School of applicants in all departments.

F. A sample of recent scholarly or critical writing (optional).

G. Proficiency in a foreign language equivalent to two years of college work.

H. Acceptance by both the Department of English and the Graduate School.

Admission to Graduate Studies in Comparative Literature (Doctoral Level)

Applicants holding the M.A. degree in English with Graduate Studies in Comparative Literature from Stony Brook may, upon the advice of the Graduate Program Committee, be directly admitted to the Ph.D. program. Other applicants will be admitted to the program after review of their qualifications. These normally will include a B.A. or M.A. degree from a recognized institution and in a suitable area of study (see Course Requirement A for the master's level in Comparative Literature, above); letters of recommendation; G.R.E. scores; and other evidence of interest and ability. The applicant may also be asked, at the request of the Graduate Program Committee, to take the M.A. examination in comparative literature. Ph.D. candidates in comparative literature are expected to demonstrate *professional* competence in English and in *at least* two foreign languages. (See "Foreign Language Requirements for the Ph.D. in English," below.)

Deficiencies in Requirements for Admission

As in the case of those admitted to study for the master's degree, any deficiencies on admission to the Ph.D. program will have to be made up promptly and must not be used to satisfy any specific requirements for the degree itself.

The Ph.D. Program in English

Coursework in English

During their first year incoming Ph.D. students will take two semesters of pro-seminars (Backgrounds for the Study of English Literature). These seminars are designed to provide students with the classical, cultural and critical backgrounds which they will need in all later study. During that same year students will also take three M.A. (500-level) courses in addition to a teaching practicum linked to a teaching assignment. The English Department regards training in teaching as a necessary and valuable part of work toward the Ph.D. degree. Incoming students should therefore ordinarily expect to begin practical classroom experience under supervision in the second semester of their residence. These practica in teaching meet regularly with faculty members under the general supervision of the Director of Writing Programs.

At the end of the first year, students' records will undergo a departmental review. At this stage students may decide to leave the program, or to proceed to the next stage, or to interrupt their studies in order to take the master's degree.

In the last case students must take another teaching practicum and three more master's courses. They then will have an important credential for possible employment or for the later resumption of graduate work.

Students continuing without interruption will, however, be preparing for the preliminary (or qualifying) examination to be taken at the end of their third semester. The preliminary examina-

tion will be in seven periods of English and American literature, and students must pass it in order to remain in good standing. Students entering with the B.A. will normally take this examination in their third semester; students entering with the M.A. will be expected to take it during their first semester.

Students in the Ph.D. program must take a minimum of seven doctoral (600-level) seminars covering at least two areas of English and American literature and language in addition to EGL 695, Methods of Teaching English, a practicum in teaching methods. (It should be very carefully noted that no transfer credit is accepted at the seminar level.)

Teaching Program

Every student is required to teach responsibly one course for at least two semesters. Training in teaching is stressed by the Department, and such training may take the form of apprenticeship to a senior professor during the first and, possibly, second semester of preparation for the doctoral degree. During the second or later semesters, the student may be asked to instruct in sections of large lecture courses offered through the Center for Continuing and Developing Education. During apprenticeship and teaching, students will receive guidance in discussions with the Director of Writing Programs and the professors they assist, and advice from senior members of the Department. They will participate in staff meetings of large courses, and in seminars in which students are joined by senior members of the staff. During those semesters in which they teach, students are required to be enrolled in EGL 697 or EGL 698, Practica in Teaching.

The Director of Writing Programs for the English Department will, upon application by the student, decide to what extent a student's teaching experience elsewhere will satisfy the requirements at Stony Brook.

Foreign Language Requirements for the Ph.D. in English

Students must complete one or two options:

Option I: Students must, on examination, demonstrate ability to translate writings of moderate difficulty in two foreign languages appropriate to the area of study and hence ability to make use of relevant literary and scholarly writings in those languages. The choice of foreign languages will be decided by the students and their advisors.

Option II: Students must, on examination, demonstrate (1) ability to read, understand and speak well one living foreign language, or ability to read and understand well one classical language appropriate to the area of study, and (2) knowlege of the major literature of that language in the original language, and hence ability to make full use of the literature of another language. This option can be satisfied by passing a half-hour oral examination conducted in the language over the major literary figures or works of the language. Students' advisors should consult the Director of Graduate Studies about setting up such examinations. *The passing of the reading and/or comprehension examination at the M.A. level shall not be sufficient evidence that the student has met Option II.*

Students will not be permitted to take oral examinations without first satisfying the departmental language requirement. Students choosing Option I must satisfy one language requirement before taking the Ph.D. Qualifying Examination and the second before taking the Oral Examination.

The Oral Examination

Following the completion of coursework, there will be a single cral examination of approximately three hours in length, normally taken in the spring of the third year or the fall of the fourth year of full-time study. This examination will cover a substantial portion of English literature, including the field of the proposed dissertation. Students will be responsible for primary as well as major secondary works. Materials outside English and American literature will be included where relevant.

Candidates will submit a description and, if necessary, a justification of the areas to be covered, which must be approved by their advisors and then by the Graduate Program Committee. The areas are:

1. Old English
2. Middle English
3. Tudor
4. Seventeenth Century (i.e., 1603-1660)
5. Restoration and Eighteenth Century
6. Romantic
7. Victorian
8. Modern British
9. Early American
10. Modern American.

The Graduate Program Committee has stipulated that the normal paradigm of the doctoral oral examination shall be three chronological periods. Genres and special areas will be admitted only by petition and are to be regarded as highly exceptional. *(See departmental guidelines.)*

The examining board is appointed by the Vice Provost for Research and Graduate Studies on recommendation of the Director of Graduate Studies and will be selected by the candidate's advisor and the Graduate Program Committee, and will be composed of five members: the advisor, one specialist representing each area, and a fifth member recommended by the Director of Graduate Studies.

After successful completion of the oral examination the student is recommended to the Vice Provost for Research and Graduate Studies for advancement to candidacy.

Dissertation

As soon as possible after passing the oral examination, students must prepare a written statement setting out the scope and method of the dissertation and submit it to their advisors, who will then forward the statement to the Graduate Program Committee of the Department for its approval. After the statement has been approved, the dissertation director will meet with the Graduate Program Committee to discuss the selection of the other three readers of the dissertation. The Graduate School requires that one of the readers be from outside the Department. The four readers of the dissertation will recommend acceptance of the dissertation before it can be approved by the Graduate Program Committee of the Department *(See departmental guidelines.)*

Additional Requirements

To be awarded the Ph.D., every student must have passed (1) one course in Shakespeare, (2) one course in either Chaucer or Milton and (3) one course in the history and structure of the English language. These requirements may be met by courses taken while the student was an undergraduate. In any event, these three requirements, as well as the language requirement, will have to be satisfied in the same year as the oral examination, *at the latest.*

Graduate Studies in Comparative Literature (Doctoral Level)

Coursework in Comparative Literature
The student in Graduate Studies in Comparative Literature is expected to complete the following coursework:

1. CLT 500 and CLT 501 (Literary Theory I and II).
2. CLT 502 (Problems in Translation) taken *twice* in two different foreign languages.
3. At least seven doctoral (600-level) seminars. Four of these seminars must be conducted in the foreign languages in which the student has demonstrated *professional* competence; one of these seminars must be an Interdisciplinary Seminar.

Teaching Requirement in Comparative Literature
Students in Comparative Literature will be required to do a year of supervised teaching in appropriate courses designated by the Graduate Studies Committee.

Area of Speciality
During their second semester of doctoral work, candidates are asked to submit to their advisory committee an outline of a proposed area of speciality. The area of speciality will be used as a basis for advising the students in curriculum, for determining their specific language requirements and for structuring their general examinations. Normally, the area of speciality will consist of a core subject mastered in detail and on a comparative basis.

The Preliminary Examination
The preliminary examination in comparative literature is oral, approximately three hours in length, and will cover the candidate's area of speciality; students will be expected to discuss texts from the two foreign languages in which they have demonstrated competence.

Dissertation
It is assumed that the dissertation topic will develop out of the student's area of speciality. The program encourages studies that are critical as well as scholarly: a group of related essays focusing on a single literary problem; a lengthy translation prefaced by a critical introduction; studies involving literature and other disciplines.

Residency Requirement for the Ph.D.
Every full-time student is normally expected to make a three-year commitment to study toward the doctorate. Students will be considered in full-time residence during any semester in which they: (1) are taking at least one 500-level course or 600-level seminar or are, in the opinion of the Graduate Program Committee, properly preparing for the Doctoral Examination; (2) are holding no position other than that required under the teaching program; (3) are registered for EGL 690, Thesis Research, or 699, Directed Reading for Doctoral Candidates, for 3, 6, 9 or 12 credit hours, depending on the number of other courses being taken and the teaching assignment, the total of all these credits and teaching hours to be no more than 12.

Dissertation Colloquium
Students will present the results of dissertation research at an informal colloquium convened for that purpose by the Department of English and open to interested faculty and graduate students.

Matters Pertaining to All Advanced Degrees in English (including Graduate Studies in Comparative Literature and Creative Writing)
A. Extensions of time limits: Extensions of time limits are granted at the discretion of the Graduate Program Committee of the Department and the Vice Provost for Research and Graduate Studies and are normally for one year at a time.

B. Incompletes: The Graduate Program Committee has established as sufficient grounds for the granting of Incompletes either medical reasons on the part of the students themselves or emergencies arising within students' families.

C. English Graduate Colloquium: The colloquium is designed to foster a scholarly community by bringing the faculty and graduate students together informally to discuss literature and related matters. All graduate students are members of the colloquium. Students will elect the officers from among themselves to plan and direct the meetings of the colloquium. Students and members of the faculty will be invited to present papers or lectures, or to participate in panel discussions.

Foreign Languages and Graduate Study in English
Although the Ph.D. program includes a foreign language requirement, the M.A. program does not. The English Department feels, however, that graduate students at all levels should maintain and improve their foreign language skills as a means of better equipping themselves in their own chosen fields. Opportunities exist at Stony Brook for further study in comparative literature and in the foreign languages departments.

Additional Notes on Graduate Courses
Graduate courses in the 500 series are open to all graduate students. Courses in the 600 series are normally open only to students admitted to study for the Ph.D. degree although M.A. students with adequate preparation and background can sometimes be admitted with the permission of the instructor. All graduate courses normally carry three credits.

Each course in the 500 and 600 series to be offered in a given semester will be described by the instructor in some detail in a special departmental announcement prepared and distributed toward the end of the semester prior to that in which it is to be offered.

None of the courses numbered 690-699 can be taken to satisfy the requirement of seven seminars as stated in "Coursework in English" and "Coursework in Comparative Literature," above.

Advisement
There are a number of problems which the preceding explanations make no attempt to cover; for example, there are students whose careers may fall into two widely separated phases, whose previous records may show only a minor rather than a major interest in English or comparative literature, whose academic preparation now seems remote or whose recent experiences have kindled new interests. For such reasons the functioning of an advisement system under the directors is of the greatest importance. This advisement system itself functions in an informal atmosphere. Further questions should be directed to the graduate office of the Department.

Faculty

Altizer, Thomas J.J., Professor. Ph.D., 1955, University of Chicago: Religion and literature; myth and imagination.

Bashford, Bruce, Assistant Professor. Ph.D., 1970, Northwestern University: Literary criticism; rhetoric and the teaching of composition.

Christensen, Jerome, Associate Professor. Ph.D., 1975, Cornell University: Romantic literature; poetry and prose.

Dolan, Paul, Associate Professor. Ph.D., 1966, New York University: Modern British and American literature: Yeats; literature and politics.

Erdman, David V., Professor Emeritus. Ph.D., 1936, Princeton University: Romantic literature; Blake; textual and critical editing.

Fiess, Edward, Associate Professor, Director of Graduate Studies in English. Ph.D., 1951, Yale University: American literature; twentieth-century literature; biography and autobiography.

Flanagan, Thomas, Professor. Ph.D., 1958, Columbia University: Irish literature and cultural history; Victorian literature; modern British literature; Yeats; Joyce.

Fortuna, Diane, Assistant Professor. Ph.D., 1967, The Johns Hopkins University: Twentieth-century British and American literature; nineteenth-century American literature.

Fry, Donald, Professor.[1] Ph.D., 1966, University of California, Berkeley: Old English; Middle English; Chaucer.

Goldberg, Homer, Professor. Ph.D., 1960, University of Chicago: The Restoration and the eighteenth century; the novel; literary criticism.

Gross, Harvey S., Professor.[1] Ph.D., 1955, University of Michigan: Prosody and poetic theory; modern intellectual history.

Harris, William J., Assistant Professor. Ph.D. 1976, Stanford University: Black American literature; nineteenth-century American literature.

Huffman, Clifford C., Associate Professor. Ph.D., 1969, Columbia University: The Renaissance; Shakespeare.

Jordan, June, Associate Professor: Creative writing; children's literature; women's studies; Black American literature.

Kott, Jan, Professor.[1] Ph.D., 1947, Lodz University, Poland: Shakespeare; the drama; literary criticism.

Kranidas, Thomas, Professor. Ph.D., 1962, University of Washington: Prose and poetry of the seventeenth century; Milton; rhetoric and revolution.

Laurence, David, Assistant Professor. Ph.D., 1976, Yale University: Colonial and nineteenth-century American literature.

Levin, Richard, Professor. Ph.D., 1957, University of Chicago: The drama of the Renaissance; literary criticism.

Levine, Richard A., Professor and Chairperson. Ph.D., 1961, Indiana University: Victorian literature; the novel; literature and society.

Lipton, Aaron, Associate Professor. Ed.D., 1966, New York University: The teaching of reading, composition, and literature; the psychology of literature.

Ludwig, Jack, Professor. Ph.D., 1953, University of California, Los Angeles: The literature of the twentieth century; Joyce; Yeats.

Maresca, Thomas E., Professor. Ph.D., 1963, The Johns Hopkins University: Restoration and eighteenth-century literature; the epic; satire.

Miller, Ruth, Professor.[1] Ph.D., 1965, New York University: Early American literature; poetry; Emily Dickinson; Black American literature.

Newlin, Paul A., Associate Professor. Ph.D., 1967, University of California, Los Angeles: Nineteenth-century American literature; Black American literature.

Pequigney, Joseph, Associate Professor. Ph.D. 1959, Harvard University: The seventeenth century; Shakespeare.

Rogers, Thomas, Associate Professor. Ph.D., 1955, University of Pennsylvania: The Restoration and the eighteenth century; rhetoric; the teaching of compositon and literature.

Scheps, Walter, Associate Professor.[1] Ph.D., 1966, University of Oregon: Old English and Middle English; the history of the English language.

Sears, Sallie, Associate Professor. Ph.D., 1963, Brandeis University: The novel; Henry James; literary criticism; women's studies.

Shaw, Peter, Associate Professor. Ph.D., 1965, Columbia University: American literature; twentieth-century literature.

Sheehan, David, Associate Professor. Ph.D., 1974, University of Wisconsin, Madison: The Restoration and the eighteenth century.

Simpson, Louis, Professor.[1] Ph.D., 1959, Columbia University: Nineteenth- and twentieth-century British and American literature; poetry; literary criticism.

Spector, Stephen, Associate Professor. Ph.D., 1973, Yale University: Old English and Middle English; the history of the English language.

Squier, Susan, Assistant Professor. Ph.D., 1977, Stanford University: Nineteenth- and twentieth-century British literature; women's studies.

Stampfer, Judah L., Professor. Ph.D., 1959, Harvard University: The Renaissance and the seventeenth century; Shakespeare; literature and psychology.

Thompson, John, Professor. Ph.D., 1957, Columbia University: The literature of the twentieth century; prosody, literary criticism.

Weisinger, Herbert, Professor.[1] Ph.D., 1941, University of Michigan: The Renaissance; Shakespeare, mythology and ritual.

Wilson, Alice S., Associate Professor. Ph.D., 1947, Cornell University: The English and continental literature of the Renaissance; classical backgrounds of English literature; mythology.

Zimbardo, Rose, Associate Professor. Ph.D., 1960, Yale University: The Restoration and the eighteenth century; the Renaissance; the modern drama.

Estimated number of teaching, graduate and research assistants, fall 1982: 65.

[1]*Joint appointment, Comparative Literature.*

Courses

EGL 501 Studies in Chaucer
The purpose of this course is to trace Chaucer's development as a poet from the *Book of the Duchess* through the *Canterbury Tales.* By means of a close examination of stylistic and generic phenomena, we should be able to isolate those characteristics which are idiosyncratically Chaucerian as well as those which are typical of medieval narrative poetry generally.
Fall, 3 credits

EGL 502 Studies in Shakespeare
This course will attempt to study genre in Shakespearean history, tragedy and comedy, the growth of forms and the uses of plot.
Spring, 3 credits

EGL 503 Studies in Milton
A study of Milton's major poetry and prose in the context of the political and religious controversies of the period.
Fall, 3 credits

EGL 505 Studies in Genre
Section 1: Major American Fiction. An examination of the work of a broad range of writers from Charles Brockden Brown to Nabokov and Pynchon.
Fall, 3 credits

EGL 509 Studies in Language and Linguistics
History of the English Language: A study of the phonology, morphology, syntax and dialectology

of English from the beginnings to the present. Course requirements to include exams and a paper.
Spring, 3 credits

EGL 510 Studies in Old English Language and Literature
Beginning course in Old English literature, language and culture. After a brief introduction to grammar, we shall translate and discuss seven Old English poems: *Caedmon's Hymn, Brunanburh, Dream of the Rood, Maldon, Deor, Seafarer, Wanderer* and perhaps one more. No pre-requisites, no papers. One mid-term and a final exam.
Fall, 3 credits

Beowulf
Reading and translation of *Beowulf* and the *Finnsburh Fragment* via daily recitation. Some attention to backgrounds in Norse, archaeology, art and folklore. No papers, one mid-term, one final.
Prerequisite: EGL 300 or 510 or reading knowledge of Old English.
Spring, 3 credits

EGL 515 Studies in Middle English Language and Literature
A generic approach to Middle English literature excluding drama.
Spring, 3 credits

EGL 520 Studies in the Renaissance
Sixteenth-Century Literature: An introduction to representative literary and dramatic works of the 16th century in England. Readings in the anthologies will be supplemented by library assignments, which will include some attention to 20th-century criticism on this period.
Spring, 3 credits

EGL 530 Studies in the Age of Dryden
A study of Restoration literature (1660-1700) with a focus on major writers including Dryden, Bunyan, Rochester and the comic dramatists Etherege, Wycherley and Vanbrugh.
Spring, 3 credits

EGL 535 Studies in Neoclassicism
The Johnson Circle: The course will deal with Samuel Johnson's essays, criticism, poems and fiction; the imaginative and intellectual work of other writers in his orbit (for example, Goldsmith, Burke, Smart, Cowper, Crabbe); and Boswell's *Life.*
Fall, 3 credits

EGL 545 Studies in Victorian Literature
An intensive study of the major works of the period.
Spring, 3 credits

EGL 560 Studies in Early American Literature
A study of the forging of American culture in the furnace called Puritanism. The course asks the student to set aside stereotypical notions about Puritanism and to enter imaginatively into its way of understanding man and nature.
Fall, 3 credits

EGL 565, Studies in 19th-Century American Literature
The course will concentrate on the work of Emerson, Thoreau, Hawthorne, Melville and Whitman in the cultural context of America's literary coming-of-age.
Spring, 3 credits

EGL 570 Studies in 20th-Century American Literature
The course will deal with selected writers.
Spring, 3 credits

EGL 580 Poetry Workshop
An intensive workshop in the writing of poetry designed for M.A. candidates in creative writing.
Spring, 3 credits

EGL 581 Fiction Workshop
This course will be concerned primarily with the writing of the members of the class, but there will be some close critical study made of a few prominent published works of fiction. Students must produce some writing each week.
Fall, 3 credits

EGL 582 Drama Workshop
An intensive workshop in drama designed for M.A. candidates in creative writing.
3 credits

EGL 583 Non-Fiction Workshop
An intensive workshop in non-fiction for M.A. candidates in creative writing.
3 credits

EGL 585 Creative Writing Project
Under the supervision of a faculty advisor, the candidate will develop and create a creative writing project in a form suitable for publication or performance.
Fall and spring, 1-12 credits each semester

EGL 594 Contexts of Literary Study
Biography and Autobiography: The course will examine biography and autobiography in relation to the following themes and issues: their history and development, especially in English literature since the 19th century; the methodology of the biographer and the historian; the relation of these forms to prose fiction.
Spring, 3 credits

EGL 599 Independent Study
Fall and spring, 3 credits each semester

EGL 600 Pro-Seminar in English Literature I
Classical Backgrounds: The development of the major genres. Reading (in translation) and analysis of representative Greek and Latin pastoral, georgic, epic, drama and satire as background to the study of English literature. Concepts of genres, development of forms, structures, techniques.
Fall, 3 credits

EGL 605 Problems in Period and Tradition
Section 1: *Old English*
A detailed study of *Beowulf* and *Finnsburh Fragment* in terms of style and contexts. Sessions on themes, imagery, diction, structures, analogues, characterization, etc. Short reports, one research paper.
Prerequisite: Two semesters of Old English or permission of the instructor.
Fall, 3 credits

Section 2: *Modern British, American and European Fiction*
Modern British, American and European fiction with special emphasis upon the relationship between the technical aspects of the works and their underlying world view, and upon the nature of modernism.
Fall, 3 credits

Section 3: *Romantic Drama*
We will combine an intensive study of the dramatic works of Wordsworth, Coleridge, Byron and Shelley with an investigation of Romantic dramatic theory. Specific topics will include the eclipse of the tragic, the problem of pathos, the closet drama as mental theater and/or social criticism, the concept of lyrical drama, and Continental models and parallels for British plays.
Fall, 3 credits

EGL 606 Problems in Period and Tradition
Section 1: *Theories of American Literature.*
An examination of the major texts which present diverse approaches to the theory and practice of American literature.
Spring, 3 credits

Section 2: *Medieval Drama*
A close study of early English religious drama as seen from a variety of perspectives. We shall explore the history of the native English drama, the thematic and religious import of the plays and recent theories about presentation. Special attention will be paid to iconography and drama and to affinities between the medieval and Shakespearean traditions. One paper and one oral presentation.
Spring, 3 credits

EGL 607 Problems in Individual Authors
Section 1: *Contemporary American Poets*
The course will deal with selected contemporary poets.
Fall, 3 credits

Section 2: *Shakespeare*
This seminar will examine a specific topic or problem in Shakespearean drama, which will be determined in consultation with the students at the first meeting.
Fall, 3 credits

EGL 611 Pro-Seminar in English Literature II
English Literature: An examination of issues in critical theory that are of general interest to advanced students of literature; e.g., is there a single "right" reading for a literary work? Does poetry tell the "truth"?
Spring, 3 credits

EGL 690 Dissertation Research
Fall and spring, variable credit

EGL 695 Methods of Teaching English
This practicum will provide that all students be observed personally and periodically by the instructor. Each observational visit will be followed by a personal oral evaluation.
Prerequisite: EGL 697 or permission of instructor
Spring, 3 credits

EGL 697 Practicum in the Teaching of English Composition
For new Teaching Assistants
Fall, 3 credits

EGL 698 Practicum in the Teaching of English Literature
Fall and spring, 3 credits, repetitive

EGL 699 Directed Reading for Doctoral Candidates
Fall and spring, variable credit

Faculty for Comparative Literature

The names and fields of specialization of other faculty members from the Departments of French, Germanic and Slavic Languages and Literatures, and Hispanic Languages and Literature, who teach in the program in Comparative Literature, are:

Bieber, Konrad, Professor. Ph.D., 1953, Yale University: Eighteenth-century and contemporary French literature; comparative literature.

Cocco, Mia, Assistant Professor. Ph.D., 1976, University of California at Riverside: French and Italian Renaissance literature.

Fainberg, Louise Vasvari, Associate Professor. Ph.D., 1969, University of California, Berkeley: Medieval romance literature; romance philology.

Fry, Joan, Adjunct Lecturer. M.A., 1966, University of California, Berkeley: Classical archaeology; literature; history.

Gabbard, Krin, Assistant Professor. Ph.D., 1979, Indiana University: The arts and their interrelations; film studies; drama.

Godfrey, Aaron, Lecturer. M.A., 1960, Hunter College: Latin; medieval studies.

Hathorn, Richmond Y., Professor. Ph.D., 1950, Columbia University: Myth; Classical drama; Classical languages.

Hegde, Narayan, Adjunct Assistant Professor. Ph.D., 1980, State University of New York at Stony Brook: Twentieth-century English literature; literature of East and West.

Karst, Roman, Professor Emeritus. LL.M., 1936, Jagiellonian University, Cracow, Poland: Goethe; modern novel; Kafka; Mann.

Petrey, D. Sandy, Associate Professor. Ph.D., 1966, Yale University: Nineteenth-century French literature.

Rivers, Elias, Professor. Ph.D., 1952, Yale University: Spanish literature, literary theory.

Rosen, Charles, Professor. Ph.D., 1951, Princeton University: Music; interdisciplinary studies in music, literature, art and philosophy.

Silverman, Hugh J., Associate Professor. Ph.D., 1973, Stanford University: Contemporary European philosophy; philosophy and literature; philosophical psychology.

Schroter, Klaus, Professor. Ph.D., 1961, University of Hamburg, W., Germany: Literary theory; prose of the Weimar Republic; dialectical-materialistic aesthetics.

Sjoberg, Leif, Professor. Ph.D., 1968, Uppsala University, Sweden: Scandinavian literature: Ibsen, Strindberg, Lagerkvist, Ekelof; Old Norse.

Tejera, Victorino, Professor. Ph.D., 1956, Columbia University: Greek philosophy; aesthetics; philosophy of history and myth.

Zavala, Iris M., Professor. Ph.D., 1962, Universidad de Salamanca: Seventeenth- to twentieth-century Peninsular Spanish and Caribbean literature.

Zimmermann, Eleonore M., Professor. Ph.D., 1956, Yale University: Seventeenth-, nineteenth- and twentieth-century French literature; comparative literature.

Estimated number of teaching, graduate and research assistants, fall 1982: 10.

Comparative Literature Courses

CLT 500 Literary Theory I: From Antiquity to the 19th Century
An examination of the basic texts in literary criticism from Plato to the nineteenth century. Stress will be placed on the predominantly ethical and mimetic approach of classical theory, its transformation in the Renaissance and the Neo-Classical period and its replacement by Romantic-Modern theories.
Fall, 3 credits

CLT 501 Literary Theory II: Modern Trends
The development of literary theory from the beginnings of the nineteenth century to the present. The class will consider texts by Hegel, Coleridge, Nietzsche, Arnold, Richards, Sartre, Barthes, Frye and Trilling.
Spring, 3 credits

CLT 502 Problems in Translation
After suitable preparation in the theory of translation, the student plans and carries out a translation of a literary text. Student must demonstrate competence in the language he or she chooses to work in.
Section 1: French
Section 2: German
Section 3: Russian
Section 4: Spanish
Section 5: Latin
Fall and spring, 3 credits, repetitive

CLT 503 Comparative Studies in Literary History
Section 1: Renaissance
Studies in the European Renaissance (primarily French, Italian, English) with emphasis on lyric poetry. Authors studied will include Petrarch and the Petrarchisti, Marot, DuBellay and the Pleiade, Wyatt, Spenser and Donne. Authors will be studied in relation to historical, social and artistic movements of the period.
Fall, 3 credits

CLT 508 Literature in Relation to Other Disciplines
Spring, 3 credits

CLT 597 Directed Readings for M.A. Students
Fall and spring, variable and repetitive credit

CLT 599 Independent Study
Fall and spring, variable and repetitive credit

CLT 601 Seminar in Literary Theory
Part 1: The Art of Interpretation
Hermeneutic studies in Auerbach, Lukacs, Panofsky, Sartre, Frye.
Fall, 3 credits

Part II: The Art of Interpretation
Studies in de Saussure, Jakobson, Barthes, Freud.
Spring, 3 credits

CLT 602 Interdisciplinary Seminar
Section 1: Literature and music
The emphasis will be on nineteenth-century literature and music and the development of Spirit, Beethoven, Hegel and Wordsworth to the period before World War I.
Spring, 3 credits

CLT 690 Dissertation Research
Fall and spring, variable and repetitive credit

CLT 698 Practicum in Teaching
Fall and spring, variable and repetitive credit

CLT 699 Directed Readings for Doctoral Candidates
Fall and spring, variable and repetitive credit

Department of French and Italian

Admission to Graduate Study

Candidates for admission to the M.A. program in Romance Languages and Literature with Graduate Studies in French or French and Italian must hold the bachelor's degree or its equivalent from a recognized academic institution. The dossier must include:

A. Three letters of recommendation from persons qualified to assess the student's preparation.

B. The results of the Graduate Record Examination (verbal and quantitative aptitude as well as the advanced test in French).

C. A transcript of grades.

D. Acceptance by both the Department of French and Italian and the Graduate School.

It is also recommended that students submit one or two sample papers. These papers are required of applicants transferring from graduate programs in other universities.

While it is expected that applicants demonstrate superior preparation in French and/or Italian language and literature, they need not have majored in French and/or Italian as undergraduates. Foreign students must furnish as much information as possible about their training.

The University requires all foreign students to take the TOEFL examination. The Department does not subscribe to fixed degree equivalencies for institutions abroad, and prefers to judge each application individually. Transfer credit (up to 6 credits) is awarded where circumstances warrant.

Requirements for the M.A. Degree

Graduate Studies in French

To qualify for the M.A. degree in Romance Languages and Literature with Graduate Studies in French, students will normally complete 30 graduate credit hours (ten courses), including at least 18 credits (six courses) in the Department of French at Stony Brook. French 507 (Advanced Stylistics) and 508 (*Explication de Texte*) are required; French 501 (Civilization) is highly recommended. Students who wish to have a double concentration in French and Italian will normally complete 36 credits (twelve courses), with at least 15 credits in each language.

A student who has completed his or her course requirements with a satisfactory (B) average and has earned at least a B (not B–) in French 507 will become a candidate for the M.A. examination.

The Department urges all students to acquire at least a functional oral, written and reading knowledge of a second foreign language.

Students who wish to satisfy the New York State certification requirements for secondary school teachers of French will consult Professor Tursi and arrange their schedules with these requirements in mind.

The general reading list and details of the M.A. examination, which comprises a written and an oral part, can be obtained from the Department. Both will be sent to the candidate upon admission into the program, together with a description of the courses to be offered in the semester following his or her admission.

Graduate Studies in French and French/Italian

The Department's M.A. curricula fulfill the needs of students interested in a pre-Ph.D. program as well as of those who choose to prepare themselves for a practical, terminal M.A. In addition, a thorough and extensively supervised program for teaching assistants is available; it has been considered usually helpful by all who have participated in it. Our carefully developed advising system enables us to tailor individual programs to suit the needs and interests of individual students.

The M.A. curriculum emphasizes linguistic proficiency as well as training in literature and its cultural context. Courses are taught in French or Italian; written and oral assignments are in French or Italian. Students must obtain the grade of B or better in advanced stylistics before being admitted to the M.A. examination. (Those with insufficient background will be directed towards remedial work and/or undergraduate courses; neither counts for degree credit.)

The curriculum is conceived so that students may acquire a general knowledge of French and/or Italian literature, culture and history, as well as the tools necessary to deal independently with a literary text. Upon entering, students are given a general reading list and, well before taking the M.A. examination, they will select an area of concentration with the help of their advisors. Normally this will involve a specific topic or theme in two periods of literature to be chosen for study in greater depth.

Our graduate courses are open to qualified students in other fields and in the CED program. Conversely, our students are encouraged to take courses in related areas. With the permission of their advisor and the Director of Graduate Studies, students may obtain 6 credits outside the Department.

The Doctor of Arts Program

The D.A. degree is primarily an advanced degree for continuing a career in teaching at the high school, junior college or undergraduate level. Entering students must have at least a B.A., more frequently an M.A. In the French or Italian major, 15 credits (depending on previous preparation) are to be distributed evenly among literature, advanced language and culture courses. In the minor (Spanish, German, Slavic or TESOL) 12 credits are required. In addition, one course in advanced composition, one course in general linguistics and three education courses (including one in testing) are required. The requirements of a practicum, an internship and an externship vary. The total number of credits ranges normally from 45 to 51. Practical experience in teaching, a comprehensive examination (written and oral) and a doctoral project are required. A B average in coursework must be maintained.

Faculty

Allentuch, Harriet, Professor. Ph.D., 1962, Columbia University: Seventeenth-century French literature.

Bieber, Konrad, Professor. Ph.D., 1953, Yale University: Contemporary French literature; eighteenth-century French thought; history of ideas.

Blum, Carol, Associate Professor. Ph.D., 1966, Columbia University: Eighteenth-century French literature.

Brown, Frederick, Professor. Ph.D., 1960, Yale University: Nineteenth and twentieth-century literature in relation to social history and the history of ideas.

Brugmans, Linette, Professor Emeritus. Ph.D., 1951, New York University: Nineteenth- and twentieth-century French literature.

Carpetto, George, Assistant Professor. Ph.D., 1973, Rutgers University: Fifteenth-century Italian humanism; romanticism.

Cocco, Maria, Assistant Professor. Ph.D., 1976, University of California, Riverside: French and Italian Renaissance literature.

Franco, Charles, Assistant Professor. Ph.D., 1977, Rutgers University: Italian Medieval literature with special emphasis on Dante.

Goldman, Jeanine M., Assistant Professor. Ph.D., 1973, Fordham University: French language and literature; phonetics.

Haac, Oscar A., Professor. Ph.D., 1948, Yale University: Eighteenth- and nineteenth-century French and comparative literature.

Laidlaw, G. Norman, Professor Emeritus. Ph.D., 1950, Columbia University: Eighteenth- and twentieth-century French literature; literature and science.

Mills, Leonard R., Associate Professor. Ph.D., 1963, Columbia University: Medieval literature, paleography.

Mignone, Mario, Associate Professor. Ph.D., 1972, Rutgers University: Twentieth-century Italian literature and contemporary theater.

Petrey, Sidney, Associate Professor. Ph.D., 1966, Yale University: Nineteenth-century literature; contemporary criticism.

Riggs, Elizabeth P., Assistant Professor. Ph.D., 1971, Columbia University: Medieval French language and literature; contemporary French novel and theater; French films.

Rizzuto, Anthony, Associate Professor. Ph.D., 1966, Columbia University: Nineteenth- and twentieth-century literature.

Tursi, Joseph A., Professor and Chairperson. Ph.D., 1965, New York University: Eighteenth-century Italian literature; methodology and language.

Whitney, Mark S., Professor. Ph.D., 1962, University of Pennsylvania: Sixteenth-century French literature.

Zimmermann, Eleanore M., Professor. Ph.D., 1956, Yale University: Seventeenth-century French drama; nineteenth-century literature, especially lyricism; twentieth-century drama.

Estimated number of teaching, graduate and research assistants, fall 1982: 11.

French Courses

FRN 500 Techniques of Reading for Graduate Research
Through intensive study of language structures and idiomatic usage, with extensive practice in written translation of scholarly texts, candidates for advanced degrees are able to attain the proficiency level of the graduate French reading requirement. Several departments grant exemption from further examination for successful completion of this course.
Spring, 3 credits

FRN 501 Contemporary French Culture and Institutions
Analysis of contemporary French civilization through the study of the development of its historical, cultural, political, and social characteristics. Designed for potential teachers of French at the college level as well as in secondary schools, this course will emphasize and trace the evolution of the character and institutions of contemporary France
Fall, 3 credits.

FRN 507 Advanced Stylistics
Designed to deepen the advanced student's knowledge of the finer points of the syntax, structure and stylistic versatility of the French language, this course, during the first semester, will emphasize three principal exercises: translations from English into French stressing idiomatic turns of phrase and correct structuring, compositons in the French language, and advanced work in major discrepancies between French and English syntax.
Spring, 3 credits

FRN 508 Explication de Texte
Emphasis will be placed upon weekly explication de texte, beginning with Renaissance literature, and proceeding to the modern period, in which analysis will be made of those effects that, taken together, constitute a given author's stylistic pattern.
Fall, 3 credits

FRN 521 Seminar in French Renaissance Literature
Study of the major literary genres as practiced by some of the foremost writers of 16th-century France from Marot to Montaigne.
Fall, 3 credits

FRN 531 Studies in the Classical Theatre
Analysis of classical dramaturgy and some of the major themes of seventeenth-century tragedy and comedy. Careful reading of Corneille, Racine and Moliere.
Spring, 3 credits

FRN 552 Studies in 19th-Century French Literature
Through discussion of selected texts by Balzac, Stendhal, Flaubert and Zola, this course will explore the nature of realist prose and its place in French literary history.
Spring, 3 credits

FRN 562 Studies in Contemporary Literature
The active pursuit of humanist ideas from Anatole France to Louis Guilloux, from Romain Rolland to Camus, with emphasis on the works of Valery Larbaud, Roger Martin du Gard, Andre Gide and Andre Malraux.
Fall, 3 credits

FRN 581 Independent Individual Studies
Fall and spring, variable and repetitive credit

FRN 599 Practicum in Teaching
Fall and spring, variable and repetitive credit

Italian Courses

ITL 500 Reading Italian
Designed to prepare graduate students to read contemporary research in their respective disciplines published in Italian, the course will present systematic instruction in the fundamentals of reading comprehension and in specialized subject-oriented vocabulary.
Spring, 3 credits

ITL 501 Contemporary Italy
Analysis of contemporary Italy and its civilization through the study of the development of its historical, cultural, political and social characteristics. Designed for potential teachers of Italian at the college as well as secondary school levels, this course will emphasize and trace the evolution of the character and institutions of contemporary Italy.
Spring, 3 credits

ITL 508 Advanced Grammar and Stylistics
This course is designed to analyze and discuss the finer points of Italian grammar and to investigate diverse styles in writing. Students will be expected to develop grammatical drills from elementary through advanced levels. Literary masterpieces will be translated from English to Italian in order to demonstrate types of style and possible alternatives in writing.
Spring, 3 credits

ITL 518 Boccaccio: Seminar
The course emphasizes the origin of Italian prose-fiction, as seen through the first attempts at the short story, such as the *Novellino*, but it will deal mainly with Boccaccio's *Decameron*, as the perfection of the *genre*.
Fall, 3 credits

ITL 562 Studies in Contemporary Literature
Contemporary Italian Poetry: The Quest for Meaning
Contemporary Italian poetry reflects the dynamic despair and frustration that the intellect experiences when it confronts a universe which does not answer to human expectations and desires. Although faithless and hopeless, the poets cannot become prisoners of ignorance about their own destiny and conduct an indomitable search for new values and answers. Besides the poetry of the two Nobel Prize winners, Quasimodo and Montale, readings will include selected poems by other outstanding poets such as Ungaretti, Saba, Campana and Pasolini.
Fall, 3 credits

ITL 581 Independent Individual Studies
Fall and spring, variable and repetitive credit

ITL 599 Practicum in Teaching
Fall and spring, variable and repetitive credit

Department of Germanic And Slavic Languages And Literatures

Admission to the M.A. Program

For admission to graduate study in Germanic languages and literatures the following are required:

A. A bachelor's degree from a recognized institution.

B. An average of at least a B in undergraduate German literature courses.

C. An official transcript of undergraduate record.

D. Letters of recommendation from three previous instructors.

E. Results of the Graduate Record Examination Aptitude Test.

F. Proficiency in a second foreign language equivalent to two years of college work. Preference will be given to French, Spanish, Italian or Russian, but each case will be treated on its individual merits.

G. Acceptance by both the Department of Germanic and Slavic Languages and Literatures and the Graduate School.

Any deficiencies in these requirements will not automatically bar admission but will normally mean that the student, after being admitted, may have to do additional work to bring his or her level of preparation up to the required standard.

If the applicant's credentials and background seem to indicate deficiencies in the German language, he or she may be required at the outset of the first semester of study to take a written and oral examination testing command of the language. If judged insufficiently prepared, the student may be required to enroll in GER 321 and perhaps GER 322 in addition to the other course requirements listed below.

Other relevant graduate courses taken at Stony Brook may be used to substitute for certain courses of the minimum requirements listed below if they are approved in advance by the Department.

Requirements for the M.A. Degree

Option 1:

A. Formal course requirements: *Credit Hours*

1. GER 549 Modern Trends in Literary Theory 3
   GER 556 Bibliography and Methodology 3
   GER 557 History of the German Language 3
   GER 561 Goethezeit 3
   GER 599 Thesis 6
2. Four additional offerings at the graduate level from courses within the Department or, upon prior approval by the Department, from those of other departments within the Graduate School. 12

30

B. Performance: Average of B or better for all courses listed under A.

C. Language examination: Passing an examination testing the candidate's ability to use for research purposes at least one other language, ancient or modern, approved by the Department.

D. M.A. paper: Submission of a scholarly essay on a topic and of a standard acceptable to the Department.

Option II:

A. Formal course requirements — Credit Hours

No thesis required—all 30 credits can be fulfilled by coursework, as follows:

1. GER 504 German Cultural History 3
   GER 539 Contrastive Structures 3
   GER 556 Bibliography and Methodology 3
   GER 571 Comparative Germanic Linguistics 3
2. Six additional offerings at the graduate level from courses within the Department or, upon prior approval by the Department, from those of other departments within the Graduate School. 18

30

B. Performance: Average of B or better for all courses listed under A.

C. Language examination: Passing an examination testing the candidate's ability to use for research purposes at least one other language, ancient or modern, approved by the Department.

Matters Pertaining to the M.A. Degree

A. Graduate instruction in the Department of Germanic and Slavic Languages will be given as far as possible by tutorials and seminars. Members of the Department of professorial rank will advise students in the planning of their programs according to their special interests and needs against the background of their undergraduate and graduate preparation before entering the Stony Brook program. In the M.A. program, normal coursework has been reduced to a minimum so that the maximum amount of time may be released for independent study under the tutorial and seminar programs.

B. Extensions of time limitations: Extensions of time (beyond three years for the M.A. degree) are granted at the discretion of the Department and the Vice Provost for Research and Graduate Studies and are normally for one year at a time.

C. Incompletes: A student wishing to request an Incomplete must get the course instructor's approval, as well as that of the Director of Graduate Studies.

D. Part-time study for the M.A. degree may be permitted at the discretion of the Department.

TESOL (Teaching English to Speakers of Other Languages)

Graduate Studies in Teaching English to Speakers of Other Languages offers an M.A. degree in Germanic Languages and Literature jointly staffed by the Department of Germanic and Slavic Languages and Literatures and by the Program in Linguistics.

Admission to Graduate Studies in TESOL

For admission to Graduate Studies in TESOL the following are required:

A. A bachelor's degree from a recognized institution.

B. An official transcript of undergraduate record.

C. Letters of recommendation from three previous instructors.

D. Results of the Graduate Record Examination.

E. Proficiency in a foreign language equivalent to two years of college work.

F. Students whose native language is not English must have a minimum score of 550 on the TOEFL for admission to the program. Students will not be allowed to take the required practica until their English is deemed adequate by the faculty. This may entail a delay in the completion of requirements for some students.

Requirements

A. Formal course requirements:

	Credit Hours
1. ESL 521 Syntax	3
ESL 522 Phonetics	3
ESL 524 Methods of TESOL	3
ESL 525 Contrastive Analysis	3
OR	
ESL 526 Analysis of an Uncommonly Taught Language	3
ESL 527 English Grammar & Usage	3
Two of the following courses:	
ESL 531 Language Testing	3
ESL 532 Second Language Acquisition	3
ESL 534 Applied Linguistics	3
ESL 571 Practicum in TESOL I	3
ESL 572 Practicum in TESOL II	3

2. One elective course approved by the Department.
3. ESL 595 Thesis: Certain students may, with the recommendation of the faculty, be permitted to present a thesis.

B. Performance: Average of B or better for all courses listed under A. The student must achieve a grade of Satisfactory in ESL 571 and/or 572 in order to be graduated from the program.

C. Certain required courses may be waived for students showing an exceptional background in linguistics or TESOL. Application for such waivers must be made in writing to the Department. In any case, all students must complete 30 graduate credits of approved coursework to receive a degree.

Advancement to Candidacy for the Ph.D. Degree in Germanic and Slavic Languages and Literatures*

A. Residence requirement: Minimum of two consecutive semesters of full-time study.

B. Foreign language requirements: A student who has not fulfilled the language requirement during the master's program must pass an examination in at least one other ancient or modern language approved by the Department.

C. Comprehensive examination: Before the end of the fourth semester of full-time residence after receiving the M.A., a student will be required to take and pass the departmental comprehensive examination testing knowledge and critical understanding of German literature and language.

D. Dissertation subject: Presentation of a proposal for a doctoral dissertation which is supported by that member of the Department who has agreed to sponsor the dissertation.

E. Course requirements: In addition to those listed under the master's degree, students must take the following courses:

1. In preparation for the independent research involved in the dissertation, students must take at least two advanced tutorials:

	Credit Hours
GER 601 Special Author	3
GER 602 Special Period	3

2. Six additional offerings at the graduate level from courses within the Department or, with prior approval by the Department, from those of other departments within the Graduate School. (Students should note that the comprehensive examination can be expected to cover material drawn from not only the four courses listed under the M.A. requirements but also GER 558, Middle High German, and GER 563, Old High German.) 18

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Persons wishing to stress Germanic philology will be encouraged to do so by substituting appropriate courses from within the Department's offerings as well as those from other departments, such as FRN 511, EGL 509, EGL 510, EGL 515 or EGL 601.

Graduate work in Slavic is offered and may be credited toward the M.A.L.S., D.A. and Ph.D. degrees.

*The doctoral program is currently not accepting new students.

Faculty

Anshen, Frank, Associate Professor. Ph.D., 1968, New York University: Sociolinguistics.

Aronoff, Mark, Associate Professor. Ph.D., 1974, Massachusetts Institute of Technology: Morphology; syntax.

Berr, Samuel, Associate Professor. Ph.D., 1968, New York University: Historical linguistics; Old Saxon; Yiddish language and literature.

Bethin, Christina Y., Assistant Professor. Ph.D., 1978, University of Illinois: Slavic linguistics; general linguistics.

Brown, Russell E., Associate Professor. Ph.D., 1963, Harvard University: Modern German literature; Expressionist poetry; Trakl; Brecht; Jahnn.

Cannon-Geary, Irene, Assistant Professor. Ph.D., 1978, Brown University: 16th-century German studies; Baroque literature.

Carton, Aaron S., Professor. Ph.D., 1961, Harvard University: Psycholinguistics.

Chanover, Susan A., Lecturer. M.A., New York University: Teaching of English to speakers of other languages.

Czerwinski, Edward J., Professor. Ph.D., 1965, University of Wisconsin: Russian literature; comparative literature; Dostoevsky.

Elling, Barbara E., Associate Professor and Chairperson. Ph.D., 1971, New York University: Romanticism; literature and sociology; methods of language teaching.

Hall, Beatrice L., Assistant Professor. Ph.D., 1963, New York University: Historical linguistics.

Karst, Roman, Professor Emeritus. LL.M., 1936, Jagiellonian University, Cracow, Poland: Goethe; modern novel; Kafka; T. Mann.

Katsell, Jerome H., Assistant Professor. Ph.D., 1974, University of California, Los Angeles: 19th- and 20th-century Russian literature; literary theory; Chekov; Russian and Czech languages.

Kerth, Thomas, Assistant Professor. Ph.D., 1977, Yale University: German literature of the Middle Ages.

Ruplin, Ferdinand A., Associate Professor. Ph.D., 1965, University of Minnesota: Applied linguistics; Middle High German; computer-assisted instruction.

Russell, John R., Associate Professor. Ph.D., 1966, Princeton University: Rokoko; Novelle; computer-assisted instruction.

Schroter, Klaus, Professor. Ph.D., 1961, University of Hamburg, W. Germany: Goethe; literary theory; prose of the Weimar Republic; dialectical-materialistic esthetics.

Sjoberg, Leif, Professor. Ph.D., 1954, Uppsala University, Sweden: Scandinavian literature; Ibsen, Strindberg, Lagerkvist; Ekelof; Old Norse.

Sridar, S.N., Assistant Professor. Ph.D., 1980, University of Illinois: Applied linguistics and psycholinguistics.

Estimated number of teaching, graduate and research assistants, fall 1982: 18.

German Courses

GER 500 Intensive Reading German
Intensive introductory German for non-majors. Practice in reading and translation; German prose; use of dictionaries and reference materials; as much attention as possible to special problems of various disciplines.
Fall and spring, 3 credits each semester.

GER 501 Strategies of Teaching German
Detailed examination of various approaches to teaching German as a foreign language, conventional teaching aids; use of media in instruction. [Given at Goethe House in New York City.]
Fall, 3 credits

GER 502 Language Practicum
Techniques of classroom instruction; teacher and peer visitation and evaluation. To be taken in conjunction with initial teaching assignment.
Fall and spring, 3 credits each semester

GER 503 Literature Practicum
Apprenticeship to a senior professor for work in undergraduate literature course. Preparation and delivery of lectures. Evaluation of students' performance in class and written work.
Fall and spring, 3 credits each semester

GER 504 German Cultural History
Examination of major developments in the German speaking countries in the areas of history, philosophy, education and the arts as related to various literary periods.
Spring, 3 credits

GER 506 Advanced Stylistics
Advanced stylistics and textual analysis. Designed to deepen the advanced student's knowledge of the finer points of syntax, structure and stylistic versatility of the German language.
Spring, 3 credits

GER 539 Contrastive Structures: German-English
Fall, 3 credits

GER 541 Literature of the Goethe Period
Die Weimarer Klassik: Goethe und Schiller. The major figures considered as poets, philosophers and theoreticians of the arts and literature.
Spring, 3 credits

GER 545 20th-Century Prose and Poetry
A survey of twentieth-century prose and/or poetry with emphasis on the poetry of Expressionism.
Spring, 3 credits

GER 546 20th-Century Drama
Concentration on aspects of modern drama, e.g., Brecht's anti-illusionistic theater, and drama as a vehicle for dissemination of political ideology. Readings will also include works by Ionesco, Beckett, Frisch and Grass. Cross-listed with CEL 503.
Fall, 3 credits

GER 547 Special Author Studies
Tutorial.
Fall and spring, 3 credits

GER 548 Special Period Studies
Tutorial.
Fall and spring, 3 credits

GER 549 Theory and Criticism
Problems of Realism. Studies in Georg Lukac's later works: *Wider den miBverstandenn Realismus* and his *Aesthetik,* with reference to the international development of Marxist literary sociology (Benjamin, Brecht, Caudwell). Cross-listed with CLT 601.
Fall, 3 credits

GER 553 Seminar V: Romanticism and Realism
Spring, 3 credits

GER 555 Scandinavian Literature
Scandinavian Nobel Prize winners: Bjornson, Undset, Hamsun, Lagerlof, Heidenstam, Lagerkvist, Laxness, Johns V. Jensen (and Blixen-Dinesen).
Spring, 3 credits

GER 557 History of the German Language
The development of the German language from Indo-European to modern High German: a representative selection of texts from different periods will be examined.
Fall, 3 credits

GER 565 Middle High German Literature
Spring, 3 credits

GER 580 Translation from Germanic Languages
A course enabling those who take it to translate from Icelandic, Danish, Norwegian and Swedish according to the needs of the class, concentrating on medieval texts such as Saxo Grammaticus, Sankta Birgitta, various types of Icelandic and Norwegian sagas. We shall translate folk stories from the various Scandinavian countries.
Spring, 3 credits

GER 599 Master's Thesis
Variable and repetitive credit

GER 601 Special Author
Tutorial to be arranged with appropriate staff member.
Fall and spring, 3 credits each semester

GER 602 Special Period
Tutorial to be arranged with appropriate staff member.
Fall and spring, 3 credits each semester.

GER 603 The Middle Ages
Medieval German Lyric, Middle High German Lyric and its antecedents.
Fall, 3 credits

GER 699 Doctoral Dissertation
Taken after advancement to candidacy.
3 credits each semester, repetitive.

Russian Courses

RUS 500 Reading Russian
Intensive introductory Russian for non-majors. Practice in reading and translation: Russian prose; use of dictionaries and reference materials; as much attention as possible to special problems of various disciplines.
Spring, 3 credits

SLV 503 Special Topic in Slavic Linguistics
The course will investigate various topics in Slavic linguistics. Its orientation is primarily theoretical and may include discussion of Slavic accentology, history of Slavistics, the phonology, morphology or syntax of a given Slavic language.
Spring, 3 credits

RUS 504 Russian Culture
Fall, 3 credits

RUS 506 Stylistics of Russian
Advanced stylistic and textual analysis. Designed to deepen the advanced student's knowledge of the finer points of syntax, structure and stylistic versatility of the Russian language.
Fall, 3 credits

RUS 509 Dostoevsky and the West
Crosslisted with CLT 504.
Fall, 3 credits

RUS 512 Early 20th-Century Russian Literature
An introduction to the various movements which characterize the pre-Revolutionary period of 20th-century Russian literature—Symbolism, Acmeism, Fundamentalism, etc.—and then focus on the works of one or two of its major writers or poets such as Blok, Axmatova, Mandelstram, Pasternak, etc.
Fall, 3 credits

RUS 517 Old Russian Literature
The course will discuss Russian literature from the 11th to the 18th centuries and will investigate the relationship between the world view of pre-19th-century Russia and the literary genres, styles and symbolism of that time. Discussions will include analysis of such major works as the Chronicles, The Tale of Igor's Campaign, The Life of Avvakum, the verses of Simon Polotskij, and others.
Fall, 3 credits

RUS 520 Applied Linguistics
A practical course in Russian syntax, idiomatic phraseology and etymology for teachers of Russian.
Fall, 3 credits

RUS 539 Teaching Strategies in Russian
An investigation of the methodology and materials available to a teacher of Russian. The course will discuss applied linguistics in teaching.
Spring, 3 credits

RUS 563 Old Church Slavonic
An investigation of the phonology and morphology of Old Church Slavonic, the language of the oldest Slavic manuscripts and a form close to Common Slavic which was presumably spoken by the early Slavs, with close textual analysis of selected extant manuscripts.
Fall, 3 credits

RUS 571 Introduction to Slavic Linguistics
A survey of the major West, East and South Slavic languages with particular attention paid to their historical development. The course will include comparative and contrastive studies in the areas of phonology, morphology and syntax.
Spring, 3 credits

Scandinavian Courses

SCN 506 Advanced Stylistics—Scandinavian Language
Advanced stylistics and textual analysis. Designed to deepen the advanced student's knowledge of the finer points of syntax, structure and stylistic versatility of the Scandinavian languages.
Spring, 3 credits

SCN 564 Old Norse Language
Formerly GER 564
Fall, 3 credits

SCN 565 Old Norse Literature
Spring, 3 credits

TESOL Courses

Teaching English to Speakers of Other Languages

ESL 521 Syntax
A study of the fundamental notion of a grammar and the application of the general method of modern syntax to specific problems.
Fall, 3 credits

ESL 522 Phonetics
Articulatory, acoustic and physiological phonetics with some attention paid to speech perception.
Fall, 3 credits

ESL 524 Methods of TESOL
An analysis of the differences between first and second language acquisition and relevant learning principles.
Fall, 3 credits

ESL 525 Contrastive Analysis
The course offers a survey of linguistic typology and examines the ways in which linguistic subsystems may legitimately be compared across languages, thus providing a basis for devising strategies for teaching one language to speakers of another language.
Spring, 3 credits

ESL 526 Analysis of an Uncommonly Taught Language
Working from primary and secondary sources students will construct an outline of the phonology, morphology and syntax of a language previously unknown to them.
Spring, 3 credits

ESL 527 English Grammar and Usage
An analysis of "good" or "correct" usage of English for practical application in the classroom.
Spring, 3 credits

ESL 530 Introduction to General Linguistics
An introduction to modern theoretical and applied linguistics.
Fall, 3 credits

ESL 531 Language Testing
How the general principles of measurement can be and are applied to the assessment of linguistic functioning.
Spring, 3 credits

ESL 532 Second Language Acquisition
This course examines the major theories, methods and findings in the field of second language acquisition, with emphasis on the nature of the cognitive processes and variables involved, the possibility of designing empirical studies, and the implications of such studies for second language teaching. Oral presentation, midterm examination, and a final research paper.
Fall, 3 credits

ESL 534 Applied Linguistics
Students will study the latest research in foreign language learning.
Spring, 3 credits

ESL 550 Selected Topics in Linguistics
Language Acquisition and Creolization: A consideration of how pidgins become creoles and what this process reveals about universals of language acquisition.
Fall, 3 credits

ESL 571 Practicum in TESOL I
Reading: The teaching of English to non-native speakers. Practical classroom experience.
Fall and spring, 3 credits each semester

ESL 572 Practicum in TESOL II
Speaking: The teaching of English to non-native speakers. Practical classroom experience.
Fall and spring, 3 credits each semester

ESL 591 Directed Readings in Applied Linguistics
Qualified students will be given the opportunity to do independent work on a selected topic in applied linguistics under the guidance of a faculty member.
Fall, 1-3 credits

ESL 595 Thesis
Exceptionally well-qualified students may be given the opportunity to present a thesis, consisting of original work on a topic in applied linguistics. Only students who are specifically invited to do so by the faculty may take this course.
Fall, 3 to 6 credits

Department of Hispanic Languages and Literature

The Department of Hispanic Languages and Literature offers different programs leading to the degrees of Master of Arts, Doctor of Arts and Doctor of Philosophy. Part-time study is permitted; some graduate courses are offered during the late afternoon and in the summer session. At the Ph.D. level at least two consecutive semesters of full-time graduate study in residence are required.

Admission Requirements

Besides filling in the official graduate application forms, the prospective student is required to provide transcripts covering previous studies, normally including a baccalaureate degree with a major in Spanish; three letters of academic and personal reference; and, if possible, a sample of written work (an essay or term paper). Except in the case of part-time study toward the M.A., all applicants are required to provide their scores on the Graduate Record Examination Aptitude Test (GRE).

Foreign applicants must have a score of at least 500 (TOEFL) in English and must show that they have the necessary funds to finance their education (living expenses plus tuition).

An applicant whose qualifications seem deficient may be admitted on a part-time trial basis as a Graduate School Special student (GSP) through the Center for Continuing Education.

Degree Requirements for the Master of Arts

In addition to proficiency in both Spanish and English, there is a general requirement of 36 graduate credit hours for the Master of Arts degree. As many as six of these credits may be earned by completing a special project, thesis and/or examination. A course in teaching methods (a practicum) is required. Students working on a part-time basis should complete all requirements within three years after their first regular graduate registration. Graduate Studies in Hispanic bilingual-bicultural studies leading to an M.A. degree require a total of 15 credits in bilingual courses: SPN 581, 583, 584, 585 (or 586) and 587 (an independent project to be completed in the final semester). This program does not require a third language or a comprehensive examination and is normally a terminal degree program.

Other programs may be terminal or may be combined with the doctor of arts or the Ph.D. program. For secondary and junior college teachers who do not intend necessarily to plan on post-M.A. studies, the usual minimum of 36 graduate credit hours in Spanish is required. These courses *may* include linguistics, problems in bilingual education, Spanish and Spanish-American literature. They *must* include 1) a teaching practicum and 2) either an independent project (essay or thesis) or an examination adapted to the needs and interests of the individual student.

An interdepartmental Romance languages M.A. is offered, requiring 36 credit hours of specified coursework in two different languages and a comprehensive examination based on a special reading list. This M.A. may be combined with the D.A. or Ph.D. program.

A reading knowledge of French is required for the pre-doctoral M.A. in Spanish. Under this program, the required minimum of 36 credit hours would normally include a practicum in teaching problems, at least one course in linguistics, and other courses in Spanish and Spanish-American literature. A comprehensive examination, based on the Department's standard list of readings and topics, is required for the pre-doctoral M.A. (see the Ph.D. program as described below); this examination is normally scheduled early in November or early in April.

Degree Requirements for the Doctor of Arts

The D.A. degree is primarily an advanced degree for continuing a career in teaching at the high school, junior college or undergraduate level. Entering students must have at least a B.A., more frequently an M.A. In the Spanish major, 9-18 credits (depending on previous preparation) are to be distributed evenly among literature, advanced language and culture courses. In the minor (French, German, Italian, Slavic or linguistics) 9 credits are required. In addition, one course in advanced composition, one course in general linguistics and three education courses (including one in testing) are required. The requirements of a practicum, an internship and an externship vary. The total number of credits ranges normally from 40 to 50. Practical experience in teaching, a comprehensive examination (written and oral) and a doctoral project are required. A B average in coursework must be maintained.

Degree Requirements for the Doctor of Philosophy

The Ph.D. degree is the highest teaching and research degree offered by the University; it normally prepares one for a career at the level of the four-year college or the university, or possibly for other careers in humanistic study, research and writing. The entering graduate student who is considering the possibility of working for a Ph.D. should consult immediately with the Chairperson and/or the Director of Graduate Studies in order to plan a broad program of reading and coursework in all areas offered by the Department. To ensure minimal coverage of basic material, the following three courses are required of all Ph.D. candidates: SPN 528 (Seminar on Cervantes), SPN 549 (Seminar on Spanish-American Modernism), and SPN 609, or CLT 500, or CLT 501. The student should begin by taking courses with as many dif-

ferent faculty members as possible. In addition, the student normally takes at least two courses in Spanish linguistics (see "Comprehensive (Preliminary) Examination," below).

The number of credit hours required in the Ph.D. program depends on the student's previous preparation. A student with a B.A. (or equivalent) and an undergraduate major in Spanish is usually expected to earn 72 graduate credits (three full years of study). A student with an M.A. (or equivalent) in Spanish is usually expected to earn 42 additional graduate credits (about two years of study). A student who has already done a year's work or more in another institution beyond the M.A. level is required to complete at least two consecutive semesters of full-time graduate study (24 credits) at Stony Brook. Teaching experience and two practica are required and may be counted as part of the student's full-time study. Undergraduate courses may also be considered as part of full-time study, but without graduate credit. Before registering for each semester, the student should consult with the Chairperson and/or the Director of Graduate Studies and work out an approved combination of courses.

Qualifying Examination

In addition to completing coursework successfully (that is, maintaining at least a B average), all full-time graduate students intending to work for a Ph.D. must pass a qualifying examination shortly after their first full-time semester. This examination, usually given in January, is based on a list of 6 literary works, and serves to indicate preparation and aptitude for doctoral work in Spanish. It consists of a written part (two hours) and an oral part (one-half hour). This examination may not be repeated.

Language Requirements

In addition to proficiency in Spanish and English, the Ph.D. candidate must demonstrate a reading knowledge of French and another language related to the field of the dissertation. A knowledge of Latin, for example, is required for research in philology or medieval literature, and may be required for research in Renaissance literature. Students are urged to demonstrate a reading knowledge of French by the beginning of the second year of full-time study; they are required to fulfill both language requirements prior to being advanced to candidacy. A language requirement may be fulfilled by 1) passing the Princeton Graduate School Foreign Language Test (GSFLT); 2) successful completion (that is, with a grade of B or better) of a graduate reading course or regular graduate course in the foreign language; or 3) passing a special reading examination administered by the Department of Hispanic Languages and Literature.

Comprehensive (Preliminary) Examination

When the student has completed the Department's standard reading list for a general coverage of topics in Spanish and Spanish-American literature, he or she may take the *first part* of the comprehensive (preliminary) examination, provided that he or she has a reading knowledge of French and no incomplete grades outstanding. This examination will consist of eight hours of written work and one hour of oral questions and answers. In addition to literature, a section of the examination will be devoted to Spanish linguistics (unless the student has already completed two departmental courses in Spanish linguistics with a grade of at least B). Upon successful completion of this stage of general preparation, the student is granted the degree of Master of Arts.

The *second part* of the comprehensive (preliminary) examination must be taken within six months. It is planned by the student in consultation with the prospective director of his or her dissertation. Both language requirements must by this time have been fulfilled. A specialized bibliography of relevant works is drawn up by the director and is studied by the student. The student then drafts a thesis prospectus to be presented with the bibliography to the Department at large and to a special examination committee. An oral examination of one to two hours, based on the bibliography and thesis prospectus, must be satisfactorily passed before the student can be advanced to doctoral candidacy.

Dissertation

After the student has been advanced to candidacy, he or she will concentrate on a dissertation (the written results of specialized study and research) under the supervision of a member of the graduate faculty, with the advice of a second reader. After the dissertation is completed, it is judged by a committee of five members, consisting of the director, the second reader, another member of the Spanish faculty, and two faculty members from outside the Department who have specialized in related areas. The committee may decide to discuss the dissertation with the candidate before reaching a decision. If the dissertation is approved by this committee, the candidate is recommended to the University for the Doctor of Philosophy degree, and is asked to give a public lecture on the subject of the dissertation.

Faculty

De la Campa, Roman, Associate Profesor. Ph.D., 1975, University of Minnesota: Ideology in literature and criticism; Caribbean culture; applied linguistics. Books on contemporary Cuban theater and Hispanic culture in the U.S.

Deutsch, Lou Charnon, Assistant Professor. Ph.D., 1978, University of Chicago: Eighteenth- and nineteenth-century Peninsular literature; recent articles on Galdos, Clarin and Alarcon.

Fainberg, Louise Vasvari, Associate Professor. Ph.D., 1969, University of California, Berkeley: Medieval Spanish literature; Romance philology; applied linguistics; critical editions of *El laberinto de Fortuna, El tratado sobre el titulo de duque.*

Giordano, Jaime A., Associate Professor. Universidad de Chile, 1961 (University Professor, Universidad de Concepcion, 1958-1966): Modern and contemporary Spanish-American literature; *La edad del ensueno;* recent articles on Huidobro, Neruda, Fuentes and Mistral.

Lastra, Pedro, Professor. Universidad de Chile, 1967 (University Professor, 1960-1973): Modern and contemporary Spanish-American literature; *Noticias del extranjero;* recent articles on Enrique Lihn, Fuentes and Rilke.

Lida, Clara E., Associate Professor.[1] Ph.D., 1969, Princeton University: Peninsular and Latin American history; cultural and intellectual history; *Anarquismo y revolucion en la Espana del XIX.*

McKenna, James B., Associate Professor. Ph.D., 1965, Harvard University: Twentieth-century Spanish culture and literature.

Montoro, Adrian, Associate Professor. Doctor en Filosofia y Letras, 1963, Universidad de La Habana: Medieval and modern Hispanic literature; *El leon y el azor: simbolismo y estructura trifuncional en la epica espanola;* recent articles on the picaresque novel and contemporary literature.

Navajas, Gonzalo, Assistant Professor. Ph.D., 1975, University of California, Los Angeles: Twentieth-century Peninsular literature; *La novela de guan goytisolo;* articles on modern Spanish writers and theory of literature and fiction.

Rivers, Elias L., Professor and Chairperson. Ph.D., 1952, Yale University: Sixteenth- and seven-

teenth-century literature of Spain; written and oral traditions in literature; *Renaissance and Baroque Poetry of Spain; Poesia lirica del Siglo de Oro;* Garcilaso's *Obras completas con comentarios.*

Sabat Rivers, Georgina, Associate Professor. Ph.D., 1969, The Johns Hopkins University: Spanish Golden Age and Colonial literature; *Sor Juana Ines de la Cruz: Obras selectas; El Sueno de Sor Juana Ines de la Cruz: Tradiciones literarias y originalidad.*

Zavala, Iris M., Professor. Ph.D., 1962, Universidad de Salamanca: Seventeenth- to twentieth-century Peninsular and Caribbean literature; *Historia social de la literatura espanola; Clandestinidad y libertinaje erudito en los albores de la Ilustracion.*

Estimated number of teaching, graduate and research assistants, fall 1982: 15.

[1]*Joint appointment, Department of History*

Courses

SPN 501 Seminar in Spanish Linguistics
3 credits each semester, repetitive

SPN 512 Seminar in Medieval Literature
3 credits, repetitive

SPN 515 Seminar in Spanish Composition and Stylistics
Advanced language course for the beginning graduate student. Required by new Doctor of Arts Program; also useful for M.A. and Ph.D. students.
3 credits, non-repetitive

SPN 523 Seminar in Renaissance and Golden Age Literature
3 credits, repetitive

SPN 528 Seminar in Cervantes
3 credits, repetitive

SPN 531 Seminar in Spanish Enlightenment and Romanticism
3 credits, repetitive

SPN 541 Seminar in 19th-Century Spanish Literature until the Generation of 1898
3 credits, repetitive

SPN 543 Seminar in 20th-Century Spanish Literature
3 credits each semester, repetitive

SPN 552 Seminar in Colonial Spanish-American Literature
3 credits each semester, repetitive

SPN 562 Seminar in 19th-Century Spanish-American Literature
3 credits, repetitive

SPN 569 Seminar in Spanish-American Modernism
3 credits, repetitive

SPN 571 Seminar in 20th-Century Spanish-American Literature
3 credits each semester, repetitive

SPN 581 Seminar: Cultural Aspects of Hispanic Bilingual-Biculturalism
3 credits, non-repetitive

SPN 583 Spanish and English: Languages in Contact I
3 credits, non-repetitive

SPN 584 Spanish-English Contrastive Structures: Phonology
Prerequisite: Fluent Spanish
3 credits, non-repetitive

SPN 585 Seminar in Caribbean Literature
3 credits, repetitive

SPN 586 Seminar in the Hispanic Literature in the United States
3 credits, non-repetitive

SPN 595, 596 Independent Individual Studies
Not more than nine (9) of these credits are accepted for credit. Students in a regular graduate program must obtain permission from the Director of Graduate Studies or the Chairperson before registering in these courses.
Fall and spring, 1-6 credits, repetitive.

SPN 609 Literary Theory
M.A. students may be admitted only with permission of instructor.
3 credits, non-repetitive

SPN 621 Problems in Comparative Hispanic Literature
M.A. students may be admitted only with permission of instructor.
3 credits, repetitive

SPN 691 Practicum in Lower Division Teaching
3 credits, repetitive

SPN 693 Practicum in the Teaching of Advanced Language and Literature
3 credits, non-repetitive

SPN 695, 696 Directed Doctoral Research
Fall and spring, 1-9 credits, repetitive

Department of Music

Degree Programs

The Department of Music offers programs leading to the Master of Arts degree and the Doctor of Philosophy degree in music with Graduate Studies in Music History, in Music Theory and in Composition; and to the Master of Music degree and the Doctor of Musical Arts degree in music performance. A special emphasis in each of these programs on the music of the twentieth century reflects one aspect of the Department's philosophy. The Department encourages as well the development of professional competence in more than one area of musical study; the capability for combining work in more than one area is innate in the design of the programs at the doctoral level. For students at that level who propose to do serious work both in performance and in some other area, the decision to pursue either the D.M.A. or the Ph.D. degree will depend upon the balance of emphases in the intended program of study.

Facilities

Stony Brook's new Fine Arts Center includes an acoustically excellent theater-concert hall and a more intimate recital hall. The music building contains a full range of rehearsal and teaching facilities, over 70 practice rooms and studios for graduate students and more than 40 Steinway grand pianos. The Fine Arts Center offers electronic music studios and a recording studio, and the Music Library contains 37,000 books and scores as well as microfilms, recordings and sound reproduction equipment.

Admission to the M.A. Program

The following are required for admission to Graduate Studies in Music History, in Music Theory and in Composition leading to an M.A. degree.

A. A baccalaureate degree from a recognized institution.

B. An official transcript of undergraduate record.

C. A minimum grade average of B in undergraduate music courses.

D. Examples of undergraduate work:

1. For history applicants, essays in music research, analysis or criticism.

2. For theory applicants, essays in music analysis and examples of work in courses such as counterpoint, fugue or composition.

3. For composition applicants, music compositions.

E. Scores of the Graduate Record Examination Aptitude Test (GRE).

F. Acceptance by both the Department of Music and the Graduate School.

Applicants are invited to submit any other evidence of their abilities in support of their application for admission, such as recordings of music performances or the score on the Graduate Record Examination Area Test in music.

All students entering the M.A. program will be examined in the following areas during the week before the beginning of classes:

1. Ear training.
2. Basic keyboard skills.
3. The harmonization of a chorale in four voices.
4. The composition of a passage in free two-part counterpoint in either the sixteenth-century or eighteenth-century style, according to the student's choice.
5. The history of music (for history and theory students only).

Students who are found deficient in any of the areas of ear training, keyboard, harmony and history will be required to take the appropriate undergraduate or graduate courses to remedy the deficiencies.

Music History: Requirements for the M.A. Degree

A. Courses: Thirty graduate credit hours (exclusive of those in MUS 501, Compositional Skills of Tonal Music, and MUS 591, Practicum in Teaching) chosen in consultation with the student's advisor. The program must include:

1. MUS 502, Pro-Seminar in Tonal Analysis, to be taken during the spring semester of the first year of study. Students who are well prepared in analysis may be exempt from this requirement by examination.

2. MUS 503, Music in the Twentieth Century.

3. At least two courses from the group MUS 543-555 (Special Topics Courses).

If a course in a department other than Music is taken towards the degree, approval by the Graduate Studies Committee must be obtained.

B. Foreign languages: A reading knowledge of French and German. One examination must be taken at the beginning of the first semester of study. Both examinations must have been taken by the second semester.

C. Comprehensive examinations: Written and oral examinations in the history of music and in the analysis of preassigned compositions.

D. Research paper: A substantial essay, normally one which the student has written as part of the coursework. The paper should be submitted no later than the first week of the semester in which the student expects to receive the degree.

Music Theory: Requirements for the M.A. Degree

Students will choose to concentrate on either the history of theory (Option I) or problems in speculative theory (Option II).

A. Courses: Thirty graduate credit hours (exclusive of those in MUS 501 Compositional Skills of Tonal Music, and MUS 591 Practicum in Teaching) chosen in consultation with the student's advisor. The program must include:

1. MUS 502 Pro-Seminar in Tonal Analysis, to be taken during the spring semester of the first year of study. Students who are well prepared in analysis may be exempt from this requirement by examination.
2. Seminars in Music Theory: MUS 531 and two courses from the group MUS 532-534.
3. MUS 559 Topics in Analysis (two semesters).
4. One course from the group MUS 543-555 (Special Topics Courses).
5. One of the following:
   MUS 511 Compositional Techniques of the 20th Century
   MUS 516 Electronic Music Workshop
   MUS 521 Composition in Traditional Styles.

If a course in a department other than Music is taken toward the degree, approval by the Graduate Studies Committee must be obtained.

B. Foreign languages: A reading knowledge of French and German. One examination must be taken at the beginning of the first semester of study. Both examinations must have been taken by the second semester.

C. Comprehensive examinations: Projects, to be done over a period of one week, involving analytically based problems, criticism of theoretical texts, and problems in the history of theory. Students who have chosen Option I must also write an examination in the history of western music theory.

D. Thesis: Required only of students who have chosen Option II. The paper should be submitted no later than the first week of the semester in which the student expects to receive the degree. The thesis must be prepared in accordance with the guidelines presented in the booklet entitled "Guide to the Preparation of Theses and Dissertations," available from the Graduate School.

Composition: Requirements for the M.A. Degree

A. Courses: Thirty graduate credit hours (exclusive of those in MUS 501 Compositional Skills of Tonal Music and MUS 591 Practicum in Teaching) chosen in consultation with the student's advisor. The program must include:

1. MUS 502 Pro-Seminar in Tonal Analysis, to be taken during the spring semester of the first year of study. Students who are well prepared in analysis may be exempt from this requirement by examination.
2. One course in the history of music before 1900.
3. MUS 523 Advanced Composition, to be taken in every semester of residence.
4. MUS 515 The Fundamentals of Electronic Music.
5. MUS 516 Electronic Music Workshop.

If a course in a department other than Music is taken toward the degree, approval by the Graduate Studies Committee must be obtained.

B. Foreign language: A reading knowledge of French, German or Italian. The examination must be taken at the beginning of the first semester of study.

C. Comprehensive examination: Written examination in the analysis of preassigned compositions.

D. Compositions: Students must satisfy the Department that they have written compositions of sufficient quality and variety during the period of study after admission to the Graduate School. Fair copies of all such works must be submitted to the Graduate Studies Committee as they are completed. The "Last day for graduate students to submit theses and dissertations," as specified in the Academic Calendar, will be the final deadline for all works to be submitted.

Admission to the M.Mus. Program

The following are required for admission to the M.Mus. program in performance:

A. A baccalaureate degree from a recognized institution.

B. An official transcript of undergraduate record.

C. An audition in the major field of performance. Students residing at a distance may gain provisional acceptance by means of recordings of their work. Applicants should contact their prospective major teachers regarding suitable repertory for auditions.

D. Letters of recommendation from the principal teacher and at least one other person familiar with the student's work.

E. Scores of the Graduate Record Examination Aptitude Test (GRE).

F. Acceptance by both the Department of Music and the Graduate School.

Requirements for the M.Mus Degree

A. Courses: Thirty graduate credit hours (exclusive of those in MUS 501, Compositional Skills of Tonal Music and MUS 591, Practicum in Teaching) chosen in consultation with the student's advisor. Up to fifteen credits in individual study of the major instrument or voice may be counted toward the degree. None of the remaining fifteen degree credits may be in individual study of another instrument or voice. The program must include at least two semester courses or one year course *outside* the following group of courses:

MUS 509 Performance Studies
MUS 561 Orchestral Conducting
MUS 563 Choral Conducting
MUS 565 Graduate Orchestra
MUS 570 Twentieth-Century Conducted Ensemble
MUS 571 Advanced Instruction in Instrument or Voice
MUS 573 Chamber Music
MUS 575 Master Class in Solo Repertory for Instrument or Voice
MUS 595 Chamber Players.

MUS 565 Graduate Orchestra is required of all students who play orchestral instruments during each semester of residence. All students except those in the conducting programs must be enrolled in MUS 571 or 572 during each semester of full-time residence. If a course in a department other than Music is taken toward the degree, approval by the Graduate Studies Committee must be obtained.

B. Jury examinations: These are offered each semester.

1. Students must take one jury examination during each academic year.
2. Students must take and pass the jury examination in the semester prior to the one in which the degree recital (see C, below) is given.

C. A public recital.

Admission to the Doctor of Musical Arts Program

In addition to the admission requirements set forth by the Graduate School, a master's degree is required, normally in the pertinent area of performance. Applicants must present themselves to a faculty committee for an audition, which is usually

held in February. Applicants who plan to include study in the areas of history, theory or composition as a part of their program should submit examples of their work in these areas as well. Students who intend to work in a secondary area of specialization must demonstrate to the pertinent faculty competence commensurate with a master's degree at a distinguished level in that area.

Students currently enrolled in one of the Department's master's programs who wish to pursue doctoral work in the Department must announce application in a formal letter which should reach the Director of Graduate Studies by February 1 for fall admission, and which should be accompanied by letters of recommendation and examples of work where pertinent.

Entering students who plan to do considerable work in areas other than performance as part of their degree program must take the appropriate advisory examinations, described under "Admission to the M.A. Program," if they have not already done so. Any remedial work must be completed by the end of the first year of study.

Requirements for the Doctor of Musical Arts Degree

Contract Toward Candidacy

A plan of study in the form of a working contract toward candidacy will be drawn up jointly by the student and a directing committee early in the student's first semester. The directing committee will consist of the student's advisor and a member of the academic faculty, to be appointed by the Director of Graduate Studies after consultation with the student and appropriate members of the faculty. The committee may include faculty members from outside the Department when that is appropriate. Final approval of the contract, and of any revisions that may be necessary, rests with the Graduate Studies Committee.

The design of the program is to be developed around the requirements given below, and the contract should specify such terms as the core of courses to be taken, the length of full-time residence and the schedule and substance of various recitals and examinations. The terms of the contract should normally be completed after two years of full-time residence.

A. Work in the student's area of specialization: Progress during residence in the program will be demonstrated to the directing committee through the presentation of four recitals, not including the Doctoral Recital, showing ability to perform in a wide range of musical styles. Two of these must be solo recitals, unless otherwise specified by the directing committee. Students who propose to work as well in a secondary area of specialization should see section H below.

B. Public lecture-recital.

C. Essays: Two papers, one on an analytical topic, one on a historical topic. These essays may be on performance-oriented subjects. Each must grow out of work in a separate graduate music course.

D. Work in the area of twentieth-century music: Either a substantial portion of one of the recitals, described above in section A, or the lecture-recital, described above in section B, must be devoted to twentieth-century music.

E. Foreign language: A reading knowledge of French, German or Italian. Students in voice must in addition demonstrate singing competence in all three. The contract toward candidacy may specify further language proficiency depending upon the proposed plan of study.

F. Teaching: A minimum of two semester courses, either or both of which may comprise individual lessons, ensemble coaching, or classroom teaching.

G. Doctoral jury examination: A thirty-minute examination, to be taken at the end of the period of residency covered under the contract toward candidacy. The jury examination must be passed as a condition for advancement to candidacy.

H. Work in a secondary area of specialization: Students who propose to do work in composition, history or theory as an integral part of the program must do one or a combination of the following:

1. Present a number of musical compositions demonstrating fluency in working with a variety of contemporary performance media, both live and electronic.

2. Present a number of essays demonstrating proficiency in various aspects of musicological research, theoretical studies, analysis or criticism. The essays may have been prepared as coursework.

Advancement to Candidacy

To be advanced to candidacy, the student must:

1. Submit a program of the proposed doctoral recital to the Graduate Studies Committee. The program must not include works previously performed to satisfy other graduate degree requirements.

2. Appear before an examining committee to demonstrate mastery of the doctoral recital program and of areas pertinent to the works to be performed.

Advancement to candidacy normally occurs within one year after completion of the terms of the contract toward candidacy.

Doctoral Recital

The doctoral recital, which is given after advancement to candidacy, must demonstrate a distinguished level of performance. A recording of it is to be kept permanently in the University Library.

Admission to the Doctor of Philosophy Program

In addition to the admission requirements set forth by the Graduate School, a master's degree is required in a pertinent area of competence. As evidence of ability to carry on doctoral work in that area, applicants in history and theory should submit examples of recent prose writings about music; applicants in composition should submit scores and, when possible, recordings of recent works. Applicants who plan to include study in performance as a part of their degree program should follow the audition procedure outlined under "Admission to the Doctor of Musical Arts Program," above. Students who intend to work in a secondary area of specialization must demonstrate to the pertinent faculty competence commensurate with a master's degree at a distinguished level in that area.

Students currently enrolled in one of the Department's master's programs who wish to pursue doctoral work in the Department must announce application in a formal letter which should reach the Director of Graduate Studies by February 1 for fall admission, and which should be accompanied by examples of work and letters of recommendation.

Those applicants who do not possess the Master of Arts degree in music from Stony Brook may be asked to demonstrate achievement commensurate with that degree by the end of the first year of study.

Entering students who have not already done so must take the appropriate advisory examinations described under "Admission to the M.A. Program." Any remedial work must be completed by the end of the first year of study.

Requirements for the Doctor of Philosophy Degree

Contract Toward Candidacy

A plan of study in the form of a working contract toward candidacy will be drawn up jointly by the student and a directing committee early in the student's first semester. The directing committee will consist of the student's advisor and at least two other faculty members. The Director of Graduate Studies, after consultation with the student and appropriate members of the faculty, will appoint the directing committee and will designate its chairperson, who shall not be the student's advisor. The committee may include faculty members from outside the Department when that is appropriate. Final approval of the contract, and of any revisions that may be necessary, rests with the Graduate Studies Committee.

The design of the program is to be developed around the requirements given below, and the contract should specify such terms as the core of courses to be taken, the length of full-time residence, and the schedule and subject areas of various examinations including the preliminary examination. The terms of the contract should be completed within one or two years, depending upon the scope of the program.

A. Work in the student's area(s) of specialization: Progress during residence in the program will be demonstrated to the directing committee in one or a combination of the following ways:

1. The presentation of a number of musical compositions demonstrating fluency in working with a variety of contemporary performance media.

2. The presentation of a number of essays demonstrating proficiency in various aspects of musicological research, theoretical studies, analysis or criticism. The essays may have been prepared as coursework

Students who propose to do work in performance as an integral part of the program must, in addition, present at least two recitals showing ability to perform in a wide range of musical styles.

B. Work in the area of twentieth-century music: Competence is to be demonstrated to the directing committee through the following:

1. An essay dealing with twentieth-century music from a historical, theoretical, critical or analytic point of view.

2. A public lecture or colloquium on a topic of significant interest in twentieth-century music.

C. Foreign language: A reading knowledge of French, German or Italian. A student intending a dissertation in history or theory must demonstrate proficiency in both French and German. The contract toward candidacy may specify further language proficiency depending on the area of the dissertation.

D. Teaching: A minimum of two semester courses, at least one of which shall be an introductory college course in musicianship, theory or literature. Students must also participate in the Seminar on the Teaching of Music for a minimum of one semester and must present to the seminar at least one project or report.

Advancement to Candidacy

After completing the terms of the contract, a student is eligible for advancement to candidacy. To be advanced to Ph.D. candidacy, the student must:

1. Submit a prospectus outlining the nature and aims of the dissertation.

2. Pass a preliminary examination that will demonstrate preparation in his or her special competence, normally the area of the dissertation.

Dissertation

The dissertation shall be a significant original work of scholarship or composition. Approval of the dissertation in scholarship will rest upon a formal oral defense to be conducted by the Dissertation Committee.

Faculty

Addison, Adele, Performing Artist in Residence. B. Mus., 1946, Westminster Choir College, New England Conservatory of Music: Voice; vocal pedagogy.

Anderson, Ronald, Performing Artist in Residence. M.D., 1958, Juilliard School of Music; Ed.D., 1969, Columbia University: Trumpet; Renaissance and Baroque brass performance practice; twentieth-century brass performance.

Arel, Bulent, Professor and Director of the Electronic Music Studio. Diploma, 1947, State Conservatory of Ankara, Turkey: Composition; electronic music.

Baron, Samuel, Professor. B.S., 1948, Juilliard School of Music; pupil of George Barrere and Arthur Lora: Flute; chamber music; Baroque performance practice; twentieth-century wind performance.

Ronvalot, E. Antony, Associate Professor. Ph.D., 1966, Harvard University: Bibliography; English Renaissance music.

Barror, Ronald, Performing Artist in Residence. D.M.A., 1978, Yale University: Trombone, brass ensemble.

Brooks, Marguerite L., Assistant Professor and Director of the University Chorus. M.Mus., 1975, Temple University: Choral conducting.

Canin, Martin, Performing Artist in Residence. M.S., 1956, Juilliard School of Music: Piano; piano pedagogy.

Chafe, Eric T., Assistant Professor. Ph.D., 1975, University of Toronto: Seventeenth-century music; J. S. Bach; Baroque music theory.

Cohen, Isidore, Performing Artist in Residence. B.S., 1950, Juilliard School of Music; pupil of Ivan Galamian: Violin, chamber music.

Des Roches, Raymond, Performing Artist in Residence. M. Mus., 1961, Manhattan School of Music: Percussion; twentieth-century percussion ensemble.

de Zeeuw, Anne Marie, Instructor. M. Mus., 1971, University of Texas, Austin: Theory.

Eddy, Timothy, Performing Artist in Residence and Coordinator of Chamber Music. M. Mus., 1970, Manhattan School of Music: Cello; chamber music; twentieth-century string performance.

Fuller, Sarah, Associate Professor. Ph.D., 1969, University of California, Berkeley: Medieval and Renaissance music.

Glaze, Gary, Performing Artist in Residence. M. Mus., 1962, University of Michigan: Voice, opera workshop.

Glazer, David, Performing Artist in Residence. B.Ed., 1935, University of Wisconsin, Milwaukee: Clarinet; chamber music.

Graham, John, Performing Artist in Residence. B.A., 1960, University of California, Berkeley: Viola; chamber music.

Greenhouse, Bernard, Professor. Diploma, 1939, Juilliard Graduate School: Cello; cello pedagogy; chamber music.

Kalish, Gilbert, Performing Artist in Residence. B.A., 1956, Columbia University: Piano; twentieth-century piano performance.

Kramer, Richard, Associate Professor and Director of Graduate Studies. Ph.D., 1974, Princeton University: Eighteenth-century theory; Beethoven.

Kreiselman, Jack, Performing Artist in Residence. Manhattan School of Music; pupil of Simeon Bellison and Simon Kovar: Clarinet; twentieth-century wind performance.

Lawton, David, Associate Professor and Director of the University Orchestra. Ph.D., 1973, University of California, Berkeley: Orchestral and opera conducting; nineteenth-century studies.

Layton, Bill Jim, Professor. Ph.D., 1960, Harvard University: Composition; analysis.

Lessard, John, Professor. Diploma, 1940, Ecole Normale; Diploma, 1941, Longy School of Music: Composition.

Levine, Julius, Performing Artist in Residence. B.A., 1943, Brooklyn College; B.S., 1946, Juilliard School of Music: String bass; chamber music.

McCalla, James, Assistant Professor. Ph.D., 1976, University of California, Berkeley: Twentieth-century music; aesthetics and criticism.

Purvis, William W., Performing Artist in Residence. B.A., 1971, Haverford College; pupil of Forrest Standley and James Chambers: French horn; chamber music.

Roseman, Ronald, Performing Artist in Residence. B.A., 1955, Queens College: Oboe; chamber music; twentieth-century wind performance.

Rosen, Charles, Professor. Ph.D., 1951, Princeton University; D. Mus., H.C., 1976, Trinity College, Dublin; D. Mus., H.C., 1977, University of Leeds: Classical and Romantic music; music of the twentieth century; criticism in art, music and literature; piano.

Semegen, Daria, Associate Professor. M. Mus, 1971, Yale University: Composition; electronic music.

Silver, Sheila, Assistant Professor. Ph.D., 1976, Brandeis University: Composition; analysis.

Treitler, Leo, Professor and Chairperson. Ph.D., 1966, Princeton University: Medieval and early Renaissance music; twentieth-century music; history of music theory; historiography; music criticism.

Weisberg, Arthur, Performing Artist in Residence and Conductor of the Graduate Orchestra. Juilliard School of Music; pupil of Simon Kovar: Bassoon; orchestral conducting; twentieth-century ensemble.

Willard, Jerry, Performing Artist in Residence. Pupil of Sophocles Papas: Guitar, lute.

Winler, Peter, Associate Professor. M.F.A., 1967, Princeton University: Composition; theory and history of popular music.

Courses

MUS 501 Compositional Skills of Tonal Music
An intensive course in chorale harmonization and tonal counterpoint. (Enrollment limited to 12. MUS 501 may not be included in the courses taken in fulfillment of degree requirements.)
Fall, 3 credits

MUS 502 Pro-Seminar In Tonal Analysis
The application of various techniques of analysis to tonal works. Rhythmic, harmonic, linear, thematic and other elements of musical structures will be considered. Preparation equivalent to MUS 501 is assumed.
Spring, 3 credits

MUS 503 Music In the 20th Century
An intensive course in 20th-century musical styles, focusing on historical problems. Seminar reports and research papers on works of major significance.
Fall, 3 credits

MUS 504 Analysis of 20th-Century Music
Detailed analyses of various works which are representative of the significant compositional systems of recent music.
Fall, 3 credits

MUS 507 Studies In Music History
Concentrated study of the works of a single composer, or of repertories that comprehend single compositional tendencies in western music. Various topics are offered each semester.
Fall and spring, variable credit
(See note below MUS 509)

MUS 508 Studies In Composition
Concentrated study of skills and techniques ancillary to musical composition.
Fall and spring, variable credit
(See note below MUS 509)

MUS 509 Performance Studies
This course provides opportunity for a student who is not in a performance degree program, but who can demonstrate graduate-level performance ability, to pursue performance studies without investing the time and credit required of M. Mus./D.M.S. students. The course is not open to M. Mus./D.M.A. students, except for conducting students who can demonstrate graduate-level ability in an instrument or voice.
Fall and spring, variable credit

Note: Not more than 8 credits of MUS 507, 508 and 509 combined may be counted toward the degree.

MUS 511 Compositional Techniques of the 20th Century
A study, by means of practical exercises in writing, of some of the important techniques of the present century in the organization or non-organization of pitch, rhythm, line, motive and form.
Fall, 3 credits

MUS 515 The Fundamentals of Electronic Music
A short survey of the history and literature of the medium will be followed by study of the pertinent background in theoretical acoustics and practical engineering. Students will then be instructed in the basic techniques of electronic sound production and modification.
Fall, 3 credits

MUS 516 Electronic Music Workshop
Individual short experimental works on specific assignments. Uses of electronic music equipment.
Prerequisite: MUS 515 or the equivalent
Spring, 3 credits

MUS 521 Composition In Traditional Styles
A study of one of the established disciplines such as fugue, homophonic forms, or composition in the sacred style of the 16th century. The content of the course will be announced each time it is offered.
3 credits

MUS 523 Advanced Composition
Individual projects for graduate students in composition.
Fall and spring, 3 credits each semester

MUS 531 Seminar In Music Theory: Compositional Theory Before 1700
Studies in the writings of theorists from the Middle Ages through the 17th century in the context of contemporary repertories. Topics, varying from semester to semester, will include the following areas of investigation: Modal theory as model for melodic composition, and the efforts to adapt modal theory to polyphonic practice; problems of *musica ficta* as symptoms of the confrontation of modality and the melodic dimension with tonality and the harmonic dimension; discant and counterpoint.
Fall, 3 credits

MUS 532 Seminar In Music Theory: Rhythm and its Notation
Investigations, with the aid of theoretical writings ancient and recent, and through musical analyses, into the nature of the rhythmic impulse; studies in the efforts, throughout musical history, to make rhythm as performance competence and as compositional parameter; studies in the relation of rhythm and meter in theory and practice. The work in any single semester may be confined to a special aspect of such topics.
3 credits

MUS 533 Seminar In Music Theory: Topics In Tonal Theory
Studies in the problems of such concepts as root, harmonic syntax, tonal, tonality, consonance and dissonance, as abstractable from musical time and as immersed in it, and of the basic writings on those problems, from Rameau and the theorists of the 18th century through Schenker and the commentaries on his work.
3 credits

MUS 534 Seminar in Music Theory: 20th-Century Topics
Studies in the formation of systematic theories pertinent to various idioms from C. Debussy to the present. The following would be representative areas: attempts to extend prolongational (Schenkerian) theory beyond "tonality"; attempts, Forte's in particular, to systematize a theoretical basis for pitch-structure in "atonal" music; classical twelve-tone theory; rhythmic systems in Babbitt, Boulez and Stockhausen.
3 credits

MUS 535 Lecture-Workshop in the Performance of Baroque Music
An examination of problems confronting the performer of music from the period ca. 1600-1750, from both musicological and practical points of view. The basso continuo, its function and realization; phrasing and articulation; ornaments, notated and improvised; period instruments; aspects of notation; bibliography. The course will meet in lecture for two hours each week with a third hour devoted to the coaching of a rehearsal or performance of music prepared by members of the class.
3 credits

MUS 537 Seminar in Analysis and Performance
A study of the relationship of technical aspects of performance, such as tempo, phrasing, articulation and dynamics, to conceptual problems, such as rhythmic and metric levels, tonal structure and serial organization, based upon the analysis and performance of representative solo and chamber works from the 18th through the 20th centuries.
3 credits

MUS 539 Contemporary Criticism and Analysis in Music, Literature and Art
The methodology of contemporary criticism. A discussion of theories of form and style, and the relations and cross-currents among contemporary criticisms in different media. Formalist theories (Schenker in music, Riegl and Woelfflin in art), statistical analysis, sociological criticism and Marxism (Adorno), structuralism, psychological theory, and traditional psychology.
3 credits

MUS 540 Studies in Cultural Historiography
This course is intended to promote the student's knowledge and reflection about the study of the history of the arts as history. It is organized on the following topics: origins and philosophical foundations of the modern historical consciousness; the nature of historical knowledge and explanation; historiographic models; origins, philosophical foundations, and genres of historical musicology.
3 credits

SPECIAL TOPICS COURSES

Topics to be chosen each time a course is offered will depend upon the needs of the students and the interests of the instructor.

MUS 543 Topics in Medieval Music
3 credits

MUS 545 Topics in Renaissance Music
3 credits

MSU 547 Topics in Baroque Music
3 credits

MUS 549 Topics in 18th-Century Music
3 credits

MUS 553 Topics in 19th-Century Music
3 credits

MUS 555 Topics in 20th-Century Music
3 credits

MUS 559 Topics in Analysis
3 credits

MUS 561 Orchestral Conducting
Advanced training in the preparation and conducting of orchestral scores from the standard repertory. Students will study the works in a seminar, and then conduct them in regular supervised readings with the Graduate Orchestra.
Fall and spring, 3 credits each semester

MUS 563 Advanced Choral Conducting A
Advanced training in preparing and conducting choral works. Students will attend a seminar in score study, will receive individual private instruction, and will be expected to participate in the rehearsing of the University Chorus, the University Chorale and the Chamber Singers. Open only to students enrolled in graduate conducting programs.
Fall and spring, 6 credits each semester

MUS 564 Advanced Choral Conducting B
Advanced training in preparing and conducting choral works. Not open to students enrolled in the graduate conducting programs.
Fall and spring, 3 credits each semester

MUS 565 Graduate Orchestra
Study and performance of orchestral works from the Baroque period to the present. Weekly readings of important works from the standard repertory.
Fall and spring, 2 credits each semester

MUS 569 Performance Problems in 20th-Century Music
A study of performance skills required in new music, with emphasis on polyrhythms, composite rhythms, control of tone color and dynamics, and on the understanding of new methods of notation. Exercises, and the study of selected 20th-century works.
Fall, 2 credits

MUS 570 20th-Century Conducted Ensemble
Works to be studied will range from five to 15 players. Representative composers would be: Boulez, Carter, Stockhausen, Stravinsky, Varese, Webern. Performance of the works will be a normal part of the course. Instrumental students will be conducted by the instructor for one and one-half hours per week, and by the student conductors for one hour per week. Conducting students will meet with the instructor alone for one and one-half hours per week; besides working with the instrumentalists, they will also observe the sessions conducted by the instructor. Enrollment of conducting students will be limited to three.
Prerequisite: MUS 569 or the equivalent
Spring, 3 credits for conducting students, 2 credits for instrumentalists

MUS 571 Advanced Instruction in Instrument or Voice A
Individual guidance in technique and repertory, with 30 practice hours required each week. Each student is required to perform at least one solo piece per semester, unless excused by the instructor in a written note to the Department's Graduate Studies Committee.
Fall and spring, 6 credits each semester

MUS 572 Advanced Instruction in Instrument or Voice B
Individual guidance in technique and repertory. Each student is required to perform at least one solo piece per semester, unless excused by the instructor in a written note to the Department's Graduate Studies Committee. Open only to second-year students in the Master of Music program.
Prerequisite: MUS 571
Fall and spring, 2-4 credits each semester

MUS 573 Chamber Music
Chamber ensembles such as the string quartet, wind quintet, solo vocal ensemble, two-piano team and other special groups meet, each under the direction of a member of the performance faculty, for the study of works from the repertories of the respective groups, with particular attention given to the music of the 20th century. *Required:* presence at a weekly coaching session, at least three hours per week of uncoached rehearsal, and at least one performance per semester.
Fall and spring, 2 credits

MUS 574 Master Class in Chamber Music
Advanced studies in the repertories for various chamber ensembles. Each section will be limited to three ensembles, to be chosen by the instructor of the section prior to the beginning of the semester.
2 credits

MUS 575 Master Class in Solo Repertory for Instrument or Voice
Performance techniques and problems in works for instrument or voice, drawn from all historical periods. The instructor will be a teacher of the specific instrument in each case, except that his or her section may be open to students of certain other instruments with his or her permission. Not offered each semester in every instrument.
Fall and spring, 2 credits each semester

MUS 577 Master Class in Performance Pedagogy
Guidance and supervision in the teaching of an instrument or voice.
2 credits

MUS 579 Opera Workshop
Study and performance of scenes or complete operas from the standard and 20th-century repertories. An interdisciplinary approach involving the Departments of Music and Theatre Arts.
Fall and spring, 3 credits each semester

MUS 581 20th-Century Repertory for Instrument or Voice
A study of the solo works of the 20th century, with emphasis on performance techniques and problems. The instructor will be a teacher of the specific instrument in each case, except his or her section may be open to students of certain other instruments with his or her permission. Not offered each semester in every instrument.
Fall and spring, 2 credits each semester

MUS 585 Renaissance and Baroque Brass Performance Practice
Study and survey of original and transcribed Renaissance works, and of various Baroque works, for brasses. Investigation of styles and techniques of Renaissance ornamentation using mainly Ganassi's Fontegara (1535) as text. Investigation of Baroque ornamentation styles and symbols.
Fall, 2 credits

MUS 591 Practicum in Teaching
Instruction in the Department under the supervision of the faculty. (MUS 591 may not be included in the courses taken in fulfillment of degree requirements.)
Fall and spring, 1-3 credits each semester

MUS 592 Seminar on the Teaching of Music
Discussion of fundamental problems in teaching music. Topics may include the explanation of musical processes, communication to non-professionals, integration of aspects of performance, theory, history or analysis with one another. Required of all students who teach one of the introductory undergraduate courses in musicianship, theory or literature; to be taken during the first semester of teaching.
Fall, 1 credit

MUS 595 Chamber Players
The Graduate String Quartet, the Graduate Wind Quintet and the Graduate Piano Trio, specially appointed groups, work under the direction of a member of the performance faculty and present concerts and workshops at the University and elsewhere.
Fall and spring, 3 credits each semester

MUS 599 Independent Studies
Individual studies under the guidance of a faculty member. Each student must submit to the Graduate Studies Committee of the Department a written prospectus of the work he or she intends to pursue, with the amount of credit proposed, together with the written endorsement of the prospective instructor. Approval of the Graduate Studies Committee is required; hence this material should be submitted as soon as possible, and in any case within the first two weeks of the semester (or the first week of a summer session).
Fall and spring, variable credit

MUS 602 Music and Other Disciplines
An interdisciplinary seminar which will be offered from time to time with members of other graduate departments, on topics to vary from semester to semester. The topic for spring 1982 is "Language, Music, Imagination," offered conjunctly with the Departments of Philosophy and Comparative Literature.
3 credits

MUS 611 Workshop in Composition and Performance
Student composers and student performers will be under the joint supervision of the composition faculty and a member of the performance faculty. The composers will write examples, to be performed and discussed in class, that confront specified problems in performance and composition. The course can be repeated once for credit toward the degree.
Spring, 3 credits

MUS 615 Seminar in Electronic Music Composition
Individual compositions, of substantial proportions, in electronic or concrete music media. The course may be repeated. Open only to qualified students in a music degree program.
Prerequisite: MUS 516 or the equivalent.
Fall and spring, 3 credits each semester

MUS 623 Directed Study in Composition
Intended for doctoral students in composition.
Fall and spring, 1-12 credits each semester, repetitive

MUS 661 Directed Study in Conducting
Intended for doctoral students in conducting.
Fall and spring, 1-12 credits each semester, repetitive

MUS 671 Directed Study in Instrumental and Vocal Performance
Intended for doctoral students in instrumental and vocal performance.
Fall and spring, 1-12 credits each semester, repetitive

MUS 697 Directed Reading
Intended for preparation for the preliminary examinations and related requirements.
Fall and spring, 1-12 credits each semester, repetitive

MUS 698 Directed Dissertation Research
Intended for work in the area of the dissertation.
Fall and spring, 1-12 credits each semester, repetitive

Department of Philosophy

The Department of Philosophy offers programs leading to the Master of Arts in philosophy with Graduate Studies in Philosophical Perspectives, and to the Doctor of Philosophy. The two programs differ in content and purpose.

Graduate Studies in Philosophical Perspectives (Master's Level)

Students in Graduate Studies in Philosophical Perspectives concentrate on the development of an appreciation of the contributions of philosophic thought to the self-understanding of men and women in a changing world. The curriculum is designed for people with experience or expectations in other areas, but who wish to engage in both structured and individualized studies in philosophy. Most courses fall into one of three areas: History of Philosophy, Contemporary Schools of Philosophy and Contemporary Moral and Social Problems.

Classes are usually scheduled in the late afternoon, evening or Saturday mornings. Full-time students can complete requirements for the degree in three semesters, and the master's thesis or alternative teaching practicum or fieldwork within a short time thereafter. Part-time students set their own deadlines (students must petition for an extension of the deadlines, if completion time exceeds three years).

Admission to Graduate Studies in Philosophical Perspectives (Master's Level)

For admission to Graduate Studies in Philosophical Perspectives, the following are required:

A. A bachelor's degree from a recognized institution.

B. An average of at least B in the last two years of undergraduate work or six credits of graduate work with a B average in the MA/LS program or another recognized graduate program.

C. An official transcript of undergraduate record and of any work completed in the MA/LS program or other graduate program.

D. Letters of recommendation from two previous or current instructors.

E. An admission essay of roughly 500 words expressing your interests and expectations of the program as it relates to your current state of life.

F. Results of the Graduate Record Examination Aptitude Test.

G. Acceptance by both the Department of Philosophy and the Graduate School.

Deficiencies in these requirements shall not automatically bar admission to the program, although a candidate may be required in such cases to enroll in philosophy courses in the MA/LS program prior to consideration of his or her application.

Requirements for the M.A. Degree

A. Formal course requirements: A student preparing for the degree of Master of Arts in philosophy, with Graduate Studies in Philosophical Perspectives is required to take a total of ten courses amounting to 30 graduate credit hours. These courses will include seven courses on contemporary problems (e.g., communication, death, feminism), two courses in the history of philosophical perspectives (PHI 524-25), and one course in the detailed examination of the work of a single philosopher (PHI 527 or 528).

Additionally, the student is required to take two courses (PHI 588 and 589) in directed research leading to the M.A. paper or the M.A. practicum or fieldwork.

B. 1. The M.A. paper: The paper is a research paper in which the student exhibits his or her ability to locate, comprehend and present in a communicatively sensitive form the fruits of mature philosophical research as that bears upon one or another contemporary problem. The paper will usually be written under the direction of the instructor in one of the seven perspective courses and will eventually be presented to that instructor and one other faculty member upon completion. Students who have not completed the paper by the end of the third semester must enroll for at least one credit of work during the semester in which they intend to complete the paper.

2. The M.A. practicum: For those students who are teaching in high school and who can obtain permission to introduce a philosophy course into the curriculum, the supervised preparation and teaching of this course will substitute for the M.A. paper. The student will be required to present course plans, bibliographies and other evidence of his or her academic readiness prior to the teaching of the course. During the course, the construction and grading of exams and papers will be supervised and several classes will be visited. Overall evaluation will take place at the conclusion of the course. The Philosophy Department has some resources to locate programs or schools where the student might teach such a course.

3. Fieldwork: A student, with the direction of two professors (as advisors), chooses a problem related to the philosophical perspective on contemporary social and moral issues that he or she wishes to investigate by going into the community (e.g., hospitals, businesses, schools, etc.). The credits will involve 3 credits for the preparation and execution of the fieldwork project and 3 credits for the written analysis of the project itself and the final conclusions.

C. Performance: An average grade of B is the minimum, but no more than six credits of C's will be permitted to count for credit toward the degree. Any student who accumulates 12 credits of C grades will be dropped from the program.

D. Credit for work done elsewhere: A maximum of six hours of post-baccalaureate credit in philosophy from other institutions *may* be transferred towards the M.A. in philosophical perspectives. The transference of credit will not be automatic, but will depend upon the suitability of the courses to the goals of the program and upon the grades received in the courses. All credits in philosophy earned in Stony Brook's MA/LS program are transferable, subject only to the performance and distribution regulations mentioned above. Credits transferred from other institutions will not be accepted toward the PHI 524, 525 courses.

General Aims of the Doctoral Program

1. To cultivate the principal contemporary styles of philosophical reasoning;
2. To engage in philosophical discourse about aspects of contemporary human experience that involve communication with other disciplines;
3. To bring philosophers using different styles into ongoing dialogue on such contemporary interface issues;
4. To make explicit the methodology and rational values involved in the different contemporary styles of philosophical reasoning.

Requirements for Admission Into the Doctoral Program

Students who have a bachelor's degree with a major in philosophy will be admitted to the doctoral program only if undergraduate work has introduced the students to the history of philosophy and given some acquaintance with a variety of contemporary philosophical styles. In the case that these requirements are not fulfilled, the Department may require that some special remedial work be done. In applying for admission, a student must also submit a philosophical essay he or she has written.

Requirements of the Doctoral Program

The doctoral program is designed so that a doctoral student will ordinarily be able to complete the Ph.D. in four years of full-time work after admission to the doctoral program. No minimum length of time, however, is prescribed other than the two semesters of full-time enrollment required by Graduate School regulations. Requirements are as follows:

A. Four doctoral courses or seminars in the history and the traditional core areas of philosophy. Doctoral students must take PHI 500 History of Philosophy and Philosophical Texts, which will be offered every year. In addition, they will take their choice of three out of six graduate courses or seminars offered in a two-year cycle, where at least one course will have to be taken from each of the following groups:

Group A: PHI 501 Philosophy of Science and Logic; PHI 502 Metaphysics and Systematic Philosophy; PHI 503 Epistemology, Philosophy of Mind, Perception and Experience.

Group B: PHI 504 Philosophy of Value, Culture and Society; PHI 505 Aesthetics and Rhetoric; PHI 506 Oriental Philosophy.

B. Participation in four *Style Seminars* is required. These are courses in which philosophical issues are addressed in one of three main contemporary modes of pursuing the activity of philosophy. Ordinarily the Style Seminars offered in the fall semester of each year (PHI 590, 591, 592) will be pro-seminars, which are advanced introductions to the particular styles, and will be followed by the more advanced Style Seminars, PHI 600, 601, and 602. Pro-seminars assume a general background in philosophy and serve to acquaint the beginning graduate student with the methods, presuppositions and operational modes of the philosophies involved. The more advanced Style Seminars (PHI 600, 601, 602) have as prerequisites some advance preparation on the part of the students involved.

Of the four Style Seminars required of each student, no more than two of the courses may be in any one Style, and at least one of the four must be on the 600 level.

C. Participation in two *Interface Seminars* where communication is established between philosophy and some other discipline. The content of interdisciplinary seminars will vary from term to term. Interface Seminars are ordinarily team-taught with staff members acquainted with fields of study outside philosophy. Interface Seminars will draw upon visiting and interdepartmental participants as well.

D. A Practicum in the teaching of philosophy, PHI 622 Supervised Teaching, in relation to other teaching experience, is also required.

E. Performance: An overall average grade of B or better is required, but no more than six credits of C will be permitted to count toward the degree.

Over and above these requirements, the student will be guided by the Director of Graduate Studies in planning and executing an appropriate program of philosophical studies.

M.A. Degree Requirement

Students whose goal is a master's degree will not ordinarily be accepted into the Ph.D. program. A student already enrolled in the program may, however, be awarded an M.A. degree upon completion of 30 graduate credits of coursework, all of which must be graded, and upon satisfaction of two of the following three committee-judged requirements:

History of Philosophy Examination
Philosophical Style Essay
Interface Essay.

(In addition, there is the entirely distinct program leading to the Master of Arts in philosophical perspectives, listed above.)

Ph.D. Candidacy

To be promoted to Ph.D. candidacy, a student must, in addition to the above requirements, fulfill the following conditions:

A. Pass an exam in the history of philosophy.

B. Submit a philosophical essay in a major philosophical style.

C. Submit a philosophical essay in an interface area.

D. Fulfill the symbolic logic requirement, which is to have acquired a knowledge of the concepts and notation of first-order logic sufficient to deal with its application to problems in analytic philosophy. Satisfactory completion of an undergraduate course in symbolic logic is usually considered to be an adequate demonstration of competence.

E. Fulfill the foreign language requirement, which is to have translated a previously untranslated philosophical article (or the equivalent) *or* to have written a research paper which includes the original and translation of substantial plhilosophical passages.

F. Pass the preliminary exam (see below).

G. Be recommended by the graduate faculty to begin work on a dissertation.

The preliminary exam will ordinarily be oral and will be based on material prepared by the student with the help of the faculty advisor. The material will be from the student's area of special competence (usually the area in which he or she intends to write the dissertation) and will be presented in the form of an extended outline (approximately 4000 words) with bibliography. The examining committee will consist of three or four faculty members, including the student's advisor.

Principal Structures on the Doctoral Level

There will be *Style Seminars,* each exploiting a major contemporary method of philosophical reasoning. These styles comprise principally analytic philosophy, phenomenology and systematic philosophy. These seminars will meet once each year in a tracked sequence.

The Style Seminars will discuss (1) contemporary philosophical problems, both narrowly professional and those involving interdisciplinary issues, the topics to be determined by the chairperson of the seminar together with the members of the seminar; (2) the methodology, style, and rational values of their own way of philosophical reasoning. The faculty will participate either by engaging in philosophical discourse according to the style appropriate to the seminar, or by raising critical metaphilosophical questions. The aim of the Style Seminar is to display the way a philosophical style or sensibility works.

There will also be an unspecified number of *Interface (Interdisciplinary) Seminars* where other disciplines are brought into communication with philosophy. These seminars will be chaired by cross-disciplinary appointments or visiting professors or members of the Department versed in some discipline other than philosophy.

In addition to the above structures there is flexibility allowed for independent and directed studies. There are also opportunities for individual reading and research projects under faculty direction.

Faculty

Allison, David, Associate Professor and Doctoral Program Director. Ph.D., 1974, Pennsylvania State University: Phenomenology, structuralism.

Buchler, Justus, Professor Emeritus. Ph.D., 1938, Columbia University: Systematic philosophy.

Casey, Edward S., Professor and Chairperson. Ph.D., 1967, Northwestern University: Aesthetics; phenomenology; philosophy of psychology.

de Nicholas, Antonio, Professor. Ph.D., 1971, Fordham University: Indian philosophy.

Dilworth, David, Associate Professor. Ph.D., 1963, Fordham University; 1970 Columbia University: East-West comparative philosophy.

Gelber, Sidney, Professor. Ph.D., 1954, Columbia University: Political philosophy.

Grim, Patrick, Assistant Professor. Ph.D., 1976, Boston University: Contemporary ethics and social philosophy; philosophy of the social sciences; analytic philosophy and philosophy of language.

Heelan, Patrick, Professor. Ph.D., 1952, St. Louis University; 1964, University of Louvain, Belgium: Philosophy of science.

Hill, Patrick J., Associate Professor. Ph.D., 1969, Boston University: Communication; community; education.

Howard, Dick, Professor. Ph.D., 1970, University of Texas: Political and social philosophy; Marxism.

Ihde, Don, Professor. Ph.D., 1964, Boston University: Phenomenology, philosophy of technology.

Kittay, Eva, Assistant Professor. Ph.D., 1978, City University of New York: Philosophy of language; philosophy and literature; feminism.

Kuspit, Donald B., Professor [1] D.Phil., 1960, University of Frankfurt; 1971, University of Michigan: Art criticism; twentieth-century art: Northern Renaissance art.

Martin, Christopher, Assistant Professor. Ph.D., 1982, Princeton University: Philosophy and history of logic; philosophy of time; logic.

Miller, Clyde Lee, Associate Professor. Ph.D., 1974, Yale University: History of philosophy.

Neville, Robert, Professor.[2] Ph.D., 1963, Yale University: Philosophy of religion; process philosophy.

Nolan, Rita D., Associate Professor. Ph.D., 1965, University of Pennsylvania: Analytic philosophy.

Pomerantz, David, Assistant Professor. Ph.D., 1979, Vanderbilt University: Ethics; social philosophy; logic.

Rawlinson, Mary C., Assistant Professor. Ph.D., 1978, Northwestern University: Philosophy of medicine and medical ethics; phenomenology; philosophical psychology; modern philosophy.

Silverman, Hugh J., Associate Professor. Ph.D., 1973, Stanford University: History of ideas; continental philosophy; structuralism.

Simon, Michael, Associate Professor. Ph.D., 1967, Harvard University: Philosophy of mind; philosophy of biology; philosophy of social science.

Spector, Marshall, Professor. Ph.D., 1963, The Johns Hopkins University: Philosophy of science; modern philosophy.

Sternfeld, Robert, Professor. Ph.D., 1948, University of Chicago: Logical theory; epistemology.

Tejera, Victorino, Professor. Ph.D., 1956, Columbia University: Aesthetics; classical philosophy.

Watson, Walter, Associate Professor. Ph.D., 1958, University of Chicago: History of philosophy.

Welton, Donn, Associate Professor. Ph.D., 1973, Southern Illinois University: Phenomenology and social philosophy.

Williams, Peter, Assistant Professor.[3] Ph.D., 1973, Harvard University: Philosophy of law; ethics.

Zyskind, Harold, Professor. Ph.D., 1964, University of Chicago: Philosophic rhetoric; history of philosophy.

Estimated number of teaching, graduate and research assistants, fall 1982: 33.

[1] *Joint appointment, Department of Art*

[2] *Joint appointment, Program in Religious Studies*

[3] *Joint appointment, Community and Preventive Medicine*

Courses

The Department of Philosophy offers programs leading to the Master of Arts in Philosophical Perspectives, and to the Doctor of Philosophy. The two programs are extremely different in content and purpose.

Students should consult the Department's course list each semester for specific offerings and descriptions.

MASTER'S PROGRAM IN PHILOSOPHICAL PERSPECTIVES

Course Offerings (all courses are for 3 credits unless otherwise noted):

PHI 524, 525 History of Philosophical Perspectives

PHI 527, 528 Individual Thinkers in the History of Philosophy

PHI 530 Anglo-American Philosophy in the 20th Century

PHI 531 Existentialism and Phenomenology

PHI 532 Marxism and Communism

PHI 533 Oriental Views of Man and Nature: China

PHI 534 Oriental Views of Man and Nature: Japan

PHI 535 Faith, Reason, Religion

PHI 541 Language and Thought

PHI 542 The Structure of Inquiry

PHI 543 Logic

PHI 544 Perspectives on Communication

PHI 545, 546, 547 Perspectives on Social and Political Issues
(Variable topics, including equality, genetics, the cities, technology, etc.)

PHI 548 American Philosophy

PHI 549 Philosophy of Law

PHI 550 Contemporary Moral Issues

PHI 551 Medical Ethics

PHI 552 Perspectives on Feminism

PHI 553 Science, Society and Technology

PHI 554 Perspectives on Death

PHI 555, 556 Philosophy of Education

PHI 570 Philosophy of Art

PHI 572 Philosophy of Film

PHI 574 Philosophy in Literature

PHI 580 Guilt and Responsibility

PHI 581 Moral Theories of the Modern World

PHI 582, 583 Colloquium: Contemporary Problems

PHI 584, 585 Teaching Practicum

PHI 586, 587 Directed Readings
Variable credit

PHI 588, Directed Research
Variable credit

DOCTORAL PROGRAM IN PHILOSOPHY

Course Offerings (all courses are for 3 credits unless otherwise noted):

I. AREA COURSES

PHI 500 History of Philosophy and Philosophical Texts

PHI 501 Philosophy of Science and Logic

PHI 502 Metaphysics and Systematic Philosophy

PHI 503 Epistemology, Philosophy of Mind, Perception and Experience

PHI 504 Philosophy of Value, Culture and Society

PHI 505 Aesthetics and Rhetoric

PHI 506 Oriental Philosophy

II. PROSEMINARS

PHI 590 Analytic Philosophies

PHI 591 Phenomenological-Existential Philosophies

PHI 592 Contemporary Systematic Philosophies

III. ONGOING STYLE SEMINARS

PHI 600 Ongoing Style Seminar: Analysis

PHI 601 Ongoing Style Seminar: Phenomenology and Existentialism

PHI 602 Ongoing Style Seminar: Systematic Philosophies

IV. ONGOING INTERDISCIPLINARY SEMINARS

PHI 610 Interface Seminar: Philosophy-Natural Science

PHI 611 Interface Seminar: Philosophy-Social Science

PHI 612 Interface Seminar: Philosophy-Humanities

V. INDEPENDENT AND DIRECTED STUDIES

PHI 620 Advanced Problems in Philosophy
Variable and repetitive credit

PHI 621 Independent Study
Variable and repetitive credit

PHI 622 Supervised Teaching
3 credits, repetitive

PHI 690 Dissertation
Variable and repetitive credit, maximum 6 hours

Doctor of Arts in Foreign Language Instruction

General Aims of the Doctor of Arts

The program leading to the Doctor of Arts degree is designed to train professionals in the field of foreign language teaching on the secondary, junior college and college levels. It is also appropriate for providing a basis in language training for language education specialists and specialists in bilingual media and communications, and for marketing consultants whose expertise in the foreign language(s) will aid business or advertising. The program is flexible, competency-based and, where possible, tailored to individual needs.

Requirements for Admission into the Doctoral Program

The program is open to both full-time and part-time students who have a master's degree or its equivalent with specialization in one of the following languages: French, German, Italian, Russian, Spanish, or TESOL (Teaching of English to Speakers of Other Languages).

All applications for admission to the program will be reviewed by the Doctor of Arts Committee and, where necessary, candidates will be interviewed personally. Selection will be based on official transcript of undergraduate and/or graduate courses plus three letters of recommendation, language proficiency, and background in major and minor fields. The general GRE scores will be necessary and all applicants must demonstrate mastery of English. The procedure and requirements are the same as described by the Graduate School.

Requirements of the Doctor of Arts

The program is competency-based and does not specify a maximum number of credits to be taken. Linguistic, methodological, pedagogical and literary progress of each candidate will be checked periodically by a committee consisting of the Doctor of Arts Committee and the major and minor advisors. Students found deficient in one or more areas will be placed on probation until all deficiencies are eliminated or will be asked to withdraw from the program

Candidacy for the Doctor of Arts is attained after all approved coursework has been completed and reviewed by the Doctor of Arts Committee.

Distribution of Course Requirements: Languages

1. *Major field* (to be chosen among French, German, Italian, Russian, Spanish): Candidates are expected to take a minimum of 15 credits, distributed among the following areas: Literature, Advanced Language, Culture, with no less than *one* course in each of these areas. 15 credits
2. *Minor field* (may be chosen from any field related to second language acquisition): The selection of the minor field must be approved by the major advisor and the D.A. Committee. If a language is chosen, candidates must present at least 18 prior credits in that language. The required additional 12 credits must be divided among Literature, Advanced Language, Culture. 12 credits
3. *One course in General Linguistics.* 3 credits
4. *Professional Preparation:* One course in Testing, one course in Methods. 6 credits
5. *Practicum:* Teaching an elementary or intermediate course in the major. 3 credits
6. *Internship:* Team-teaching a course of literature, advanced language or culture for one semester. 3 credits
7. *Externship:* Full-time teaching for one semester, three courses, at the secondary or college level. 3 credits
8. *Dissertation.* 3 credits

Distribution of Requirements: TESOL

1. *Major Field:* TESOL/Linguistics 12 credits
2. *Minor Field:* Foreign Language/Comp. Lit./Psychology/other/areas related to TESOL 12 credits
3. *Literature:* English Lit./Comp. Lit. 6 credits
4. *Professional Courses:* Language Testing and Teaching Methodology 6 credits
5. *Practicum* 3 credits
6. *Internship* 3 credits
7. *Externship* 3 credits
8. *Project/Thesis* 6 credits

MINIMUM TOTAL 51 credits

NOTE:

1. Courses in the minor field must be approved by the departmental advisor.

2. In place of courses in advanced composition or stylistics required for the other tracks, two courses in English literature are required for this track.

3. A maximum of 6 transfer credits may be recognized for non-

SUNY candidates and 9 for SUNY candidates.

4. The requirement of one of the items in 5-7, i.e. Externship, Practicum or Internship may be waived upon production of satisfactory teaching record.

5. All TESOL majors must take and pass a language proficiency exam in all four basic skills, in a language other than their native tongue.

Final Evaluation

The final evaluation is to be based directly on the specific program of study that the candidate has completed. In addition to demonstrating mastery of the individual curriculum requirements, the candidate is expected to evidence a certain synthesis of knowledge based on the component parts of the program.

A. The final evaluation is to include both a written and an oral comprehensive examination and will include topics from all areas covered in the program. The comprehensive examination will be administered only after the candidate has demonstrated competence in verbal fluency in the target language and in language instruction and methodology. A doctoral committee will test the verbal fluency of all candidates.

It will be the responsibility of the candidate to prepare, with his or her major and minor advisors, a reading list to cover his or her individual specialties. This list must be submitted and approved one semester prior to taking the comprehensive examination..

B. Dissertation: All doctoral candidates must complete a creative research project. The subject of the research project will be determined by the candidate's professional interest and training. The dissertation will be undertaken after the students have completed all coursework and have been reviewed by the doctoral committee, which will make final determination for conferral of the degree of Doctor of Arts in foreign language instruction.

Faculty

The faculty teaching in the program will be drawn from the following departments or programs: French and Italian; Germanic and Slavic Languages and Literatures; Hispanic Languages and Literature; Linguistics; Comparative Literature; Center for Continuing Education.

Courses

The following courses are available only to candidates in the Doctor of Arts Program:

DLF 601, DLG 601, DLI 601, DLR 601, DLS 601 Internship in Foreign Languages: French, German, Italian, Russian, Spanish
Students in the Doctor of Arts Program will assist an instructor as an aide in a literature, culture or language course on the undergraduate level.
Fall and spring, 1-3 credits

DLF 602, DLG 602, DLI 602, DLR 602, DLS 602 Externship in Foreign Languages: French, German, Italian, Russian, Spanish
Students in the Doctor of Arts Program will teach one to three courses at the high school, junior college or college levels under the supervision of a master teacher.
Prerequisite: All other coursework completed
Fall and spring, 3-6 credits

DLF 699, DLG 699, DLI 699, DLR 699, DLS 699 Doctoral Research in Foreign Languages: French, German, Italian, Russian, Spanish
Independent research for the Doctor of Arts degree. Open only to candidates for the Doctor of Arts who have passed the preliminary examination.
Fall and spring, 1-6 credits, repetitive

The Biological Sciences

StonyBrook

DIVISION OF BIOLOGICAL SCIENCES

The Division of Biological Sciences consists of three academic departments: Biochemistry, Ecology and Evolution, and Neurobiology and Behavior. The faculty of these three departments, together with individual members of the Departments of Chemistry, Marine Sciences Research Center, the School of Basic Health Sciences, Cold Spring Harbor Laboratory, and Brookhaven National Laboratory, collaborate in operating six different fields of graduate study in various areas of the biological sciences. Some faculty members participate in more than one of these fields. Through these interdepartmental interactions it is possible to meet the needs of students with diverse intellectual and professional interests without the constraints imposed by traditional departmental boundaries. The six fields comprise: Graduate Studies in Cellular and Developmental Biology, Ecology and Evolution, Genetics, Molecular Biology, and Neurobiology and Behavior, and an M.A. Program in Biological Sciences. The five Graduate Studies are designed for students seeking the Ph.D. degree, while the last leads to the M.A. degree. Each of the Graduate Studies is guided by a Director and an Executive Committee, and each establishes its own entrance standards and degree requirements.

Each of the Graduate Studies also separately evaluates candidates for admission. The paragraphs below describe the five Graduate Studies and the M.A. program in detail, and interested students should address inquiries directly to the appropriate Director of Graduate Studies.

Cellular and Developmental Biology (BCD)

Graduate Studies in Cellular and Developmental Biology provides training and research opportunities in the molecular and cellular bases of growth, differentiation and morphogenesis of biological systems. Faculty members are drawn from departments of both the Biology Division and the Health Sciences Center and are engaged in research on a large variety of organisms ranging from viruses and eukaryotic microorganisms to higher plants and animals. Methodologies and levels of analysis vary from the molecular to the cellular to the organismic. Emphasis is placed on the control mechanisms which define and regulate growing and developing systems.

Facilities

The Biology Division and Health Sciences Center are well equipped for work in developmental and cellular biology. The modern laboratory facilities include constant temperature rooms, equipment for continuous and synchronized cell culture as well as equipment for all major molecular biological and biochemical analyses. The electron microscope facility houses two transmission scopes and one scanning scope along with all accessory equipment. Besides coursework and seminars, students in the program have an early opportunity to work in the laboratories of selected faculty members to gain laboratory experience and help them decide which area of cellular and developmental biology they wish to pursue further.

Admission Requirements

Graduate Studies in Cellular and Developmental Biology requires the following in addition to the minimum Graduate School admission requirements:

A. A baccalaureate degree in biology or a related area including the following preparation: one year of general chemistry; one year of organic chemistry, including organic chemistry laboratory; one semester of physical chemistry or physical biochemistry; two semesters of college mathematics, including at least one semester of calculus; and two semesters of physics. Students may be admitted without some of the above undergraduate courses but will be required to make up these deficiencies during the first year.

B. A report of Graduate Record Examination scores.

C. Acceptance by both the Graduate Studies and the Graduate School.

M.A. Degree Requirement

Graduate Studies in Cellular and Developmental Biology normally does not accept a student whose goal is a master's degree. In exceptional instances, a student already in the Graduate Studies may be awarded an M.A. degree upon completing an approved course of study, including a minimum of 30 graduate credit hours, passing a comprehensive examination, and presenting and defending a research thesis.

Ph.D. Requirements

Course Requirements

1. Cell Biology at the graduate level (BCD 656).
2. Developmental Biology at the graduate level (BCD 657).
3. Molecular Genetics (BIO 360), or Microbial Genetics (HBM 503).
4. Biochemistry (BMO 520-521).
5. Student seminar for at least four semesters (BCD 531, 532). One acceptable seminar is to be given each semester until advancement to candidacy, and attendance at all research seminars (BCD 621, 622) is required.
6. Two semesters of research (BCD 530) in staff laboratories. The student generally must work in four different laboratories during the two semesters. The particular laboratories involved will be decided by the student's advisory committee in consultation with the student and with approval of the Executive Committee.
7. At least three elective graduate courses to be approved by the student's advisory committee.

Students must achieve a B or better in all required courses and must maintain a B average in undergraduate and graduate elective courses.

Residence Requirement

The University requires at least two consecutive semesters of full-time graduate study. The demands of the program necessitate a longer period of residence.

Teaching Requirement

It is expected that each graduate student completing a doctoral degree will have functioned as a teaching assistant during at least two semesters of his or her graduate career (BIO 600/601).

Comprehensive Examination

At the beginning of the fourth semester, the student will take a written preliminary examination covering the areas of cell and developmental biology.

Thesis Proposal Examination
After successful completion of the preliminary examination, the student selects a thesis advisor and writes a proposal for thesis research. After approval by the thesis advisor, the proposal is orally defended before a thesis committee.

Advancement to Candidacy
After successful completion of all required and elective courses, the preliminary examination and the thesis proposal examination, the student will be recommended to the Graduate School for advancement to candidacy.

Ph.D. Dissertation
The research for the Ph.D. dissertation is conducted under the supervision of the thesis committee. A dissertation examining committee is appointed by the Vice Provost for Research and Graduate Studies when the dissertation nears completion. The dissertation examining committee reads the finished dissertation and gives the candidate an oral examination on the dissertation research and related areas.

Faculty

Arnheim, Norman, Associate Professor.[2] Ph.D., 1965, University of California, Berkeley: Structure and genetic behavior of multigene families; ribosomal genes in mammals.

Bogenhagen, Daniel, Assistant Professor.[5] M.D., 1977, Stanford University: Molecular genetics of transcriptional control for mitochondrial DNA and for *Xenopus* 5S DNA.

Brink Peter R., Assistant Professor.[1] Ph.D., 1976, University of Illinois at Urbana-Champaign: Cell-to-cell communication, electrophysiology of invertebrate nervous system and muscle structure and function.

Broach, James R., Assistant Professor.[4] Ph.D., 1973, University of California, Berkeley: Investigations of gene expression in the yeast *S. cerevisiae.*

Delihas, Nicholas, Associate Professor.[4] Ph.D., 1961, Yale University: Structure and function of RNA and ribosomes.

Dewey, Maynard, M., Professor and Chairperson.[1] Ph.D., 1958, University of Michigan: Contractile mechanisms; structure of vertebrate smooth muscle; cell-cell communication; immunocytochemical localization of membrane proteins.

Dudock, Bernard S., Associate Professor.[2] Ph.D., 1966, Pennsylvania State University: Structure and function of tRNA, mRNA and viral RNA.

Edmunds, Leland N., Professor.[1] Ph.D., 1964, Princeton University: Membrane transport; cell cycles and biological clocks in synchronized cultures of *Euglena* and yeast.

Gordon, Joel S., Assistant Professor.[1] Ph.D., 1971, University of Pennsylvania: Control of transcription in cell differentiation; myogenesis.

Katz, Eugene R., Associate Professor and Director, Graduate Studies in Genetics.[4] Ph.D., 1969, University of Cambridge, England: Developmental genetic studies on cellular slime molds; genetic approaches to cytoskeletal functions.

Krikorian, Abraham, D., Associate Professor.[2] Ph.D., 1965, Cornell University: Control of the morphogenetic potential of cultured plant cells; biochemical differentiation in cultured cells of angiosperms.

Laval-Martin, Danielle, Research Associate Professor.[1] Ph.D., 1975, University of Paris VI, France: Relation between photosynthetic activities and the structural organization of the thylakoidal components.

Ledbetter, Myron, Senior Scientist.[13] Ph.D., 1958, Columbia University: The relationship of fine structure to functions of plant cells, especially the relationship of microtubules to the formation of cell walls.

Levine, Arnold J., Professor and Chairperson.[4] Ph.D., 1966, University of Pennsylvania: Oncogenic viruses, gene expression and developmental biology.

Lucas, Joseph J., Assistant Professor.[4] Ph.D., 1972, University of Pennsylvania: Mechanisms and control of gene expression during eukaryotic cell growth and development.

Lyman, Harvard, Associate Professor and Director, Graduate Studies in Cellular and Developmental Biology.[1] Ph.D., 1960 Brandeis University: Control mechanisms in the biogenesis, development and replication of chloroplasts and other cellular organelles.

Marcu, Kenneth, Assistant Professor.[2] Ph.D., 1975, State University of New York at Stony Brook: Organization and mechanisms of expression and evolution of eukaryotic multigene systems.

Merriam, Robert W., Associate Professor.[3] Ph.D., 1953, University of Wisconsin: The role of actins in the structure and function of eggs and early embryos.

Palatnik, Carl, Research Assistant Professor.[1] Ph.D., 1975, State University of New York at Stony Brook: Gene regulation and messenger RNA processing in cellular slime molds.

Privis, Joav, Assistant Professor.[1] Ph.D., 1969, McGill University, Montreal, Canada: Differentiation of surface membranes in muscle cells developing in culture; the regulation of cell surface components; interactions of cell surface receptors with cytoskeleton.

Scott, Sheryl A., Assistant Professor.[3] Ph.D., 1976, Yale University: Development of the segmental pattern of skin sensory innervation in the chick hindlimb.

Taichman, Lorne B., Associate Professor.[16] Ph.D., 1971, University of Wisconsin; M.D., 1965, University of Toronto, Canada: Epithelial keratinization and differentiation.

Walcott, Benjamin, Associate Professor.[1] Ph.D., 1968, University of Oregon: Comparative neurophysiology; relation between muscle tension, sarcomere length and filament length in striated muscle; sensory integration; electron microscopy.

Wigler, Michael H., Senior Staff Investigator and Head.[19] Ph.D., 1978, Columbia University: Gene expression in genetically transformed animal cells.

Williams, David L., Associate Professor.[5] Ph.D., 1972, University of Illinois: Hormonal control of protein secretion.

Williamson, David L., Associate Professor.[1] Ph.D., 1959, University of Nebraska: Biochemical and structural aspects of sex ratio-determining organisms from insects and plants; insect cell cultures.

Wimmer, Eckard, Professor.[4] Ph.D., 1962, University of Gottingen, W. Germany: Structure and biological function of RNA's and proteins of picornaviruses and RNA tumor viruses and their host cells.

Estimated number of teaching, graduate and research assistants, fall 1982: 35.

[1]*Department of Anatomical Sciences*

[2]*Department of Biochemistry*

[3]*Department of Neurobiology and Behavior*

[4]*Department of Microbiology*

[5]*Department of Pharmacological Sciences*

[13]*Brookhaven National Laboratory*

[16]*Department of Oral Biology and Pathology*

[19]*Cold Spring Harbor Laboratory*

Courses

BCD 500 Directed Readings in Genetics and Developmental Biology
Directed readings in topics of current interest, under supervision of a faculty sponsor culminating in one or more critical review papers.
Prerequisite: Sponsor and approval of Master's Programs Executive Committee
Yearly, 1-3 credits, repetitive

BCD 512 Contractile and Cytoskeletal Mechanisms in Developing Systems
The three major cytoskeletal systems of cells are discussed with respect to their molecular characteristics, cellular locations and functional implications. Research techniques and date interpretation are emphasized. Topics include the molecular bases of cell motility, cell division and the relationship between the cell surface and cytoskeletal elements.
Prerequisites: Biochemistry and cell biology courses
Fall, 3 credits

BCD 527 Photoperiodic Control of Plant and Animal Development
Examination of seasonally correlated developmental processes that are modulated and controlled by light, the physiological and biochemical pathways whereby the control is mediated, and the nature of the biological timing mechanism involved. Topics will include flowering and phytochrome system; insect development; insect development; annual reproductive cycles in birds and mammals; the Bunning hypothesis; and circannual rhythms.
Fall, alternate years, 3 credits

BCD 529 Organelle Development
This course is concerned primarily with the development of the mitochondrion and the chloroplast. Subjects will include the biogenesis of these organelles and their relation to the interaction with the nucleus. Emphasis will be on genetical and biochemical analysis.
Fall, alternate years, 3 credits

BCD 530 Projects in Developmental Biology
Individual laboratory projects, closely supervised by staff members, to be carried out in staff research laboratories on a rotation basis.
Fall and spring, 2 credits

BCD 531, 532 Graduate Seminar in Developmental Biology
Seminars are given by graduate students on current literature in the field of developmental biology.
Fall and spring, 1 credit

BCD 535 Physiology and Development of Higher Plants
Survey of selected topics in plant physiology with emphasis on developmental aspects. Areas from which specific problems will be selected include photomorphogenesis, hormonal control of plant growth and plant tissue culture.
Fall, alternate semesters, 2 credits

BCD 536 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: influence of light, temperature and chemicals: use of the clock for adaptation to diurnal, tidal and lunar cycles, for direction-finding (homing and orientation) and for day-length measurement (photoperiodism); chronopathology and chronopharmacology; aging and life cycle clocks; possible molecular mechanisms of the clock.
Spring, 3 credits

BCD 537 Physiology and Biochemistry of the Cell Cycle
An integrated view of the cell developmental cycle in prokaryotes and eukaryotes. Topics considered will include cell cycle anatomy; cell population dynamics; general patterns of nucleic acid synthesis; regulation of enzyme activity during the cell cycle; temporal control of gene expression; development and function of cellular organelles during the cell cycle; and the control of cell division. Crosslisted with HBA 537.
Fall, 3 credits

BCD 599 Research
Original investigation under the supervision of a member of the staff.
Fall and spring, credit to be arranged

BCD 621, 622 Developmental Biology Seminar
A weekly series of seminars by members of the staff, postdoctoral students, advanced graduate students, and visiting scientists on current research in developmental biology.
Fall and spring, 1 credit

BCD 656 Comparative Cell and Tissue Biology
Introduction to the structural organization of cells and tissues and to the way structure relates to function. Particular emphasis placed on cell organelle structure and function in specialized cells in tissues. The organization and interaction of cells in tissues will also be covered. The course will be comparative and will include examples of tissues from vertebrates and invertebrates. Crosslisted with HBA 656.
Spring, 4 credits

BCD 657 Principles of Development
This course will deal with developing systems at all levels from the morphological to the molecular. Illustrative material from both animal and plant kingdoms will be used. Special attention will be given to gametogenesis, genetic control of early development, translational control of protein synthesis, the role of cell division and cell movements, and cell-cell interactions in defining developing systems. Crosslisted with HBA 657.
Prerequisite: BCD 656
Fall, 3 credits

BCD 681-684 Advanced Seminars
Topics to be arranged.
Fall and spring, variable and repetitive credit

BCD 699 Dissertation Research
Original investigations undertaken as part of the Ph.D. program under supervision of research committee.
Fall and spring, credit to be arranged

Ecology and Evolution (BEE)

Graduate Studies in Ecology and Evolution provides training and research opportunities over a broad spectrum of theoretical, laboratory and field problems involving diverse groups of terrestrial and marine organisms in geographic regions ranging from the tropics to the Arctic. Graduate Studies also includes a diversity of approaches to ecological and evolutionary problems, stressing population biology in its experimental, field-oriented, mathematical and behavioral aspects. Taxonomic theory and methodology (especially numerical taxonomy) and certain aspects of genetics (especially population and ecological genetics), marine biology and multivariate statistics are also being studied in relation to ecological and evolutionary problems. Some staff members work in the area of applied ecology and are actively involved in ecologically based social action in the Long Island area and on a national and international scale.

Facilities

Ample laboratory, greenhouse and environmental facilities as well as all of the normal laboratory equipment for physiological and biochemical studies are available in a modern biology building. All the equipment typically found in a modern laboratory concerned with biochemistry of proteins is available, including high-speed and ultracentrifuges, generous facilities for sonicators, fraction collectors, spectrophotometers, water baths (both refrigerator and electrofocusing systems), liquid scintillation, spectrofluorimeter and flat plate high-voltage electrophoresis system. The Department of Ecology and Evolution has unusually good computing facilities. In addition to the University's large computer installation to which staff and students are connected by numerous terminals, there is available within the Department a computer facility comprising two medium-sized minicomputers with graphic and scanning capabilities.

Field and marine study areas are available at Flax Pond, a University-affiliated laboratory four miles from campus. Some terrestrial studies can be performed at the Ashley Schiff Memorial Ecology Preserve, a 28-acre forested area on the campus. Several large tracts of land (4,000 acres in aggregate) are available for research within a 30-minute drive of the campus. The University is a member of the Organization for Tropical Studies, which maintains a field station in Costa Rica. In addition, collaboration is possible with scientists at Brookhaven National Laboratory. Several field stations are maintained by other University Centers and colleges of the State University of New York. The Marine Sciences Research Center of the State University is located on the Stony Brook campus. Stony Brook is also close enough to New York City and Washington, D.C. for arrangements to be made for consultation and work at museums and other institutions in those cities.

Admission Requirements

Graduate Studies in Ecology and Evolution requires the following in addition to the Graduate School admission requirements:

A. A baccalaureate degree, which should include formal training in genetics, ecology and at least one course specializing in the biology of a particular group of organisms.

B. Report of Graduate Record Examination scores.

C. Acceptance by Graduate Studies in Ecology and Evolution and by the Graduate School.

M.A. Degree Requirements

Graduate Studies in Ecology and Evolution normally does not accept a student whose goal is an M.A. degree. In exceptional instances, a student already in Graduate Studies may be awarded an M.A. degree upon completion of an approved course of study, including 30 graduate credit hours and a research thesis.

Ph.D. Requirements

Course Requirements

1. Students are required to take three courses—Principles of Ecology (BEE 550), Principles of Evolution (BEE 551) and Biometry (BEE 552) in the first year, and a minimum of three other courses, other than seminars, within this or other departments of this or other universities, during their graduate career. Each student is also required to take a minimum of one Department seminar per year under normal circumstances.

2. Research Areas in Ecology and Evolution (BEE 556).

3. Colloquium in Ecology and Evolution (BEE 671) should be taken each semester.

4. The faculty feels that each student will require advanced training in various ancillary disciplines appropriate to the student's chosen field of research. Requirements for any specific student will be determined by the student's advisory committee and might include one or more foreign languages or advanced study in mathematics, statistics, computer sciences, biochemistry or other areas.

Teaching Requirement
It is expected that all graduate students completing a doctoral degree will have functioned as teaching assistants during at least two semesters of their graduate careers.

Residence Requirement
At least two consecutive semesters of full-time graduate study are required. The demands of the course of study usually necessitate a longer period of residence.

Preliminary Examination
Early in the fourth semester of study, a student is required to take a preliminary examination. The preliminary examination will be partly written and partly oral, and will consist of a general part given to all students and a special part tailored to the student's interests and administered by his or her advisory committee.

Research and Dissertation
A dissertation is required for the Ph.D. degree. It must contain the results of original and significant investigation. A dissertation proposal must be approved by the faculty during an early stage of a student's research.

Advancement to Candidacy
The faculty will recommend a student to the Graduate School for advancement to candidacy upon satisfactory completion of the preliminary examination, any language requirement established for the student and acceptance of a thesis proposal by the program.

Final Examination
The completed dissertation must be approved by the student's advisory committee. A dissertation examining committee is then appointed by the Vice Provost for Research and Graduate Studies. A formal public oral defense of the dissertation is scheduled, at which the student presents his or her findings and is questioned by members of the examining committee and by other members of the audience.

Faculty

Armstrong, Robert A., Assistant Professor.[6] Ph.D., 1975, University of Minnesota: Mathematical and experimental approaches to population dynamics and community structure; theoretical ecology.

Arnheim, Norman, Associate Professor.[2] Ph.D., 1965, University of California, Berkeley: Structure and genetic behavior of ribosomal DNA in mammals.

Battley, Edwin H., Associate Professor.[6] Ph.D., 1956, Stanford University: Thermodynamics of microbial growth; ecological energetics; microbial ecology; nitrification and denitrification in aquatic systems.

Bell, Michael A., Assistant Professor.[6] Ph.D., 1976, University of California, Los Angeles: Evolutionary biology; population genetics; ichthyology; paleobiology and geographic variation.

Bentley, Barbara L., Associate Professor.[6] Ph.D., 1974, University of Kansas: Nitrogen fixation; plant ecology; plant-animal interactions; tropical ecology.

Carpenter, Edward J., Associate Professor.[8] Ph.D., 1969, North Carolina State University: Nitrogen cycling in the marine environment; physiology of nitrogen incorporation by marine algae; phytoplankton ecology.

Creel, Norman, Associate Professor.[1] Ph.D., 1967, Eberhard-Karls University, Tubingen, W. Germany: Quantitative taxonomy of primate populations; polyfactorial inheritance; primate evolution.

Eanes, Walter F., Assistant Professor.[6] Ph.D., 1976, State University of New York at Stony Brook: Population and biochemical genetics of *Drosophila;* molecular evolution.

Farris, James S., Associate Professor.[6] Ph.D., 1968, University of Michigan: Theory of phylogenetic inference.

Futuyma, Douglas J., Associate Professor.[6] Ph.D., 1969, University of Michigan: Population genetics; coevolution of species, especially of plants and insects; effects of evolution on the structure of ecological communities.

Ginzburg, Lev, Associate Professor.[6] Ph.D., 1970, Agrophysical Institute, Leningrad, U.S.S.R.: Evolutionary theory; mathematical population genetics; theoretical and applied ecology.

Hechtel, George J., Associate Professor.[6] Ph.D., 1962, Yale University: Systematics and zoogeography of marine demospongiae.

Koehn, Richard K., Professor.[6] Ph.D., 1967, Arizona State University: Population genetics; enzyme function and adaptation in natural populations.

Levinton, Jeffrey S., Associate Professor.[6] Ph.D., 1971, Yale University: Marine benthic ecology; population genetics of bivalve mollusks; paleoecology.

Okubo, Akira, Professor.[8] Ph.D., 1963, The Johns Hopkins University: Oceanic diffusion; animal dispersal; mathematical ecology.

Prestwich, Glenn D., Associate Professor.[11] Ph.D., 1974, Stanford University: Chemical ecology of plant-insect interactions.

Riley, Monica, Professor.[2] Ph.D., 1960, University of California, Berkeley: Macromolecular evolution in bacteria and mechanisms of genetic recombination in bacteria.

Rohlf, F. James, Professor.[6] Ph.D., 1962, University of Kansas: Multivariate data analysis techniques applied to problems in taxonomy and ecology; mathematical population genetics.

Slobodkin, Lawrence B., Professor.[6] Ph.D., 1951, Yale University: Evolutionary strategy with reference to species diversity, timing of responses, self-image; adaptive mechanisms of *Hydra.*

Smolker, Robert E., Associate Professor.[6] Ph.D., 1955, University of Chicago: Applied ecology; ornithology; public interest environmental law.

Sokal, Robert R., Leading Professor, Chairperson and Director of Graduate Studies.[6] Ph.D., 1952, University of Chicago: Numerical taxonomy; theory of systematics; geographic variation; spatial models in ecology and evolution.

Thomson, James D., Assistant Professor.[6] Ph.D., 1978, University of Wisconsin: Pollination biology; plant reproductive systems; community ecology.

Walsh, John J., Adjunct Associate Professor.[6,8,13] Ph.D., 1969, University of Miami: Upwelling ecosystems; phytoplankton ecology; modelling of continental shelf ecosystems.

Williams, George C., Professor.[6] Ph.D., 1955, University of California, Los Angeles: Evolution of life-history strategies; ecology and population genetics of marine fishes.

Estimated number of teaching, graduate and research assistants, fall 1982: 45.

[1]*Department of Anatomical Sciences*

[2]*Department of Biochemistry*

[6]*Department of Ecology and Evolution*

[8]*Marine Sciences Research Center*

[11]*Department of Chemistry*

[13]*Brookhaven National Laboratory*

Courses

BEE 500 Directed Readings in Population Biology
Directed readings in topics of current interest, under supervision of a faculty sponsor culminating in one or more critical review papers.
Prerequisites: Sponsor and approval of Master's Programs Executive Committee
Fall and spring, 1-3 credits, repetitive

BEE 501 Directed Readings in the Biology of Organisms
Directed readings in topics of current interest,under supervision of a faculty sponsor culminating in one or more critical review papers.
Prerequisite: Sponsor and approval of Master's Programs Executive Committee
Fall and spring, 1-3 credits, repetitive

BEE 550 Principles of Ecology
This course examines the interactions of organisms. The development of theoretical concepts of community structure and their biological and evolutionary implications.
Prerequisite: Permission of instructor
Fall, 4 credits

BEE 551 Principles of Evolution
Biological evolution including the genetics of populations, speciation, evolution of higher taxa, the fossil record and biogeography.
Fall, 4 credits

BEE 522 Biometry
An intensive course in statistical theory and methodology. The analysis of real biological data is emphasized. Topics include analysis of variance, simple multiple and curvilinear regression analysis, correlation analysis and goodness of fit tests.
Spring, 4 credits

BEE 553 Multivariate Analysis in Biology
An introduction to multivariate statistical analysis for biologists. Topics include general least squares analysis, MANOVA, cluster analysis and factor analysis.
Prerequisite: BEE 552 or equivalent
Fall, odd years, 3 credits

BEE 554 Population Genetics and Evolution
A general introduction to mathematical population genetics and evolutionary theory. The effects of mutation, recombination, selection and migration are studied. Modern concepts in both theoretical and experimental population genetics are covered.
Prerequisites: BIO 220, BEE 552 or their equivalents, and a course in evolution
Spring, even years, 3 credits

BEE 555 Isoenzyme Methods in Ecological Genetics
An introduction to biochemical techniques for investigations in ecology and population genetics with an emphasis on the use of electrophoresis for ecogenetic studies of natural and experimental populations. Topics include an introduction to the properties of proteins, particularly enzymes, genetic variation of populations, and the molecular basis of genetic and non-genetic variability of enzymes.
Spring, odd years, 4 credits

BEE 556 Research Areas of Ecology and Evolution
A description of the current research areas of ecology and evolution broadly conceived. All first-year Ecology and Evolution students are expected to participate.
Fall, 1 credit
Spring, variable credit

BEE 557 Numerical Taxonomy
The application of numerical techniques to classificatory problems in biology. Lectures cover the theory of classification and include phenetic, cladistic, and evolutionary approaches. Topics include character coding, similarity coefficients, cluster analysis, ordination, graph-theoretic methods, and techniques applicable to numerical cladistics.
Fall, even years, 3 credits

BEE 558 Tutorial Readings
Individual tutorial study with an instructor in the Ecology and Evolution Program for the purpose of background reading in an area of ecology and evolution.
Fall and spring, variable credit

BEE 559 Individual Studies in Organisms
A detailed study of the biology of a selected systematic group chosen by the graduate student and a faculty member. This is conducted as a tutorial course.
Fall and spring, variable credit

BEE 560 Microbial Ecology
A course intended to cover the basic aspects of the interaction of microorganisms with their environments, and the various environmental variables which influence their growth. Methods of field and laboratory study of the ecology of microorganisms will be discussed. Examples will be taken from the algae, fungi, slime molds, bacteria, protozoa and bryophytes. There will be an initial series of lectures followed by student presentations and discussions using material from the literature. Hours to be arranged. Open to qualified undergraduates by permission of the instructor.
Prerequisites: Inorganic and organic chemistry, general zoology, general botany.
Spring, 2 credits

BEE 561 Theoretical Ecology
Introduction to the construction, analysis and interpretation of mathematical models in population, community and evolutionary ecology.
Prerequisite: Permission of instructor
Spring, odd years, 3 credits

BEE 562 Advanced Invertebrate Zoology
Lectures, student seminars and discussions on selected topics in invertebrate zoology, with emphasis on the local and tropical American faunas.
Spring, 2 credits, repetitive

BEE 571 The Institutions of Environmental Policy
The environmental effects of existing economic, legal and other social institutions will be examined with emphasis on identification of areas of agreement and conflict with ecological theory.
Fall, odd years, 3 credits

BEE 575 Phylogenetics
A survey of principles and methods of phylogenetic systematics, covering both principles of classification and methods for inferring phylogenetic relationships. A quantitative approach is stressed throughout and instruction on computer methods of phylogenetic analysis is included. The connection between phylogenetic and biogeographical theories is also covered.
Spring, odd years, 3 credits

BEE 587 Computer Programming Techniques in Biology
An introduction to assembly language and FORTRAN programming applications in ecology, population genetics and taxonomy. Simulation and graphic techniques wil be emphasized.
Fall, 2 credits

BEE 588 Current Topics in Ecology and Evolution
The subject matter of the special topics course varies from semester to semester, depending upon the interests of students and staff.
Fall and spring, variable and repetitive credit

BEE 599 Research
Original investigation undertaken with the supervision of a member of the staff.
Fall and spring, variable and repetitive credit

BEE 670 Informal Seminar
Presentation of preliminary research results and current research problems by students and faculty.
Fall and spring, no credit

BEE 671, 672 Ecology and Evolution Colloquium
A weekly series of research seminars presented by visiting scientists as well as by the faculty. Required every semester of all Ecology and Evolution graduate students.
Fall and spring, no credit

BEE 689 Seminar on Adaptations of Marine Organisms
Seminars on selected topics concerning ecological, genetical and evolutionary problems in the marine environment.
Fall and spring, 2 credits, repetitive

BEE 690 Seminar on Evolutionary Processes
Seminars on selected topics concerning evolutionary processes.
Fall and spring, 2 credits, repetitive

BEE 691 Seminar on Systematics and Phylogeny
Seminars on selected topics in systematics. Topics will include the theory of classification and numerical taxonomy, both phenetic and cladistic.
Fall and spring, 2 credits, repetitive

BEE 692 Seminar on the Environment and Human Affairs
Student seminars on selected topics concerned with the effect of man on the environment. Application of ecological and evolutionary theory to the solution of human problems.
Fall and spring, 2 credits, repetitive

BEE 693 Seminar on Population and Community Ecology
Student seminars on selected topics in population and community ecology.
Fall and spring, 2 credits, repetitive

BEE 699 Dissertation Research
Original investigations undertaken as part of the Ph.D. Program in Ecology and Evolution.
Prerequisite: Advancement to candidacy
Fall and spring, variable and repetitive credit

Molecular Biology (BMO)

Graduate Studies in Molecular Biology is designed to prepare the student to formulate and attack biological problems at the molecular and cellular levels. Traditional departmental organization is transcended: the faculty is comprised of all the members of the Department of Biochemistry plus faculty members from the Department of Chemistry and from the School of Medicine.

Training is offered in a broad range of research areas, among them the chemical basis of enzyme action, the physical biochemistry of macromolecules, the structure and function of proteins, the biosynthesis of proteins and nucleic acids, the molecular and cellular bases of gene expression, metabolic control mechanisms, membrane biochemistry, contractile systems and ultrastructure.

Facilities

A full range of modern facilities and equipment is available for research in molecular biology.

Admission Requirements

Graduate Studies in Molecular Biology requires the following in addition to the Graduate School admission requirements:

A. A baccalaureate degree with the following minimal preparation: mathematics through one year of calculus; chemistry, including organic chemistry and physical chemistry; general physics; and one year of biology.

B. Letters from three previous instructors, and the Graduate Record Examination scores.

C. Acceptance by Graduate Studies in Molecular Biology and by the Graduate School. In special cases, students not meeting all of the requirements listed in A, above, may be admitted, but such students must immediately remedy these deficiencies.

M.A. Degree Requirements

Graduate Studies in Molecular Biology normally does not accept students whose goal is a master's degree. In exceptional instances, a student already in the Graduate Studies may be awarded an M.A. degree upon completing an approved course of study, including a minimum of 30 graduate credit hours, passing a comprehensive examination, and submitting and defending a master's thesis.

Ph.D. Requirements

Course Requirements

A. Core courses:

1. Principles of Biochemistry (BMO 520, 521), a two-semester course.
2. Microbial Genetics (HBM 503) or Molecular Genetics (BIO 364).
3. Physical Biochemistry (BMO 512).
4. Enzymology (BMO 513).
5. Experimental Biochemistsry (BMO 509, 510), a two-semester course in which the student spends a half semester in each of four different faculty laboratories actively participating in the research work of the laboratory.

B. Three elective courses in molecular biology or related fields.

C. Enrollment every semester in three seminar courses: Colloquium in Molecular Biology (BMO 601, 602), which is a series of invited lectures by visiting scientists from other institutions; Student Seminar (BMO 603, 604), in which each student presents a talk on a topic from the current literature; and Molecular Biology Workshop (BMO 605, 606), in which faculty members, postdoctoral fellows and advanced students present informal progress reports on their current research activities.

Residence Requirement

The University requires at least two consecutive semesters of full-time graduate study. The demands of the course of study necessitate a longer period of residence.

Teaching Experience

All students in Molecular Biology, whether or not they are supported by teaching assistantships, are required to gain experience in teaching by assisting in laboratory sections, leading discussion sections or helping to formulate and grade examination papers. The teaching experience may be in either undergraduate or graduate courses, and is to extend over a period of at least four semesters.

Qualifying Examination

In the middle of the second year all students take a two-day written qualifying examination covering the material of the core courses. This examination tests the student's ability to integrate basic concepts and information from the core courses and to apply them to current problems in molecular biology.

Proposition Examination

After passing the written qualifying examination, each student is required to prepare and defend one proposition. The student proposes an original mechanism or theory which could serve to explain a biological phenomenon in molecular terms, and devises hypothetical experiments designed to test the proposal. The proposition may be in any area of molecular biology, including the probable area of the Ph.D. thesis. The student presents a detailed write-up of the background and logic of the proposition and the experiments proposed to test it, which then forms the

basis for an oral proposition examination. The qualifying examination and the proposition examination together constitute the preliminary examination specified in the regulations of the Graduate School.

Advancement to Candidacy
When the above requirements have been satisfactorily completed, a recommendation for advancement to candidacy for the Ph.D. will be forwarded to the Graduate School.

Ph.D. Dissertation
During the second year the student initiates a dissertation research project in the laboratory of a particular member of the program faculty. After the student has passed the proposition examination, a research committee is appointed to guide the dissertation research, and when the research nears completion a dissertation examining committee is appointed by the Vice Provost for Research and Graduate Studies.

Dissertation Defense
The dissertation defense, which completes the requirements for the Ph.D., consists of a public seminar presentation of the dissertation work followed by an oral examination before the dissertation examining committee.

Faculty

Arnheim, Norman, Associate Professor.[2] Ph.D., 1965, University of California, Berkeley: Structure and evolution of ribosomal DNA in mammals.

Bauer, William R., Professor.[4] Ph.D., 1968, California Institute of Technology: Structure and interactions of the nucleic acids, especially circular DNAs; mechanism of action of antitumor drugs.

Carlson, Elof A., Distinguished Teaching Professor.[2] Ph.D., 1958, University of Indiana: Human genetics; mutational mosaicism; retinoblastoma; phenoxyacetic acid mutagenesis.

Cirillo, Vincent P., Professor.[2] Ph.D., 1953, University of California, Los Angeles: Mechanisms of membrane transport processes in yeast and bacteria.

Cohen, Seymour, Distinguished Professor of Pharmacological Sciences.[5] Ph.D., 1941, Columbia University: Comparative biochemistry, function of polyamines.

Dudock, Bernard S., Professor.[2] Ph.D., 1966, Pennsylvania State University: tRNA and tRNA genes in eukaryotes and eukaryotic organelles: sequence determination of tRNA genes, their organization and location in the genome, their transcription processing and regulation.

Eisenberg, Moises, Associate Professor.[5] Ph.D., 1972, California Institute of Technology: Effect of pore-forming antibiotics on the movements of small molecules and ions across membranes.

Erk, Frank C., Professor.[2] Ph.D., 1952, The Johns Hopkins University: Pattern formations and mutagenesis in *Drosophila*; developmental genetics of dermatoglyphic pattern specification in humans.

Freundlich, Martin, Associate Professor.[2] Ph.D., 1961, University of Minnesota: *In vivo* and *in vitro* studies on regulation of protein synthesis in bacteria.

Grollman, Arthur P., Professor[5,10] and Chairperson.[5] M.D., 1959, The Johns Hopkins University: Molecular pharmacology involving mechanisms of action of antitumor drugs, antiviral agents and toxins.

Inouye, Masayori, Professor and Chairperson.[2] Ph.D., 1963, Osaka University, Japan: Control mechanisms of cell division; characterization of membrane proteins associated with cell division and DNA replication.

Jesty, Jolyon, Assistant Professor.[10] Ph.D., 1972, Oxford University, England: Biochemistry of control mechanism in coagulation.

Kaplan, Allen P., Professor.[10] M.D., 1965, State University of New York, Downstate Medical Center: Biochemical mechanisms of allergic reactions.

Katz, Eugene R., Associate Professor.[4] Ph.D., 1969, University of Cambridge, England: Developmental genetics of cellular slime molds; eye development in Mexican cave fish.

Krikorian, Abraham D., Associate Professor.[2] Ph.D., 1965, Cornell University: Development of higher plants; physiological control of morphogenesis in higher plants.

Marcu, Kenneth B., Assistant Professor.[2] Ph.D., 1975, State University of New York at Stony Brook: Organization, mechanisms of expression, and evolution of eukaryotic multigene systems.

McLaughlin, Stuart G., Professor.[12] Ph.D., 1968, University of British Columbia, Canada: Biophysics of natural and synthetic membranes.

Moos, Carl, Associate Professor.[2] Ph.D., 1957, Columbia University: Contractile proteins of muscle and mechanism of contraction; actin-myosin interaction; ATPase kinetics.

Morrison, Sidonie, Assistant Professor.[10] Ph.D., 1973, Oxford University, England: Kinetic aspects of blood coagulation.

Perucho, Manuel, Assistant Professor.[2] Ph.D., 1976, Complutense University of Madrid, Spain: Isolation and characterization of human tumor genes.

Riley, Monica, Professor.[2] Ph.D., 1960, University of California, Berkeley: Macromolecular evolution in bacteria and mechanisms of genetic recombination in bacteria.

Sambrook, Joseph F., Adjunct Professor.[2,19] Ph.D., 1965, Australian National University: Molecular genetics of DNA tumor viruses.

Sarma, Raghupathy, Associate Professor.[2] Ph.D., 1963, University of Madras, India: X-ray crystallography to determine the structure of immunoglobulins, lysozymes, and other molecules of biological interest.

Schechter Nisson, Assistant Research Professor of Psychiatry.[14] Ph.D., 1971, Western Michigan University: Molecular basis of learning and memory.

Schmidt, Jakob, Associate Professor.[2] Ph.D., 1970, University of California, Riverside; M.D., 1966, University of Munich, Germany: Molecular biology of synaptic transmission; structure and function of nicotinic acetylcholine receptors in muscle and brain.

Setlow, Richard B., Adjunct Professor.[2,13] Ph.D., 1947, Yale University: DNA damage and repair; carcinogens and radiation.

Shaw, Elliott N., Adjunct Professor.[2,13] Ph.D., 1943, Massachusetts Institute of Technology: Protein chemistry of proteolytic enzymes (purification, structure and function); synthetic inhibitor of proteases.

Simon, Sanford R., Associate Professor.[2] Ph.D., 1967, Rockefeller University: Structure-function relationships in normal and modified hemoglobins, Na-K ATPase, and ionophorous antibiotics, employing spectroscopic and kinetic techniques.

Simpson, Melvin V., American Cancer Society Professor of Biochemistry.[2] Ph.D., 1949, University of California, Berkeley: Mitochondrial DNA and its replication; conformational changes in ribosomes related to function.

Springer, Charles S., Jr., Associate Professor.[11] Ph.D., 1967, Ohio State University: Biophysical chemistry; studies of biological membranes; physical properties and mediated cation transport; hyperfine shift nuclear magnetic resonance studies.

Sternglanz, Rolf, Associate Professor[2] and Director, Graduate Studies in Molecular Biology.[2] Ph.D., 1967, Harvard University: DNA replication in bacterial and eukaryotic systems; function of topoisomerases.

Studier, F. William, Adjunct Professor.[2,13] Ph.D., 1963, California Institute of Technology: Genetics and physiology of bacteriophage T7; control of gene expression; replication of T7 DNA.

Williams, David L., Associate Professor.[5] Ph.D., 1972, University of Illinois: Purification of the messenger RNA for a specific egg-yolk protein and the regulation of its synthesis by estrogens and antiestrogenic drugs.

Wimmer, Eckard A., Professor.[4] Ph.D., 1962, University of Gottingen, W. Gemany: Structure and function of cellular and viral ribonucleic acids and proteins; replication of polioviruses.

Estimated number of teaching, graduate and research assistants, fall 1982: 21

[2]*Department of Biochemistry*

[4]*Department of Microbiology*

[5]*Department of Pharmacological Sciences*

[10]*Department of Medicine*

[11]*Department of Chemistry*

[12]*Department of Physiology and Biophysics*

[13]*Brookhaven National Laboratory*

[14]*Department of Psychiatry*

[19]*Cold Spring Harbor Laboratory*

Courses

BMO 500 Directed Readings in Molecular Biology
Directed readings in topics of current interest, under supervision of a faculty sponsor culminating in one or more critical review papers.
Prerequisite: Sponsor and approval of Master's Program Executive Committee
Yearly, 1-3 credits

BMO 504 DNA, RNA, Protein Synthesis
Special topics in nucleic acid replication, transcription and protein synthesis, both *in vivo* and *in vitro*, are discussed in detail
Prerequisites: BMO 520, 521 or permission of instructor
Spring, odd years, 2 credits

BMO 505 Microbial Regulatory Mechanisms
Lectures and discussions devoted to current concepts of regulatory mechanisms involved in intermediary metabolism. Major metabolic pathways and their regulation will be studied in detail.
Fall, even years, 2 credits

BMO 507 Molecular Neurobiology
Correlation of chemistry and nerve cell function. Covers classical neurochemistry (chemical composition and metabolism of important constituents of the brain) as well as functional neurochemistry (molecular basis of neuronal excitability, synaptic transmission, sensory transduction, neuronal recognition, and synapse plasticity). Related topics in neuropharmacology and neuroendocrinology will also be discussed.
Prerequisites: BMO 520; BNB 532; or permission of instructor
Spring, 2 credits, repetitive

BMO 509, 510 Experimental Biochemistry
An introduction to modern biochemical research techniques. The student spends a half-semester in the laboratory of each of four different members of the faculty. In each laboratory the student participates in some aspect of the research being pursued by the faculty member.
Fall and spring, minimum two credits each semester, variable

BMO 512 Physical Biochemistry
Theoretical principles and experimental methods used in the study of proteins and nucleic acids, *e.g.*, hydrodynamics, spectroscopy, magnetic resonance and diffraction.
Prerequisites: BMO 520, 521; CHE 301 or 312
Fall, 2 credits

BMO 513 Enzymology
Principles of steady-state kinetics, transient kinetics, allosteric proteins, mechanisms of enzyme catalysis and specific examples of enzyme structure and function.
Prerequisites: BMO 520, 521
Fall, 2 credits

BMO 517 Biomembranes
The molecular architecture of membranes: the organization, functions, and assembly of lipids and proteins in biological membranes; and biophysical phenomena such as diffusion and conductivity, which are amenable to detailed molecular analysis, will also be examined.
Spring, 3 credits

BMO 520/521 Principles of Biochemistry
A comprehensive survey of modern biochemistry. Materials discussed will include proteins, membranes, the biosynthesis and degradation of carbohydrates, lipids and amino acids, energy transformations, and the structure, function and biosynthesis of nucleic acids.
Fall and spring, 3 credits each semester

BMO 599 Research
Original investigation undertaken under the supervision of a member of the staff
Fall and spring, credit to be arranged

BMO 601, 602 Colloquium in Molecular Biology
A weekly series of talks and discussions by visiting scientists in which current research and thinking in various aspects of molecular and cellular biology will be presented. This course is required of all students every semester in which they are registered in the Molecular Biology Program and attendance is mandatory. Visitors are welcome.
Fall and spring, 1 credit each semester

BMO 603, 604 Student Seminar in Molecular Biology
Seminars given by graduate students on recent work taken from the literature in the area of molecular or cellular biology. This course is required of all students every semester in which they are registered in the Molecular Biology Program and attendance is mandatory. Visitors are welcome.
Fall and spring, 1 credit each semester

BMO 605, 606 Molecular Biology Workshop
Progress reports given each week by members of the faculty, post-doctoral fellows, and advanced graduate students on their current research. This course is required of all students every semester in which they are registered in the Molecular Biology Program and attendance is mandatory. Visitors are welcome.
Fall and spring, 1 credit each semester

BMO 685-688 Advanced Seminars
Topics to be arranged.
Fall and spring, variable and repetitive

BMO 699 Dissertation Research
Original investigations undertaken as part of the Ph.D. program under supervision of a research committee.
Prerequisite: Advancement to candidacy
Fall and spring, credit to be arranged

Neurobiology and Behavior (BNB)

Graduate Studies in Neurobiology and Behavior offers doctoral training in the rapidly expanding field of neuroscience. Through coursework and independent research students are trained to approach research problems in neuroscience with a broad perspective involving the application of concepts and methods from a variety of disciplines including anatomy, biochemistry and physiology. Faculty research accommodates a wide range of student interests such as developmental neurobiology, neuroanatomy including comparative, visual system organization, motor system organization, the neural basis of behavior including learning, invertebrate neurobiology, central autonomic function and neural plasticity.

Facilities

Research facilities are excellent and there is ample opportunity for interaction with neuroscientists in other departments of the University and with visiting neuroscientists.

Admission Requirements

A. A baccalaureate degree, including the following preparation: two semesters of calculus, two semesters of physics, two semesters of inorganic chemistry, two semesters of organic chemistry, four semesters of biological sciences. Physical chemistry is recommended by not required.

B. Grade point average of B or better.

C. Submission of scores of Graduate Record Examination and letters from three previous instructors.

D. Acceptance by the Graduate Studies and the Graduate School. Students may be admitted to Graduate Studies in Neurobiology and Behavior without some of the above undergraduate courses, but deficiencies must be satisfied, without graduate credit, before taking the preliminary exam.

M.A. Degree Requirements

Graduate Studies in Neurobiology and Behavior normally does not accept a student whose goal is an M.A. degree. In exceptional instances, a student already in the Graduate Studies may be awarded an M.A. degree upon completion of an approved course of study, including 30 graduate credit hours, a comprehensive examination and a research thesis.

PH.D. Requirements

Course Requirements

A. Basic Biology and Behavior

1. Principles of Biochemistry [B10 361 (3 units)]: This requirement can be waived if the student can demonstrate that a sufficient course has already been taken. Students can also take the equivalent graduate course (BMO 520) which features additional more specialized material.

2. Cell Biology [BCD 656 (4 units) or HBM 611 (3 units)]: This requirement can be waived if the student can demonstrate that a sufficient course has already been taken.

B. Introduction to Neurobiology I, II [BNB 561, BNB 562 (3 units)]: A two-semester course in which the student is introduced to a broad variety of topics in neurobiology in the form of lectures, seminars and tutorials by members of the staff. These will be taken in the fall and spring semesters of the first year.

C. Advanced Neuroscience [BNB 531, BNB 532 (2 units each)]: Four of these one-semester courses given by various faculty members are required to be taken during the period of residency and will begin normally in the spring of the first year. These courses will include presentations both by faculty and students. Each semester will be organized around a specific topic e.g. neurochemistry, development and plasticity, excitable membranes, etc.

D. Electives: Three courses in various biological (graduate level), physical or mathematical sciences must be selected by the student in consultation with the student's graduate advisor.

Teaching Requirements

All students, as part of their training, are required to participate in teaching at the undergraduate level for at least two semesters. If the student is supported by a teaching assistantship, he or she must participate in teaching each semester the assistantship is held.

Residence Requirement

The student must complete at least three years of full-time study, two of which must be in residence.

Preliminary Examination

In February of the second year after admission, each student must take the preliminary exam. The exam will consist of both written and oral parts and will include content from courses required prior to the preliminary exam. Synthesis of information will be stressed in this exam.

Advancement to Candidacy
The recommendation to the Graduate School with respect to candidacy for the Ph.D. degree is based upon the satisfactory completion of the above requirements.

Ph.D. Dissertation
A dissertation which constitutes an original and significant contribution to the field of neurobiology and behavior is required for the Ph.D. The work must be of a quality acceptable for publication in a recognized scientific journal. By the end of the second year, the student should initiate a dissertation research program in the laboratory of a member of the Department. After consultation with an advisory committee appointed to guide the dissertation research, the student should present and defend a dissertation proposal. Upon completion of the dissertation research the student will present a departmental seminar based on the dissertation. Following this the student will be given an oral examination on the dissertation research and related areas by the dissertation committee.

Faculty

Adams, Paul R., Associate Professor. Ph.D., 1974, London University: Biophysics of ion channels in nerve and muscle cells.

Cabot, John B., Assistant Professor.[12] Ph.D., 1976, University of Virginia: Neural control of the cardiovascular system.

Carlson, Albert D., Professor. Ph.D., 1960, University of Iowa: Physiology of invertebrate nervous systems; insect neuropharmacology; neuronal control of flash patterns by fireflies.

Cohen, David H., Professor and Chairperson.[1] Ph.D., 1963, University of California, Berkeley: Cellular mechanisms of conditioning; neural control of the heart.

De Blas, Angel L., Assistant Professor. Ph.D., 1978, Indiana University: Molecular basis of the synaptic functions. Monoclonal antibodies to synaptic molecules.

Halegoua, Simon, Assistant Professor. Ph.D., 1978, State University of New York at Stony Brook: Biochemistry of neural development.

Karten, Harvey J., Professor.[1,14] M.D., 1959, Albert Einstein College of Medicine: Avian nervous system; comparative neuroanatomy.

Matthews, Gary G., Assistant Professor. Ph.D., 1975, University of Pennsylvania: Retinal physiology.

McKelvy, Jeffrey F., Professor. Ph.D., 1968, The Johns Hopkins University: Molecular neurobiology.

Mendell, Lorne, Professor.[12] Ph.D., 1965, Massachusetts Institute of Technology: Spinal physiology: modifiability of spinal circuitry.

Moore, Robert Y., Professor and Chairperson.[20] M.D., 1957; Ph.D., 1962, University of Chicago: Organization, development and plasticity of central monoamine neuron systems; central neural mechanisms in circadian rhythm regulation.

Scott, Sheryl A., Assistant Professor. Ph.D., 1976, Yale University: Developmental neurobiology.

Sherman, S. Murray, Professor.[1] Ph.D., 1969, University of Pennsylvania: Plasticity of developing visual systems.

Yazulla, Stephen, Associate Professor. Ph.D., 1971, University of Delaware: Electrophysiology and ultrastructure of the retina in vertebrates.

Zipser, Birgit, Adjunct Associate Professor.[19] Ph.D., 1972, Albert Einstein College of Medicine: Invertebrate neurophysiology; neuropeptide immunocytochemistry; monoclonal antibodies and neuronal specificity.

Estimated number of teaching, graduate and research assistants, fall 1982: 11

[1]*Department of Anatomical Sciences*

[12]*Department of Physiology and Biophysics*

[14]*Department of Psychiatry*

[19]*Cold Spring Harbor Laboratory*

[20]*Department of Neurology*

Courses

BNB 500 Directed Readings in Neurobiology and Behavior
Directed readings in topics of current interest, under supervision of a faculty sponsor, culminating in one or more critical review papers.
Prerequisite: Sponsor and approval of Master's Program Executive Committee
Yearly, 1-3 credits, repetitive

BNB 531 Advanced Neurobiology
Advanced seminar course centered around a topic to be determined. Examples include neurochemistry, membrane biophysics, neuronal plasticity, synaptic mechanisms, molecular neurobiology, developmental neurobiology. Students will be expected to read original literature and deliver oral presentations of material.
Prerequisite: Permission of instructor
Fall, 3 credits, repetitive

BNB 532 Advanced Neurobiology
Advanced seminar course centered around a topic to be determined. Students will be expected to read original literature and deliver oral presentations of material.
Prerequisite: Permission of instructor
Spring, 3 credits, repetitive

BNB 540 Molecular Neurobiology
Correlation of chemistry and nerve cell function. Covers classical neurochemistry (chemical composition and metabolism of important constituents of the brain) as well as functional neurochemistry (molecular basis of synaptic transmission, neuronal excitability, sensory transduction, neuronal recognition and synapse plasticity). Related topics such as neuropharmacology and neuroendocrinology will be discussed.
Prerequisite: BMO 520, BNB 561, or permission of instructor
Spring, 2 credits, repetitive

BNB 547 Readings in Neurophysiology
Discussion and critical evaluation of neurophysiological research published in biological journals. Critical analyses of techniques, methodology and conclusions of those researched will provide the primary focus of this seminar.
Prerequisite: Permission of instructor
Fall and spring, 1-3 credits each semester

BNB 561 Introduction to Neurobiology and Behavior I
A survey of cellular neurobiology. Topics to be treated include cell biology of neurons, electrophysiology of axons, synapses, and sensory receptors, neurochemistry of synaptic transmission, neural development.
Prerequisite: BIO 334 or permission of instructor
Fall, 3 credits

BNB 562 Introduction to Neurobiology and Behavior II
A survey of integrative neurobiology. Topics include sensory and motor systems, autonomic

nervous system, organization of brain stem and cortex, comparative neuroanatomy and cellular mechanisms of conditioning and learning.
Prerequisite: BNB 561
Spring, 3 credits

BNB 579 Topics in Developmental Neurobiology
An introduction to the development of the nervous system. Topics include neuroembryology, neuronal differentiation, synapse formation and specificity and plasticity of connections in vertebrates and invertebrates. Students will be expected to do at least one oral presentation.
Prerequisite: Permission of instructor
Spring, biennially, 3 credits

BNB 583-585 Special Seminars
Topics to be arranged.
Fall and spring, variable and repetitive credit

BNB 599 Research
Original investigation undertaken with supervision of a member of the staff.
Fall and spring, credit to be arranged

BNB 693-696 Advanced Seminars
Topics to be arranged.
Fall and spring, variable and repetitive credit

BNB 697 Advanced Neurobiology and Behavior Seminar
Seminar presentations delivered by faculty, associates, students and visiting speakers.
Prerequisite: Permission of instructor
Fall and spring, repetitive credit, 1 credit each semester

BNB 699 Dissertation Research
Original investigations undertaken as part of the Ph.D. program under the supervision of the research committee.
Fall and spring, credit to be arranged

M.A. Degree in Biological Sciences

Graduate Studies in Biology offers a Master of Arts degree for persons with a variety of career goals, including government service and secondary education. The program affords the opportunity to pursue master's level study in a research-oriented academic environment.

Graduate Studies in Biology is neither part of, nor prelude to, other graduate studies in the biological sciences. (M.A. students are eligible to apply for admission to doctoral programs at Stony Brook.)

The curriculum is aimed at students who have completed a baccalaureate degree with at least the following courses: one year of college mathematics, two years of college chemistry and two years of college biology including laboratory. Applicants also must have a 3.0 grade point average in science courses during the last two years of undergraduate work, or have completed six credits of B or better in graduate work at an accredited institution of higher education, to be considered for matriculated status. Persons who have not met the grade point average or undergraduate science course requirements will be considered for provisional admission. They may become matriculated by completing the first six credits of graduate work within this program with grades of B or better.

All applicants must complete an application form available from the Student Information Office, Division of Biological Sciences, Graduate Biology Building, SUNY at Stony Brook, Stony Brook, New York 11794. That form, in addition to routine information, requests a concise statement of career goals and a tentative program of study. In addition, three letters of recommendation are required as well as copies of all previous college transcripts. Letters, transcripts and applications should be sent to the Student Information Office. We prefer letters of recommendation written by faculty members in biology (or related sciences) at the applicant's undergraduate or previous graduate institution, and/or by school or research supervisors.

Applicants are also required to take the Graduate Record Examination (including both the general aptitude and biology tests). Information about this examination is available from the Career Development Office. Applicants should plan to take the GRE well in advance of admissions deadlines.

Applications will be accepted for entry starting in either the fall or spring session. Application folders must be completed by the following deadlines: May 15th for fall semester; November 15th for spring semester.

M.A. Degree Requirements

Graduate Studies in Biology has no full-time residency requirement, but all part-time students must work continuously by taking at least one course each semester. Deviations from such a minimum schedule require the consent of the Director of Graduate Studies.

The M.A. in biological sciences requires completion of an approved course of study, a thesis and a minimum of 30 graduate credits (a maximum of 6 approved transfer credits may be applied to this requirement). The overall grade point average in graduate courses must be at least 3.0.

The program of study must include at least one course in Area I-Research and Educational Techniques, and at least one course in three of the other five areas: II-Molecular Biology, III-Cellular and Developmental Biology plus Genetics, IV-Neurobiology and Behavior, V-Animal and Plant Biology and VI-Ecology and Evolution. Additional courses may be taken from the offerings of the other graduate programs, with permission of the instructor. At least 6 (but no more than 15) credits must be taken as individual study, under the headings of directed readings, laboratory research, and master's project (the last for at least 3 credits). Faculty sponsors must be obtained for this part of the program.

The master's project may be a thesis, presenting the results of a laboratory and/or field study. Alternatively, it may be a paper, providing either a critical assessment of a topic, based largely on the primary literature, or a curriculum in biology, for secondary schools or community colleges, developed by the student. In all cases, the results must be presented in a divisional seminar, and the project must be accepted by a project committee appointed by the program.

Faculty

All Division faculty are members of Graduate Studies in Biology.

Courses

BIO 500 Natual History of Intertidal Organisms
Adaptations, reproductive strategies, classification, evolution, and ecology of selected intertidal organisms. Emphasis on local invertebrate fauna. Visits to SUSB Biology Museum and two Saturday field trips required.
Prerequisite: 1 year of general biology, or zoology, or zoology-botany
Summer, 3 credits

BIO 561 Human Genetics
This course assumes a knowledge of the fundamentals of general genetics. It focuses upon the study of genes in human kindreds and populations, giving attention to human cytogenetics and to the importance of genetic factors in human development, disease, society and evolution.
Fall, 3 credits

BIO 563 Research Strategies, Techniques and Implementation
Research design and experimentation of varied areas in the biological sciences and an analysis of biological literature and processes related to graduate research. Emphasis is on the strategies and techniques for utilizing living organisms, making quantitative observations, and analyzing group data. A seminar presentation and research proposal is expected of students in this course.
Prerequisite: B.S. or B.A. degree in biology
Fall, 3 credits

BIO 571 Biology and Ethics
A consideration of ethical problems growing out of recent developments in molecular biology, genetics, reproductive physiology, pharmacology and psychology, as well as other branches of the biological sciences. Topics to be considered include the ethical animal; evolutionary basis and the naturalistic fallacy; levels of organization and conflicting values; the ethics of the gene pool; senescence and the prolongation of life; death-necessity and dignity; and reproduction
Spring, 3 credits

BIO 593-598 Special Seminars
Topics to be arranged
Fall, spring, summer, 1-3 credits, repetitive

BIO 599 Research
Under the supervision of a member of the graduate staff, the student does an independent labroatory, field or theoretical research project
Fall, spring, summer, credit to be arranged

BIO 600 Practicum in Teaching
Participation in the presentation of a biology course, under supervision of the course director.
Fall, spring, 0 credits, repetitive

BIO 601 Practicum in Teaching
Participation in the presentation of a biology course, under supervision of the course director.
Fall, spring, 1-3 credits, repetitive

Note: Additional courses are available from the offerings of other graduate programs.

Genetics (BGE)

Graduate Studies in Genetics, an inter-institutional curriculum, is designed to provide training in a broad area of genetics. It offers graduate training in molecular genetics, developmental genetics, immunogenetics, evolutionary genetics and human genetics. All students, no matter what their particular interest, are exposed to all the areas of specialization offered within the curriculum. This experience ensures that the students will be prepared to cope with the broad range of challenges that may be met after graduation.

The breadth of Graduate Studies in Genetics makes it likely that the entering predoctoral trainees will come from very heterogeneous backgrounds. To provide a common base of knowledge, all trainees will take the course Graduate Genetics in their first year. Each time this course is offered, one topic, such as genetic recombination or gene organization, will be discussed from the view of all five areas of specialization represented in the curriculum. Incoming trainees also will take part in a series of laboratory rotations where the student will spend eight weeks in each of four laboratories where he or she will have the opportunity to gain a hands-on knowledge of the methods and approaches taken by each laboratory. Each trainee will have a faculty advising committee that will aid in tailoring a set of specialty courses, from offerings both within and outside the program, to meet the student's particular needs. Seminars involving both internal speakers and outside visitors will ensure that the predoctoral students continually are exposed to the full range of interests represented in the Graduate Studies.

Facilities

The primary training facilities are the State University of New York at Stony Brook and the Cold Spring Harbor Laboratory. A secondary facility is the Brookhaven National Laboratory. At Stony Brook the faculty is drawn from the departments of the College of Arts and Sciences and five departments from the Health Sciences Center. The three Arts and Sciences departments as well as the Department of Microbiology from the Health Sciences Center are housed in the Graduate Biology Building, a five-year-old structure with excellent facilities and equipment. The other Health Sciences departments are situated directly across the road in the two-year-old Health Sciences Center. This ultramodern structure contains the very latest equipment and facilities available. The Cold Spring Harbor Laboratory provides a most modern research facility and unique environment for the trainees. The Brookhaven National Laboratory facility provides an environment in which predoctoral trainees may carry out research in conjunction with program faculty.

Admission Requirements

Graduate Studies in Genetics requires the following in addition to the minimum Graduate School admission requirements:

A. A baccalaureate degree, which should include some formal training in genetics.

B. Report of Graduate Record Examination scores.

C. Acceptance by Graduate Studies in Genetics and by the Graduate School.

Ph. D. Requirements

Course Requirements

1. Molecular Genetics (HBM 503)
2. Graduate Genetics (BGE 510)
3. Graduate Biochemistry (BMO 520-521)
4. Graduate Student Seminar in Genetics (BGE 531) (must be taken four semesters)
5. Laboratory Rotation in Genetics (BGE 530) (two semesters). The student will generally work in four different laboratories during the two semesters. The particular laboratories will be decided by the students advisory committee in conjunction with the student.
6. The faculty feels that each student will require advanced training appropriate to the student's area of specialization within genetics. Requirements for any specific student, in addition to those enumerated above, will be determined by the student's advisory committee.

Residence Requirement

The University requires at least two consecutive semesters of full-time graduate study. The demands of the course of study necessitate a longer period of residence.

Teaching Requirement

It is expected that each graduate student completing a doctoral degree will have functioned as a teaching assistant during at least two semesters of his or her graduate career (B10 600).

Comprehensive (Preliminary) Examination

At the beginning of the fourth semester, the student will take a written comprehensive (preliminary) examination covering all areas of genetics.

Thesis Proposal Examination

After successful completion of the comprehensive (preliminary) examination, the student selects a thesis advisor and writes a proposal for thesis research. After approval by the thesis advisor, the proposal is orally defended before a thesis committee.

Advancement to Candidacy

After successful completion of all required and elective courses, the comprehensive (preliminary) examination and the thesis pro-

posal examination, the student will be recommended to the Graduate School for advancement to candidacy.

Ph. D. Dissertation

The research for the Ph. D. dissertation is conducted under the supervision of the thesis committee. Upon approval of the completed dissertation by this committee, a dissertation examining committee is appointed by the Vice Provost for Research and Graduate Studies. A formal public oral defense of the dissertation is scheduled, at which the student presents his or her findings and is questioned by members of the examining committee and by other members of the audience.

M.A. Degree Requirement

Graduate Studies in Genetics normally does not accept a student whose goal is a master's degree. In exceptional instances, a student already in the Graduate Studies may be awarded an M. A. degree upon completing an approved course of study, including a minimum of 30 graduate credit hours, passing a comprehensive examination, and presenting and defending a research thesis.

Faculty

Arnheim, Norman, Associate Professor.[2] Ph.D., 1965, University of California, Berkeley: Recombinant DNA approaches to human chromosomal abnormalities, genetic behavior of multigene families.

Broach, James R., Assistant Professor.[4] Ph.D., 1973, University of California, Berkeley: Yeast 2 mu circle-replication, gene regulation and molecular cloning, galactose gene regulation in yeast.

Bukhari, Ahmad I., Senior Scientist.[19] Ph.D., 1970, University of Colorado: Phage mu integration, replication and insertional mutagenesis.

Burr, Benjamin, Geneticist.[13] Ph. D., 1969, University of California, Berkeley: Maize controlling elements, molecular cloning, storage protein genes of maize.

Burr, Frances A., Associate Botanist.[13] Ph.D., 1968, University of California, Berkeley: Maize controlling elements, molecular cloning, storage protein genes of maize.

Carlson, Elof A., Distinguished Teaching Professor.[2] Ph.D., 1958, Indiana University: Mutational mosaicism in human disorders, retinoblastoma, Apert's syndrome, achondroplasia, Marfan's syndrome.

Ginzburg, Lev R., Associate Professor.[6] Ph. D., 1970, Agrophysical Institute, Leningrad, U.S.S.R.: Theoretical population genetics, multilocus population genetics, selective and neutral variation, ecological genetics.

Grodzicker, Terri, Senior Scientist.[19] Ph.D., 1969, Columbia University: Animal virus genetics, nonsense mutations and suppression, genetic analyses of viral gene functions.

Heffron, Fred L., Staff Investigator.[19] Ph. D., 1976, University of Washington: Biochemical and genetic analyses of transposable elements.

Hicks, James B., Senior Staff Investigator.[19] Ph.D., 1975, University of Oregon: Regulation of the mating locus of yeast.

Inouye, Masayori, Professor and Chairperson.[2] Ph.D., 1963, Osaka University, Japan: Genetic control of morphogenesis and development of Myxobacteria, genetics of membrane biogenesis.

Kaplan, Allen P., Professor.[10] M.D., 1965, State University of New York, Downstate Medical Center: The human complement system, polymorphisms, genetic control of the level of proteins, complement deficiencies.

Katz, Eugene R., Associate Professor.[4] Ph.D., 1969, University of Cambridge, England: Genetic control of development in *Dictyostelium discoideum.*

Klar, Amar J.S., Staff Investigator.[19] Ph.D., 1975, University of Wisconsin: Mating locus of yeast, regulation of silent genes, mechanism of transposition.

Koehn, Richard K., Professor.[6] Ph. D., 1967, Arizona State University: Evolutionary genetics of natural populations and evolution of physiological variation using marine bivalves and mice.

Levine, Arnold J., Professor.[4] Ph.D., 1966, University of Pennsylvania: Viruses as genetic tools to study development with teratocarcinomas, mouse tumor transplantation rejection genetics.

Lucas, Joseph J., Assistant Professor.[4] Ph. D., 1972, University of Pennsylvania: Somatic cell genetics, karyoplasts and cytoplasts to investigate gene regulation.

Marcu, Kenneth B., Assistant Professor.[2] Ph. D., 1975, State University of New York at Stony Brook: Immunoglobulin heavy chain gene families of mice, trypanosome membrane antigens, molecular cloning and gene organization.

McClintock, Barbara, Distinguished Service Member.[19] Ph. D., 1927, Cornell University: Maize controlling elements, evolutionary genetics.

Ohtsubo, Eiichi, Associate Professor.[4] Ph.D., 1971, Osaka University, Japan: Translocatable DNA elements of bacteria, molecular biology, evolution and effects upon gene regulation.

Palatnik, Carl M., Assistant Professor.[1] Ph. D., 1975, State University of New York at Stony Brook: Molecular genetics of *Dictyostelium discoideum.*

Rapaport, Felix T., Professor.[21] M. D., 1954, New York University: Human transplantation rejection antigens—HL-A, linkage with developmental abnormalities, allogenic unresponsiveness.

Riley, Monica, Professor.[2] Ph. D., 1960, University of California, Berkeley: Evolutionary divergence of genome structure in enteric bacteria.

Setlow, Jane K., Senior Scientist.[13] Ph.D., 1959, Yale University: Genetics of repair and recombination in *Hemophilus influenzae.*

Setlow, Richard, Professor.[21,13] Ph. D., 1947, Yale University: DNA repair in eukaryotic cells in culture, the study of genetic disorders involving repair deficiencies.

Shenk, Thomas E., Professor.[4] Ph.D., 1973, Rutgers University: DNA tumor viruses, genetic analyses of gene regulation and expression.

So, Magdalene Y. H., Staff Investigator.[19] Ph. D., 1976, University of Washington: Genetic analysis of host-parasite interactions, gene regulation of enterotoxins and bacterial invasiveness.

Sokal, Robert R., Leading Professor and Chairperson.[6] Ph. D., 1952, University of Chicago: Spatial variations of gene frequencies and morphometric variation using human populations.

Strathern, Jeffrey N., Staff Investigator.[19] Ph. D., 1977, University of Oregon: The mating locus interconversions of yeast.

Studier, F. William, Senior Biophysicist.[13] Ph. D., 1963, California Institute of Technology: Genetic analysis of bacteriophage T-7 gene regulation.

Tegtmeyer, Peter, Professor.[4] M. D., 1960 Saint Louis University: Genetic analysis of SV40, genetics of virus reproduction and cellular transformation.

Trunca, Carolyn, Assistant Professor.[22] Ph. D., 1972, University of Wisconsin: Cytogenetics, human reciprocal translocations and risk estimates of disease.

Estimated number of teaching, graduate and research assistants, fall 1982: 5.

[1] *Department of Anatomical Sciences*

[2] *Department of Biochemistry*

[4] *Department of Microbiology*

[6] *Department of Ecology and Evolution*

[10] *Department of Medicine*

[13] *Brookhaven National Laboratories*

[19] *Cold Spring Harbor Laboratories*

[21] *Department of Surgery*

[22] *Department of Biology*

[23] *Department of Obstetrics-Gynecology*

Courses

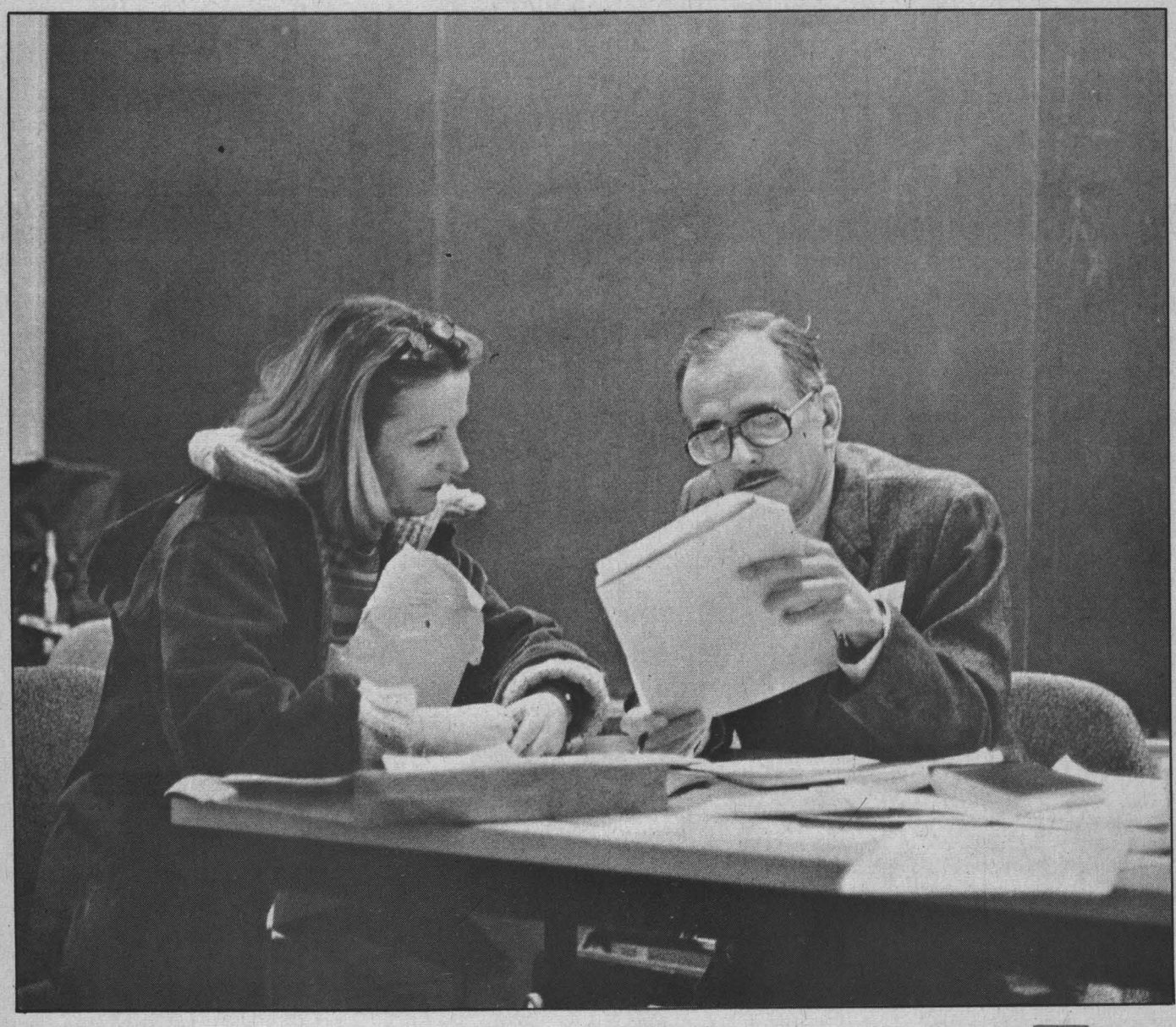
BGE 510 Graduate Genetics
This introductory course for graduate students will cover a specific topic each time it is offered and will treat that topic from different scientific perspectives, such as, a) Molecular Genetics, b) Developmental Genetics, c) Immunogenetics, d) Evolutionary Genetics, and e) Human Genetics. The semester topics will include Genetic Recombination, Mutation and Gene Organization.
Prerequisite: Permission of Instructor
Spring, 3 credits

BGE 530
Laboratory Rotation
The student rotates through two professors' laboratories, spending approximately one-half semester in each. The selection of laboratories is made by the student in consultation with his/her advisory committee. By taking part in ongoing projects the student will learn experimental procedures and techniques and become acquainted with research opportunities in the participating departments.
Prerequisite: Permission of Instructor
Fall and spring, 2 credits

BGE 531 Graduate Student Seminar in Genetics
Seminars are given by graduate students on the current literature in genetics.
Prerequisite: Permission of Instructor
Fall and spring, 1 credit

BGE 550 Genetics Seminar
A weekly series of seminars in genetics given by outstanding visiting scientists, supplemented by members of the staff, postdoctoral students and advanced graduate students.
Prerequisite: Permission of Instructor
Fall and spring, 1 credit

The Center for Continuing Education



StonyBrook

The Center for Continuing Education

The Center for Continuing Education (CED) provides opportunities for part-time liberal studies to persons seeking a broader post-baccalaureate education than is ordinarily found in programs that focus on a single discipline. The Center offers two options for part-time graduate study. One leads to a Master of Arts in Liberal Studies (MA/LS). The other provides an opportunity for graduate study at the University to individuals not planning to obtain a degree, but who want to take graduate courses to satisfy other goals.

A wide variety of University courses is open to students under either option, not only those designed especially for the MA/LS student, but also, with appropriate approval, other graduate courses offered by all of the University's Divisions.

The Master of Arts in Liberal Studies Degree Program

With the help of an advisor, students seeking the Master of Arts in Liberal Studies plan a 30-credit program that meets their individual needs and interests and that includes courses from three general subject areas: Arts and Humanities, Natural and Applied Sciences, and Social and Behavioral Sciences. In addition, students are required to submit two major papers or projects used to satisfy course requirements or prepared specifically for this purpose.

Admission Requirements

All persons holding a baccalaureate degree or its equivalent, or an advanced degree from an accredited institution of higher learning, are eligible for admission to the Master of Arts in Liberal Studies Program.

How to Apply for Admission

Applications may be obtained by writing or calling the CED office, N-201 Social & Behavioral Sciences Building, State University of New York at Stony Brook, Stony Brook, NY 11794 (516/246-5936). When a student is ready to submit an application, he or she should call 516/246-3301 to schedule an appointment with a CED advisor to plan an approved program of study. The completed application should be given to the advisor at the time of the conference.

To avoid registration problems, students should arrange interviews as far in advance as possible of the start of the semester when they want to begin taking courses.

Individuals who miss the deadline for applying to the degree program in any semester but who want to begin taking courses as soon as possible may apply as special graduate students (GSP) for the one semester and then apply to the degree program for the next semester. Information about the procedures to follow may be obtained from the CED office.

MA/LS Degree Requirements

Students must complete an approved 30-graduate-credit program of study which includes:

1. An 18-credit cluster of courses related by theme or subject. Students will have the opportunity to develop, with the guidance and approval of a CED advisor, a cluster that suits their particular needs or interests.
2. Twelve elective credits.
3. Courses from three general subject areas. Among the thirty credits there must be a minimum of six from each of three general subject areas. The three areas are: Arts and Humanities, Natural and Applied Sciences, and Social and Behavioral Sciences.
4. An MA/LS essay requirement. Each candidate for the MA/LS degree is required to submit two major papers or project reports used to satisfy course requirements which should be from different general subject areas.

A candidate for the MA/LS may petition to transfer a maximum of six graduate credits from another institution toward the MA/LS degree.

Time Limit

All requirements for the MA/LS degree must be completed within seven years of the time a student is admitted to the program.

New York State Teaching Certification (Minimum Requirements)

A. Provisional Certification: This certification requires education courses, the fulfillment of a full-time practice teaching requirement and, in the case of secondary education, a number of credits in a particular subject area.

Professional education courses and many subject area courses have always been offered through CED, and now a complete teacher preparation program which includes student teaching is also available in the following secondary school subjects:

English
Foreign Languages
Mathematics
Biology
Physics

B. Permanent Certification: The Master of Arts in Liberal Studies will meet the master's degree requirement for permanent certification in all certification areas except those related to pupil personnel service and school administration and supervision.

Staff

Fusco, Josephine, Associate for Continuing Education. M.A., 1956, State University of New York College at New Paltz.

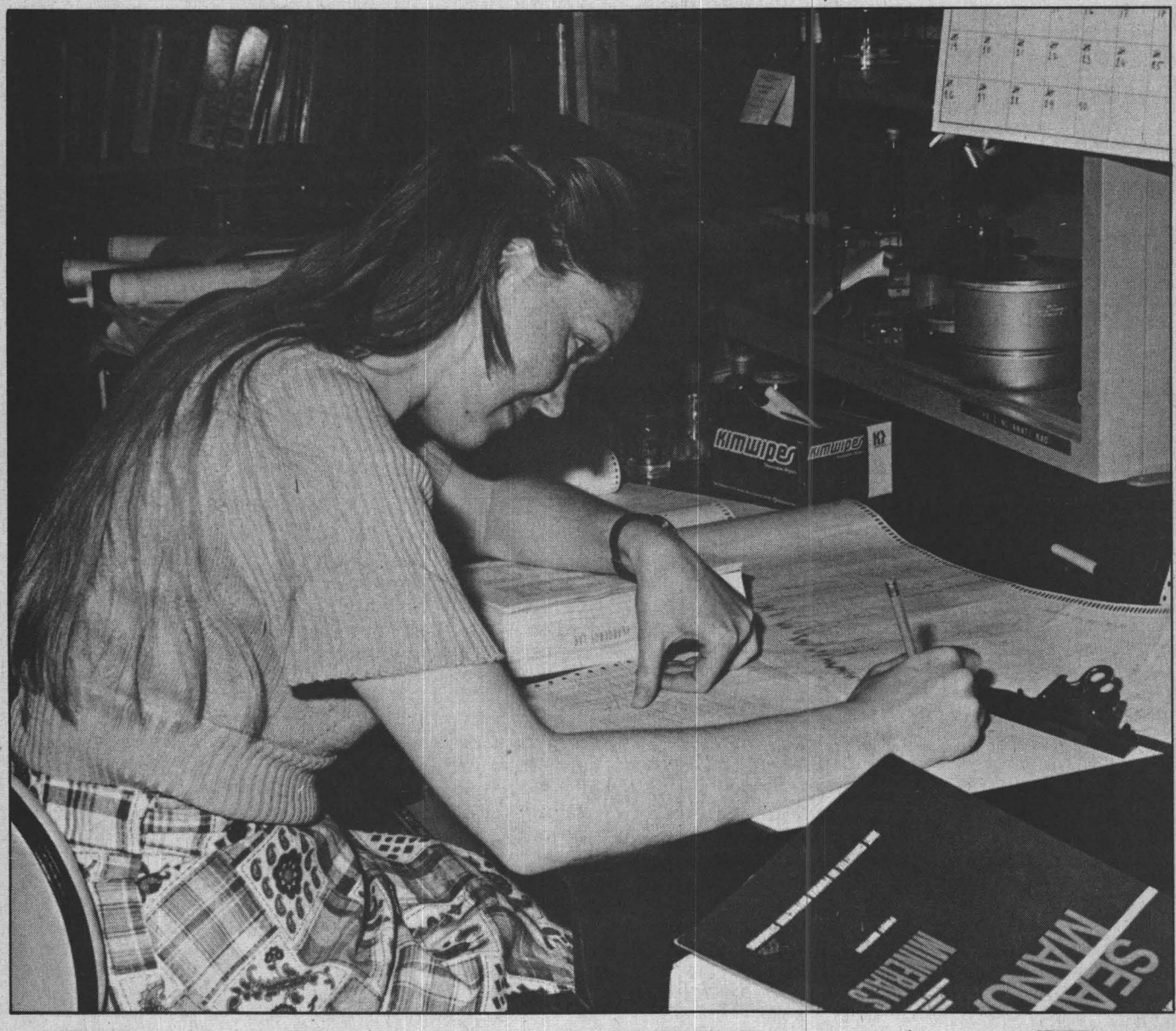
Kempner, Doris, Assistant Dean. M.A./L.S., 1974, State University of New York at Stony Brook.

Keim, Gertrude, Assistant to the Dean. M.A./L.S., 1980, State University of New York at Stony Brook.

Paldy, Lester G., Dean. M.S., 1966, Hofstra University.

Shea, Mary, Assistant to the Dean. B.A., 1959, Brown University.

The Engineering and Applied Sciences



StonyBrook

Department of Applied Mathematics and Statistics

The graduate program of this Department provides a course of study in modern applied mathematics with a view to its utilization in the physical, social, biological and behavioral sciences, as well as in engineering. The course offerings and the research program cover both the theories and principles which are common to the applications as well as the more specialized methods which arise in specific areas.

The task of translating physically or socially meaningful problems into a mathematical framework is called "Mathematical Modeling" and is often the key element in understanding the complex interrelations which underlie many problem areas. Students with a training in the use of modeling techniques are prepared for careers in government and industry in which mathematics is used to advantage either as a computational or conceptual tool.

Faculty research programs currently in progress include physiological modeling, numerical analysis (sparse matrices and partial differential equations), nuclear reactor theory, crack theory and elasticity, solid and fluid mechanics, modeling of urban service systems, robust tests of hypotheses, data analysis, applied graph theory, stochastic modeling and nonparametric methods, sequential analysis, Bayesian models, queuing theory and game theory.

Admission to Graduate Study

For admission to graduate study in Applied Mathematics and Statistics, the minimum requirements are as follows:

A. A bachelor's degree in engineering, mathematics, physics, chemistry or the social sciences with a strong mathematics background.

B. A minimum grade average of at least 2.75 in all courses in pertinent or related fields.

C. Results of the Graduate Record Examination Aptitude Test. (Part-time master's degree students are exempt.)

D. Acceptance by both the Department of Applied Mathematics and Statistics and the Graduate School.

Requirements for the M.S. Degree

A. The M.S. degree in the Department of Applied Mathematics and Statistics requires the satisfactory completion of a minimum of 30 graduate credits.

B. All credits in satisfaction of the degree must be at the graduate level. The Department may impose additional requirements as described below. In addition, the grades in courses totaling at least 18 credits must be B or better and the average for all courses taken must be B or better.

C. Final recommendation: Upon the fulfillment of the above requirements the faculty of the graduate program will recommend to the Vice Provost for Research and Graduate Studies that the Master of Science degree be conferred or will stipulate further requirements that the student must fulfill.

D. Time limit: All requirements for the Master of Science degree must be completed within three years of the student's first registration as a full-time graduate student.

Requirements for the Ph.D. Degree

A. *Minimum residence:* At least two consecutive semesters of full-time study.

B. Qualifying examination: A student must satisfactorily pass a qualifying examination to ascertain ability for study for the Ph.D. degree

C. Research advisor: After completion of at least one year of full-time residence and prior to taking the preliminary examination, the student must select a research advisor who agrees to serve in that capacity.

D. Preliminary examination: An oral examination mainly of a research proposal will be given to the student.

E. Advancement to candidacy: After successfully completing all requirements for the degree other than the dissertation, the student is eligible to be recommended for advancement to candidacy. This status is conferred by the Vice Provost for Research and Graduate Studies upon recommendation from the departmental Director of Graduate Studies.

F. Dissertation: The most important requirement of the Ph. D. degree is the completion of a dissertation, which must be an original scholarly investigation. The dissertation must represent a significant contribution to the scientific literature and its quality must be comparable with the publication standards of appropriate and reputable scholarly journals.

G. The student must defend the dissertation before the dissertation examining committee. On the basis of the recommendation of this committee, the Chairperson of the Department of Applied Mathematics and Statistics will recommend acceptance or rejection of the dissertation to the Vice Provost for Research and Graduate Studies. All requirements for the degree will have been satisfied upon the successful defense of the dissertation.

H. Time limit: All requirements for the Ph.D. degree must be completed within seven years after the completion of 24 graduate credits in the program.

I. Language requirement: The student must demonstrate a reading ability in one of the following three languages: French, German or Russian. Proficiency may be demonstrated in a number of ways to be outlined by the Director of Graduate Studies.

The Department of Applied Mathematics and Statistics offers several areas of specialization. They include applied mathematics, statistics and operations research, all of which are offered on a full-time and part-time basis in both M.S. and Ph.D.

programs. All of the M.S. programs in Applied Mathematics and Statistics, when pursued on a full-time basis, should be completed in three to four semesters. However, students with strong backgrounds may have certain requirements waived and thus may be able to complete studies in two semesters. It is strongly urged that all students in Applied Mathematics have some familiarity with computer programming. Requirements in each of the three tracks are listed below.

A. *Core Requirements*
   1. *Applied Mathematics*
      MSA 500 Mathematical-Modeling
      MSA 501 Differential Equations and Boundary Value Problems
      MSA 503 Applications of Complex Analysis
      MSA 504 Foundations of Applied Mathematics
      MSA 505 Applied Algebra I
      MSA 526 Numerical Analysis I
   2. *Operations Research*
      MSA 505 Applied Algebra I
      MSA 530 Linear Programming
      MSA 535 Stochastic Processes
      MSA 540 Modeling Laboratory
      MSC 530 Simulation and Modeling
      or
      MSC 548 Analysis of Algorithms
      One course in statistics
   3. *Statistics*
      MSA 504 Foundations of Applied Mathematics
      MSA 505 Applied Algebra I
      MSA 569 Probability Theory I
      MSA 570 Mathematical Statistics I: Estimation
      MSA 571 Mathematical Statistics II: Hypothesis Testing
      MSA 572, 573 Exploratory Data Analysis I, II
      MSA 575 Data Analysis Laboratory
      MSA 578 Regression Theory
      MSA 581 Analysis of Variance

B. *Elective Requirements*
   1. *Applied Mathematics and Operations Research*
      Any graduate-level MSA or other related graduate-level courses in a related discipline approved by the Director of Graduate Studies may be used to satisfy the credit requirement beyond the core course requirement. In addition, six elective credits may be earned by completion of a master's thesis.
   2. *Statistics*
      Recommended electives:
      MSA 584 Sequential Analysis
      MSA 585 Sampling Techniques
      MSA 586 Time Series
      MSA 588 Biostatistics
      MSA 605 Probability Theory II
      MSA 691 Topics in Applied Mathematics
      ECO 620, 621 Advanced Econometrics I, II
      BEE 553 Multivariate Analysis in Biology
      BEE 557 Numerical Taxonomy
      MSC 530 Simulation and Modeling
      Other graduate-level courses with prior approval of advisor.

Graduate Studies in Industrial Management

The Department of Applied Mathematics and Statistics administers a part-time Graduate Studies in Industrial Management for the College of Engineering and Applied Sciences. Satisfactory completion of the Industrial Management curriculum leads to a terminal M.S. degree in applied mathematics and statistics.

These Graduate Studies are designed to meet a growing demand by industry for managers in technologically based firms. Typical students are engineers in Long Island industries planning to move into management positions. Industrial Management is open to both full- and part-time students who have completed a baccalaureate degree in engineering, physical science, social sciences, economics or mathematics. Acquaintance with the elements of computer programming is desirable.

Industrial Management is under the jurisdiction of the Dean of the College of Engineering and Applied Sciences, together with an advisory committee consisting of key industrial executives in the Long Island area, and Stony Brook faculty. Subjects include financial management, data base practices and quantitative analysis.

For course descriptions and further information concerning the program, contact the graduate faculty representative, Professor Daniel Dicker, Director of the Postgraduate Extension Program of the College of Engineering and Applied Sciences, or Mrs. Esther Weitzman, Administrator of the Postgraduate Extension Program of the College of Engineering and Applied Sciences.

Core Requirements for Industrial Management:

EMP 504 Quantitative Management Methods
and
At least four of the five courses below:
EMP 500 Management Policy and Planning by Case Study
EMP 501 Behavioral and Organizational Aspects of Management
EMP 502 Management Accounting and Financial Decision Analysis
EMP 503 Legal and Regulatory Aspects of Management
EMP 509 Management Information Systems
One course in economics chosen from master's-level courses in Economic Policy Analysis

Electives shall be selected with approval of faculty advisor from a broad selection of programs.

Postgraduate Extension Program

In addition to the resident full-time graduate program leading to the M.S. and Ph.D. degrees with specializations in Applied mathematics, operations research and statistics, the Department conducts an extensive part-time program at several locations in Nassau and Suffolk counties. The part-time program is governed by regulations governing the resident full-time program with the exception that students in the Postgraduate Extension Program have greater flexibility in choosing the time for the qualifying examination if they are contemplating pursuing the Ph.D.

At the present time, courses in the Postgraduate Extension Program are offered at the State University College at Farmingdale as well as at the Stony Brook campus. The purpose of this program is to provide an opportunity for men and women who are employed full-time to pursue serious graduate study leading to advanced degrees in applied mathematics and industrial management. Applicants who hold a bachelor's degree in applied mathematics, mathematics, engineering, physical science or life science and social science, with a strong background in undergraduate mathematics, will be considered for admission to

this program. Qualified students may continue beyond the master's degree for the Ph.D. degree in the Applied Mathematics program.

A matriculated part-time degree candidate may pursue courses at ony one of the several off-campus locations as well as those offered on campus. Additional information may be obtained from the Administrator of the Postgraduate Extension Program, Esther Weitzman, at the Department of Applied Mathematics and Statistics, State University of New York at Stony Brook, Stony Brook, NY 11794.

Faculty

Baxter, Laurence, Assistant Professor. Ph.D., 1980, University College, London, England: Applied statistics, stochastic processes, reliability.

Beltrami, Edward J., Professor. Ph.D., 1962, Adelphi University: Optimization techniques; models for public systems analysis.

Chen, Yung Ming, Professor. Ph.D., 1963, New York University: Numerical analysis and methods; deterministic and stochastic partial differential equations and their applications.

Dicker, Daniel, Professor & Coordinator of College of Engineering Industrial Management Program. D.Eng. Sc., 1961, Columbia University: Boundary value problems of solids and fluids; aeroelastic analysis of suspension bridges.

Dolezal, Vaclav, Professor. Ph.D., 1955 and D.Sc., 1966 Czechoslovak Academy of Sciences, Prague, Czechoslovakia: Network theory; control theory; applications of distribution theory.

Finch, Stephen, Associate Professor. Ph.D., 1974, Princeton University: Robust estimation and nonparametric statistics.

Frauenthal, James, Associate Professor. Ph.D., 1971, Harvard University: Mathematical modeling; population dynamics; applied mechanics; shell stability and optimization.

Katehakis, Michael, Assistant Professor. Ph.D., 1980, Columbia University: Operations research; Markovian decision theory.

Kim, Woo Jong, Associate Professor and Graduate Program Director. Ph.D., 1964, Carnegie Institute of Technology; Ph.D., 1968, Carnegie-Mellon University: Ordinary differential equations; oscillation, disconjugacy and monotonicity of solutions; factorization of differential operators; fractional inequalities.

Mendell, Nancy, Assistant Professor. Ph.D., 1972, University of North Carolina, Chapel Hill: Biostatistics.

Provan, Scott, Assistant Professor. Ph.D., 1977, Cornell University: Operations research.

Robbins, Herbert, Leading Professor. Ph.D., 1938, Harvard University; Sc.D. (Honorary), 1974, Purdue University: Sequential analysis; stochastic approximation; Bayesian models and tests of power.

Schreiber, Heinz, Visiting Assistant Professor. Ph.D., 1972, Polytechnic Institute of New York: Communications systems analysis; quantitative methods in management.

Simon, Gary, Associate Professor. Ph.D., 1972, Stanford University: Categorical data analysis; multivariate nonparametric methods.

Slote, Leslie, Visiting Assistant Professor. Ph.D., 1970, Columbia University: Organizational behavior.

Srivastav, Ram P., Professor. Ph.D., 1958, Lucknow University, India; Ph.D., 1963, Glasgow University, Scotland; D.Sc., 1972, Glasgow University: Fracture mechanics; integral equations; complex analysis; integral transforms.

Tewarson, Reginald P., Professor. Ph.D., 1961, Boston University: Numerical analysis and computational methods: sparse matrices; generalized inverses and large non-linear systems; mathematical models of diffusion problems in biology and medicine.

Tucker, Alan, Professor and Chairperson. Ph.D., 1965, Stanford University: Graph theory; combinatorial algorithms.

Estimated number of teaching graduate and research assistants, fall 1982: 57.

Courses

MSA 501 Differential Equations and Boundary Value Problems I
Examples of initial and boundary value problems in which differential equations arise. Existence of solutions, systems of linear differential equations and the fundamental solution matrix. Reduction to canonical forms and the matrix exponential. Strum-Liouville theory and eigenfunction function expansion. Green's functions.
Prerequisite: MSA 505
Recommended prerequisite: MSA 504
3 credits

MSA 502 Differential Equations and Boundary Value Problems II
The initial and boundary value problems for the wave, the heat and Laplace's equations illustrated by a number of examples in heat conduction, vibrations, aerodynamics. Transform techniques; separation of variables, conformal mapping and approximation.
Prerequisite: MSA 501
3 credits

MSA 503 Applications of Complex Analysis
A study of those concepts and techniques in complex function theory which are of interest for their applications. Pertinent material is selected from the following topics: harmonic functions, calculus of residues, conformal mapping and the argument principle. Application is made to problems in heat conduction, potential theory, fluid dynamics and feedback systems.
3 credits

MSA 504 Foundations of Applied Mathematics
An introductory course for the purpose of developing certain concepts and techniques which are fundamental in modern approaches to the solution of applied problems. An appropriate selection of topics is based on the concepts of metric spaces, convergence, continuity, compactness, normed and Hilbert spaces. Included is an introduction to measure and integration.
Fall, 3 credits

MSA 505 Applied Algebra I
Review of matrix operations. Elementary matrices and reduction of general matrices by elementary operations, canonical forms and inverses. Applications to physical problems.
Fall, 3 credits

MSA 506 Finite Structures
Problem-solving in combinatorial analysis and graph theory using generating functions, recurrence relations, Polya's enumeration formula, graph coloring and network flows.
3 credits

MSA 507 Introduction to Applied Probability
Sample spaces; conditional probability and independence, random variables and functions of random variables; binomial, Poisson, normal and other special distributions; moment-generating functions; law of large numbers and central limit theorem; Markov chains. Applications to statistics.
3 credits

MSA 511 Methods in Applied Mathematics for Engineers and Scientists
This course is concerned with basic mathematical questions related to solutions frequently encountered in engineering and scientific problems. Topics include series, sequences, convergence; integral formulas and relationships (Gauss, Stokes, Green's theorems); implicit function theorems.
3 credits

MSA 514 Applied Algebra II
This course develops and then applies those concepts and techniques of modern algebra which have been found useful in various computer-oriented disciplines such as automata theory. Included are selected topics from the following areas: general theory of algebraic systems, lattice theory, semi-groups, groups and ring theory.
Prerequisite: MSA 505
3 credits

MSA 516 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. Topics include orthogonal sets of functions, recursion formulas, series solution of linear differential equations, Fourier-Bessel expansions, functional equations, application to boundary value and intial value problems.
3 credits

MSA 517 Ordinary Differential Equations
This course deals with 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 probelms, the Green's function method and eigenvalue problems.
3 credits

MSA 518, 519 Workshop in Finite Mathematical Structures for Teachers, I, II
An introduction to the principles of combinatorial and graph theoretic reasoning especially designed for high school teachers by the utilization of visual aids, games, puzzles and other illustrative models, coupled with a workshop in which these principles are applied to the solution of a broad range of applied problems. The course is developed with reference to the projected New York State high school curriculum requirement in finite mathematics.
Prerequisite: Permission of the instructor
2 credits each semester

MSA 520 Mathematical Modelling in the Analysis of Public Systems
Review of models relating to the questions of the improvement in delivery of urban service systems (e.g., fire, police, health, sanitation, transit). Topics include optimal location and districting of public facilities, distribution networks, models of congestion and delay in municipal services, and optimal deployment of emergency vehicles.
3 credits

MSA 521 Mathematical Models in Physiological Sciences
Mathematical models of blood flow and renal function. Numerical solution of the counter current exchange models by utilizing information about the physiological structures in the solution process. Use of compartmental analysis, sparse matrix techniques and generalized inverses.
3 credits

MSA 524 Theory of Approximation
A survey of various solutions which present special problems in approximation theory. Topics covered include smoothing of data, least squares methods, Chebyshev approximations, approximation by rational functions, orthogonal functions. Hilbert space methods, general aspects of approximation in normed linear spaces.
3 credits

MSA 526 Numerical Analysis I
Direct and indirect methods for solving simultaneous linear equations and matrix inversion, conditioning and round-off errors. Computation of eigenvalues and eigenvectors.
3 credits

MSA 527 Numerical Analysis II
Numerical integration. Solution of ordinary differential equations. Different methods for partial differential equations; consistency convergence and stability. Numerical solution of integral equations. (MSA 527 may be taken whether or not the student has completed MSA 526.)
3 credits

MSA 530 Linear Programming
Formulation of linear programming problems and solution by simplex method. Duality, sensitivity analysis, dual simplex algorithm, decomposition. Applications to the transportation problem, two-person games, assignment problem and introduction to integer and non-linear programming.
Corequisite: Linear algebra course
Fall, 3 credits

MSA 531 Generalized Inverses and Sparse Matrices
Moore-Penrose, various other types of generalized inverses; efficient methods for their computation. Condition numbers and scaling. Factored forms of inverses of large sparse matrices and their relationship to elimination and orthogonalization methods. Sparse matrices and graph theory. Applications to applied problems in linear programming.
3 credits

MSA 532 Mathematical Demography
A one-semester introduction to human demography. Topics will include survival and childbearing probabilities, discrete and continuous models for the birth renewal process, marriage models, migration, occupational mobility, kinship and the problems of inferring birth and death rates from census data.
Fall, 3 credits

MSA 533 Integer Programming
Discrete optimization. Linear programming in which the variables are restricted to be integer-valued. Cutting plane methods, enumeration methods and group theoretic methods. Special treatment of knapsack problem and cutting stock problems.
Prerequisite: MSA 530
Fall, odd years, 3 credits.

MSA 534 Non-Linear Programming
Necessary and sufficient conditions for unconstrained and constrained optima. The geometric background is developed using tangents and cones in finite dimensional spaces. Computional methods, including interior (penalty function), boundary (gradient projection), and exterior (cutting plane) approaches.
Prerequisite: MSA 530 or permission of instructor
Spring, 3 credits

MSA 535 Stochastic Processes
Review of probability theory. Poisson processes. Renewal theory. Markov processes. Applications to queues, statistics and other problems of engineering and social sciences.
Prerequisite: MSA 507 or equivalent
Spring, 3 credits

MSA 536 Queuing Theory
Introduction to the mathematical aspects of congestion. Birth and death processes. Queues with service priorities and bulk service queues. Analysis of transient and steady state behavior. Estimation of parameters. Applications to engineering, economic and other systems.
Prerequisite: MSA 507
Fall, even years, 3 credits

MSA 537 Inventory Theory
Nature of inventory systems. Design and control. Continuous and periodic review policies. Economic order quantities and the optimality of (&, S) policies.
Prerequisite: MSA 507
Fall, odd years, 3 credits

MSA 538 Operations Research II: Stochastic Models
Queuing problems under varying assumptions on input, service mechanism and queue discipline. Basic ideas of inventory theory. Introduction to statistical decision theory. Monte Carlo methods.
Prerequisite: MSA 507 or equivalent
3 credits

MSA 539 Network Flows
Theory of flows in capacity constrained networks. Topics include maximum flow, feasibility criteria, scheduling problems, matching and covering problems, minimum length paths, minimum cost flows and associated combinatorial problems.
Prerequisite: MSA 530 or permission of instructor
Spring, even years, 3 credits

MSA 540 Modelling Laboratory
Students undertake practical operations research problems. Lectures on case studies of recent systems analysis projects by faculty and local industrial/governmental groups. Students must present a lecture on their project.
Prerequisite: Permission of instructor
Spring, 3 credits

MSA 541 Markov Decision Processes and Dynamic Programming
Stochastic and deterministic multistage optimization problems. Stochastic path problems. Principle of optimality. Recursive and functional equations. Method of successive approximations and policy iteration. Applications to maintenance, inspection and replacement problems.
Prerequisite: MSA 535
3 credits

MSA 542 Mathematical Theory of Nuclear Reactors
Nuclear reactors as an energy source. Topics to be treated are: introduction to multiplying systems with nuclear reactors as prime examples: transport equations, properties and solutions techniques; problems in moderation theory; the age equation; stochastic and Monte Carlo approaches; problems in homogeneous and heterogeneous reactors; group diffusion equations.
Prerequisites: MSA 311, or MSA 507 or equivalent, and MSA 320 or MSA 517
3 credits

MSA 543 Actuarial Science I: The Theory of Interest
The course will cover the material required for Part 3(b) of the examinations for the Society of Actuaries, basic concepts of interest

theory. The different types of annuities, amortization schedules and sinking funds. Bonds; yields and coupon rate; common and preferred stocks.
3 credits

MSA 544 Actuarial Sciences II: Life Contingencies
This course covers the material required for Part 4 of the Actuarial Exams. The mortality tables, endowments and insurance. Premiums and premium reserves. Allowance for expenses. Generalizations to multi-life situations. Introduction to populations theory. Solution of sample problems for each topic.
Prerequisite: Actuarial Science I or equivalent
3 credits

MSA 545 Graph Theory and Applications
Basic structure of undirected and directed vector space analysis of graphs, applications.
3 credits

MSA 547 Statistical Methods for Environmental Engineering
A one-semester survey course in statistical methods. Applications will be to water and air quality programs. Topics: basic concept of sampling and data analysis, and of linear modeling procedures. The techniques of analysis of variance and linear regression will also be discussed.
Fall, 3 credits

MSA 548 Models for Water Resource Management
Introduction to cost benefit analysis and linear and integer programming techniques. Optimal sitting applied to water supply and treatment. Multi-dimensional regional optimization.
Spring, 3 credits

MSA 549 Models for Water Resource Management II
Advanced topics in water resource management modelling. Linear, nonlinear and dynamic programming. Search techniques for optimization. Simulation. Multidimensional regional optimization. Course requirements will include reading professional journals and the preparation of a water resource system model.
Prerequisites: Calculus, familiarity with programming (preferably FORTRAN), EMP 510 or MSA 548 or their equivalents
3 credits

MSA 550 Algebraic Coding Theory
Utilizing concepts and results from modern algebra and number theory which are developed in the course, a study is made of those error-correcting codes whose basic structure is algebraic. Among the classes of codes considered are those designed, respectively, as: linear, cyclic, BCH, perfect and residue.
Prerequisite: Permission of the instructor
3 credits

MSA 552 Game Theory
Elements of cooperative and noncooperative games. Matrix games pure and mixed strategies, and equilibria. Solution concepts such as core, stable sets and bargaining sets. Voting games, the Shaply and Banzhaff power indices.
Prerequisites: MSA 530
3 credits

MSA 553 Control Theory
Introduction to optimal control via the calculus of variations. Discussions of functional minimization from optimal control viewpoint. Introduction of state variable form for linear differential equations used to solve linear, quadratic cost, optimal control problem and time minimum control for some simple systems. Derivation of matrix Ricatti equation. Presentation of linearization on nonlinear differential equations using perturbation techniques.
Prerequisite: MSA 501
3 credits

MSA 557, 558 Elasticity I and II
This course is identical with ESC 541, 542.
3 credits

MSA 563 Computational Fluid Dynamics
Finite difference methods and relaxation methods for solving the incompressible flow equations. Methods of characteristics, finite difference methods using explicit artificial viscosities and implicit artificial damping for solving the compressible flow equations. Numerical treatment of shocks. Various mighty hydrodynamic codes.
Prerequisite: Permission of instructor
3 credits

MSA 565 Wave Propagation I
Theory of propagation of vector and scalar waves in bounded and unbounded regions. Equivalence theorems of field theory. Development of methods of geometrical optics. Propagation in inhomogeneous and in anisotropic media. Green's function for boundary value problems.
3 credits

MSA 567, 568 Statistics and Data Analysis Workshop
Provides teachers of high school mathematics with an understanding of the principles of probability, statistics and data analysis through lectures and problem-solving sessions that emphasize underlying concepts and relegate computational details to a supporting role. The course will include material based on the projected New York State high school curriculum requirements in probability and statistics. (Credits will be awarded upon successful completion of MSA 568.)
Prerequisite: Permission of instructor
4 credits, 2 credits each semester

MSA 569 Probability Theory I
Intermediate-level probability. Random variables, distribution functions, moments, generating functions, properties of random variables, limit theorems, conditional expectation, combinatorial identities.
Corequisite: MSA 504 or MSM 512 or instructor's permission
3 credits

MSA 570 Mathematical Statistics I: Estimation
Sampling distribution of means and variances; introduction to moment calculations and order statistics. Theory of maximum likelihood estimates, Pitman estimates and sufficient statistics. Parametric confidence intervals and fiducial intervals. Cramer-Rao bounds, Fisher's Information Matrix, other bounds on variance of estimators.
Prerequisite: MSA 507 or equivalent
3 credits

MSA 571 Mathematical Statistics II: Hypothesis Testing
Decision problems, Neyman-Pearson lemma, likelihood ratio tests, uniformly most powerful tests, unbiased tests, invarient tests, sequential tests, nonparametric tests. Introduction to tests on contingency tables and multivariate data. Bayesian approaches and introduction to current research problems.
Prerequisite: MSA 507 or equivalent
3 credits

MSA 572, 573 Exploratory Data Analysis I, II
Introduction to exploratory techniques: stem and leaf plots, location and scale estimates, common transformations, regression, analysis of residuals. Two-way analysis. Exploratory analysis of more complex tables. Advanced techniques including smoothers.
3 credits

MSA 575 Data Analysis Laboratory
Directed quantitative research problem in conjunction with currently existing research programs outside the Department. Students specializing in a particular area will work on a problem from that area; others will work on problems related to their interests, if possible. Efficient and effective use of computers. Each student will give at least one informal lecture to his or her colleagues on the research problem and its statistical aspects.
Prerequisite: Permission of instructor
3 credits

MSA 576 Statistical Methods for Social Scientists
This course is an introduction to statistical thinking in the social sciences. The course will cover statistical variability, standard scores, regression, correlation, sampling notions, estimation, confidence intervals, significance testing, conditional probability and Bayesian manipulations.
Prerequisite: Good standing in social science department or permission of instructor
3 credits

MSA 578 Regression Theory
Classical least squares theory for regression including the Gauss-Markov theorem and classical normal statistical theory. An introduction to stepwise regression, procedures and exploratory data analysis techniques. Analysis of variance problems as a subject of regression. Brief discussions of robustness of estimation and robustness of design.
3 credits

MSA 581 Analysis of Variance
Analysis of models with fixed effects. The Gauss-Markov theorem; construction of confidence elipsoids and tests with Gaussian observations. Problems of multiple tests of hypotheses. One-way, two-way and higher-way layouts. Analysis of incomplete designs such as Latin squares, incomplete blocks and nested designs. Analysis of covariance problems.
Prerequisite: MSA 507, 570 or 572 or permission of instructor
3 credits

MSA 582 Design of Experiments
Discussion of the accuracy of experiments, partitioning sums of squares, randomized designs, factorial experiments, Latin squares, confounding and fractional replication, response surface experiments and incomplete block designs.
Prerequisite: MSA 507 or equivalent
3 credits

MSA 584 Sequential Methods
Sequential decision problems in statistics. Two two-armed bandit,

selection by relative rank and other examples. Optimal stopping and sequential analysis. Empircal Bayes and compound decision problems. Fixes-width confidence intervals, confidence sequences, and tests of power, one. Adaptive least squares and stochastic approximation.
Prerequisite: MSA 570
3 credits

MSA 585 Sampling Techniques
Properties of simple random sampling, application to estimating proportions and sample sizes which give predetermined accuracy. Stratified random samples; Neyman allocation. Ratio and regression estimates, accuracy and bias, systematic sampling, cluster sampling, two-stage sampling.
Prerequisite: MSA 570
Fall, 3 credits

MSA 586 Time Series
Analysis in the frequency domain. Periodograms, approximate tests, relation to regression theory. Prewhitening and digital fibers. Common data windows. Fast fourier transforms. Complex demodulation, Gibbs phenomenon issues. Times domain analysis.
Prerequisites: MSA 507 and MSA 570
3 credits

MSA 587 Non-Parametric Statistics
This course will cover the applied non-parametric statistical procedures — one-sample Wilcoxon tests, two-sample Wilcoxon tests, runs test, Krushal-Wallis test, Kenall's tau, Spearman's rho, Hodges-Lehman estimation, Friedman analysis of variance on ranks. The course will give the theoretical underpinnings to those procedures, showing how existing techniques may be extended and new techniques developed. An excursion into the new problems of multivariate non-parametric inference will be made.
Prerequisites: MSA 312 or equivalent
Fall, 3 credits

MSA 588 Biostatistics
Statistical techniques for planning and analyzing medical studies. Planning and conducting clinical trials and retrospective and perspective epidemiological studies. Analysis of survival times including singly censored and doubly censored data. Quantitative and quantal bioassay, two-stage assays, routine bioassay. Quality control for medical studies.
Prerequisite: MSA 570 or permission of instructor
Fall, 3 credits

MSA 599 Research
Variable and repetitive credit

MSA 605 Probability Theory II
Advanced probability. Conditional sigma-fields, stochastic processes, Brownian motion, Markov property, weak convergence, infinitely divisible distributions, martingales, stochastic integrals, stochastic differential equations, stochastic approximation.
Prerequisites: MSA 569 or instructor's permission
3 credits

MSA 611 Theory of Partial Differential Equations and Their Applications
Theorem of Cauchy and Kowalesky; classification of partial differential equations in general; characteristics; potential theory and elliptic equations; hyperbolic equations and propagation of discontinuities, parabolic equations, various methods of solving partial differential equations; applications to problems in electromagnetics, solid mechanics, plasma physics.
Prerequisite: MSA 502
3 credits

MSA 615 Nonlinear Differential Equations
Existence, uniqueness and continuity theorems. Approximate solutions by method of iteration. Study of autonomous systems. Phase plane analysis, periodic solutions. Singular points, cycles, limit cycles. Theory of bifurcation. Stability theory, Liapunov functions. Analytical and geometrical investigations of second-order equations such as van der Pol's and Lienard's equations.
Prerequisite: MSA 501
3 credits

MSA 620 Theory and Applications of Large Scale Networks
A rigorous treatment of mathematical techniques used to answer many practical questions arising in the study and design of large scale networks. Emphasis on the development of algorithms. Several lectures devoted to specific applications to computer networks to be used throughout the course.
Prerequisite: MSA 537 or equivalent
3 credits

MSA 621 Numerical Solutions of Partial Differential Equations
Variational form of the problem, Ritz Galerkins, collocation and mixed methods; triangular, rectangular (2-D) and tetrahedral element (3-D); accuracy, convergence, stability, solutions of linear, nonlinear steady state and dynamic problems; implicity, explicity time integration; equivalence of finite element and finite difference methods
Prerequisite: MSA 502 or equivalent
3 credits

MSA 627 Theory of Integral Equations and Their Applications
Integral equations with degenerate kernels, equations of the second kind, iterative solutions, contraction mapping principle, Fredholm theory, spectral theory for symmetric kernels. Volterra equations of the first and second kind, equations with weakly singular kernels, simultaneous systems, applications.
Prerequisites: MSA 504 and MSA 505
3 credits

MSA 628 Applications of Functional Analysis
Introduction to such topics as unbounded operators and the closed graph theorem, convexity and weak convergence in Hilbert space and degree theory. Applications to monotone operators and the stability of nonlinear systems, Schwartz distibutions and passive linear systems, and to the solution of nonlinear equations.
3 credits

MSA 635, 636 Realizability Theory I and II
Banach-space-valued distrbutions. The postulational foundations of linear system theory. Time-varying Banach systems, the kernel theorem and composition. Causality and realizability. Time-invariant Banach systems and convolution. Hilbert ports and passivity. The admittance and scattering formulisms. Representation theorems. Synthesis of Hilbert ports.
Corequisite: MSA 628 or MSM 554, MSM 555
3 credits

MSA 651 Nonlinear Analysis and Optimization
Iterative methods for solving nonlinear operator equations. Frechet differentials. The Newton-Raphson method in function space and nonlinear boundary value problems. The Courant penalty concept and constrained optimization. General multiplier rules. Variable metric gradient techniques and gradient projection for nonlinear least square methods, with applications.
3 credits

MSA 691 Topics in Applied Mathematics
Varying topics, selected from the list below if sufficient interest is shown. Several topics may be taught concurrently in different sections.
3 credits

Stochastic Modelling

Conrol Theory and Optimization

Mixed Boundary Value Problems in Elasticity

Advanced Operational Methods in Applied Mathematics

Applied Mathematics

Approximate Methods in the Boundary Value Problems in Applied Mathematics

Foundations of Passive Systems Theory

Partial Differential Equations

MSA 698 Practicum in Teaching
3 credits, repetitive

MSA 699 Dissertation Research
Variable and repetitive credit

Department of Computer Science

The graduate programs in computer science ae designed to train both academically oriented students and students with professional goals in he many business, industrial or governmental occupations requiring advanced knowledge of computer theory and technology. Generally speaking, the Ph.D. program serves the first type of student while the professional M.S. program serves the second type. A student who is progressing satisfactorily toward the Ph.D. will earn an M.S. degree. However, professional M.S. students will, for the most part, be emphasizing more practical and applied subject matter, excluding themselves from automatic entry into the Ph.D. program.

Students seeking graduate studies in computer science with strictly limited professional goals in mind are interested in spending a relatively short period of time concentrating on the acquisition of knowledge and skill required for applied computer science. The professional M.S. degree program was designed to satisfy this need. Programming, computing systems and applications are emphasized in the coursework. In addition, each student in the program is given the experience of grappling with a large-scale problem involving analysis, design, evaluation and implementation. This is accomplished through either M.S. thesis work or workshop-type course activities.

The aims of the Ph.D. program are to give the student a rigorous and thorough knowledge in the subject areas discussed above and to develop in the student the ability to recognize and pursue significant research problems. The first two years of graduate study are generally devoted to the first aim, with the student taking a relatively heavy and well-defined program of courses. By the end of the second year the research phase of the student's graduate career should be under way with participation in advanced study and preliminary research work. Research for the dissertation represents the final stage of the student's training.

Facilities

The Computer Science Laboratory contains a VAX 11/780 and a PDP 11/60, both of which are run under the UNIX operating system. The VAX is used primarily for research in data base systems, graphics and VLSI and as a result is equipped with over 500 MB of disk storage. The PDP 11/60 is used primarily for research in operating systems and computer networks and has a connection to an experimental multiprocessor network consisting of up to 18 LSI-11 microcomputers. An Alpha Micro system is also in use for research in data base systems. In addition, terminal connections to Stony Brook's UNIVAC 1100/80, The ARPANET (through Brookhaven National Laboratory) and the CSNET are provided. Graduate students normally make full use of these facilities as a part of their research or project work.

Admission to Graduate Study

For admission to graduate study in computer science, the following are normally required:

A. A baccalaureate degree in a physical science, biological science, mathematics or engineering.

B. Two semesters of calculus, and one course in linear algebra (e.g., MSM 231).

C. One year of a natural science at the college level, with physics preferred.

D. At least three college-level courses in computer science, covering programming in a higher-level structured language such as PASCAL or PL1, assembly language, and an introduction to date structures and advanced programming techniques (i.e., recursive algorithms and structured programming).

E. A grade average of at least B in all undergraduate coursework and in science, mathematics and engineering courses.

F. Acceptance by both the Department of Computer Science and by the Graduate School.

G. All applicants must submit Graduate Record Examination scores for the general aptitude tests. Applicants are encouraged to submit GRE test scores for the advanced examination in their undergraduate major field as well.

Whatever the area of undergraduate specialization, students offering additional preparation in computer science (computer organization, systems programming, digital logic and systems), or in mathematics (probability and statistics, logic, finite mathematics, modern algebra, numerical analysis) can expect more favorable consideration. It is highly recommended that students include courses in digital systems, numerical analysis and modern algebra as part of their undergraduate preparation. Ph.D.-bound students in particular will be seriously handicapped without preparation in either digital systems design or modern algebra.

Students of exceptional promise who are deficient in preparation will be considered for admission to the program on a provisional basis. Upon entrance, students will be informed of the requirements they must staisfy for the termination of provisional status.

Students with insufficient preparation to enroll in core courses offered during their first fall semester of residence may suffer a full year of delay in satisfying the requirements for the M.S. degree, for these core courses, offered only in the fall, may be prerequisites for core courses offered only in the spring, as well as for most of the spring electives open to M.S. students. Such students should plan their course of study with these restrictions in mind. If the applicant's deficiency in preparation can be remedied in one semester, and if the required undergraduate courses are offered in the spring, he or she should consider applying for special spring admission to the Graduate School in order to avoid needlessly prolonging the duration of matriculation.

Requirements for the M.S. Degree

Summary

Students in the professional M.S. degree program choose between two options, the M.S. with thesis and the M.S. without thesis. The course requirements depend on the option. Both options require the following five core courses and at least one approved graduate-level computer science elective:

1. Foundations of Computer Science (MSC 540)
2. Data Structures (MSC 521)
3. Computer Architecture (MSC 502)
4. Compiler Design (MSC 522)
5. Operating Systems (MSC 525)

Both options also require proficiency in finite mathematics and digital systems at the level of MSA 301 (Finite Mathematical Structures) and ESE 318 (Digital Systems Design), respectively. The following are considered evidence of proficiency:

1. A grade of at least B in equivalent courses on the student's undergraduate record.
2. Taking and passing the above courses with a grade of B or higher.
3. Taking the final examinations in the above courses, obtaining a grade of B or higher.

In lieu of the M.S. thesis, students chosing the *no thesis option* are required to take an additional approved elective and the Laboratory in Computer Science (MSC 523/524). The latter course extends over a full academic year and provides the student with the experience of dealing with large-scale computer-oriented problems.

Specific Requirements

The above requirements are summarized and are included in the following complete description of the M.S. degree requirements:

A. Residence: No residency requirement
B. Language requirement: None.
C. Proficiency requirements: Demonstration of proficiency in finite mathematics and digital systems at the senior undergraduate level.
D. Course requirements (30 graduate credits):
   1. M.S. without thesis.
      a. Core courses (MSC 502, 521, 522, 525 and 540)
      b. Laboratory in Computer Science (MSC 523/524), five credits extending over two semesters
      c. Six credits of graduate-level elective courses, chosen with advisor's approval
   2. M.S. with thesis
      a. Core courses (MSC 502, 521, 522, 525 and 540) (19 credits)
      b. Three credits of graduate-level elective courses, chosen with advisor's approval
      c. MSC 599 Research (8 credits)

   A grade average of B or better is required in the above courses of study.
E. Thesis requirements:
   1. M.S. without thesis: None
   2. M.S. with thesis: A student choosing the thesis option must select a research advisor as soon as possible who agrees to serve in that capacity. The advisor will supervise the student's other studies and advise the student on his or her choice of courses. The thesis must be approved by a departmental faculty committee of no less than three members, appointed by the Graduate Program Director. At the discretion of the committee, the student may be required to present a seminar on the topic of his or her thesis.
F. M.S. degree requirements for Ph.D.-bound students: A student enrolled in the Ph.D. program may satisfy the requirements for the M.S. degree by completing 30 graduate credits of coursework with a B average or better and passing the Ph.D. Qualifying Examination.

A student who does not meet *all* of the listed entrance requirements, *including proficiency in finite mathematics and digital systems design, cannot* in general expect to earn the M.S. degree in less than three semesters. Undergraduate courses which must be taken to make up deficiencies or to acquire proficiency in finite mathematics and digital systems design may not be applied toward meeting graduate degree credit requirements.

A student who elects the *thesis option* generally must have substantial undergraduate background in computer science and well-defined subject preference in order to select a problem area and begin thesis research during the first semester of residence. More often, a full semester of exploration is necessary on the part of the student, and the thesis research is completed during the next two semesters (or, occasionally, during the next semester and the following summer). Students who have majored in computer science as undergraduates will usually have no difficulty in completing the requirements for either option in one year.

Requirements for the Ph.D. Degree

A. Residence: Two consecutive semesters of full-time study.

B. Qualifying examination and research proficiency examination: Students must satisfactorily pass a qualifying examination to demonstrate their ability to undertake the course of study leading to the Ph.D. degree. The examination is given early in the fall semester of each year. The student must take the examination within three semesters of admission to the Graduate School (i.e., during the second year of residence).

Students who perform satisfactorily on the qualifying examination are required to demonstrate their ability to undertake a creative research problem by preparing an oral presentation to the faculty during the spring semester of the same academic year in which the qualifying examination was passed (research proficiency examination).

Final qualification for admission to the research phase of the Ph.D. program will be determined by the faculty on the basis of performance on the written qualifying examination, the quality of the written research proposal or report, the results of the associated oral examination and the academic record achieved by the student to date.

C. Course requirements: The faculty of the Department of Computer Science has decided that the student seeking the Ph.D. degree shall initially pursue a relatively heavy and controlled program of courses. The following first-year program of courses will be followed by the majority of students in the Ph.D. program. Students with exceptional strengths or weaknesses follow appropriately modified programs, worked out in consultation with their advisors. In the following model program of courses, it is assumed that the student has taken a course in either digital systems or modern algebra before entering.

First Year

Fall Semester (14 credits)

1.	MSA 514	Applied Algebra II
	or ESE 318	Digital Systems Design
2.	MSC 543	Automata Theory I
3.	MSC 521	Data Structures
4.	MSC 525	Operating Systems

Spring Semester (14 credits)

1.	MSA 506	Finite Structures
2.	MSC 541	Theoretical Foundations of Computing I
3.	MSC 502	Computer Architecture
4.	MSC 522	Compiler Design

In general, the second-year program is more variable than the first-year program, reflecting the research interests of the students to a large degree. A typical program follows:

Second Year

Fall Semester (12 credits)

1.	MSC 542	Theoretical Foundations of Computing II
2.	MSC 532	Database Systems
3.	MSC 552	Microprocessor Design and Application
4.	MSC 699	Research -

Spring Semester (12 credits)

1.	MSC 641	Mathematical Theory of Computation
2.	MSC 548	Analysis of Algorithms
3.	MSC 535	Advanced Topics in Operating Systems
4.	MSC 699	Research

In addition, students must take two 600-level courses (this does not include MSC 698 or MSC 699) to complete the degree requirements

D. Preliminary Examination: The preliminary examination must be taken, with the approval of the student's research advisor, within eighteen months of the time that the student has successfully completed the research proficiency examination. The purpose of the preliminary examination is to ascertain the bredth and depth of the student's preparation to undertake a significant original investigation.

The major requirement of the preliminary examination is a complete and detailed Ph.D. thesis research proposal. The student is expected not only to be thoroughly familiar with the background and current status of his or her research area, and to have clear and well-defined plans for pursuing his or her research objectives, but also to offer evidence of progress in achieving these objectives. The student must be prepared to justify the effort to be expended in this reseach in terms of the value of the results expected, and to justify the extent and challenge of this research as evidence of research competence at the Ph.D. level.

E. Advancement to Candidacy: After the student has completed all requirements for the degree other than the dissertation, he or she is eligible to be recommended for advancement to candidacy. This status is conferred by the Vice Provost for Research and Graduate Studies upon recommendation of the Chairperson of the Department.

F. Dissertation: The most important requirement of the Ph.D. program is the completion of a dissertation which must be an original scholarly investigation. The dissertation shall represent a significant contribution to the scientific literature, and its quality shall be compatible with the publication standards of appropriate reputable scholarly journals.

Faculty

Badr, Hussein G., Assistant Professor. Ph.D., 1980, Pennsylvania State University: Operating systems design; performance evaluation.

Bernstein, Arthur J., Professor. Ph.D., 1962, Columbia University: The design and correctness of operating systems; concurrent programming; computer networks.

Gelernter, Herbert L., Professor. Ph.D., 1957, University of Rochester: Artificial intelligence; scientific applications; on-line data acquisition, reduction and experiment control systems.

Heller, Jack, Professor and Chairperson. Ph.D., 1950, Polytechnic Institute of Brooklyn: Database systems; office automation; distributed processing.

Henderson, Peter B., Associate Professor. Ph.D., 1975, Princeton University: Software engineering; software reliability; scheduling theory; concurrent processes; operating systems.

Jones, Mark A., Assistant Professor. Ph.D., 1980, University of Kansas: Database systems; artificial intelligence.

Kedem, Zvi M., Associate Professor. Ph.D., 1974, Technion, Haifa, Israel: Database systems; computer graphics.

Lee, D. T., Associate Professor. Ph.D., 1978, University of Illinois: Computational geometry; VLSI systems; graphics.

Salveter, Sharon, Assistant Professor. Ph.D., 1978, University of Wisconsin: Artificial intelligence; datebase design; data structures.

Sciore, Edward, Assistant Professor. Ph.D., 1980, Princeton University: Database design: programming language semantics.

Smith, David R., Professor. Ph.D., 1961, University of Wisconsin: Computer architecture; digital system design; computer systems.

Srivas, M. K., Assistant Professor. Ph.D., 1981, MIT: Specification of software; programming language semantics.

Warren, David, Assistant Professor. Ph.D., 1979, University of Michigan: Natural language processing; datebase systems; algorithms.

Zorat, Alessandro, Assistant Professor. Ph.D., 1979, University of Southern California: Distributed computing; computer architecture.

Estimated numbjer of teaching, graduate and research assistants, fall 1982: 38.

Courses

MSC 502 Computer Architecture
Register transfer language, sequential and microprogrammed control, instruction set design, 1/0 structures, memory hierarchy management, performance measurement, multiprocessor structures, parallel processing. Students will perform design extercises using the Computer Structure Language.
Prerequisites: MSC 120 and ESE 318
Spring, 4 credits

MSC 520 Techniques for Software Design
Topics relevant to software design and development, especially those relating to commercial/industrial programming environment. To include system and module construction and decomposition methodologies (top down, bottom up, hierarchical), structured programming concepts, maintainability, reliability, program and system documentation (design spec's, implementation spec's, user manual), management of software ("Mythical Man Month," etc.), psychology of computer programming, and programmers.
Fall, 4 credits.

MSC 521 Data Structures
The study of data structures and algoithms for their manipulation. Emphasis is on abstract data types, data type specification and verification, and complexity analysis of implementations. Topics include varied uses of recursion; linked structures for pattern matching, storage management, garbage collection and heaps; general, balanced, and multi-way trees; graph representations and algorithms including traversals, path finding, closure, and spanning trees.
Prerequisite: MSC 201 or equivalent
Fall and spring, 4 credits

MSC 522 Compiler Design
Investigates contemporary methods of programming language implementation, including table-driven syntax analysis, run-time storage management, symbol table organizations, error recovery, code generation, compiler checkout and verification. Students will participate in a term project involving design of an actual compiler.
Prerequisites: MSC 521 and MSC 540 or 543
Spring, 4 credits

MSC 523/524 Laboratory in Computer Science
A significant programming problem or digital system design will be undertaken. Solutions are to include all aspects of large-scale problem solving including cost analysis, design, testing and documentation. The course will extend over two semesters.
First semester, 2 credits
Second semester, 3 credits.

MSC 525 Operating Systems
Review of batch processing systems. Discussion of topics such as virtual memory, protection, interprocess communication and directory structures in the context of several modern operating systems. Sequential processes, asynchronous operation and modularization of systems.
Corequisite: MSC 521
Fall, 4 credits

MSC 526 Programming Languages
A study of modern programming languages, with special emphasis on facilities that aid in composing modular and reliable software. Topics to be included are abstract data types, tasking facilities, exception handling and protection specifications. Languages to be studied include Pascal, Euclid, Mesa, Clu, Alphard, Concurrent Pascal, and Ada.
Prerequisite: MSC 522
Fall, 3 credits

MSC 530 Simulation and Modeling
A comprehensive course in formulation, implementation and application of simulation models. Topics include data structures, simulation languages, statistical analysis, pseudo-random number generation and design of simulation experiments. Students will apply simulation modeling methods to problems of their own design.
Prerequisite: MSC 201 or equivalent
Spring, 3 credits

MSC 532 Database Systems
Storage in and retrieval from large files of information in the form of well-structured databases. Physical file organization, Relational, Hierarchical and Network data models, data manipulation languages, database design, query optimization, concurrency, database security and privacy.
Prerequisite: MSC 521 or permission of instructor
Spring, 4 credits

MSC 535 Advanced Topics in Operating Systems
The course discusses asynchronous systems, their description using concurrent programming languages and their verification. Topics include concurrent and real time programming, device handling, ADA, monitors and message passing, introduction to formal verification.
Prerequisite: MSC 525
Spring, 3 credits

MSC 540 Foundations of Computer Science
The student will be introduced to those topics in theoretical computer science necessary for successfully completing subsequent courses (MSC 522, MSC 526). Elements of modern algebra, automata theory, formal languages, computability, combinatorics and graph theory will be covered.
Fall, 3 credits

MSC 541 Theoretical Foundations of Computing I
The mathematical and logical foundations of computing considered at an advanced level. General syntax of formal languages, formal logistic systems, proof theory. Decision procedures. Functional caculi of the first order. Axiomatization of elementary arithmetic within the first order functional calculus. Post canonical systems. The informal notion of an algorithm. Formal characterizations of the algorithmic functions. Introduction to recursive function theory, computability and unsolvability.
Spring, 3 credits

MSC 542 Theoretical Foundations of Computing II
Recursive function theory and effective computability. The partial recursive functions. Church's thesis. The universal partial function, the halting problem for Turing machines, recursive unsolvability. Recursive invariance. The recursion theorem. Reducibility orderings and the structure of unsolvability degrees.
Prerequisite: MSC 541
Fall 3 credits

MSC 543 Automata Theory I
Finite-state machines and regular expressions, context-free languages and push-down automata. Turing machines and the halting problem, complexity of computation.
Prerequisite: MSA 514
Fall, 3 credits

MSC 544 Automata Theory II
Elaboration and extension of MSC 543 including undecidability, basic recursive function theory, the Chomsky hierarchy of grammars, deterministic context-free languages and parsing techniques, families of languages, abstract computational complexity theory and intractable problems.
Prerequisite: MSC 543
Spring, 3 credits

ESE/MSC 546 Analysis and Synthesis of Computer Communication Networks
Mathematical analysis of message queuing and buffering processes for various signal statistics. Analytical and algorithmic methods for networked optimization. Topological design for network reliability. Waveform optimization encoding. Error analysis of coded and feedback systems. Optimum features and software requirements of communication processors.
Fall, 3 credits

MSC 548 Analysis of Algorithms
Models of computation and associated time and space measures for complexity of algorithms in the various models. Techniques for designing efficient algorithms, including choice of data structures, recursion, divide and conquer, and dynamic programming. Asymptotic behavior, lower bounds on complexity and correctness of algorithms for sorting, set manipulation, graph operations, matrix multiplication, fast Fourier transform and pattern matching. Also covers nondeterminism, NP-completeness and intractability.
Prerequisite: MSC 521
Recommended: MSA 506
Spring, 3 credits

ESE/MSC 552 Microprocessor Design and Application
Assumes the student is familiar with 8-bit microprocessors and microprocessor-based design at the level of ESE 380. Covers bit slice products, current 16-bit microprocessors and peripheral support chips, bus standards, multiprocessor and multibus structures. Experience in the laboratory with 16-bit products and cross compilers as available will be included.
Prerequisite: ESE 380 or permission of instructor
Spring, 4 credits.

MSC 621 Seminar In Programming Languages
3 credits, repetitive

MSC 622 Seminar in Operating Systems
3 credits, repetitive

MSC 630 Seminar in Artificial Intelligence
3 credits, repetitive

MSC 631 Seminar in Database Systems
3 credits, repetitive

MSC 641 Mathematical Theory of Computation
Logical foundations of computation are studied. Topics include correctness models; semantic models; schemata. Mathematical logic will be a principal investigative tool.
Prerequisite: MSC 542
Fall or spring, 3 credits

MSC 642 Seminar in Analysis of Algorithms
3 credits, repetitive

MSC 645 Seminar in Theory of Computation
3 credits, repetitive

MSC 681 Special Topics in Programming Languages
3 credits, repetitive

MSC 682 Special Topics in Computer System Design
3 credits, repetitive

MSC 683 Special Topics in Computer Applications
3 credits, repetitive

MSC 684 Special Topics in Computer Architecture
3 credits, repetitive

MSC 685 Special Topics in Artificial Intelligence
3 credits, repetitive

MSC 686 Special Topics in Theory of Computation
3 credits, repetitive

MSC 698 Practicum in Teaching
3 credits, repetitive

MSC 699 Dissertation Research
Variable and repetitive credit

Department of Electrical Engineering

The Department of Electrical Engineering offers graduate programs leading to the M.S. and Ph.D. degrees. Graduate programs are tailored to the needs of each student to provide a strong analytical background helpful to the study of advanced engineering problems. Ample opportunities exist for students to initiate independent study and to become involved in active research programs, both experimental and theoretical.

Facilities

The Department of Electrical Engineering operates two laboratories for both teaching and research, a microelectronics laboratory and a minicomputer laboratory

The microelectronics laboratory, which includes equipment covering RF, microwave and optical frequencies, and photolithographic processing equipment for integrated electronics, is available for teaching and graduate research. The microcomputer laboratory has equipment for research and teaching in digital electronics, microcomputer hardware design and interface, and digital system study and research.

Admission to Graduate Study

For admission to graduate study in the Department of Electrical Engineering, the minimum requirements are:

A. A bachelor's degree in engineering, mathematics, physics, chemistry or a closely related area from an accredited college or university.

B. A minimum grade point average of at least B in all courses in engineering, mathematics and science.

C. Results of the Graduate Record Examination Aptitude Test (part-time master's students are exempt).

D. Acceptance by both the Department of Electrical Engineering and the Graduate School.

Requirements for the M.S. Degree

The M.S. degree in the Department of Electrical Engineering requires the satisfactory completion of a minimum of 30 graduate credits. This requirement may be satisfied by either one of the following two options.

1. M.S. Non-Thesis Option

A. At least 30 graduate credits with a grade point average of 3.0 or better. Among these 30 credits, up to 6 credits may be earned in ESE 506, ESE 507, ESE 599, ESE 597, ESE 691, ESE 698 or ESE 699. All non-EE courses must receive prior approval from the Graduate Program Director.

B. Minimum of eight (8) regular courses with at least 3.0 grade point average. At least five regular courses must be in the Department of Electrical Engineering.

C. ESE 506, ESE 507, ESE 599, ESE 597, ESE 698 and ESE 699 are not counted as regular courses in (B). ESE 670 Topics in Electrical Engineering with different subject matters and offered as formal lecture-type courses are considered as different regular courses in (B). At most two of them can be counted in the five regular ESE courses in (B).

D. Up to six transfer credits may be applied toward the degree with the approval of the program committee (see section on Transfer Credits under "Academic Regulations and Procedures").

II. M.S. Thesis Option

A. At least 30 graduate credits with a grade point average of 3.0 or better. At least 6 credits of ESE 599. No more than 12 credits total may be taken from ESE 506, ESE 507, ESE 599, ESE 597 or ESE 698. All non-EE courses must receive prior approval from the Graduate Program Director.

B. Minimum of 6 regular courses with at least 3.0 grade point average. At least 4 regular courses must be in the Department of Electrical Engineering.

C. ESE 506, ESE 507, ESE 597, ESE 599, ESE 698 and ESE 699 are not counted as regular courses in (B) ESE 670 Topics in Electrical Engineering with different subject matters and offered as formal lecture-type courses are considered as different regular courses in (B). At most two of them can be counted in the four regular ESE courses in (B).

D. Up to six transfer credits may be applied toward the degree with the approval of the graduate program committee (see section on Transfer Credits under "Academic Regulations and Procedures").

E. Satisfactory completion of a thesis.

Requirements for the Ph.D. Degree

A. Minimum residence: At least two consecutive semesters of full-time study.

B. Qualifying examination: A student must satisfactorily pass a written qualifying examination to demonstrate his or her ability to undertake the course of study leading to the Ph.D. degree.

C. Course study plan: Within six months after passing the qualifying examination, the student must arrange a course study plan with his or her thesis advisor and file it with the Graduate Program Committee. This plan must later be approved by the preliminary examination committee.

D. Preliminary examination: Within 12 months after passing the qualifying examination, the student must take a comprehensive oral examination, which may be supplemented by a written examination. Both a thesis topic and the thesis background area are emphasized.

E. Advancement to candidacy: After successfully completing all requirements for the degree other than the dissertation, the student is eligible to be recommended for advancement to candidacy. This status is conferred by the Vice Provost for Research and Graduate Studies upon recommendation from the Chairperson of the Department.

F. Dissertation: The most important requirement for the Ph.D. degree is the completion of a dissertation, which must be an original scholarly investigation. The dissertation must represent a significant contribution to the scientific literature and its quality must be compatible with the publication standards of appropriate and reputable scholarly journals.

G. The student must defend the dissertation before an examining committee. On the basis of the recommendation of this committee, the Dean of Engineering will recommend acceptance or rejection of the dissertation to the Vice Provost for Research and Graduate Studies. All requirements for the degree will have been satisfied upon the successful defense of the dissertation.

H. Time limit: All requirements for the Ph.D. degree must be completed within seven years after completing 24 hours of graduate courses in the Department.

Areas of Emphasis in Graduate Study

Particular areas of emphasis in current research and instruction in the graduate programs of the Department are optimal control and system theory, computer engineering, telecommunications, optical information solid state phenomena, integrated circuits, VLSI, synthesis of logic networks, digital communications, biomedical electronics, quantum electronics, optical information processing, and electromagnetic wave phenomena. Theoretical and experimental programs reflecting these areas are currently operative and students are encouraged to actively participate in these efforts. In addition to its emphasis on modern electrical engineering, the Department participates in interdepartmental graduate programs in computer science, in urban and policy sciences and in bioengineering. These are described in adjoining sections of this *Bulletin.*

Systems Science and Engineering

Some of the research areas currently under investigation by the faculty members and graduate students in systems science and engineering include the traditional areas of optimal control theory and systems and networks theory, as well as the application of systems sciences to broader socioeconomic, urban transportation, power distribution, energy and health systems. The Department of Electrical Engineering has close ties with other related departments in order to meet these new challenges. The present academic and research programs in electrical engineering form an excellent basis for such activities. The relevant course sequence is: ESE 502, ESE 503, ESE 539, ESE 541, ESE 542, ESE 543-544, ESE 545, ESE 547, ESE 551. In addition, a number of courses useful to this subject area and offered by other departments are: UPS 513, UPS 531, ECO 510-511, ECO 514, ECO 520-521, ECO 572, SOC 502, SOC 503, SOC 505, SOC 514.

Communications and Information Science

The predicted growth pattern of communications and information processing remains explosive for the foreseeable future. Enormous volumes of data are now routinely transferred between computers or from remote devices to a central facility. Much of the world's communications is via satellite and new techniques which are suitable for this medium are increasingly important. Particular areas of emphasis in current research and instruction include; digitized voice and speech processing, data transmission and computer communications networks, satellite channels and communications traffic, digital signal processing, coding for error control, new modulation and multiplexing techniques. The course offerings which are appropriate to this area are ESE 502, ESE 503, ESE 504, ESE 531-532, ESE 533, ESE 535, ESE 544, ESE 546, ESE 547, ESE 552, ESE 560, ESE 561.

Computer Engineering, Digital Systems and Electronics

Perhaps the most rapidly expanding area of engineering is in the field of digital systems and electronics. The introduction of large-scale integrated circuits, such as microprocessors, has brought the price of digital electronics down so low as to make it possible for digital electronics to take over ever larger functions from sewing machine stitch controls to inventory control. Current research and training in the Department concentrates on research in computer organization, performance evaluation, computing system design and pattern recognition and on both theoretical and practical problems associated with the design and development. The Departments of Electrical Engineering and Computer Science have a PDP 15 Computer and peripherals for their research efforts. They work closely with one another in both research and teaching. The course offerings which are appropriate to this area are: ESE 518, ESE 545, ESE 546, ESE 549, ESE 551, ESE 552, MSC 502.

Solid State and Quantum Electronics

The program of courses and of research pertinent to solid state electronics ranges from a study of the fundamental electronic processes in solids and gases through a description of the mechanisms which yield useful devices, to a study of the design of complex integrated circuit systems. A number of the Ph.D. candidates are working part-time in local semiconductor industries while completing the doctoral work. The course offerings which relate to these subject areas are: ESE 510, ESE 511, ESE 512, ESE 514, ESE 515, ESE 516-517, ESE 518, ESE 610. Relevant courses from other departments may also be selected with the approval of a designated faculty advisor.

Bioengineering

The Department of Electrical Engineering participates in sponsoring a curriculum in Bioengineering in the College of Engineering and Applied Sciences. In addition, the Department offers courses in bioelectronics, cardiovascular dynamics, design of artificial organs and electronic instrumentation, as well as various courses in the format of seminars and internships. Research work and student projects have also been implemented by faculty in the program, with major efforts in assisted circulation technology, modeling of active physiological membranes, modeling of the cardiovascular system, design of prosthetic and orthotic devices, and design of biomedical instrumentation. The course offerings from which the student may make a selection include courses in electrical engineering and in other disciplines including the biological and physiological sciences. The program of the individual student will be set and approved in consultation with a designated faculty advisor.

Special Curriculum for Non-Electrical Engineering Majors

A number of students who did not major in electrical engineering as undergraduates have been admitted to the electrical engineering graduate programs. Depending on individual background, a suitable curriculum can often be developed. For example, a physics major can fit into the graduate program in solid state and quantum electronics; a mathematics major into the systems science program. The Department has developed a set of two intensive courses to help fill in the background of these students. Special consideration is also given to those interested in the Ph.D. program.

Evening M.S. Degree Program

This program is designed to help practicing engineers meet today's advanced technology. A set of carefully selected courses fulfilling the requirements of the M.S. degree in electrical engineering is offered in two-year cycles during evening hours. Students in this program may modify their own course of study and specialization by filling some of their course requirements with selections from the full course offering at the Stony Brook campus. The evening programs are administered through the Department of Electrical Engineering, and further information concerning these programs may be obtained through the Graduate Program Director of the Department of Electrical Engineering.

Combined B.E.-M.S. Degrees

Undergraduate students may enter this special five-year master of science-bachelor of engineering program at the end of their junior year. During the following two years the student completes the requirements for both the B.E. and the M.S. degrees and for the M.S. thesis.

Faculty

Barry, Patrick E., Adjunct Associate Professor. Ph.D., 1969, State University of New York at Stony Brook: Systems and control; optimization theory.

Carleton, Herbert R., Professor.[1] Ph.D., 1964, Cornell University: Optical materials; electro-optics; ultrasonics; optical instrumentation.

Chang, Sheldon S.L., Professor. Ph.D., 1947, Purdue University: Optimal control; energy conservation; information theory; economic theory.

Chang, T.S., Professor. Ph.D., 1981, Harvard University: Decision and control.

Chen, Chi-Tsong, Professor. Ph.D., 1966, University of California, Berkeley: CA systems and control theory; digital signal processing.

Driscoll, Timothy J., Adjunct Associate Professor. M.S., 1970, Polytechnic Institute of Brooklyn: Electrical power and distribution systems.

Eslami, Mansour, Assistant Professor. Ph.D., 1978, University of Wisconsin-Madison: Automatic control systems; circuits theory; theory of sensitivity; applied mathematics.

Halioua, Maurice, Adjunct Associate Professor. Ph.D., 1971, University of Paris, France: Optical information processing; applications in biology, medicine and engineering.

Hantgan, Jeffrey C., Assistant Professor. Ph.D., 1981, Cornell University: Linear network theory and electrophysics.

Marburger III, John H., Professor and President.[2] Ph.D., 1967, Stanford University: Theoretical laser physics.

Marsocci, Velio A., Professor. Eng.Sc.D., 1964, New York University: Solid state electronics; integrated electronics; biomedical engineering.

Parekh, J.P., Associate Professor. Ph.D., 1971, Polytechnic Institute of Brooklyn: Microwave acoustics; microwave magnetics; microwave electronics.

Pashtoon, Nazir A., Assistant Professor. Ph.D., 1981, Stevens Institute of Technology: Application of analog and digital integrated electronics; seismic instrumentation.

Rappaport, Stephen S., Professor. Ph.D., 1965, New York University: Communication theory; systems.

Shapiro, Stephen D., Professor and Chairperson. Ph.D., 1967, Columbia University: Digital systems and picture processing.

Short, Kenneth L., Associate Professor and Undergraduate Program Director. Ph.D., 1973, State University of New York at Stony Brook: Digital system design, instrumentation.

Smith, David R., Professor.[3] Ph.D., 1961, University of Wisconsin: Logic design; computer architecture.

Sussman-Fort, Stephen E., Assistant Professor. Ph.D., 1978, University of California, Los Angeles: VLSI; computer-aided circuit design; active and passive filters; classical network theory.

Truxal, John G., Professor.[4] Sc.D., 1950, Massachusetts Institute of Technology: Control and systems engineering; science education.

Tuan, Hang-Sheng, Professor. Ph.D., 1965, Harvard University: Electromagnetic theory; integrated optics; microwave acoustics.

Ucci, Donald R., Assistant Professor. Ph.D., 1979, The City College of The City University of N.Y.: Communications; communication systems; digital systems; digital processing.

Waters, Charles R., Adjunct Assistant Professor. Ph.D., 1975, State University of New York at Stony Brook: Control and systems engineering.

Zemanian, Armen H., Professor. Eng. Sc.D., 1953, New York University: Network theory; food system modelling.

Estimated number of teaching, graduate and research assistants, fall 1982: 46.

[1] *Joint appointment, Department of Materials Science and Engineering*

[2] *Joint appointment, Department of Physics*

[3] *Joint appointment, Department of Computer Science*

[4] *Full-time appointment with Department of Technology and Society*

Courses

ESE 501 Graduate Laboratory in Electrical Sciences

Intended to familiarize the student with the use of research laboratory equipment, basic measurement techniques and integration into an overall experimental project. Each student will select at least three experimental projects from the following areas to be supervised by the faculty: applied optics, microwave electronics, wave propagation and solid state electronics. The student must set up the experimental system, measure the necessary parameters and perform the required experiments in order to complete the project.
3 credits

ESE 502 Linear Systems

Mathematical descriptions and correspondences between continuous-time and discrete-time linear systems. State variable and input-output formulation and the use of laplace and z-transforms in analysis. Controllability, observability, minimal realization and structural canonical forms. Assignment of system nodes, Rx state variable feedback and the design of observers. Stability criteria and the Routh-Hurwitz test for asymptotic stability.
3 credits

ESE 503 Stochastic Systems
Basic probability concepts and application. Probabilistic bounds, characteristic functions and multivariate distributions. Central limit theorem, normal random variables. Stochastic processes in communications, control and other signal processing systems. Stationarity, ergodicity, correlation functions, spectral densitites and transmission properties. Optimum linear filtering, estimation and prediction.
3 credits

ESE 504 Congestion and Delay in Communications Systems
Applications of random process representations to further problems in communications. Traffic congestion, queuing and delay in communications systems. Important channel and queuing models. Message and circuit switching. Alternative communication structures and protocols. Multiple access techniques. Blocking and rescheduling. Packet radio and broadcast schemes.
Prerequisite: ESE 503 or permission of instructor
3 credits

ESE 506, 507 Electronic Circuits, Devices and Systems I and II
An intensive coverage of the concepts fundamental to the analysis and synthesis of electronic circuits and systems, both analog and digital. This course is not open to students with an undergraduate degree in electrical engineering.
Prerequisite: Permission of Graduate Program Chairperson
3 credits each semester

ESE 510 Fundamentals of Physical Electronics
Lagrangian and Hamiltonian formulation of mechanics. Classical and quantum statistics. Schrodinger's and Heisenberg's representation of quantum mechanics; perturbation theory. Solid state theory, crystal structure, simple band structure, effective mass theorem, properties of semiconductors. Transport theory, derivation and application of Boltzman transport theory. Semiconductor devices.
3 credits

ESE 511 Solid State Electronics I
A study of the electron transport processes in solids leading to the analysis and design of solid state devices. Electrical and thermal conductivities; scattering mechanism; diffusion, galvanomagnetic, thermomagnetic, and thermoelectric effects. Hall effect and magnetoresistive devices. Conductivity in thin films. Ferroelectrics, piezoelectrics, theory of magnetism and of magnetic devices.
3 credits

ESE 512 Solid State Electronics II
Resonance phenomena in solids; applications to microwave devices and to measurements of electronic parameters, optical properties of solids, direct and indirect transitions, luminescence, photoelectric devices, photomagnetic effects. Elements of superconductivity, the macroscopic and the microscopic theories, tunneling effects.
3 credits

ESE 514 Semiconductor Electronics
This course provides an introduction to the physics, design and fabrication techniques for planar MOSFET devices, LSI and VLSI integrated circuits. Topics include the following: surface field-effect, MOS capacitors and transistors threshold voltage as a function of oxide thickness, doping concentration, interface charge density and substrate bias, characteristics of MOS devices under different operating conditions for both low and high frequencies, equivalent circuits and device parameters and their dependence on different processing techniques. The latest technological developments to achieve high-speed and high-density LSI circuits will also be discussed.
Prerequisite: ESE 511
3 credits

ESE 515 Quantum Electronics I
Physics of microwave and optical lasers. Topics include introduction to laser concepts; quantum theory; classical radiation theory; resonance phenomena in two-level systems; Block equations, Kramers Kronig relation, density matrix; rate equation approach to laser oscillation and amplification; CO_2 lasers; discharge lasers; semiconductor lasers.
3 credits

ESE 516, 517 Integrated Electronic Devices and Circuits I & II
Theory and applications: elements of semiconductor electronics, methods of fabrication, bipolar junction transistors, FET, MOS transistors, diodes, capacitors and resistors. Design techniques for linear digital integrated electronic components and circuits. Discussion of computer-aided design, MSI and LSI.
3 credits each semester

ESE 518 Quantum Electronics II
Interaction of simple quantum systems with complex systems; semiclassical laser oscillation theory, stochastic theory of fluctuations. Brillouin scattering. Raman effect; spontaneous emission, interaction theory; quantum theory of laser oscillation, coupled Green's function relations. Quantized nonlinear optics, quantum noise, photon scattering.
3 credits

ESE 520 Electronics II—Fundamentals of Electromagnetics
Electro- and magneto-statics; Maxwell's equations; vector and scalar potentials, vector and tensor transformation properties, Lorentz transformation; derivation of Maxwell's equations from Coulomb's Law and Lorentz transformation. Boundary value problems; Green's function, guided waves, travelling wave and charged particle interactions. Radiation.
3 credits

ESE 521 Applied Electromagnetic Theory
Advanced boundary value problems in electromagnetic and microacoustic wave propagation, guided wave and radiation. Topics include variation and perturbation methods applied to cavity, wave guide discontinuity radiation from wave guide aperture and equivalent source theorem, mode theory of guided wave around the earth, microwave acoustic wave guide and transducers.
3 credits

ESE 522 Wave Propagation in Plasma
The course includes the following topics: introduction to magnetic theory and plasma kinetic theory, wave propagation in unbounded plasma, guided waves at a plane plasma interface and its application to terrestrial propagation, radiation from antennas in plasma.
3 credits

ESE 523 Integrated and Fiber Optics
The course includes the following topics: the film dielectric optical waveguides and modes, dielectric fibers, semiconductor planer waveguides, input and output couplers, groove reflectors, resonators and filters, modulators and detectors, semiconductor junction lasers and thin-film feedback lasers, fabrication techniques of thin-flim guides and devices; optical communication system consideration and requirements.
3 credits

ESE 524 Microwave Acoustics
Continuum acoustic field equations. Wave equation, boundary conditions and Poynting vector. Waves in isotropic elastic media: plane-wave modes, reflection and refraction phenomena, bulk-acoustic-wave (BAW) waveguides, surface acoustic waves (SAW's). Plane and guided waves in piezoelectric media. BAW transduction and applications: delay-line and resonator structures, the Mason equivalent circuit, monolithic crystal filters, IMCON dispersive delay lines, acoustic microscopes. SAW transduction and applications: the interdigital transducer, band-pass filters, dispersive filters, convolvers, tapped delay lines, resonators.
Prerequisite: ESE 319
3 credits

ESE 529 Network Theory
An exposition of a variety of topics that lead to selected areas of current research in network theory. Graphs and digraphs. Minimum-cost problems. Network flows, the max-flow min-cut theorem, matching theory, proportioning networks. Kirchhoff's laws, linear and non-linear electrical networks, state-space representation, n-ports and Hilbert ports, the scattering and imittance formulisms, realizability theory. Operator networks and infinite networks.
3 credits

ESE 530 Computer-Aided Design
The course presents techniques for analyzing linear and nonlinear dynamic electronic circuits using the computer. Some of the topics covered include network graph theory, generalized nodal and hybrid analysis, companion modeling, Newton's method in n-dimensions and numerical integration.
Prerequisite: B.S. in electrical engineering
3 credits

ESE 531 Theory of Digital Communication I
Multivariate (vector) random variables and random processes, digital signal alphabets as vector configurations, optimum receiver principles, efficient signalling, comparison of classes of signalling schemes.
Prerequisite: ESE 503 or permission of instructor
3 credits

ESE 532 Theory of Digital Communication II
The channel capacity theorem, bounds on optimum system performance, encoding for error reduction, the fading channel, communications with feedback, telemetry, factors in design of multiplexed and repeated transmission systems.
Prerequisite: ESE 531
3 credits

ESE 533 Satellite Communication Engineering
Historical perspective, economics, orbital mechanics, synchronous satellites, transponders, multi-access earth terminals, frequency division multiple access, time division multiplexing, time division multiple access, PSK, carrier-phase tracking, filter distortion, bit sync, timing systems, delay-lock tracking.
3 credits

ESE 534 Intro to VLSI Systems
The course provides sufficient basic information about integrated devices, circuits, digital and analog sample-data subsystems, and system architecture to enable the student to span the range of abstraction from the underlying physics to complete VLSI systems. The course presents basic procedures for designing and implementing digital and analog integrated systems, including a structured design methodology, use of stick diagramming, use of a symbolic layout language, and use of a scalable set of design rules. Also examined are the effects of scaling down the dimensions of devices and systems, as will occur with future improvements in fabrication technology.
Prerequisite: B.S. in electrical engineering or computer science
3 credits

ESE 535 Information Theory and Reliable Communications
Source and channel models. Measure of information and source coding theorems. Mutual information, channel capacity and channel coding theorems. Block codes. Convolutional codes. Research topics.
3 credits

ESE 539 Communications Transportation and Power Nets
A problem-oriented lecture and seminar course in deterministic and probabilistic large-scale systems, and techniques for the solution of problems arising therein.
3 credits

ESE 541 Discrete Time Systems
Analysis and synthesis of discrete time systems and discrete time-controlled continuous systems. Topics include Z-transform and state variable representations of discrete time systems, controllability and observability. Stability criterion. Synthesis methods. Dynamite programming and optimum control. Sampled spectral densities and correlation sequence. Optimum filtering and control of random processes.
Prerequisite: ESE 502
3 credits

ESE 542 Stability Theory and Application
Definition and application of stability criteria in both linear and non-linear systems. Topics include equilibrium points, limit cycles, describing function analysis, construction of lyapunov functions, the popov circle criterion and perturbation methods. Application of stability theory to design of non-linear control systems.
3 credits

ESE 543 Optimal Control
Topics include parameter optimization, La Grange multipliers, numerical techniques such as steepest descent. Newton's Method and conjugate gradients. In the area of trajectory optimization the Hamilton-Jacobi Equations, Pontryagin Maximum Principle and Dynamic Programming are applied to the quadratic regulator, minimum time, minimum fuel and other linear and non-linear control problems. Control in restricted phase space.
3 credits

ESE 544 Optimal Filtering and Date Reconstruction
Effects of stochastic noise and inexact measurement on the performance of control and communication systems. Topics include matching filter, coherent detection, optimal estimation, prediction and smoothing of data using the Weiner-Hopf and Kalman-Bucy methods. The separation principle in optimal control of stochastic systems.
3 credits

ESE 545 Computer Architecture
Covers multiprocessors, stack-organized computers, pipeline computers, microprocessors and computer networks. Topics including microprogramming, computer design language, hierarchical memory management systems, machine algorithm for high-speed arithmetic, hardware dynamic loader, micro-programmed control. Input/output organization, virtual memory and virtual machine are discussed. May not be taken in addition to MSC 502 for credit.
Prerequisite: ESE 318
4 credits

ESE/MSC 546 Analysis and Synthesis of Computer Communication Networks
Mathematical analysis of message queuing and buffering processes for various signal statistics. Analytical and algorithmic methods for networked optimization. Topological design for network reliability. Wave-form optimization, encoding. Error analysis of coded and feedback systems. Optimum features and software requirements of communication processors.
3 credits

ESE 547 Digital Signal Processing
The course covers three aspects of digital signal processing: digital filter, fast Fourier transform (FFT), and error analysis. Topics include review of analog filters and design of infinite impulse filters; algorithm and implementation of FFT, application of FFT; effects and analysis of quantization errors.
3 credits

ESE 549 Fault Diagnosis of Digital Systems
This course is designed to acquaint students with fault diagnosis of logic circuits. Both combinatorial and sequential circuits are considered. Concepts of faults and fault models are presented. Emphasis is given to test generation, test selection, fault detection, fault location, fault location within a module and fault correction.
Prerequisite: ESE 318 or equivalent.
3 credits

ESE 551 Switching Theory and Sequential Machines
Survey of classical analysis and synthesis of combination and sequential switching circuits, followed by related topics of current interest such as error diagnosis and fail soft circuits, use of large-scale integration, logic arrays, automated local design.
Prerequisite: ESE 318 or equivalent.
3 credits

ESE 552 LSI and Microprocessor Design and Application
Architecture of microprocessors and associated LSI components. Microprocessor software, and applications types. Demonstrations and use of cross assembler, simulator and cross compiler via computer terminals.
Prerequisites: MSC 101, 102, ESE 318 or equivalent
4 credits

ESE 557 Digital Signal Processing II: Design, Implementation and Applications
This course emphasizes the implementation aspect of digital signal processors. Topics include the design of IIR, FIR and multirate digital filters, the FFT processor, the architectural considerations for general-purpose digital signal processors, the DISP computer, the implementation of some special-purpose processors and some other practical considerations. Some applications will also be presented.
Prerequisite: ESE 547 or permission of instructor
3 credits

ESE 560, 561 Optical Information Processing
A course introducing the field of modern image processing and optical computing. Particular emphasis is placed on generally applicable fundamentals and on the principles of experimental implementations. The theory is developed and illustrated with examples drawn from the most recent applications, including holography, pattern recognition and image restoration, optical and digital computers, optical memories, information storage and retrieval, holographic laser generation of new types of optical elements, aperture synthesis and holographic interferometry as used in non-destructive testing. Electron microscopy, microwave, radar, x-ray and ultrasonic imaging including medical applications are discussed. All the necessary special mathematics, such as Fourier transform theory, are introduced at appropriate times throughout the course.
Prerequisites: Bachelor's degree or equivalent in the physical sciences or biological sciences; mathematics training through calculus
3 credits each semester

ESE 570 Bioelectronics
Origin of bioelectric events; ion transport in cells, membrane potentials; neural action potentials and muscular activity, cortical and cardiac potentials. Detection and measurement of bioelectric signals; impedance measurements used to detect endocrine activity, perspiration and blood flow; impedance cardiography, vector cardiography; characteristics of transducers and tissue interface; special requirements for the amplification of transducer signals.
3 credits

ESE 572 Electronic Instrumentation and Operational Amplifier
Design specification for electronic instruments; signal domains, bioelectric signals, modeling, measurement of pollution in air and in water, media-electrode interfaces, electrodes, sensors/transducers. Signal conditioning, instrument amplifiers, pre-amplifiers, operational amplifiers. Data processing, conversion, microprocessors, signal transmission; output systems, storage, display recording. Instrument packages for measurement monitoring, analyzing.
3 credits

ESE 574 The Design of Artificial Organs
The physiology, anatomy and pathology of the heart, lungs and kidneys is presented to enable the student to determine the technical constraint on the design of counterparts. The role of the engineer in the conceptual process is described and constraint imposed by surgical, material and other technical aspects on the design is discussed. The student presents a proposed design of a selected organ using the standard form of NIH grant proposal.
3 credits

ESE 575 Cardiovascular Dynamics and Assisted Circulation Techniques
The physiology and anatomy of the cardiovascular system is presented and techniques for assisting the system in acute heart failure are described. The instrumentation and techniques which are utilized in animal research are described and used in the operating room; the

research projects are offered for the selection of the student as a subject for a feasibility study.
3 credits

ESE 576, 577 Physiology for Engineers and Physical Scientists
Study of human physiology with emphasis on quantitative engineering interpretation. Among the physiological systems considered are neural, cardiovascular, respiratory, renal, gastro-intestinal and endocrine.
3 credits

ESE 596 Internship in Bioengineering
Student will work with physicians in hospital or other clinical facility, and will gain experience in clinical instrumentation diagnosis and in treatment of diseases.
Prerequisite: Physiology background
3 credits, repetitive

ESE 597 Practicum in Engineering
Discussion, case studies of practical problems in engineering designed specially for part-time graduate students, relating to their current professional activity. Registrants must have the prior approval of the Graduate Program Chairperson. The grade will be assigned, and credit granted, upon submission of a written report or seminar presentation of the work performed.
Variable and repetitive credit

ESE 599 Research
Variable and repetitive credit

ESE 610 Seminar in Solid State Electronics
Current research in solid-state devices and circuits and computer-aided network design.
3 credits

ESE 630 Seminar in Communication Theory
3 credits

ESE 640 Seminar in Systems Theory
Recent and current research work in systems theory.
3 credits

ESE 650 Advanced Topics in Digital Systems
Topics of special interest in the area of digital systems.
3 credits

ESE 660 Seminar in Biomedical Systems Engineering
This seminar will treat topics of current interest in bioengineering. Modeling and simulations of physiological systems, such as cardiovascular, respiratory, renal and endocrine systems. Instrumentation systems including automatic chemical assaying, electric probes, ultrasonic tracer methods and radiation techniques. Application of computers in biomedicine in the subject of diagnosis, emergency services and hospital management.
Prerequisites: ESE 310, ESE 370 or equivalent
3 credits

ESE 670 Topics in Electrical Sciences
Varying topics selected from current research topics. This course is designed to give the necessary flexibility to students and faculty to introduce new material into the curriculum before it has attracted sufficient interest to be made part of the regular course material. A) Biomedical Engineering; b) Circuit Theory; c) Controls; d) Electronics Circuits; e) Digital Systems and Electronics; f) Switching Theory and Sequential Machines; g) Digital Signal Processing; h) Digital Communications; i) Computer Architecture; j) Networks; k) Systems Theory; l) Solid State Electronics; m) Integrated Electronics; n) Quantum Electronics & Lasers; o) Communication Theory; p) Wave Propagation; q) Integrated Optics; r) Optical Communications and Information Processing; s) Instrumentation; t) VLSI Computer design and processing.
Variable and repetitive credit

ESE 691 Seminar in Electrical Engineering
This course is designed to expose students to the broadest possible range of the current activities in electrical engineering. Speakers from both on and off campus discuss topics of current interest in electrical engineering. All full-time Ph.D. candidates are required to register for this course and all Ph.D. candidates are required to present their thesis finding to the Department as a whole.
1 credit, repetitive

ESE 698 Practicum in Teaching
Variable and repetitive credit

ESE 699 Dissertation Research
Variable and repetitive credit

Department of Materials Science and Engineering

The Department of Materials Science and Engineering offers graduate work leading to the Master of Science and Doctor of Philosophy degrees. The motivating philosophy of the graduate program is to provide the student with a broad synthesis of the theoretical and experimental techniques required for work with all classes of materials. Emphasis is placed on courses which unify the field in terms of fundamentals treated with sufficient depth to enable the student to contribute in diverse areas of materials science and engineering.

Laboratory and course work are structured to provide programs for students who plan on entering industry upon acquiring the Master of Science degree, in addition to research-oriented programs leading to the Master of Science and Doctor of Philosophy degrees for students planning to enter teaching or research.

Programs and Facilities

The Department of Materials Science and Engineering maintains extensive facilities for the synthesis, characterization and testing of modern materials. Laboratories are dedicated to materials processing, X-ray diffraction, thermal analysis, LEED, corrosion and erosion, mechanical testing, ultrasonics and electron microscope techniques, and are used in both the teaching and research programs of the Department.

Surface Science and Technology

A multidisciplinary laboratory has been established within the Department of Materials Science and Engineering in recognition that the surface of solids represents a significant barrier to the implementation of many novel materials in modern engineering systems. The research interests of the faculty are focused on the physics, chemistry and mechanics of surfaces, their mechanical and structural properties, and their interaction with the environment.

Synchrotron Topography Users Group

The Department of Materials Science and Engineering heads a consortium of major U.S. universities and research institutions in a Participating Research Team (PRT) formed to develop facilities and research in Synchrotron X-ray diffraction topography in conjunction with the National Synchrotron Light Source at Brookhaven National Laboratory (BNL). This PRT group administers the topography facility at BNL and is responsible for maintaining the experimental program for synchrotron topography users throughout the USA. The Department invites applications from graduate students who wish to pursue their research interests in the field of synchrotron topography.

Admission to Graduate Study

For admission to graduate study in Materials Science and Engineering, the minimum requirements are as follows:

A. A bachelor's degree in engineering, mathematics, physics, chemistry or a closely related area from an accredited college or university.

B. A minimum grade average of at least B in all courses in engineering, mathematics and science.

C. Results of the Graduate Record Examination Aptitude Test. (Part-time master's students are exempt.)

D. Acceptance by both the Department of Materials Science and Engineering and the Graduate School.

Degree Requirements

In addition to the College of Engineering and Applied Sciences and Graduate School requirements, a student will be admitted to the Ph.D. degree program after satisfactorily passing a graduate program qualifying examination. (However, see below for students entering with the M.S. degree.) The qualifying examination will be given at the beginning of each semester and will be a comprehensive examination covering undergraduate work in materials science, physics, chemistry and applied mathematics. The qualifying examination will be taken by every student who plans to study toward the Ph.D. degree, within the first month of the second semester in which he or she is enrolled as a full-time student in the Materials Science and Engineering Department. However, well-prepared students are encouraged to take this examination in their first semester.

Requirements for the M.S. Degree

A. Course requirements: There are two options for the M.S. degree in the Materials Science and Engineering Department:

1. Satisfactory completion of a minimum of 18 graduate course credits and a thesis in the student's area of specialization. A total of 30 graduate credits is required.

or

2. The satisfactory completion of a minimum of 30 graduate credits, 24 of which must be for graduate courses, and six credits for research. This option is primarily for part-time students. Full-time students may petition the Graduate Program Committee of the Materials Science and Engineering Department to elect this option, but the petition must be made at the time of admission application.

In addition, the average grade for all credits, excluding ESM 599, ESM 698, and ESM 699, must be B or better.

B. Thesis: For the student who elects to complete a thesis for the M.S. degree, the thesis must be approved by three faculty members, at least two of whom are members of the Materials Science and Engineering Department, including the research advisor.

C. Final recommendation: Upon the fulfillment of the above requirements the faculty of the graduate program will recommend to the Vice Provost for Research and Graduate Studies, through the Graduate Program Committee, that the Master of Science degree be conferred or will stipulate further requirements that the student must fulfill.

D. Time limit: All requirements for the M.S. degree must be completed within three years of the student's first registration as a graduate student in the Materials Science and Engineering Department.

Requirements for the Ph.D. Degree

A. Residency: Two consecutive semesters of full-time study are required.

B. Qualifying examination: Students must satisfactorily pass a qualifying examination as described above. A student who elects the non-thesis option for the M.S. program will be considered a terminal M.S. student by the Department and must formally reapply for admission to the Department if he or she wishes to pursue a Ph.D. degree. Students who elect the M.S. thesis program, however, will be considered as continuing students in the Department and may proceed to the Ph.D. qualifying examination.

C. Plan of work: Before completion of one year of full-time residence, the student must have selected a research advisor who agrees to serve in that capacity. The student will then prepare a plan of further coursework. This must receive the approval of the student's advisor and of the graduate committee.

D. Preliminary examination: This is a comprehensive oral examination on the subjects covered in graduate materials science courses. The examination committee will consist of four members including the research advisor, two members of the Materials Science and Engineering Department, and one member from outside the Department. Students entering the program with a baccalaureate degree must take the preliminary examination before the end of the fifth semester. If a second examination is required, this must be completed by the tenth week of the sixth semester. Students entering the program with a master's degree must complete the examination by the tenth week of the second semester.

E. Advancement to candidacy: After the student has successfully completed all requirements for the degree, other than the dissertation, he or she is eligible to be recommended for advancement to candidacy. This status is conferred by the Vice Provost for Research and Graduate Studies upon recommendation of the chairperson of the graduate program.

F. Dissertation: The most important requirement of the Ph.D. degree is the completion of a dissertation, which must be an original scholarly investigation. The dissertation shall represent a significant contribution to the scientific literature and its quality shall be compatible with the publication standards of appropriate and reputable scholarly journals.

G. Defense: The candidate shall defend the dissertation before an examining committee consisting of four members including the research advisor, two members of the Materials Science and Engineering Department and one member from outside the Department.

H. Time limit: All requirements for the Ph.D. degree must be completed within seven years after completing 24 hours of graduate courses in the Department.

Faculty

Bilello, John C., Professor. Ph.D., 1965, University of Illinois: Mechanical properties; lattice defects; fracture; refractory metals; surface coatings; synchrotron topography.

Carleton, Herbert R., Professor.[1] Ph.D., 1964, Cornell University: Optical and ultrasonic properties; Brillouin scattering in crystals; surface acoustics.

Clayton, Clive R., Professor. Ph.D., 1976, Surrey University, England: Corrosion science; ESCA; ion implantation.

Goland, Allen N., Adjunct Professor.[2] Ph.D., 1956, Northwestern University: Solid state physics; defects; interaction of radiation with condensed matter.

Hartley, Craig S., Professor. Ph.D., 1965, Ohio State University: Mechanical properties; dislocation theory; constitutive relations; crystal defects.

Herley, Patrick J., Professor.[3] Ph.D., 1960, Rhodes University, South Africa; Ph.D., 1964, Imperial College, England: Solid state chemistry; physical processes occurring in solid inorganic materials; kinetics of thermal and photolytic decomposition; radiation effects; nucleation phenomena; growth of single crystals; X-ray transmission topography.

Herman, Herbert, Professor. Ph.D., 1961, Northwestern University: Phase transformations; small-angle scattering; protective coatings; marine materials.

Jach, Joseph, Associate Professor. D. Phil., 1955, Oxford University, England: Solid state chemical reactions; gas reactions; use of Mossbauer spectroscopy in study of glass systems.

Jona, Franco P., Professor. Ph.D., 1949, Swiss Polytechnic Institute (E.T.H.), Switzerland: Studies of solid surfaces and their interactions with surrounding agents; determination of atomic arrangements in surface layers; low-energy electron diffraction (LEED); auger-electron spectroscopy (AES); photoemission (UPS).

King, Alexander H., Assistant Professor. D. Phil., 1979, Oxford University, England: Electron microscopy; crystal defects.

Levine, Sumner N., Professor. Ph.D., 1949, University of Wisconsin: Biomedical materials; industrial management.

Liu, John M., Assistant Professor. Ph.D., 1973, Johns Hopkins University: Mechanical properties; fracture; non-destructive evaluation; synchrotron topography.

Prewitt, Charles T., Professor.[4] Ph.D., 1962, Massachusetts Institute of Technology: Crystallography; solid state chemistry; mineralogy.

Seigle, Leslie L., Professor. D. Sc., 1951, Massachusetts Institute of Technology: Thermodynamics of solids, diffusion in solids; protective coatings; sintering.

Suenaga, Masaki, Adjunct Professor.[5] Ph.D., 1969, University of California, Berkeley: Metallurgy of superconducting materials.

Wang, Franklin F. Y., Professor. Ph.D., 1956, University of Illinois: Ceramics; electronic materials, manufacturing processing; solar energy technology.

Warren, John B., Adjunct Assistant Professor.[6] Ph.D., 1978, University of Florida: Analytical electron microscopy; X-ray fluorescence; semiconductor defects.

Welch, David O., Adjunct Professor.[7] Ph.D., 1964, University of Pennsylvania: Theoretical materials science; kinetics of diffusion; energetics; statistical mechanics; crystal lattice defects; equations of state phase equilibria; radiation effects.

Estimated number of teaching, graduate and research assistants, fall 1982: 29.

[2]*Adjunct, Brookhaven National Laboratory*

[1]*Joint appointment, Department of Electrical Engineering*

[5]*Adjunct, Brookhaven National Laboratory*

[4]*Joint appointment, Department of Earch and Space Sciences*

[3]*Joint appointment, Department of Chemistry*

[6]*Adjunct Brookhaven National Laboratory*

[7]*Adjunct, Brookhaven National Laboratory*

Courses

ESM 502 Techniques of Materials Science
A survey of the important experimental methods employed in studies of materials. Essentially a laboratory course where the student carries out refined measurements using research grade equipment. The areas covered include metallography, corrosion, X-ray diffraction studies of crystalline and amorphous materials, optical and electron microscopic examination of materials, and the mechanical properties of materials.
Fall, 4 credits

ESM 504 Production Processes
Selected topics in manufacturing processes in modern industry: forming, joining, fabrication, and finishing of metal and alloys as well as special methods of ceramics processing. Coatings and thin film techniques will be reviewed relative to substrate protection and for electronics and electrical applications.
Fall, 3 credits

ESM 505 Diffraction Techniques and the Structure of Solids
The structure of solids can be sudied using X-ray, neutron and electron diffraction techniques. Topics covered are: coherent and incoherent scattering of radiation, structure of crystalline and amorphous solids, stereographic projection and crystal orientation determination; concept of reciprocal vector space. Laboratory work in X-ray diffraction is also included.
Fall, 3 credits

ESM 506 Mechanical Properties of Engineering Materials
A unified approach for all solid materials will be made with regard to the correlation between microstructure and their macroscopic mechanical properties. The course deals with various testing techniques for delineating mechanical properties of materials, considering elasticity, anelasticity, plasticity, dislocation theory, cohesive strength, fracture and surface wear. Attention is given to strengthening mechanisms for solids, metals, ceramics and polymers.
Fall, 3 credits

ESM 507 Imperfections in Crystals
The characteristics of point defects in metals, semiconductors, and ionic solids are described, and the thermodynamics of point defects is developed. Dislocation theory is introduced and the structures of internal boundaries are described. Finally, interactions between lattice imperfections are discussed, with emphasis on plasticity and fractures.
Spring, 3 credits

ESM 509 Thermodynamics of Solids
Current knowledge regarding the thermodynamic properties of condensed phases is discussed. The thermodynamic treatment of ideal, regular and real solutions is reviewed. Estimation of reaction-free energies and equilibria in condensed phase reaction such as diffusion, oxidation and phase transformations; thermodynamic analysis of phase equilibria diagrams.
Fall, 3 credits

ESM 510 Kinetic Processes in Solids
Atomistic rate processes in solids with emphasis on diffusion in crystals. Theory of diffusion and experimental techniques; role played by a broad class of crystalline imperfections. Topics include annealing of deformed materials, kinetics of defect interactions, thermally controlled deformation, kinetics of nucleation and growth, solidification and precipitation.
Spring, 3 credits

ESM 511 Solid State Electronics
A study of the electronic processes in solids leading to the analysis and design of materials and devices. Crystal structures, bonding, electrical and thermal conductivities, diffusion, galvanometric, thermomagnetic, and thermoelectric effects. Hall effect and magnetoresistance. Conductivity in thin films.
Fall, 3 credits

ESM 512 Dielectric and Magnetic Properties of Materials
The physical origin and manifestation of the dielectric and magnetic properties of materials is treated in relation to structure. Topics include the atomic origin of electric and magnetic susceptibilities, optical properties, piezoelectricity, ferroelectricity, ferromagnetics, magnetic properties of alloys, ferrites and garnets. Where possible, the importance of materials properties on device and system behavior will be discussed.
Spring, 3 credits

ESM 599 Research
Variable and repetitive credit

ESM 600 Seminar in Surface Science
Discussions and readings on current problems in surface physics, chemistry and crystallography.
Spring, 3 credits

ESM 602 Seminar in Plasticity and Fracture
Intended for advanced students, especially those doing research in the area. Topics: detailed description of defects and their relation to mechanical structure, the dislocation theory; plasticity and yield criteria, creep, fatigue; microscopic theory of fracture including ductile and brittle behavior and the relationship of plastic flow to cleavage.
3 credits

ESM 604 Seminar in Ultrasonic Methods and Internal Friction in Solids
Review of advanced measurement techniques in the field of ultrasonics coupled with quantitative descriptions of experimental variables related to the sample microstructure. Applications to optical, electrical and mechanical properties will be discussed. Use of ultrasonics for non-destructive evaluation will be considered.
Prerequisite: ESM 506
Spring, 3 credits

ESM 606 Seminar in Optical Properties of Material
A survey of modern optical materials and their characterization. The properties of both glasses and crystalline materials are related to physical origin. Electro-optic, elasto-optic, and magneto-optic properties and their interrelations are related to applications in technology including laser systems, displays and spectroscopy.
Fall, 3 credits

ESM 608 Seminar in Catalysis
Introduction to homogeneous and heterogeneous catalysis. Geometric factors in catalysis. The kinetics of heterogeneous catalysis. Electronic factors in catalysis; metals, semiconductors and surface species. Preparation and properties of metal surfaces. Porosity. Typical industrial processes, e.g., Fischer-Tropsch, ammonia synthesis, ammonia oxidation, etc.
Fall, 3 credits

ESM 610 Seminar in Reactions in Inorganic Solids
Crystal growth and the nature of defects in inorganic solids. Crystallography and nucleation phenomena in selected inorganic single crystals. Theories of isothermal decomposition kinetics. Measurement of decomposition rates. Radiation effects and nature of radiation damage in inorganic solids. Photodecomposition and the underlying theories of photolysis.
Fall, 3 credits

ESM 612 Seminar in Advanced Thermodynamics of Solids
The fundamentals of the thermodynamics of irreversible processes are presented and the theory applied to thermal diffusion, thermoelectric transport and other coupled processes in solids. Thermodynamics of multicomponent phase equilibria. Diffusion, oxidation and other rate processes in ternary and higher-order systems.
Prerequisite: ESM 509
Spring, 3 credits

ESM 613 Seminar in Materials and Environment
Interactions between materials and their environments including corrosion, oxidation, absorption and adsorption reactions. The influence of these reactions on the properties of materials, the design of materials resistant to these phenomena, alternative methods of protection and the utilization of these reactions in promoting breakdown and deterioration of material.
Spring, 3 credits

ESM 614 Seminar in Diffusion in Solids
Diffusion in solids is considered in detail including solution of the transport equations for volume, grain boundary, and surface diffusion. Kirkendall effect and other diffusion phenomena, atomic mechanisms of diffusion, correlation effects, etc. Next, the theory of processes in which diffusion plays an important role is considered, such as ionic conduction, oxidation of metals, and the sintering of solids.
Spring, 3 credits

ESM 615 Seminar in Phase Transformations
The theory of phase transformations in solids is considered. Kinetics and mechanisms of nucleation and growth and martenistic transformations. Melting and solidification, precipitation from solid solution, polymorphic transformations, eutectic and eutectoid reactions, second-order transitions, recrystallization and other transformations in solids.
Fall, 3 credits

ESM 696 Special Problems in Materials Science
Supervised reading and discussion of selected publications in particular fields of materials science. This course is designed primarily for advanced graduate students who are, or expect to be, involved in research in these areas, although other students may enroll with permission of the instructor.
3 credits, repetitive

ESM 697 Materials Science Colloquium
A weekly series of lectures and discussions by visitors, local faculty members and students presenting current research results.
1 credit, repetitive

ESM 698 Practicum in Teaching
1-3 credits, repetitive

ESM 699 Dissertation Research
Variable and repetitive credit

Department of Mechanical Engineering

Degree Programs

The Department of Mechanical Engineering offers graduate work leading to the Master of Science and Doctor of Philosophy degrees. The Department offers a broad curriculum emphasizing fundamental knowledge in atmospheric sciences, energy systems, fluid mechanics and solid mechanics. Research specialties include turbulent transport, dynamic meteorology, energy transfer in planetary atmospheres, rheology, combustion, energy technology, environmental fluid dynamics, statistical mechanics, thermodynamics, suspension flows, spectroscopy, experimental solid mechanics including photoelasticity and moire methods, fracture mechanics, shock waves and energy transfer in solids. Research laboratories include fluid mechanics and heat transfer, two-phase flow, turbulent chemical reacting flows, photomechanics, etc. Two special interdisciplinary concentrations in atmospheric sciences and energy technology are available at both the master's and doctoral level. In addition to the regular graduate offerings within the Department, students may choose a special terminal master's degree in mechanical engineering with Graduate Studies in Environmental Engineering.

Facilities

The Department has a number of laboratories dedicated to graduate training and research. In addition, graduate student research may be carried out at nearby Brookhaven National Laboratory, using the facilities there. The Department has specialized laboratories for two-phase flow measurements; they include laser-Doppler velocimetric instrumentation supported by a PDP-11 computer. The turbulence laboratory is equipped with hot-film devices; fast-response pH probes are available for studying chemical reactions in turbulent media. There are additional laboratories dedicated to the experimental investigation of combustion phenomena, heat transfer and fluid mechanics. The photomechanics laboratories contain a number of unusual diagnostic devices including a laser speckle interferometer and a camera that enables the entire surface of a cylindrical object to be displayed in a single photographic image. All of the Department's laboratories are supplied with a full range of electronic instrumentation and equipment.

Admissions to Graduate Study

For admission to graduate study in Mechanical Engineering, the following are normally required:

A. A baccalaureate degree in physical science, biological science, mathematics or engineering.

B. A grade average of at least B in all courses in engineering, mathematics and science.

C. Results of the Graduate Record Examination Aptitude Test. (Part-time Master's students are exempt.) Applicants are encouraged to submit GRE test scores for the advanced examination as well.

D. Acceptance by both the Department of Mechanical Engineering and the Graduate School.

Requirements for the M.S. Degree

A minimum of thirty (30) graduate credits, exclusive of ESC-698 (Practicum in Teaching), is required for the M.S. degree.

A. Course requirements:

1. M.S. with thesis: Twenty-four (24) approved graduate course credits plus an accepted thesis;
2. M.S. without thesis: Thirty (30) approved graduate course credits. No credit for ESC-599 (Master's Thesis) is approved for fulfilling this requirement;
3. No student may take more than six (6) credits of ESC-696 (Special Problems in Mechanical Engineering) toward meeting the approved graduate course credit requirements.

B. The average for all courses taken must be B or better. Grades for ESC-599, ESC-698, and ESC-699 are not counted in this requirement.

C. A maximum of six (6) graduate credits from another institution can be transferred at the discretion of the Department and with the approval of the Graduate School. A maximum of twelve (12) credits (including transferred credits, if any) from other Departments, can be approved at the discretion of the Graduate Program Committee.

D. Thesis requirements: A student choosing the thesis option must select a research advisor as soon as possible who agrees to serve in that capacity. The advisor will supervise the student's other studies and advise the student on his or her choice of courses. The thesis must be approved by a departmental faculty committee of no fewer than three members, appointed by the Graduate Program Director. At the discretion of the committee, the student may be required to present a seminar on the topic of his or her thesis.

Requirements for the Ph.D. Degree

A. Course requirements: At least fifteen (15) approved credits in formal courses over and above the M.S. degree requirement. This does not include credit for ESC-699 (Research) or ESC-698 (Practicum in Teaching). The faculty advisor may impose additional course requirements.

B. Major and minor requirements: The student must major in one of three areas within the Department. These major areas are:

1. Energy systems and fluid mechanics
2. Solid mechanics
3. Atmospheric sciences

Students are advised to secure a dissertation advisor as early as possible but no later than after passing the preliminary written examination. In addition, the student must select a minor from one of the following academic disciplines:

1. Fluid mechanics
2. Heat transfer
3. Thermokinetics
4. Statistical mechanics
5. Solid mechanics
6. Atmospheric sciences
7. Other approved disciplines outside the Department.

The minor requirement consists of three 3-credit courses within one of the above areas. A grade of at least B in each course is necessary to complete the requirement. There will be no preliminary examination questions on these courses.

C. Preliminary written examinations: During the last two weeks of each semester, written examinations for doctoral programs will be offered in each of the three areas. A student in the doctoral program must take the preliminary written examination in his or her major area by the fourth semester in that program (second semester for a student with an M.S. degree). Only for a good reason and by a petition presented six months in advance may this examination be deferred.

In the area of energy systems and fluid mechanics, the examination consists of two parts chosen from any two of the following four academic disciplines:

1. Fluid mechanics
2. Heat transfer
3. Statistical mechanics
4. Thermokinetics

D. Preliminary oral examinations: Within one year after passing the preliminary written examination, the student must complete all formal course requirements. Within one semester after passing the preliminary written examination, the student must submit a dissertation proposal to his or her oral examination committee. In addition, three (3) credits of ESC-699 are required as a corequisite for taking the preliminary oral examination. The oral examination committee will consist of three (3) members of the Department and one (1) member from outside the Department. The student will orally defend his or her dissertation proposal. Three of the four members of the examination committee must approve the performance before the student is admitted to candidacy for the Ph.D. degree. The oral examination is not required, however, for a student who has completed a master's degree with thesis.

E. Advancement to candidacy: After the student has successfully completed all requirements for the degree, other than the dissertation, he or she is eligible to be recommended for advancement to candidacy. This status is conferred by the Vice Provost for Research and Graduate Studies upon recommendation of the chairperson of the graduate program.

F. Research and dissertation: A dissertation is required for the Ph.D. degree. The dissertation must be approved by a dissertation examining committee. This committee will have four (4) members—three (3) from the Department of Mechanical Engineering and one (1) from outside the Department. The Graduate Program Director, in consultation with the dissertation advisor, will make the tentative selection of the members of the committee in the Department. The official recommendation for the appointment of the entire dissertation examining committee will be made to the Vice Provost for Research and Graduate Studies when the candidate's dissertation is near completion.

Dissertation defense orals are open to the University faculty and to the graduate students of the department. Questioning is open to the dissertation examining committee and the faculty of the University. The decision is by majority vote of the dissertation examining committee.

Prior to the formal dissertation defense, presentation of the research results at a seminar is considered desirable and is to be scheduled by the advisor. The dissertation is to be distributed to the committee members at least three (3) weeks before the dissertation defense. One (1) copy is to be kept in the departmental office for examination by the faculty.

Concentration in Atmospheric Sciences

The Laboratory for Planetary Atmospheres Research (LPAR) houses an interdepartmental teaching and research concentration for students interested in the physics and chemistry of the atmospheres of the earth and other planets. This concentration is available to students in the College of Engineering and Applied Sciences and the Division of Physical Sciences. A graduate student in any of the departments of these divisions may, with the consent of his or her chairperson, elect to participate. The basic degree requirements are set by the department in which the student is enrolled. The student will normally be advised to take two or more courses from the list drawn up by the LPAR faculty in order to obtain a basic background in the atmospheric sciences. A major portion of the preliminary examination will be devoted to problems in atmospheric physics and chemistry. A research advisor for the dissertation will normally be selected from the LPAR faculty.

Concentration in Energy Technology

Interdepartmental teaching and research concerned with energy technology is coordinated through faculty associated with the Laboratory for Energy Technology. A graduate student in any participating department may elect to participate in the energy technology concentration. Basic degree requirements are set by the department in which the student is enrolled. Students interested in this concentration, which emphasizes the fundamentals and applications of modern technology systems, may obtain more detailed information from the Department of Mechanical Engineering.

Graduate Studies in Environmental Engineering

The master of science in mechanical engineering with Graduate Studies in Environmental Engineering is designed to meet a growing need in both the private and public sectors for planners, administrators and design engineers to deal with environment-related problems. Environmental Engineering is intended for professionals currently engaged in other areas of administration, planning, and engineering as well as those already in the environmental field. Students who have completed a baccalaureate degree in engineering, physical science, mathematics, economics or a related field may apply to Graduate Studies in Environmental Engineering.

Jurisdiction for Graduate Studies in Environmental Engineering comes under the Dean of the College of Engineering and Applied Sciences and an advisory committee of regional environmental agencies and engineering and planning firms, together with Stony Brook faculty members. Two basic tracks are available: engineering design and water resources management.

For further information, contact Professor Stewart Harris, Department of Mechanical Engineering.

Combined B.E.-M.S. Degree

Undergraduate students may enter this special five-year bachelor of engineering-master of science program at the end of their junior year. During the next two years, a student will complete the requirements for both the B.E. and M.S. degrees, including the M.S. thesis. Further information may be obtained from the Departmental Director of Graduate Studies.

Faculty

Berlad, Abraham L., Professor. Ph.D., 1950, Ohio State University: Combustion; reactive media; stratospheric photochemistry, energy technology.

Bradfield, W. Samuel, Professor. Ph.D., 1957, University of Minnesota: Environmental fluid dynamics; boundary layer heat transfer; hydrofoil ventilation studies.

Cess, Robert D., Professor. Ph.D., 1959, University of Pittsburgh: Atmospheric sciences.

Chevray, Rene, Professor. Ph.D., 1967, University of Iowa: Transport and turbulent flows.

Chiang, Fu-Pen, Professor. Ph.D., 1966, University of Florida: Experimental mechanics; photoelasticity; moire and other optical methods for stress analysis.

Hameed, Sultan, Associate Professor. Ph.D., 1968, University of Manchester, England: Air pollution dispersion.

Harris, Stewart, Professor. Ph.D., 1965, Northwestern University: Brownian motion theory and its applications; non-equilibrium theory of fluids.

Hogan, Joseph S., Associate Professor. Ph.D., 1968, New York University: Planetary atmospheres; satellite meteorology.

Irvine, Thomas F., Jr., Professor. Ph.D., 1956, University of Minnesota: Measurement of thermophysical properties; rheological fluid mechanics and heat transfer.

Lee, Richard S. L., Professor. Ph.D., 1960, Harvard University: Fluid mechanics; fire research; suspension flow; flow instability; biomedical fluid flow.

O'Brien, Edward E., Professor. Ph.D., 1960, The Johns Hopkins University: Turbulent transport.

Rubenstein, Asher A., Assistant Professor. Ph.D., 1981, Brown University: Solid mechanics and fracture.

Stell, George R., Professor. Ph.D., 1961, New York University: Statistical thermodynamics.

Tasi, James, Professor. Ph.D., 1962. Columbia University: Solid mechanics; shock waves in crystal lattices.

Varanasi, Prasad, Associate Professor. Ph.D., 1967, University of California, San Diego: Planetary spectroscopy; molecular physics.

Wang, Lin-Shu, Associate Professor. Ph.D., University of California, Berkeley: Dynamic meteorology; energy technology.

Yang, Ching H., Professor. Ph.D., 1951, Lehigh University: Thermokinetic systems.

Estimated number of teaching and research assistants, fall 1982: 41.

Courses

ESC 501 Convective Heat Transfer and Heat Exchangers
An examination of the heat transfer characteristics of both external and internal flows (laminar and turbulent) with free and forced convection. Study of the operation and design of a variety of heat exchanger types including shell and tube, regenerator, finned plate, etc.
Prerequisite: Graduate student standing in the Department
Spring, 3 credits

ESC 502 Conduction and Radiation Heat Transfer
Heat conduction and conservation law; intensity of radiation, black body radiation, and Kirchoff's law; analysis of heat conduction problems; analysis of radiative exchange between surfaces and radiative transport through absorbing, emitting and scattering media.
Prerequisite: Graduate student standing in the Department
Fall, 3 credits

ESC 504 Environmental Pollution
The pollutants in our environment, their sources, effects, and methods for their control. Pollution of the air, water, and land as well as the interrelationships among these will be discussed.
Fall, 3 credits

ESC 505 Principles of Water Pollution
The basic microbial and chemical processes are examined, especially as they relate to public health and environmental deterioration. The role of microorganisms as pathogens, pollutants, and in pollution control; the implications for aquatic ecosystems of waste and thermal loading.
Fall, 3 credits

ESC 506 Water Quality Laboratory
An introduction to the field and laboratory techniques used in measuring and predicting water quality. Sampling and monitoring methods, data handling and evaluation.
Corequisites: MSA 547, ESC 505
Fall, 3 credits

ESC 507 Reactive Media
Thermodynamics, rate processes, flow, and stability of reactive media. Thermokinetic and thermophysical properties of nonequilibrium systems. Energy storage and energy transfer in reactive systems. Non-adiabatic theory of reaction wave structure, initiation, propagation and extinction. Application of fundamentals to lasers, combustion, condensation, crystallization, population dynamics and non-equilibrium systems.
3 credits

ESC 508 Reactive Media—Current Problems
Continuation of ESC 507. Detailed discussion of selected journal articles.
3 credits

ESC 509 Engineering Hydraulics
Steady and varied flow in open channels; transient flow and water hammer phenomena in closed conduits. Study of the flow of viscous suspensions. Applications to weir, transition and spillway design and the flow of liquids, air and sludge; pumps and meters.
Spring, 3 credits

ESC 511 Advanced Fluid Mechanics I: Perfect Fluids
Lagrangian and Eulerian frames. Dynamical equations of momentum and energy transfer. Two-dimensional dynamics of incompressible and basotropic perfect fluids and of the compressible perfect gas. Conformal mapping applied to two-dimensional fluid dynamics. Jets and cavities. Surface waves, internal waves. Perfect shear flows.
3 credits

ESC 512 Advanced Fluid Mechanics II: Viscous Fluids
The role of viscosity in the dynamics of fluid flow. The Navier-Stokes equations, Low Reynolds number behavior including lubrication theory, percolation through porous media and flow due to moving bodies. High Reynolds number behavior including steady, unsteady and detached boundary layers, jets, free shear layers and wakes. Phenomenological theories of turbulent shear flows are introduced.
3 credits

ESC 513 Advanced Fluid Mechanics III: Compressible Fluids
One-dimensional gas dynamics and wave propagation. Shock waves in supersonic flow. The method of characteristics. Effects of viscosity and conductivity, and concepts from gas kinetics.
3 credits

ESC 514 Advanced Fluid Mechanics IV: Introduction to Turbulence
Introductory concepts and statistical description. Kinematics of random velocity fields. Equations of motion and their interpretation. Experimental techniques: isotropic turbulence and the closure problem. Transport processes in a turbulent medium. Turbulent jets, wakes and boundary layers.
3 credits

ESC 515 Dynamic Meteorology
Rotation of the Earth and the Coriolis force. Physical properties of atmospheric air. Large-scale atmospheric motion—Rossby waves; turbulent nature of the atmospheric motion; baroclinic effects. General circulation of the atmosphere.
3 credits

ESC 516 Climatology
General circulation of the atmosphere. Solar constant; nature of clouds; global albedo. Terrestrial outgoing radiation. Interactions of the atmosphere and the oceans. Climatic pattern and possible causes of the changes in climatic

pattern. Orbital parameters of a planet. Climate in the Quaternary period—glacial-interglacial oscillation; theories of the "ice ages." Drifting of the continents; deep ocean circulation; and the initiation of the Quaternary period. Climates of Mars.
3 credits

ESC 517/518 Waste Water Collection and Treatment Systems I and II
The principles of designing and operating an adequate, efficient, and non-pathogenic waste water collection and treatment system. Municipal and industrial sewage treatment, sedimentation, coagulation, filtration, chemical treatment, aeration, activated sludge, phosphorous and nitrate removal and other advanced treatment methods. Ultimate disposal and the holding and disposal of solids.
Prerequisites: ESC 505 and 509 or equivalent
Fall and spring, 3 credits each semester

ESC 519 Water Supply Design
Water requirements for public, industrial, agricultural and other usage. The principles of designing an adequate, efficient, and non-pathogenic water supply system.
3 credits

ESC 521 Energy Transfer in Gases
Fundamental concepts in quantum mechanics, statistical thermodynamics, and electromagnetic theory from an engineer's point of view. Thermodynamic properties of gases at high temperatures. Absorption and emission of radiation in high-temperature gaseous environments. Rates of relaxation processes in gases and plasmas. Current experimental techniques for measuring temperature, rate constants and radioactive properties of gases.
3 credits

ESC 522 Experimental Methods in Energy Transfer
Introduction to experimental techniques in convective and radiative heat transfer, combustion processes and air pollutant detection. Quantitative spectroscopy as a research tool in above mentioned areas as well as planetary atmospheric research.
3 credits

ESC 523 Atmospheric Molecular Processes
Review of electromagnetic theory of scattering and spectroscopy in a manner appropriate for studies of planetary atmospheric phenomena involving gaseous molecules. A major portion is devoted to quantitative spectroscopic aspects of absorption of infrared radiation by planetary atmospheric gases. Spectral line shaped and band models.
3 credits

ESC 524 Statistical Mechanics: The Molecular Basis of Continua Mechanics
The course develops the basic tools necessary for an understanding of the relation between the properties of matter in the bulk (e.g., thermodynamic and transport properties) and the underlying interparticle forces responsible for them.
3 credits

ESC 525 Mechanical Systems Design
Case studies in mechanical engineering design. A new project each year is solicited from industrial sources and the instructional plan is centered about the project. This course is concentrated on teaching the student the procedures for attacking a new design project and carrying it through to completion. Emphasis is on current applications of interactive computer graphics to problems of mechanical engineering design.
Prerequisite: ESG 440
3 credits

ESC 528 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. Laboratory participation is an integral part of the course.
3 credits

ESC 529 Vehicular Dynamics
Applications of fluid dynamics theory of practical devices. Elements of airfoil and hydrofoil design; structural analysis from hydrodynamic loads prediction; performance prediction for a full-scale vehicle based on a theoretical loads prediction. Elements of static and dynamic stability. Where possible, full-scale structural and vehicle performance tests are carried out.
Alternate years, 3 credits

ESC 532 Structural Dynamics
The mechanical behavior of engineering structure 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.
3 credits

ESC 533 Molecular Theory of Fluids
The course will have three main aspects. One will be the molecular basis of the results of fluid mechanics. The second will be those techniques and viewpoints common to the statistic theory of turbulence and the molecular theory of fluids. The third will be selected applications to problems of current engineering interest (e.g., flow through porous media and fluidized beds, coagulation theory, transport properties of fluid mixtures).
Spring, alternate years, 3 credits

ESC 534 Systems Engineering I
Introduction to systems engineering as a technical area of activity. Topics will include "need" analysis; concepts of the engineering system; optimization with respect to cost, performance, and weight; the design definition, system verification requirements; and system performance demonstration techniques. The course material will be illustrated by case studies of current engineering systems in development.
Alternate years, 3 credits

ESC 535 Systems Engineering II
A detailed look at the considerations and techniques involved in bringing an engineering system into existence. Topics will include acceptance criteria; program planning; technical planning; product assurance; systems safety including fault-free analysis and product liability; and a testing philosophy overview (or when to test and why). A term paper will be required concerning an industrial problem of current interest.
Prerequisite: ESC 534
Alternate years, 3 credits

ESC 536 Mechanics of Solids
A unified introduction to the engineering mechanics of elastic, plastic and time-dependent solid materials and structures, with emphasis on physical aspects of the subject. Stress and equilibrium. Kinematics of deformation, strain, and compatibility. Tensor representation and principal values. Principle of virtual work. Formulation of stress-strain relations in elasticity, plasticity, and viscoelasticity. Uniqueness. Extremum and minimum principles, including energy methods. Representative boundary value problems chosen from bending and torsion of rods, plane strain, plane stress, and plate bending. Introduction to relevant experimental techniques.
3 credits

ESC 537 Experimental Fluid Mechanics
Fundamentals of measurements and instrumentation. Operating principles and performance characteristics of instruments for measurements of physical quantities such as velocity, pressure, and temperature. Flow visualization and liquid and gases. Optical methods in compressible flow: interferometry, schlieren, shadow. Fundamentals of acoustics. Introduction to analysis and measurement of random varibles. Laboratory demonstrations.
3 credits

ESC 539 Finite Element Methods in Mechanical Engineering Design
Finite element methods for solving structural mechanics, heat transfer, and fluid flow problems in the design area. General formulations and computational schemes. Structural analysis. Thermal and momentum boundary layer flow formulations. Numerical solutions. Error estimates.
Prerequisite: MSA 361
Fall, 3 credits

ESC 540 Geophysical Fluid Dynamics
Inertia and gravity effects of entropy or density variations in fluids. Small amplitude waves, gravitational and Helmholtz instabilities, internal waves and turbulence. Coriolis effects of the earth's rotation. Comparison of gravity and rotation effects on the behavior of non-homogeneous fluids. Applications to natural phenomena.
3 credits

ESC 541, 542 Elasticity I, II
Derivation of linear equations of elasticity. Stress equations of motion. Displacement and strain. Stess-strain relations for crystalline solids. Compatability equations. Uniqueness theorem. Reciprocity theorem. Applications to static three-dimensional problems. Wave propagation in infinite and bounded media. Elastic lattice vibrations and theories of microstructure.
Alternate years, 3 credits each semester

ESC 543 Plasticity
Stress and deformation of solids: Yield criteria and flow rules for plasticity deforming solids; the notion of a stable inelastic material; static and dynamic analysis of plastic bodies under mechanical and thermal loadings; use of load bounding theorems and the calculation of collapse loads of structures; the theory of the slip-line field.
3 credits

ESC 544 Atmospheric Radiation
Discussion of the compositions and radiative components of planetary atmospheres. Backbody and gaseous radiation with emphasis upon the respective roles of electromagnetic theory and quantum statistics. Derivation of the equation of transfer and radiative exchange integrals, with application to energy transfer processes within the atmospheres of earth and other planets.
3 credits

ESC 545, 546 Theoretical Meteorology I, II
Introduction to the quantitative interpretation of the thermal and dynamical structure of the planetary atmospheres. Topics to be covered include atmospheric thermodynamics, hydrostatic equilibrium, hydrostatic equilibrium and convection, solar and terrestrial radiations, equations of motion on a rotating planet, atmospheric energetics, general circulation and numerical weather prediction.
3 credits each semester

ESC 547 Aeronomy
An examination of the physical and chemical processes which determine the structure and composition of the atmosphere. A discussion of the chemical composition of the neutral atmosphere and ionosphere will be followed by the development of the basic equations governing atmospheric structure. The major processes at work in each region of the atmosphere will be delineated. The origin and history of our atmosphere will be discussed and mankind's impact on its future will be considered. Comparisons will be drawn between our own environment and the atmospheres of other planets.
Spring, 3 credits

ESC 548 Air Pollution Meteorology
A discussion of atmospheric processes which determine air pollution concentration. Theory of diffusion with application to pollution dispersion from point, line and area sources. Practical methods for estimating pollution levels near urban and industrial sources. Chemical interactions of air pollutants. Production of ozone in urban smog. Urban heat-island. Modification of local weather by pollution.
3 credits

ESC 549 The Changing Global Environment
An introduction to the global aspects of environmental pollution and its long- and short-term consequences. Chemical balance of gases in the earth's atmosphere. Origin and fate of major air pollutants. Global circulation of atmospheric pollution. Impact of land and sea pollution on the climate. Environmental effects of energy production. Ocean pollution by toxic wastes. Environmental monitoring and control. Air quality standards versus emission standards. Systems analysis of pollution abatement.
3 credits

ESC 550 Environmental Satellites
Historical perspective, introduction to satellite mechanics, instrumentation and radiative transfer. Major topics include application of satellite measurements to earth and water resources surveying, meteorology, oceanography, agriculture, land use and pollution monitoring. The emerging potential for use of satellite data in planning and management will be discussed.
3 credits

ESC 552 Analysis of Composite Solids
The main emphasis of the course is on the analysis of layered composite materials. The Cartesian tensor calculus is used. Homogeneous anisotric media are studied first. The effect of layering is then analyzed. Applications to plates and shells are considered. Current theories of inelastic mechanical behavior of composite solids are introduced.
Alternate years, 3 credits

ESC 557 Kinetic Theory
Theory of the Boltzmann equations. The Hilbert, Chapman-Enskog and Grad solutions, and the transition to fluid dynamics, determination of transport coefficients. Relationship of normal solutions to actual solutions of the Boltzmann equation.
3 credits

ESC 561 Photoelasticity
Theory of two- and three-dimensional photoelasticity for experimental stress analysis. Lectures include the necessary optics background and such topics as frozen-stress method, scattered light technique, birefringent coating and absolution retardation methods. Special techniques such as fringe multiplication and sharpening, oblique incidence. Students will be involved in a complete project.
3 credits

ESC 591 Thermodynamics
The course will begin with a review of elementary thermodynamics and go on to consider more advanced areas of thermodynamic theory that are fundamental to various engineering applications, such as irreversible thermodynamics. Special topics will include thermophysical properties of fluids and the form of thermodynamic perturbation theory that has proven to be of enormous utility to chemical engineers.
3 credits

ESC 592 Classical Thermodynamics
A rigorous presentation of classical thermodynamics. Applications to flow systems and heat engines. Applications to systems involving intensive variables besides pressure and temperature.
Spring, 3 credits

ESC 599 Research
Variable and repetitive credit

ESC 601 Nonlinear Mechanics
Phase plane analysis of binary systems. Autonomous and non-autonomous systems. Stability theory. Liapunouv functions and functionals. Bifurcation theory and critical phenomena. Limit cycles and oscillations. Generalized Volterra and Van der Pol equations. Perturbation theory and asymptotic process of Krylov and Bogoliubov. Problems in chemical kinetics and dynamic systems.
3 credits

ESC 602 Two-Phase Suspension Flows
The flow of a two-phase suspension of particles in a carrier fluid plays a central role in a large class of technical problems of practical importance. Topics include interphase dynamic interaction, formulation of fundamental governing equations for a two-phase mixture, migration of particles in laminar and turbulent shear flows, and experimental techniques which are needed for the study of such flows.
Prerequisite: ESC 364
3 credits

ESC 613 Phase Transitions and Critical Phenomena
Traditional approaches (Weiss mean field, Bragg-Williams and van der Waalslike theories) as well as more recent work (scaling laws of Kadanoff and Widom functional expansion, "semi-invariant" expansions) are examined. Various useful models such as the Ising model are discussed. In addition to liquid-gas and order-disorder transitions, the nature of the solid-liquid transition is also considered.
3 credits

ESC 614 Applications of Statistical Mechanics
The relation between the thermodynamical properties of a system at equilibrium and its Hamiltonian. The emphasis is in developing a set of techniques that enables one to assess the properties of fluids and certain solids over a wide range of thermodynamic conditions (critical or curie point). The use of cluster expansions and functional Taylor series are among the techniques stressed.
3 credits

ESC 615 Seminar In Radiative Transfer
Topics of current interest concerning radiative energy transfer in gases are discussed.
3 credits

ESC 620 Chemical Kinetics of Combustion and Atmospheric Reactions
Introduction to theory of rate process. Transition state and collision rate theories. Chain reactions and theories of explosion. Unified chain and thermal theory of explosion. Kinetic oscillations. Oxidation kinetics of hydrogen, carbon monoxide and hydrocarbon. Gasification of graphite and coal particles. Photo-chemical smog and kinetic processes in stratosphere.
3 credits

ESC 621 Combustion Theory I
Theory of laminar, turbulent and diffusion flames. Combustion of suspended droplets and solid particles. Inflammability limits of fuel-oxident mixtures. Explosions in unconfined fuel and oxident clouds. Theory of source ignition and extinction limits. Auto ignition and knocking in reciprocating engines. Detonation theories of gas and condensed phase explosives. Plane and spherical blast and detonation waves. Initiation and transition between deflagration and detonation waves. Special topics in turbo jet propulsion and rocket oscillation.
3 credits

ESC 624 Baroclinic-Fluid Flow
The role of baronclinicity in the dynamics of fluid flow. Wave propagation in a solenoidal non-homogeneous fluid. Natural convection flow and the Bernard-Rayleigh problem. Quasi-geostrophic theory of rotating baroclinic stratified fluids. Intense vortices in a conditionally stable stratified fluid.
3 credits

ESC 625 Turbulent Diffusion
Eulerian description of passive contaminants in homogeneous turbulence. Closure techniques and their flaws. Lagrangian description of single particle and relative diffusion. Similarity in shear flows. The role of buoyancy forces in atmospheric transport. An introduction to turbulent reactive flows.
3 credits

ESC 626 Rheological Heat Transfer
Consideration of the flow and heat transfer of rheological fluids in ducts and boundary layers. Both purely viscous and viscoelastic fluids will be considered. The measurement of rheological transport properties will be discussed.
Prerequisite: Permission of instructor
Alternate years, 3 credits

ESC 637 Experimental Methods in Turbulence
Theory and application of hot-wire anemometry, constant-temperature and constant-current modes, laser Doppler velocimetry. Modern methods of signal processing: wave-form education, lock-in amplication, box-car integration. Fast-rate data acquisition systems and storage.
Prerequisite: ESC 514
Alternate years, 3 credits

ESC 641 Fracture Mechanics
The mechanics of brittle and ductile fracture in structural materials. Elastic stress fields near cracks, theories of brittle fracture, elastic fracture mechanics. Techniques of stress analysis, analytical function methods. Elastic-plastic analysis of crack extension. Plastic instability. Dislocation mechanisms, cleavage. Transitional behavior, rate sensitivity, running cracks. Fatigue toughness testing and structural design considerations.
Alternate years, 3 credits

ESC 642 Advanced Mechanics of Continua
The curvilinear tensor calculus is reviewed. Basic equations which govern the behavior of continuous media are derived in which finite deformations are permitted. Coupling between mechanical, thermal and other effects is considered. The thermodynamics of continuous media are studied. Singular surfaces and waves are examined.
3 credits

ESC 661 Measurements System Design
Design of research instrumentation in the context of the research problem. Selection of appropriate transducers for response to a given phenomenon and design of appropriate intermediate and readout components. Specific problems may be selected, depending upon the students' interest.
3 credits

ESC 671 Optical Methods for Experimental Stress Analysis
Theory and applications of moire methods (inplane, shadow, reflection, projection and refraction moire techniques) for measuring static and dynamic deformation of 2-D and 3-D models, bending of plates and shells, and temperature distribution or refraction index change in fluids. Other topics: holographic interferometry, laser speckle interferometry, and current research activities of the field.
3 credits

ESC 681 Planetary Atmospheres
A survey of current knowledge about the compositions, structures and dynamics of the atmospheres of planets in our solar system. Models for upper and lower regions and probable evolutionary histories will be discussed. Emphasis will be placed on the most recent results obtained from space craft and ground-based observations. Student participation is encouraged. This course is identical to ESS 661.
3 credits

ESC 696 Special Problems in Mechanics
Conducted jointly by graduate students and one or more members of the faculty.
3 credits, repetitive

ESC 698 Practicum in Teaching
3 credits, repetitive

ESC 699 Dissertation Research
Variable and repetitive credit

Department of Technology and Society

Faculty

Braun, L., Professor. D.E.E., 1959, Polytechnic Institute of Brooklyn: Computers in education; bioengineering.

Chan, Y., Associate Professor. Ph.D., 1972, Massachusetts Institute of Technology: Operations research; transportation.

Ferguson, D. L., Assistant Professor. Ph.D., 1980, University of California, Berkeley: Computer applications; applied probability and statistics; mathematics/science education.

Gilmore, A.W., Assistant Professor. M.S., 1957, University of Colorado: Aerospace engineering; engineering economics.

Liao, T.T., Associate Professor. Ed.D., 1971, Columbia University: Computers in education; decision making.

Paldy, L., Associate Professor and Dean of Continuing Education. M.S., 1966, Hofstra University: Nuclear arms control; science policy.

Piel, E.J., Professor and Chairperson. Ed. D., 1960, Rutgers University: Decision making; technology-society issues.

Truxal, J.G., Distinguished Professor. Sc.D., 1950, Massachusetts Institute of Technology: Control systems; technology-society issues.

Visich, M., Jr., Professor and Associate Dean of Engineering and Applied Sciences. Ph.D., 1956, Polytechnic Institute of Brooklyn: Aerospace engineering, technology-society issues.

Courses

EST 560 Urban and Regional Planning Models
Overview of urban and regional development process, theoretic basis for model construction, including the land use impacts of transportation; activity allocation models as a tool for forecasting; survey of submodels on each economic sector: democraphic, residential, industrial and public service; the use of gaming in community planning. Crosslisted with UPS 560.
Spring, 3 credits

EST 561 Transportation Policy Analysis
Overview of transportation policy analysis and implementation; travel demand forecasting, including the sequential modeling steps of generation, distribution and model split, as well as direct demand modeling; network models as a means to analyze equilibrium traffic flow; evaluation of options through an actor participatory framework.
Prerequisites: College algebra or permission of instructor
Fall, 3 credits

EST 565 Personal Computers in Learning Environments
The purpose of the course is to develop in the student an understanding of the uses of microcomputers in education and to develop some level of understanding of the computer as a system. The course defines *hardware, software* and *courseware,* and how they interact. Interfacing, peripheral devices, and I/O ports are presented. Advanced programming techniques are introduced including machine language programming and the uses of graphics and sound.
Prerequisite: EST 583
Spring, 3 credits

EST 570 Design of Courseware
The purpose of the course is to build in the student the ability to develop courseware to support the learning needs of her/his students. The principal mode of instruction involves one-on-one instruction in a laboratory environment.
Prerequisite: EST 565
Spring, 3 credits

EST 581 Decision Making in Technology-People-Environment Problems
Application of basic elements of decision making (criteria constraints, models and optimization techniques) to the analysis of potential solution to problems which involve technology and its impact on people and the environment. Areas of study include technology for forecasting and assessment methods, cost/benefit analysis, resource management and the matching of technological systems to societal needs.
3 credits

EST 582 Systems Approach to Man-Machine Systems
Application of system concepts (input-output, feedback, stability, information analysis) to the analysis of dynamic systems involving technology and society. Areas of study include automatic compensation of systems through the use of feedback; stability and instability of urban systems, transportation epidemics, and economics; machines and systems for men, including communication and prosthetics.
3 credits

EST 585 Technology in Learning Systems
The primary objectives of the course are to apply engineering concepts and systems analysis to the design and development of instructional systems; to analyze

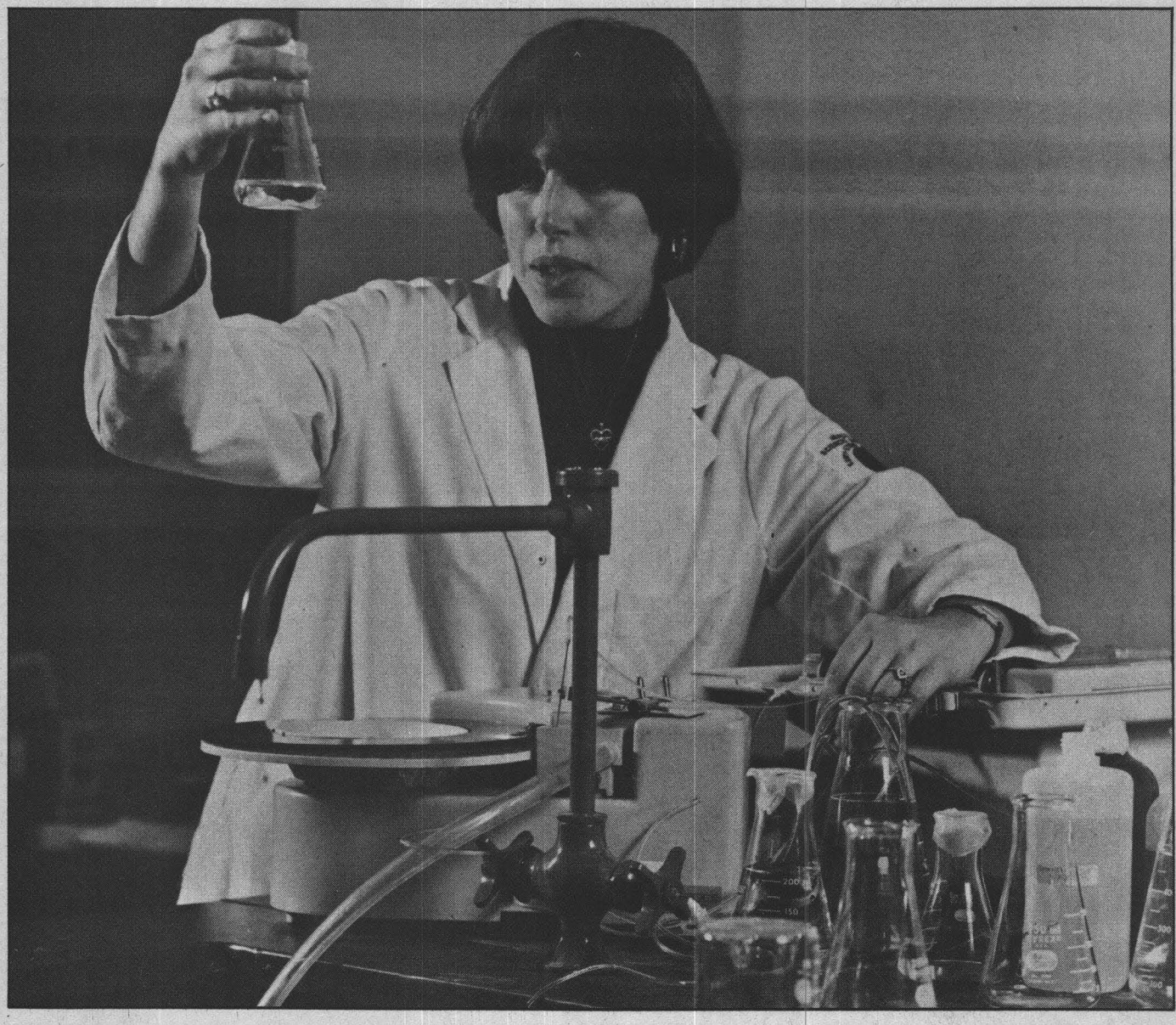
specific examples of how technological hardware can be used to enhance delivery of instruction; to study various techniques of using technology to improve the evaluation process.
Prerequisite: EST 583
Fall, 3 credits

EST 586 Automation and Feedback in Technology/Society Systems
An examination through lectures-discussions and laboratory experiences of the concepts behind automation and its applications to man-machine systems.
Prerequisite: CEN 582
Spring, 3 credits

EST 590 Project Seminar in Applied Science
A forum for discussion of research methods and project ideas in Applied Science Education for Graduate Students. Seminar topics include development and implementation of new interdisciplinary applied science curricula for secondary schools and community colleges; design and evaluation of educational technology systems. Students will be required to propose and execute a pilot version of a master's project. (Credit will not be given toward other graduate degrees offered in the Department.)
Prerequisite: CEN 580, 585
3 credits

EST 591 Independent Study in Applied Science Education
The primary objective of independent study is to provide a student with opportunities to interact with faculty members who can be of assistance in his or her master's project. Students should contract individually with faculty members on work load and credit(s).
Prerequisite: EST 582
Up to 3 credits

The Health Sciences



StonyBrook

Health Sciences Center

The Health Sciences Center is a major division of the State University of New York at Stony Brook. It is the fourth and newest health center in the SUNY system.

The decision to develop a new Health Sciences Center at Stony Brook grew out of the Muir Commission Report presented to former Governor Rockefeller in 1963, which assessed the State's immediate health manpower and service needs. Noting that the then-2½ million residents of the two Long Island counties of Nassau and Suffolk were among the largest populations in the United States not served by an academic medical center, the Muir Commission recommended the development of a Health Sciences Center within the State University at Stony Brook to meet the health teaching and related service needs of the Long Island geographic area.

The Health Sciences Center now consists of five Schools: the Schools of Allied Health Professions, Dental Medicine, Medicine, Nursing, and Social Welfare. The Schools are linked to the University Hospital, a central teaching facility for all the educational programs of the Health Sciences Center. In addition, a full range of professional, technical and laboratory resources are available to the Center, providing academic support services for students and faculty.

The Health Sciences Center has also established a partnership with four Long Island hospitals where students receive patient care experience in the field. These are the Hospital of the Medical Research Center, Brookhaven National Laboratory; Long Island Jewish-Hillside Medical Center and its Queens Hospital Center Affiliation of LIJ-HMC; Nassau County Medical Center; and Northport Veterans Administration Medical Center. In addition, the five Schools have affiliation agreements with over 80 other hospitals and health agencies in the Long Island area.

The date each School opened and the degrees now conferred are:

School of Allied Health Professions	1970	B.S., M.S.
School of Dental Medicine	1973	D.D.S.
School of Medicine	1971	M.D., M.S., Ph.D.
School of Nursing	1970	B.S., M.S.
School of Social Welfare	1971	B.S., M.S.W.

Objectives of the Center

- To increase the supply and proficiency of health professionals in fields of demonstrated regional, state and national need.
- To provide health care of sufficient variety and quality to enable professional education and related research to occur.
- To sustain an environment in which research in health and related disciplines can flourish
- To emerge as a regional resource for advanced education, patient care and research in broad areas of health.

Buildings and Facilities

The Health Sciences Schools share instructional space, multidisciplinary laboratories, lecture halls and the support services of the Division of Laboratory Animal Resources, the Health Sciences Center Library, Photography and Medical Illustrating Services and the Office of Student Services.

The 19 floors of the University Hospital include surgical suites, laboratories, emergency and ambulatory care units capable of handling up to 300,000 visits per year and ancillary facilities. When fully operational, nearly half of the 540-bed hospital will be dedicated to intensive and specialty care.

Specialized services in the Hospital will include an open heart surgery program, a comprehensive renal dialysis facility, a transplant service, full perinatal care (including high-risk obstetrics and neonatal and pediatric intensive care units), acute psychiatric services for adults and children and a broad-based diagnostic and therapeutic rehabilitation program.

While the University Hospital will provide a hospital teaching environment for students, the Health Sciences Center will continue to utilize the clinical facilities currently being provided for its students in Long Island hospitals and health agencies which have entered into partnership agreements with the Health Sciences Center.

Planning for a new dental facility as part of the Center is presently underway, and it is expected that the School of Dental Medicine will move from its temporary facilities in the mid-1980's, bringing all of the Schools of the Center to one location.

The Center and the Community

At present, over 1,000 skilled professionals from the Long Island region have faculty appointments and participate in the Schools of the Center. All Health Sciences Center students, as part of their clinical training or field work, work for a specific time with some of the Long Island health and welfare agencies. Continuing education for many health professions is offered by the Schools. The Center also sponsors conferences, workshops and lectures on major health issues for the general community.

School Organization

With the exception of the Schools of Nursing and Social Welfare, the Schools of the Health Sciences Center are organized structurally around departments.

School of Allied Health Professions
Department of Allied Health Resources
Department of Cardiorespiratory Sciences
Department of Medical Technology
Department of Physical Therapy
Department of Physician's Assistant Education

School of Dental Medicine
Department of Children's Dentistry
Department of Dental Health
Department of Dental Medicine
Department of Oral Biology and Pathology
Department of Oral and Maxillofacial Surgery
Department of Periodontics
Department of Restorative Dentistry

School of Medicine
Department of Anatomical Sciences
Department of Anesthesiology
Department of Biochemistry
Department of Community and Preventive Medicine
Department of Dermatology
Department of Family Medicine
Department of Medicine
Department of Microbiology
Department of Neurology
Department of Obstetrics and Gynecology
Department of Ophthalmology
Department of Oral Biology and Pathology
Department of Orthopaedics
Department of Otorhinolaryngology
Department of Pathology
Department of Pediatrics
Department of Pharmacological Sciences
Department of Physical Medicine and Rehabilitation
Department of Physiology and Biophysics
Department of Psychiatry and Behavioral Sciences
Department of Radiology
Department of Surgery
Department of Urology

School Information

Detailed information about the professional programs offered by the five Schools is contained in the *Health Sciences Center Bulletin.* Since the Center's training of health professionals requires special academic programming and support services, significant sections of the data contained in this *Graduate Bulletin,* such as admission procedures and requirements, registration, student services, educational expenses, financial aid and the academic calendar, are not applicable to the Health Sciences Center. The exception to this generalization is the Graduate Program in Basic Health Sciences described in detail below.

The *Health Sciences Center Bulletin* can be obtained by writing to or telephoning the Health Sciences Center Office of Student Services (516/246-2111), or the Office of the Dean of a specific School.

Allied Health Professions

The School of Allied Health Professions offers a program leading to the degree of Master of Science in Health Sciences. The program is designed for professionals who wish to gain proficiency in teaching, supervision or research. Students must successfully complete 36 credits of study including a 12-credit internship or practicum and courses to demonstrate understanding and competence in medical care delivery, written communication, research methodology and interpersonal skills. A plan of study, which includes a 14-credit specialty track in teaching, supervision or research, will be designed jointly by each student and a faculty advisor from the School of Allied Health Professions.

All candidates must hold a baccalaureate degree, have professional status in one of the health professions, have one year's experience in the field, submit a graduate record score and aspire to a career in teaching, supervision or research.

Further information may be obtained from the program director:

Rose A. Walton
Department of Allied Health Resources
School of Allied Health Professions
Health Sciences Center
State University of New York at Stony Brook
Stony Brook, NY 11794
Telephone: (516) 246-2393

Dental Medicine

Admission to the School of Dental Medicine is highly selective.

All questions concerning admission to the School of Dental Medicine should be addressed to:

Office of Admissions
School of Dental Medicine
Health Sciences Center
State University of New York at Stony Brook
Stony Brook, NY 11794
Telephone: (516) 246-2805

Medicine

Admission to the School of Medicine is highly selective.

All questions concerning admission to the School of Medicine should be addressed to:

Office of Admissions
School of Medicine
Health Sciences Center
State University of New York at Stony Brook
Stony Brook, NY 11794
Telephone: (516) 246-2113

Nursing

The School of Nursing offers a full-time and part-time multidisciplinary master of science program for the preparation of nurse-practitioners in family health care and clinical care management.

All questions concerning admission requirements, application and admission procedure should be addressed to:

Paula Hunter, Ph.D.
Director, Graduate Program in Nursing
School of Nursing
Health Sciences Center
State University of New York at Stony Brook
Stony Brook, NY 11794
Telephone: (516) 246-2385

Graduate Program in Social Welfare

The School of Social Welfare is seeking applicants committed to social change—students concerned with the insufficient commitment of existing institutions to the needs of people in this society. Since the School is part of the Health Sciences Center, a major thrust of its curriculum is in the broad areas of health, mental

health and human service programs. The master's program of the School of Social Welfare is structured to provide students with theoretical and practical expertise, so that they can function with maximal competence in areas of social welfare practice, utilizing a range of methods and skills.

Applicants to the graduate program will be evaluated in part on the basis of the congruence of their interests with the School's resources and commitments. A major attempt is made to build into the student body a large degree of ethnic, income and sexual diversity.

All questions concerning admission to the School of Social Welfare should be addressed to:

Janet Steele-Holloway
Assistant Dean for Admissions and Recruitment
School of Social Welfare
Health Sciences Center
State University of New York at Stony Brook
Stony Brook, NY 11794
Telephone: (516) 246-2141

The Graduate Programs in Basic Health Sciences

The School of Medicine also offers graduate studies leading to the M.S. and Ph.D. degrees in Basic Health Sciences in the fields of anatomical sciences, molecular microbiology, oral biology and pathology, pathology, pharmacological sciences, or physiology and biophysics. These Graduate Studies are designed to lead to careers in research and teaching.

Each Graduate Studies is guided by its own director and executive committee. Students wishing to pursue a combined M.D.-Ph.D. program should apply for admission to the School of Medicine since admission to one degree program does not guarantee admission to the other.

The preclinical disciplines fundamental to the health professions are organized in the School of Medicine. These disciplines are represented by the Departments of Anatomical Sciences, Biochemistry, Microbiology, Pathology, Pharmacological Sciences, and Physiology and Biophysics in the School of Medicine, and by the Department of Oral Biology and Pathology in the School of Dental Medicine. These Departments, in conjunction with appropriate components of the Division of Biological Sciences, have principal responsibility for preclinical instruction of students in all Schools of the Health Sciences Center. They also have University-wide responsibility to students for undergraduate and graduate training and research in the disciplines basic to health sciences in the other Schools on the campus, as well as at affiliated clinical campuses.

The faculty listings that follow include only those members sharing major responsibility for graduate education. A comprehensive listing of all Health Sciences faculty members is presented in the *Health Sciences Center Bulletin*.

Admission Requirements

A. A baccalaureate degree with the following minimal preparation: mathematics through one year of calculus, chemistry, including organic chemistry, general physics, and one year of biology with laboratory.

B. A minimum grade point average of 2.75 (B–) in all undergraduate coursework, and 3.00 (B) in science and mathematics courses.

C. Letters from three previous instructors and results of the Aptitude Test of the Graduate Record Examination and the Advanced Area Test.

D. Acceptance by one of the Graduate Studies in Basic Health Sciences as well as by the Graduate School.

In special cases, students not meeting requirements A through C may be admitted on a provisional basis. These students must act to remedy deficiencies within the first year, following the requirements of the individual Graduate Studies.

M.A. Degree Requirements

The various Graduate Studies in the Basic Health Sciences normally do not accept students whose goal is a master's degree. In exceptional instances, a student already in the program may be awarded an M.S. degree upon completing an approved course of study, including a minimum of 30 graduate credit hours, passing a comprehensive examination, and/or submitting and defending a master's thesis.

Requirements for the Ph.D. Degree

A. Minimum residence: Two years of full-time graduate study.

B. Language proficiency: Whether or not foreign language proficiency or a substitute (such as computer programming) is required is left to the discretion of individual Graduate Studies.

C. Formal course requirements: Successful completion of an approved course of study (approval is the responsibility of the respective program committee).

D. Candidacy (preliminary) examination: At the discretion of the department, the preliminary examination may be oral or written, or both, and may consist of a series of examinations. Students will normally apply for the examination after completing the major portion of coursework, but not later than the end of the fifth semester of coursework. In those Graduate Studies that require foreign language proficiency tests, the latter must be passed before permission can be granted to take the preliminary examination.

E. Advancement to candidacy: The School's recommendation with respect to candidacy for the Ph.D. degree will be based upon satisfactory completion of the above requirements. Advancement to candidacy is granted by the Vice Provost for Research and Graduate Studies.

F. Research and dissertation: The general requirements of the Graduate School regarding the dissertation examination will be followed.

Department of Anatomical Sciences

Graduate Studies in Anatomical Sciences offers graduate courses in four broad areas: developmental anatomy, microscopic anatomy, macroscopic anatomy and neuroscience. The curriculum in developmental anatomy includes genetics, embryology, developmental mechanisms and fetal biometrics. The microscopic anatomy curriculum emphasizes the structure and function of biological membranes, cell organelles, and motile and excitable tissues. The curriculum in macroscopic anatomy consists of biomechanics and biometrics in human and vertebrate anatomy and physical anthropology, including primatology. The neuroscience curriculum emphasizes invertebrate and vertebrate anatomy and physiology including neurocytology, neurohistology, electrophysiology and animal behavior. Further details of Graduate Studies in Anatomical Sciences leading to the Ph.D. in Basic Health Sciences may be obtained from the Director of Graduate Studies, Dr. Madeline Fusco.

Faculty

Brink, Peter R., Assistant Professor. Ph.D., 1976, University of Illinois: Physiology and biophysics of junctional and excitable membranes.

Cohen, David H., Professor. Ph.D., 1963, University of California, Berkeley: Cellular mechanisms of conditioning; neural control of the heart.

Creel, Norman, Associate Professor. Ph.D., 1967, Eberhard-Karls University, W. Germany: Quantitative taxonomy of primate populations; polyfactorial inheritance; primate evolution.

Dewey, Maynard M., Professor and Chairperson. Ph.D., 1958, University of Michigan: Structure and function of biological membranes; comparative structure and function of muscle; electron microscopy.

Edmunds, Leland N., Professor. Ph.D., 1964, Princeton University: Cell cycles and biological clocks in *Euglena.*

Fleagle, John G., Associate Professor. Ph.D., 1976, Harvard University: Evolutionary biology of higher primates; vertebrate paleontology; behavioral and experimental analysis of comparative musculoskeletal anatomy; skeletal growth and development.

Fusco, Madeline, Professor. Ph.D., 1959, University of Pennsylvania: Neurophysiology; neural control of energy exchange; hypothalamic control systems.

Gilbert, Susan H., Assistant Professor. Ph.D., 1975, Emory University: Mechanisms of muscle contraction; muscle energetics; structure and function of vertebrate and invertebrate muscle.

Inke, Gabor B., Professor. M.D., 1944, Pazmany Peter University, Hungary; D.M.D., 1960, University of Halle/Saale, East Germany: Quantitative morphology of the human brain; physical anthropology.

Jungers, William L., Assistant Professor. Ph.D., 1976, University of Michigan: Paleoanthropology; comparative primate anatomy; biomechanics; primate paleontology and systematics.

Karten, Harvey J., Professor. M.D., Albert Einstein College of Medicine: Comparative and developmental biology of the vertebrate nervous system with emphasis on morphological and histochemical studies of nervous tissue; evolution of the nervous system.

Krause, David W., Assistant Professor. Ph.D., 1982, University of Michigan: Vertebrate paleontology; mammalian evolution; functional morphology of masticatory and locomotor systems.

Lyman, Harvard, Associate Professor. Ph.D., 1960, Brandeis University: Control mechanisms in the biogenesis, development and replication of chloroplasts and other cellular organelles.

Moore, Jean K., Research Assistant Professor. Ph.D., 1971, University of Chicago: Structure and development of the mammalian auditory system; electron microscopy.

Palatnik, Carl M., Research Assistant Professor. Ph.D., 1975, State University of New York at Stony Brook: Messenger RNA metabolism and relation to development in *Dictyostelium;* cellular aspects of development.

Panessa-Warren, Barbara, Assistant Professor. Ph.D., 1974, New York University: Transmission and scanning electron microscopy; X-ray microanalysis; quantitative elemental analysis of cells.

Prives, Joav M., Assistant Professor. Ph.D., 1968, McGill University, Canada: Differentiation of excitable membranes during development in tissue culture; regulation of biosynthesis of cell membrane components.

Sherman, S. Murray, Professor. Ph.D., 1969, University of Pennsylvania: Studies of the central visual pathways of cats; visual development; neuroanatomy.

Spector, Ilan, Assistant Professor. Ph.D., 1967, University of Paris, France: Electrophysiology of nerve and muscle cell lines; ion channels; neurotoxins.

Stern, Jack T., Jr., Professor. Ph.D., 1969, University of Chicago: Functional gross morphology; relationship between primate locomotor behavior and structure; human muscle function in relation to athletic activity and orthopaedics; radiotelemetered electromyography.

Susman, Randall L., Assistant Professor. Ph.D., 1976, University of Chicago: Functional morphology and behavior of primates; evolution of apes and humans; gross anatomy.

Walcott, Benjamin, Associate Professor. Ph.D., 1968, University of Oregon: Comparative neurophysiology; comparative muscle structure and function; sensory integration; electron microscopy.

Williamson, David L., Professor. Ph.D., 1959, University of Nebraska: Genetics; maternally inherited infections; biology of spiroplasmas.

Zieve, Gary W., Assistant Professor. Ph.D., 1977, Massachusetts Institute of Technology: Microtubules and associated proteins; mitotic apparatus; nuclear structure.

Courses

HBA 530 Microscopic Structure of the Human Body
A lecture-and-laboratory course designed to fulfill the need of medical, dental and graduate students for a basic understanding of the cytology and histology of the human body. All material will be presented with the goal of integration of structure and function. Presentations will be in formal lectures and self-study laboratory sessions.
Prerequisite: Permission of instructor
Fall, 6 credits

HBA 531 Gross Anatomy of the Human Body
A course comprising (1) laboratories in which detailed dissection of the human body is undertaken and (2) lectures covering topics in gross anatomy including functional and topographic anatomy, clinical correlations and introduction to radiology.
Prerequisite: Permission of instructor
Spring modules, 7 credits

HBA 532 Human Embryology
This course in human embryology is designed to present the development of human structure in such a way as to promote understanding of normal adult anatomy and the more common congenital anomalies. Emphasis will be placed on describing the events of early embryonic formation and subsequent organogenesis. Reproductive physiology will be covered in some detail, and an introduction to developmental mechanisms will be offered.
Prerequisites: HBA 530 and concurrently with or after HBA 531; permission of instructor
Spring modules, 2 credits

HBA 533 Basic Medical Genetics
Fundamentals of genetics with emphasis on medical aspects; coverage includes autosomal-X-linkage, gene linkage and chromosome mapping, chromosomal aberrations, multiple allelic systems, population genetics and human genetic counseling.
Prerequisite: Permission of instructor for non-Health Sciences students
Spring modules, 2 credits

HBA 560 Advanced Regional Anatomy
A course in advanced human gross anatomy for graduate students or advanced undergraduates in biology, anthropology and other life sciences.
Prerequisite: Permission of instructor
Fall and spring, 3-8 credits

HBA 562 Techniques in Electron Microscopy
A laboratory course designed to teach students how to fix and embed tissues, prepare ultrathin sections, obtain and process electron microscope photographs, and interpret ultrastructural details. Theory of electron optics will be discussed where applicable to the above techniques. Methods in routine maintenance of an electron microscope will also be stressed.
Prerequisite: Permission of instructor
Fall and spring, 1-4 credits

HBA 563 Aspects of Animal Mechanics
This course comprises an introduction to biomechanics. The first half covers free-body mechanics and kinetics as applied to vertebrate locomotion. The second half deals with the structure and physiology of muscle as it relates to adaptations of the musculoskeletal system.
Prerequisite: Introductory physics and biology or permission of instructor
Spring, odd years, 2 credits

HBA 564 Primate Evolution
The taxonomic relationships of the primates and their evolutionary history as documented by the fossil record and structural and chemical evidence. Emphasis on human lineage. Laboratory included. Open to senior undergraduates.
Prerequisite: Permission of instructor
Spring, even years, 4 credits

HBA 565 Human Evolution
Survey of the fossil record of human evolution from the later Tertiary through the Pleistocene. The course will emphasize the record of morphological evolution including evolution of the skull, teeth and limbs. Topics include the ape-human furcation, radiation of the early hominids, the evolution of *Homo erectus,* Neanderthal man, later human ancestors, the evolution of the brain and intelligence, bipedalism and other morphological complexes. The lectures and laboratories will utilize extensive comparative anatomical material, fossil casts and slide collection.
Prerequisite: Permission of instructor
Spring, odd years, 4 credits

HBA 580 Comparative Anatomy and Evolution of Mammals
A laboratory dissection course on the comparative anatomy of living mammals. Each student or group of students will dissect a different species and demonstrate the results to the class. Dissections will be supplemented by weekly seminars on the evolution of major groups of mammals and anatomical diversity among different taxa. Emphasis is placed on relating structural diversity to behavior. Seminar can be taken separately as HBA 581.
Prerequisites: Previous course in human or vertebrate anatomy; permission of instructor
Fall, odd years, 4 credits

HBA 581 Evolution of Mammals
A consideration of the evolution and radiation of mammals from the Mesozoic to the present from an anatomical and paleontological perspective. Emphasis is placed on the characteristic morphological features of major groups, the functional significance of anatomical characteristics and the mammalian fossil record.
Prerequisite: Permission of instructor
Fall, odd years, 2 credits

HBA 590 Projects in Anatomical Sciences
Individual laboratory projects closely supervised by faculty members to be carried out in staff research laboratories.
Prerequisite: Permission of instructor
Fall and spring, 1-6 credits each semester, repetitive

HBA 656 Cell Biology
The purpose of the course is to introduce students to the structural organization of cells and tissues and to the way the structure relates to the function. Particular emphasis will be placed on cell organelle structure and function in specialized cells in tissues. The organization and interaction of cells in tissues will also be covered. The course will be comparative and will include examples of tissues from vertebrates and invertebrates. (Crosslisted with BCD 656.)
Prerequisite: Baccalaureate degree in science or permission of instructor
Spring, 3 credits

HBA 657 Developmental Biology
This course will deal with developing systems at all levels from the morphological to the molecular. Illustrative material from both animal and plant kingdoms will be used. Emphasis will be placed on cellular aspects of these non-equilibrium systems, with special attention to gametogenesis, genetic control of early development, translational control of protein synthesis, the role of cell division and cell movements, and cell-cell interactions in defining developing systems. (Crosslisted with BCD 657.)
Prerequisite: Permission of instructor
Fall, 3 credits

HBA 661 Methods in Research
Students are involved in research projects supervised by staff members in their research laboratories.
Prerequisite: Permission of instructor
Fall and spring, 1-12 credits, repetitive

HBA 690 Graduate Seminar
Seminars by graduate students on current literature in the areas of the anatomical sciences.
Prerequisite: Permission of instructor
Fall and spring, 2 credits each semester

HBA 692 Advanced Topics in Anatomical Sciences Literature
Tutorial readings in anatomical sciences with periodic conferences, reports and examinations arranged with the instructor.
Prerequisite: Permission of instructor
Fall and spring, 1-2 credits, repetitive

HBA 694 Thesis Research
Original investigation under supervision of thesis advisor and committee.
Prerequisite: Permission of thesis advisor
Fall and spring, 1-12 credits, repetitive

HBA 695 Practicum in Teaching
Practice instruction in the teaching of anatomical sciences carried out under faculty supervison.
Prerequisite: Permission of instructor
Fall and spring, 1-4 credits, repetitive

HBA 760 Postgraduate Clinical Anatomy of the Head and Neck
Gross and radiologic anatomy, embryology and neuroanatomy of the head and neck, with special emphasis on applications for oral surgeons, otolaryngologists and ophthalmologists. Lectures, dissections, prosections, seminar discussions and clinical presentations with their anatomical correlates.
Prerequisite: Permission of instructor
Spring, variable credit

Department of Molecular Microbiology

Graduate Studies in Molecular Microbiology offers a variety of graduate courses leading to the Ph.D. degree in Basic Health Sciences. The general areas of research being conducted in the Department encompass all aspects of modern microbiology. These consist of prokaryotic systems, animal viruses, eukaryotic cells and subcellular systems. The Department is especially well equipped for research in the rapidly growing fields of eukaryotic cells and viral molecular biology. The recommended coursework is designed to cover cell biology, biochemistry, genetics, molecular biology and developmental biology. Students are given the opportunity initially to conduct short-term research projects in two or three different laboratories, followed by concentration on a major dissertation research project. Further details may be obtained from the Director of Graduate Studies.

Faculty

Abrahams, Irving, Clinical Associate Professor. Ph.D., 1952, Cornell University: Cellular immunity; fungal immunology; host-parasite interactions.

Anderson, Carl W., Adjunct Associate Professor. Ph.D., 1970, Washington University: Protein synthesis; molecular biology of transformation and productive infection by DNA tumor viruses.

Armstrong, Karen A., Lecturer. Ph.D., 1975, University of Minnesota: Molecular biology and genetics of bacterial plasmids, especially replication.

Bauer, William R., Professor. Ph.D., 1968, California Institute of Technology: Structure, biosynthesis, and interactions of the nucleic acids, especially of circular DNAs; structure and DNA-binding proteins of vaccinia and other animal viruses; mechanism of action of antitumor drugs; structure and replication of bacterial drug-resistance factors.

Broach, James R., Assistant Professor. Ph.D., 1973, University of California, Berkeley: Investigations of gene expression in the yeast *S. cerevisiae.*

Brugge, Joan S., Assistant Professor. Ph.D., 1975, Baylor College of Medicine: Mechanism of tumor induction by avian sarcoma virus; regulation of cellular growth control.

Bukhari Ahmad I., Adjunct Associate Professor. Ph.D., 1970 University of Colorado: Mechanism of integration of bacterio phage Mu, DNA insertion elements, and the degradation of proteins of *Escherichia coli.*

Carter, Carol A., Associate Professor. Ph.D., 1972, Yale University: Role of covalent modifications and nucleic acid-protein interactions in viral genome expression; molecular biology of reorvirus replication.

Delihas, Nicholas, Associate Professor and Associate Dean for Basic Sciences. Ph.D., 1961, Yale University: Ribosome structure; RNA structure and function; ribosome binding sites; studies of the mechanism of protein synthesis.

Dunn, John J., Adjunct Professor. Ph.D., 1970, Rutgers University: Transcription, processing and translation of RNA.

Friedling, Steven P., Adjunct Assistant Professor. M.D., 1968, State University of New York, Downstate Medical Center: Clinical infectious disease.

Grodzicker, Terri, Adjunct Associate Professor. Ph.D., 1969, Columbia University: Genetics of SV40-adenovirus junctions; development of animal virus genetic systems.

Hicks, James B., Adjunct Associate Professor. Ph.D., 1975, University of Oregon: Yeast genetics of the mating locus and gene regulation.

Jacobson, Ann B., Research Assistant Professor. Ph.D., 1962, University of Chicago: Electron microscopy; structure of viral RNAs; regulation of gene expression.

Katz, Eugene R., Associate Professor. Ph.D., 1969, University of Cambridge, England: Developmental genetics studies on cellular slime molds.

Kim, Charles W., Associate Professor and Associate Vice Provost for Graduate Studies. Ph.D., 1956, University of North Carolina at Chapel Hill: Cell-mediated immunity to parasites; thymocyte migration studies.

Klar, Amar J. S., Adjunct Assistant Professor. Ph.D., 1975, University of Wisconsin: Interconversion and control of yeast cell type.

Levine, Arnold J., Professor and Chairperson. Ph.D., 1966, University of Pennsylvania: Oncogenic viruses; gene expression; developmental biology.

Lucas, Joseph J., Assistant Professor. Ph.D., 1972, University of Pennsylvania: Nuclear-cytoplasmic interaction in eukaryotic cells studied by the techniques of enucleation with cytochalasin B and nuclear transportation.

Matkovic, Christopher S., Adjunct Assistant Professor. M.D., 1974, Columbia University; Ph.D., 1972, Harvard University: Clinical infectious disease.

McKelvy, Jeffrey F., Joint Professor of Neurobiology and Behavior and of Microbiology. Ph.D., 1968, The Johns Hopkins University: Brain peptide metabolism; hypothalamic hypophysiotropic hormones.

Milazzo, John P., Adjunct Lecturer. M.S., 1965, Adelphi University: Application of computer analyses to biological problems.

Ohtsubo, Eiichi, Associate Professor. Ph.D., 1971, Osaka University, Japan: Genetics and molecular biology of bacterial plasmids of fertility factor F and drug-resistance factor R; insertion and transposable DNA elements.

Ohtsubo, Hisako, Research Assistant Professor. Ph.D., 1975, Kanazawa University, Japan: Structure and biological functions of the replication origin region of drug-resistance factors.

Pavlova, Maria, Adjunct Associate Professor. M.D., 1957, Plovdiv Medical School, Bulgaria; Ph.D., 1969, Charles University, Czechoslovakia: Interaction between chemical carcinogens and tumor viruses in carcinogenesis.

Setlow, Jane K., Adjunct Professor. Ph.D., 1959, Yale University: Recombination and repair of microbial DNA.

Shenk, Thomas E., Professor. Ph.D., 1973, Rutgers University: Genetic analysis of SV40; adenovirus replication and transformation.

Shortle, David R., Assistant Professor. M.D., Ph.D., 1979, The Johns Hopkins University: Site-specific mutagenesis; genetic analysis of cloned yeast genes.

Strathern, Jeffrey N., Adjunct Assistant Professor. Ph.D., 1977, University of Oregon: Genetics and biochemistry of the control of cell type in *Saccharomyces* yeasts.

Tegtmeyer, Peter, Professor. M.D., 1960, Saint Louis University: Molecular biology of transforming and productive infection by tumor virus SV40.

Topp, William C., Adjunct Assistant Professor. Ph.D., 1973, Princeton University: Mechanisms of viral transformation, genetic basis for the transformed phenotype.

Wimmer, Eckard, Professor. Ph.D., 1962, University of Gottingen, W. Germany: Structure and biological function of ribonucleic acids and of proteins of picornaviruses and RNA tumor viruses and of their host cells.

Courses

HBM 501 Laboratory Techniques in Nucleic Acids
This course is designed to acquaint the incoming graduate student with a broad range of procedures used in the analysis of biologically relevant nucleic acid species. The techniques covered will include structural analysis of a cloned gene by heteroduplex mapping, restriction enzyme mapping, and Southern blot transfer; transcriptional analysis by Northern blotting and R. loop procedures; and sequences analysis using both Maxam-Gilbert and Sanger techniques.
Prerequisite: Permission of instructor
Fall, 4 credits

HBM 503 Molecular Genetics
This is a broad-based survey course designed to acquaint the student with classical work and current developments in both prokaryotic and eukaryotic genetic systems.
Prerequisite: Permission of instructor
Fall, 3 credits

HBM 505 Biological Macromolecules
This course will examine the nature of biopolymers from several perspectives, including structure, structural transitions, polymer-polymer and polymer-small molecule interactions, and macromolecular aggregates. Among the biological macromolecules to be examined will be nucleic acids (both DNA and RNA), proteins, and nucleoprotein complexes such as chromatin. Examples of the methods to be studied are centrifugation, spectroscopy, magnetic resonance, electrophoresis and rapid kinetics.
Prerequisite: Permission of instructor
Spring, 3 credits

HBM 509, 510 Experimental Microbiology
An introduction to modern microbiological research. During this course, the student rotates through two professors' laboratories spending approximately one-half semester in each. The selection of laboratories is made by the student in consultation with his or her advisory committee. By taking part in ongoing projects the student will learn experimental procedures and techniques and become acquainted with research opportunities in the departments.
Prerequisites: Matriculation in a graduate program and permission of the departmental faculty
Fall and spring, 1-4 credits each semester

HBM 531 Medical Microbiology
Information derived from molecular and experimental cellular biology will be presented to provide a foundation for understanding the basic aspects of the growth regulation, structure and function of viruses, prokaryotic and eukaryotic cells. Extrapolation and application of basic concepts of microbiology to human disease will be made.
Prerequisite: Permission of instructor
Spring modules, 4 credits

HBM 599 Graduate Research
Original investigations undertaken with the supervision of a faculty member.
Prerequisite: Permission of instructor
Fall and spring, 1-8 credits each semester

HBM 611 Animal Cells
Topics covered include the primary structures of animal cells, a survey of cell and tissue culture techniques, regulation of growth in normal and transformed cells, structure and organization of chromatin and mechanisms of replication and transcription of the genome. This material will serve as background for a critical evaluation of the recent research literature.
Prerequisite: Permission of instructor
Fall, 3 credits

HBM 612 Animal Virology
Animal virology describes the molecular mechanisms used by animal viruses to replicate nucleic acids and control gene expression. Several viruses are covered in great experimental detail to illustrate the methodology used to investigate viruses. The unique attributes of all major virus groups are also considered. A comprehensive reading list provided with the course focuses primarily on original data rather than on review articles.
Prerequisite: Permission of instructor
Spring, 3 credits

HBM 621, 622 Short Courses in Microbiology
Upon occasion the Department will present short courses covering topics in microbiology at an advanced level. Classes will meet one or two periods for three to five weeks. Announcement of the courses will be made by sending notices to University departments.
Prerequisite: Permission of instructor
Fall and spring, 1 credit

HBM 690 Microbiology Seminar
A weekly meeting devoted to current work in the Department and lectures by invited speakers.
Prerequisite: Permission of instructor
Fall and spring, 1 credit each semester, repetitive

HBM 691 Readings in Microbiology Literature
Readings in microbiology literature covering animal cells and animal viruses.
Prerequisite: Permission of instructor
Spring, 1 credit

HBM 694 Dissertation Research in Microbiology
For the student who has been admitted to candidacy. Original research will be undertaken with the supervision of the thesis advisor and advisory committee.
Prerequisite: Permission of thesis advisor
Fall and spring, 1-9 credits

Department of Oral Biology and Pathology

Graduate Studies in Oral Biology and Pathology offers graduate courses for students interested in study and research towards the M.S. and Ph.D. degrees in Basic Health Sciences and for post-doctorates desiring further training or wishing to pursue independent research in this area. The M.S. curriculum is of approximately two years' duration and is particularly suited for those dental graduates who wish to obtain basic science training before entering a clinical specialty. While the Department is interested in all aspects of oral biology, active programs of research presently being conducted include the following: development, metabolism and control of the oral microbiota; bone and salivary gland structure and metabolism; secretory mechanisms; ultrastructure and metabolism of healthy and diseased periodontal tissues; chemistry and crystallography of the biological calcium phosphates; bacterial cell walls and membranes; molecular basis of cellular differentiation. Further details may be obtained from the Director of Graduate Studies, Dr. Jerry Pollock.

Faculty

Archard, Howell O., Associate Professor. D.D.S., 1955, Columbia University: Acquired and inherited morphologic changes affecting the oral mucosa and teeth; oral manifestations of metabolic and systemic diseases; clinical oral allergic disorders.

Chatterjee, Robi, Research Assistant Professor. D. Phil., 1965, University of Allahabad, India: Degradation of salivary proteins and peptides by bacterial proteases and peptidases; involvement of salivary proteins in formation of dental plaque through alteration of salivary pH levels.

Eisenbud, Leon, Professor. D.D.S., 1940, New York University: Clinical and pathologic correlation of lichen planus; gold compounds in mucosal pemphigoid; oral biopsy and immunofluorescence of lupus erythematosus.

Garant, Philias R., Professor. D.M.D., 1965, Harvard University: Electron microscopic authoradiographic, freeze fracture and cytochemical techniques to determine the role of the fibroblast in collagen fibrillogenesis and regeneration of periodontal ligament fibers; the fibroblast in periodontitis lesions; odontogenesis and enamel maturation.

Golub, Lorne M., Professor. D.M.D., 1963, University of Manitoba, Canada; M.Sc., 1965, University of Manitoba: Synthesis maturation and degradation of collagen in oral tissues; effect of inflammation on diabetes and collagen metabolism and on the flow, cellular and chemical constituents of gingival fluid and relevance to diagnosis and management of the periodontal patient.

Gwinnett, John A., Professor. B.D.S., 1959, University of Birmingham, England; Ph.D., 1964, University of Bristol, England: Scanning electron and light optical microscopy of hard and soft dental tissue; dental biomaterials in the restoration of teeth; acid-etch resin technique in the bonding and debonding of orthodontic brackets; analysis of ancient teeth.

Kaufman, Hershell W., Associate Professor. D.M.D., 1963, University of Manitoba, Canada; Ph.D., 1967, University of Manitoba: Role of phytic acid and its inositol phosphate derivatives in protection against dental caries and in inhibition of bone resorption in organ cultures; quantitation of carious lesion formation by contact microradiography.

Kleinberg, Israel, Professor and Chairperson. D.D.S., 1952, University of Toronto, Canada; Ph.D., 1958, University of Newcastle, England: Identification of peptides and salivary factors involved in the growth and metabolism of oral mixed bacterial populations; pharmaceutical application of salivary components in the control of dental caries and oral odor; mechanisms of dental plaque formation; new oral diagnostic techniques.

McNamara, Thomas F., Associate Professor. Ph.D., 1959, Catholic University of America: Microbial etiology of dental caries and periodontal disease; immune mechanisms involved in dental pathogenesis; viral infection in oral microorganisms; significance of secretory IgA in caries prevention.

Pollock, Jerry J., Associate Professor and Graduate Advisor. Ph.D., 1969, Weizmann Institute of Science, Israel: Determination of the biological role of lysozyne; mobilization and mechanism of action of host antibacterial factors in dental pathogenesis; structural and functional organization of bacterial and mammalian cell surfaces; bacterial adherence.

Ramamurthy, Nungavarm S., Research Assistant Professor. M.V.Sc., 1965, University of Agra, India; Ph.D., 1970, University of Manitoba, Canada: Collagen synthesis and remodeling in health and systemic disease; leukocyte metabolism and chemotaxis in diabetes.

Sciubba, James J., Associate Professor. D.M.D., 1967, Fairleigh Dickinson University; Ph.D., 1974, University of Illinois: Cell deletion phenomena in salivary gland tumors; ultrastructure of cultured keratinocytes; electron microscopy of oral odontogenic tumors.

Sreebny, Leo M., Professor. D.D.S., 1945, University of Illinois: Ph.D., 1954, University of Illinois: Diet and dental disease; relationship of sugar, other refined carbohydrates and sugar substitutes to dental caries.

Taichman, Lorne B., Associate Professor. M.D., 1965, University of Toronto, Canada; Ph.D., 1971, University of Wisconsin: Epithelial keratinization and differentiation; carcinogenesis in cultured human epithelial cells; epithelial-mesenchymal interactions in determining regional specificity; DNA-protein cross-lining as a consequence of ultraviolet radiation.

Courses

HBO 500 Biology in the Oral Mineralized Tissues
This course deals with the basic chemistry, crystallography, ultrastructure and metabolism of the calcium phosphates involved in the formation and physiological and pathological resorption of the various mineralized tissues found in or associated with the oral cavity (enamel, dentin, cementum, bone): Ectopic calcifications and calculus formation will be examined.
Fall and spring, 3 credits each semester

HBO 510 Salivary Metabolism and Secretion
Consideration is given to the normal and abnormal structure and function of the glandular systems found in the oral cavity. The composition, regulations and functions of the secretions from the major and minor salivary glands will receive particular attention.
Prerequisites: Oral Biology & Pathology or its equivalent and permission of instructor
Fall and spring, 3 credits each semester

HBO 520 Oral Microbial Systems
Consideration is given to the structural composition, metabolism and environmental relationships of the bacterial systems formed on and in association with the oral hard and soft tissues. Specific and mixed bacterial populations and their role in oral disease will be dealt with.
Prerequisites: Oral Biology & Pathology or its equivalent and permission of instructor
Fall and spring, 3 credits each semester

HBO 530 Molecular Biology and Pathology of the Periodontium
This course deals with the ultrastructure and biochemical composition of the periodontal tissues, the microbial interrelations with the organic and inorganic components of the periodontal tissues, the biochemical dynamics of gingival inflammation and wound healing, and the metabolic processes responsible for the composition and flow of gingival crevice fluid.
Prerequisites: Oral Biology & Pathology or its equivalent and permission of instructor
Fall and spring, 3 credits each semester

HBO 535 Epithelial Keratinization and Differentiation
A consideration of the role of stabilization of gene expression in the development and maturation of mammalian cells and tissues. Differentiation in skin and cartilage will be considered in detail. Alterations in the differentiative process of these tissues which may result in pathological disorders will be discussed.
Prerequisites: Permission of instructor required; suggested—HBP 531; students must have had background in cellular biochemistry
Fall and spring, 3 credits each semester

HBO 545 Sugar and Man
This course will examine the societal and biologic factors which influence the role played by sugar in the development of human disease. Topics will include the chemistry and metabolism of sugar, the sweet taste, the place of carbohydrates in the diet and sucrose substitutes. Special emphasis will be given to the role of sugars in oral disease.
Prerequisites: Oral Biology & Pathology or its equivalent and permission of instructor
Fall and spring, 3 credits each semester

HBO 550 Molecular Basis of the Morphogenesis and Pathogenesis of the Oral and Related Tissues
This course deals with the basic mechanisms involved in differentiation, growth and development, and tumor formation as they relate to the biology and pathology of the oral apparatus.
Prerequisites: Oral Biology & Pathology or its equivalent and permission of instructor
Fall and spring, 3 credits each semester

HBO 560 Oral Biology and Pathology I
This course is the first of four comprehensive courses on molecular structure, biochemical and physiological function, developmental anatomy and pathology of the various systems that constitute the oral apparatus. The course consists of the following two units of instruction: (1) The Embryological Development of the Face and Oral Cavity and (2) The Biology and Pathology of the Oral Mineralized Tissues.
Prerequisites: Undergraduate degree in basic science and permission of instructor
Fall and spring, 3 credits each semester

HBO 561 Oral Biology and Pathology II
This course is the second of four comprehensive courses on molecular structure, biochemical and physiological function, developmental anatomy and pathology of the various systems that constitute the oral apparatus. The course consists of the following two units of instruction: (1) The Biology and Pathology of the Periodontal Structures and (2) The Microbiology of the Oral Cavity.
Prerequisites: Undergraduate degree in basic science and permission of instructor
Fall and spring, 3 credits each semester

HBO 562 Oral Biology and Pathology III
This course is the third of four comprehensive courses on molecular structure, biochemical and physiological function, developmental anatomy and pathology of the various systems that constitute the oral apparatus. The course consists of the following two units of instruction: (1) The Biology and Pathology of the Salivary Glands and Their Products and (2) The Biology and Pathology of the Oral Mucous Membranes.
Prerequisites: Undergraduate degree in basic science and permission of instructor
Fall and spring, 3 credits each semester

HBO 563 Oral Biology and Pathology IV
This course is the last of four comprehensive courses on molecular structure, biochemical and physiological function, developmental anatomy and pathology of the various systems that constitute the oral apparatus. The course consists of the following two units of instruction: (1) The Biology and Pathology of the Oral Sensory Systems and (2) The Biology and Pathology of Oral Motor Systems.
Prerequisites: Undergraduate degree in basic science and permission of instructor
Fall and spring, 3 credits each semester

HBO 590 Research Projects in Oral Biology and Pathology
Individual laboratory projects closely supervised by faculty members to be carried out in their research laboratories.
Prerequisite: Student must be enrolled in a master's or doctoral program.
Fall and spring, 3 credits each semester

HBO 599 Graduate Research
Original investigations undertaken with the supervision of a faculty member.
Prerequisite: Permission of instructor
Fall and spring, 1-12 credits each semester

HBO 690 Oral Biology and Pathology Seminars
Research seminars by students, staff and visiting scientists.
Prerequisite: Permission of instructor
Fall and spring, 1 credit each semester, repetitive

HBO 694 Dissertation Research in Oral Biology and Pathology
Original investigation undertaken with the supervision of a member of the staff.
Prerequisite: Permission of thesis advisor
Fall and spring, 1-12 credits each semester

HBO 695 Oral Biology and Pathology Teaching Practicum
Practice instruction in the teaching of oral biology and pathology at the undergraduate level carried out under faculty orientation and supervision.
Prerequisite: Permission of instructor
Fall and spring, 1-4 credits each semester

Department of Pathology

Graduate Studies in Pathology, offered by the Department of Pathology, provides a broadly based approach to research in the pathology of human disease, including immunology and immunopathology, oncology, connective tissue metabolism, mechanisms of tissue injury and environmental pathology. The curriculum initially is similar to that for first-year medical students, except for modification of clinical training as may be appropriate. Later, the student pursues advanced courses, selected to provide expertise in the investigative area of his or her major interest, leading ultimately to dissertation research and the Ph.D. degree in Basic Health Sciences. Further details may be obtained from the Director of Graduate Studies, Dr. Cahir McDevitt.

Faculty

Ackerman, Lauren V., Professor. M.D., 1932, University of Rochester: Pathology of cancer.

Bachvaroff, Radoslav, Associate Professor. M.D., 1959, Higher Medical Institute of Sofia, Bulgaria: B-cell differentiation; transplantation biology; immunocyte surface markers.

Burke, M. Desmond, Professor. M.D., 1959, National University of Ireland: Clinical decision making.

Chanana, Arjun D., Associate Professor. M.D., 1955, Rajputana University; S.M.S., Medical College, Jaipur (India): Hematopoiesis; pulmonary pathobiology.

Coller, Barry S., Associate Professor. M.D., 1970, New York University: Coagulation; hematology.

Costa, Daniel L., Instructor. Sc.D., 1977, Harvard University: Small-animal respiratory physiology and toxicology.

Cottrell, Thomas, Associate Professor. M.D., 1965, Columbia University, College of Physicians & Surgeons: Pulmonary pathology and pathophysiology.

Deutsch, Dale, Assistant Professor. Ph.D., 1972, Purdue University: Neurobiochemistry; effect of abuse of drugs upon brain biosynthesis.

Drew, Robert T., Associate Professor. Ph.D., 1968, New York University: Pulmonary toxicology of environmental pollutants.

Elias, Jules, Associate Professor. M.A., 1963, Long Island University: Immunohistochemistry of immunoglobulin and polypeptide hormones.

Floering, David A., Assistant Professor. M.D., 1972, Ohio State University: Trace metal analysis.

Galanakis, Dennis, Associate Professor. M.D., 1962, University of Saskatchewan, Canada: Biochemistry; metabolism and physiology of fibrinogen in health and disease.

Habicht, Gail S., Assistant Professor. Ph.D., 1965, Stanford University: Tolerance and cellular immunology; aging.

Janoff, Aaron, Professor. Ph.D., 1959, New York University: Human leukocyte proteases; pulmonary emphysema; effects of smoking on lung biochemistry.

Joel, Darrell D., Associate Professor. D.V.M., 1958, Ph.D., 1964, University of Minnesota: Immunology; responses of gastrointestinal tract to environmental pollutants.

Kane, Philip B., Associate Professor. M.D., 1967, New York University: Responses of the lung to environmental pollutants; chemical carcinogenesis.

Kaplan, Cynthia, Assistant Professor. M.D., 1974, New York University: Placental pathophysiology: pediatric pathology.

Kuschner, Marvin, Professor. M.D., 1943, New York University: Carcinogenesis; environmental factors in disease.

Lane, Bernard P., Professor. M.D., 1963, New York University: Ultrastructural pathology; differentiation; tumor cell biology.

McDevitt, Cahir, Assistant Professor and Director of Graduate Studies. Ph.D., 1977, University of London, England: Biochemistry of connective tissue macromolecules in aging and disease.

Miller, Frederick, Professor and Chairperson (Acting). M.D., 1961, New York University: Immunopathology; renal disease; protein and glycoprotein chemistry; analysis of cytoskeleton.

Peress, Nancy, Associate Professor. M.D., 1967, State University of New York, Downstate Medical Center: Neuropathology; immune disease of the nervous system.

Peerschke, Ellinor I.B., Assistant Professor. Ph.D., 1980, New York University: Platelet physiology.

Phillips, Mildred E., Associate Professor. M.D., 1950, Howard University: Tumor immunology; dermatopathology; immunodermatopathology.

Rapaport, Felix, Professor. M.D., 1954, New York University: Transplantation immunology.

Shellabarger, Claire J., Professor. Ph.D., 1952, Indiana University: Radiation pathology; experimental oncology.

Sokoloff, Leon, Professor. M.D., 1944, New York University: Arthritis and metabolic diseases of bone; biomechanics of joint(s) aging in tissue culture.

Courses

HBP 531 General Pathology
Introduction to the nature and causes of disease, death, reaction to injury and repair. Analysis of associated structural changes in cells and tissues, with reference to their functional correlates.
Prerequisite: Permission of instructor
Course Coordinator: Dr. Miller
Spring modules, 6 credits with lab, 3 credits without lab

HBP 532 Basic Immunobiology
A general introduction to the principles of immunology for Health Sciences professional students. It will include introduction to coagulation and thrombosis; definition of antigens and antibodies; description of cellular events in the immune response; theories of antibody formation; mechanism of inflammation; hypersensitivity states; and diseases associated with responsiveness of the immune system.
Prerequisites: Advanced course in biology and permission of instructor. Biochemistry, genetics and histology will be helpful.
Course Coordinator: Dr. Miller
Spring modules, 2 credits

HBP 533 Immunology
Basic principles of immunology for graduate students in the biological sciences. Includes definition of antigens and antibodies; specificity of the immune response; serological quantitation of proteins and hormones; immunoglobulin structure; the genetics of immunoglobulin synthesis; cellular cooperation in the immune response; hypersensitivity; tolerance; transplantation. Open to advanced undergraduates.
Prerequisites: Advanced courses in biology and biochemistry and permission of instructor
Fall, 3 credits

HBP 535 Cell and Tissue Injury
This course is concerned with cellular mechanisms in disease. The types of physical and chemical agents which can injure cells or aggregates of cells and the nature of the interaction between the injurious agents and the target tissue or cells will be considered first. Cellular alterations occurring as a consequence of the injury or as a response to the injury will then be examined in depth, with particular attention paid to details of the ultrastructural and molecular aspects of injury and the response to injury. Emphasis will be placed upon experimental models which permit elucidation of the mechanisms underlying human disease.
Prerequisite: HBP 531 or permission of instructor
Spring, 2 credits

HBP 552 Radiopathology
A consideration of the biological and pathological effects of ionizing radiations in living organisms, with emphasis on cellular molecular and atomic mechanisms.
Prerequisite: HBP 531
Fall and spring, by special arrangement with instructor, 1 credit each semester

HBP 553 Pathology of Neoplasia
This course will cover the nature and behavior of neoplastic tissue, the etiologies of cancer, and the effect of tumors upon the hosts and will include a special series of laboratories designed to acquaint the student (without a background in histology or physiology) with the appearance and behavior of cancer on the tissue and organ level.
Prerequisite: Permission of instructor
Course Coordinator: Dr. Miller
Spring modules, 2 credits

HBP 554 Advanced Immunology
Mechanisms of injury produced by immunological reactions in tissues. Autoimmune diseases. Immunodeficiency diseases. Supervised laboratory experience in selected topics in immunochemistry or immunology can be arranged.
Prerequisite: HBP 531, 532 or 533.
Spring, 2 credits

HBP 558 Glycoproteins: Structure, Function, Molecular Pathology
Recent developments in research of glycoproteins suggest that they play critical roles in cell interactions, cell adhesion and as communicants between the extracellular environment and the cell nucleus. The course will cover the structure, biosynthesis, catabolism, intermolecular interactions and immunochemistry of intracellular, cell membrane and extracellular glycoproteins in health and disease. Special emphasis will be placed on structure-function relationships.
Prerequisite: Permission of instructor
Spring, 1 credit

HBP 561 Electron Microscopy for Experimental Pathologists
Use of the electron microscope (EM), alone and in conjunction with other methodologies, in studies of biological dysfunction. Special techniques include histochemistry, enzyme histochemistry, immunohistochemistry, diffraction, stereo EM and scanning EM. Design of protocols, preparation and interpretation of data.
Prerequisite: Permission of instructor
Fall and spring, 2-6 credits each semester

HBP 563 Histochemistry
Application of histochemical techniques (enzyme histochemistry, radioautography, cytophotometry, electron histochemistry and immunohistochemistry) to the analysis of chemical components of cells and tissues.
Prerequisite: HBP 531 or HBP 533 and permission of instructor
Fall, 1-3 credits, 3 credits with lab, 1 credit without lab

HBP 590 Seminars on Research in Immunology
A series of monthly year-round seminars which will discuss research in progress by the participants, current journal articles in the field of immunobiology, and prepared reviews of specified areas in the general field.
Prerequisite: Permission of instructor
Fall and spring, 1 credit each semester

HBP 621 Clinical Histopathology
Histologic study of human pathologic anatomy as seen in surgical biopsy and necropsy tissues. Emphasis is placed upon correlation betwen clinical presentations of human disease and histomorphology. Special reference to diagnostic and therapeutic implications to the pathologic process. Designed for students in the health professions.
Prerequisite: Permission of instructor
Course Coordinators: Drs. Miller and Kane
Fall, 1-3 credits

HBP 622 Clinical Pathologic Correlations: Gross Pathology
Correlative exercises in clinical pathology and human gross anatomic pathology including surgical biopsy material. Open to students in medical sciences.
Prerequisite: Permission of instructor
Course Directors: Drs. Kane and Miller
Fall, 1-3 credits

HBP 690 Seminar in Pathology
Seminar in major topics in experimental pathology by students, staff and visiting scientists.
Prerequisite: Permission of instructor
Fall and spring 1-4 credits each semester, repetitive

HBP 691 Journal Club in Pathology
Critical discussions of selected topics in experimental and descriptive pathology with presentation of papers from the literature.
Prerequisite: Permission of instructor
Fall and spring, 2 credits each semester

HBP 692 Advanced Tutorial Experimental Pathology
Advanced tutorial in pathology under faculty supervision with emphasis on material not normally experienced in didactic coursework. Directed readings and other educational experiences may relate to other preparation for thesis research or for the Ph.D. qualifying examinations.
Prerequisites: Permission of instructor and successful completion of program committee-assigned courses
Fall and spring, 1-12 credits each semester

HBP 694 Thesis Research in Pathology
Original investigation undertaken with the supervision of a member of the staff.
Prerequisite: Permission of instructor
Fall and spring, 1-12 credits each semester, repetitive

HBP 695 Teaching Practicum in Pathology
Practice instruction in the teaching of pathology, carried out under faculty orientation and supervision.
Prerequisite: Permission of instructor
Fall and spring, 1-4 credits each semester, repetitive

Department of Pharmacological Sciences

The faculty of the Department of Pharmacological Sciences, in conjunction with faculty in other departments at Stony Brook, offers Graduate Studies in the Pharmacological Sciences (pharmacology, toxicology and medicinal chemistry) leading to the Ph.D. degree in Basic Health Sciences. By emphasizing early research experience and providing a broad but flexible curriculum, students lay the foundation for subsequent independent research. Graduate training in the pharmachological sciences is organized along four broad tracks: biochemical pharmacology, physiological pharmacology, toxicology and chemical biology. The curriculum is structured to give each student a flexible and individual course of study. Students, in consultation with faculty advisors, pursue basic and elective courses during the first two years of training. During this time, they participate in several research projects directed by faculty members associated with the program. Students then select a research advisor from the faculty and, upon completion of the qualifying exam, devote full effort to dissertation research. Further details may be obtained from the Director of Graduate Studies, Dr. David Williams.

Faculty

Bogenhagen, Daniel, Assistant Professor. M.D., 1977, Stanford University School of Medicine: Molecular mechanisms of gene expression for Xenopus 5S RNA genes and for mitochondrial DNA.

Brynes, Paul J., Assistant Professor.[2] Ph.D., 1975, Cornell University: Synthesis and biological studies of tumor-promoting natural products; preparation of fluorogenic substrates for proteolytic enzymes.

Cohen, Seymour S., Distinguished Professor. Ph.D. 1941, Columbia University: Biochemistry of polyamines and nucleotide analogues.

Eisenberg, Moises, Associate Professor. Ph.D., 1972, California Institute of Technology: Molecular mechanisms of ion transport through membranes mediated by pores; fundamental physical-chemical properties of lipid bilayer membranes.

Grollman, Arthur P., Professor and Chairperson.[1] M.D., 1959, The Johns Hopkins University: Mechanisms of action of anti-tumor drugs and anti-viral agents and toxins.

Iden, Charles R., Assistant Professor. Ph.D., 1971 The Johns Hopkins University: Biomedical applications of mass spectrometry; new ionization techniques; toxicology; heavy metal toxicity.

Johnson, Francis, Professor.[2] Ph.D., 1054, University of Strathclyde, Scotland: Synthesis of natural products; medicinal chemistry; anti-tumor agents.

Krantz, Allen, Associate Professor.[2] Ph.D., 1967, Yale University: Enzyme reaction mechanisms; rational approaches to drug design; physiological role of amine oxidases.

Malbon, Craig C., Assistant Professor. Ph.D., 1976, Case Western Reserve University: Biochemistry of hormone action: modulation of catecholamine and peptide hormone action by thyroid hormones.

Marcus, Philip, Adjunct Assistant Professor of Clinical Pharmacology. M.D., 1973, State University of New York, Downstate Medical Center; Internal medicine-pulmonary disease.

McLaughlin, Alan C., Adjunct Associate Professor. Ph.D., 1973, University of Pennsylvania: Nuclear magnetic resonance techniques to study the binding of divalent cations to the dynamic structure of model and biological systems.

Raisfeld, Ilene H., Associate Professor.[1] M.D., 1964, New York University: Reducing drug toxicity; toxicology and clinical pharmacology.

Reich, Edward, Professor.[3] M.D., 1956, The Johns Hopkins University: Role of plasminogen activator in normal and neoplastic states; properties of acetylcholine receptors.

Takeshita, Masaru, Research Associate Professor. Ph.D., 1960, Tokyo Kyoiku University, Japan: Mechanism of action of antitumor agents bleomycin, neocarzinostatin and auromomycin on DNA.

Williams, David L., Associate Professor. Ph.D., 1972 University of Illinois: Molecular actions of estrogens and anti-estrogens; regulation of lipoprotein synthesis.

Wilson, Tazewell, Instructor. Ph.D., 1978, State University of New York at Buffalo, Roswell Park Division: Role of electrophoresis and electro osmosis in the field-induced movement of membrane macromolecules.

Wu, Cheng-Wen, Professor. M.D., Ph.D., 1969, Case Western Reserve University: Protein-nucleic acid interactions; fast reactions in biological systems.

Wu, Felicia Y.-H., Research Associate Professor. Ph.D., 1969, Case Western Reserve University: Role of metals in RNA polymerase, mechanism of action of antitumor drugs; chemical carcino genesis.

[1] *Joint appointment, Department of Medicine*

[2] *Joint appointment, Department of Chemistry*

[3] *Part-time*

Courses

HBH 531 Pharmacological Basis of Therapeutics
Basic principles that underlie action of drugs on physiological processes with particular reference to their therapeutic and toxic actions. A general course in pharmacology for medical, dental and graduate nursing students.
Prerequisite: Permission of instructor
Spring modules, 5 credits

HBH 533 Graduate Orientation in Pharmacology
Basic principles that underlie actions of drugs on physiological processes. A supplementary course in pharmacology for graduate students (required for Pharmacology graduate students). Group discussion of current research topics in pharmacology. Concurrent with HBH 531.
Prerequisite: Permission of instructor
Spring, 6 credits

HBH 541 Medicinal Chemistry
The molecular mechanisms of drug action and its relationship to structure, with emphasis in stereochemistry, functional groups and charge distribution. Some aspects of the synthesis of drugs, covering both natural and synthetic molecules. Possible future developments.
Prerequisite: Permission of instructor
Fall, 3 credits

HBH 543 Principles of Toxicology
An examination of basic concepts of modern toxicology, with particular emphasis on the biochemistry and pathology of toxicants. Topics discussed include (1)Kinetics of absorption, distribution and elimination of toxicants; (2) Metabolism of exogenous substances; (3) Mutagenesis; (4) Chemical carcinogenesis; (5) inhalation toxicity; (6) Organ toxicity; and (7) Detection and evaluation of toxicants, and other toxicology related areas.
Prerequisite: Permission of instructor
Fall, 3 credits

HBH 545 Laboratory Techniques in Pharmacology and Toxicology
On-site demonstrations of selected methods used in toxicologic re-research. The principles, mechanics and limitations of methods used in forensic pathology, animal studies, muta-genesis and carcinogenesis testing will be discussed. Specific techniques in electron microscopy, and methods used in the detection of toxins such as radioimmunoassay, chromatography (gas, liquid) and mass and atomic absorption spectroscopy will be demonstrated. Procedures for safe handling of toxic substances in laboratory research will be discussed and demonstrated.
Prerequisite: Permission of instructor
Fall, 1 credit

HBH 550 Biophysics
Theoretical background and application of current physical techniques to the study of the moledular mechanisms of biological function. Topics to include spectroscopy, diffusion processes, noise and fluctuation, interfacial phenomena.
Prerequiste: Permission of instructor
Fall, odd years, 3 credits

HBH 560 Topics in Biochemical Pharmacology
This course will examine the biochemical characteristics of drug and homone action. Several drugs, hormones, and neurotransmitters will be examined in detail to illustrate (1) the interaction of drugs and hormones with cellular receptors; (2) bonding forces and determinants of specificity in drug receptor interactions; (3) the central role of adenyl cyclase in pharmacological regulation; (4) tranduction of the chemical signal to the pharmacological response; (5) mechanism of drug entry into cells. Emphasis will be placed on current concepts and experimental approaches.
Spring, odd years, 3 credits

HBH 563 Advanced Toxicology
Approximately four weeks will be devoted exclusively to each of three or four selected topics in toxicology. These topics will rotate biannually. Some subject areas to be examined: carcinogenesis, mutagenesis, inhalation, toxicology, natural and food-borne toxicants, systemic (organ) toxicology, neuro toxicology, clinical toxicology, environmental toxicology and industrial toxicology.
Prerequisite: Permission of instructor
Fall semester, 4 credits

HBH 565 Epidemiology and Statistics
Methods, designs and indices used in epidemiological studies will be presented. The common statistical procedures for estimation and comparison will be covered, such as the t-test, chi-squares, linear regression and correlation. Special topics will include survivorship analysis, dose-response curves and biological assay procedures.
Prerequisite: Permission of instructor
Spring, 3 credits

HBH 580 Selected Topics in Pharmacology
Student seminars and readings on topics to be arranged through consultation with staff.
Prerequisite: Permission of instructor.
Fall and spring, 1-8 credits each semester, repetitive

HBH 590 Pharmacology Seminars
Advanced research seminars by staff and visiting lecturers.
Prerequisite: Permission of instructor
Fall and spring, 1 credit each semester, repetitive

HBH 599 Graduate Research in Pharmacological Sciences
Original research projects undertaken with the supervision of a faculty member.
Prerequisite: Permission of instructor
Fall and spring, 1-12 credits each semester

HBH 650 Clinical Pharmacology
A clinically oriented, seminar-discussion course emphasizing rational therapeutics. Patients are studied at the bedside to illustrate therapeutic problems. May include field trips.
Prerequisite: Permission of instructor
Spring, 2-4 credits

HBH 694 Dissertation Research in Pharmacology
Original investigation undertaken as part of the Ph.D. program under supervision of thesis advisor and committee.
Prerequisite: Permission of thesis advisor
Fall and spring, 1-12 credits each semester, repetitive

HBH 800 Full-Time Summer Research
Full-time laboratory research projects supervised by staff members.
Prerequisites: Permission of instructor and full-time graduate student status
Summer, 0 credit

Department of Physiology and Biophysics

The Department of Physiology and Biophysics, in conjunction with other basic biomedical departments, offers Graduate Studies in Physiology and Biophysics leading to the Ph.D. degree in Basic Health Sciences. Although the departmental faculty's areas of specialization span a wide spectrum of the classical subdivisions of physiology (including neuromuscular, cardiac, renal, gastrointestinal and endocrinological), there is a common unifying approach in the emphasis on analysis at the cellular, organelle, and molecular level. Students with little formal training in biology, but with a solid background in some branch of the natural sciences, are invited to investigate their qualifications for admission. The Department's special strengths lie in the fields of neurobiology and biophysical and physico-chemical aspects of the transport and barrier functions of biological membranes. Much of the curriculum involves tutorials, readings and independent research rather than highly structured classwork. Students generally rotate through several faculty laboratories to gain research experience in the first two years, and also participate, under faculty supervision, in the teaching of elementary physiology. Upon completion of qualifying examinations and identification of an individual faculty advisor for overseeing investigative work in a selected field, students devote essentially all their time to dissertation research. Further details may be obtained from the Director of Graduate Studies, Dr. Paul G. LeFevre.

Faculty

Benjamin, William B., Associate Professor. M.D., 1959, College of Physicians & Surgeons, Columbia University: Endocrinology; mechanism of insulin action.

Brown, Joel, Professor. Ph.D., 1964, Massachusetts Institute of Technology: Biophysics and biochemistry of transduction and adaptation in photoreceptor cells; methods for measurement of ion concentration inside single living cells.

Cabot, John, Assistant Professor. Ph.D., 1976, University of Virginia: Neurophysiology.

Clausen, Chris, Assistant Professor. Ph.D., 1979, University of California, Los Angeles: Epithelial membrane transport.

Cohen, Ira, Associate Professor. M.D., Ph.D., 1974, New York University: Electrophysiology of the heart; synaptic physiology.

LeFevre, Marian E., Associate Professor. Ph.D., 1969, University of Louisville: Gastrointestinal physiology; intestinal lymphoid tissue; intestinal barrier function.

LeFevre, Paul G., Professor. Ph.D., 1945, University of Pennsylvania: Cell physiology; molecular mechanisms and kinetics of mediated transfer through cell membranes.

Levy, Harvey M., Professor. Ph.D., 1955, University of California, Los Angeles: Muscle physiology and biochemistry.

McLaughlin, Stuart, Professor. Ph.D., 1968, University of British Columbia, Canada: Biophysics of membranes.

Moore, Leon, Assistant Professor. Ph.D., 1976, University of Southern California: Renal physiology; regulation of renal hemodynamics and the medullary countercurrent system; mathematical modleing of biological processes.

Shukla, Kamal, Research Assistant Professor. Ph.D., 1977, State University of New York at Stony Brook Molecular mechanism of muscle contraction.

Van der Kloot, William G., Professor. Ph.D., 1952, Harvard University: Cellular neurophysiology.

Courses

HBY 506 Transport
Molecular and ion transport mechanisms will be studied in microorganisms, higher cells and the cellular organelles. Emphasis will be placed on the molecular basis of transport functions, their genetic and physiological control, and energy coupling mechanisms in active transport. Membrane structure, chemical composition and biosynthesis will be considered in terms of their role in membrane transport. Crosslisted with BMO 506.
Spring, even years, 2 credits

HBY 531 Introduction To Mammalian Physiology
An introduction at the graduate level to physiology, with emphasis on humans. The principle of cellular physiology, followed by an introduction to the circulatory, respiratory, gastrointestinal, renal, encocrine and nervous systems.
Prerequisites: Admission to medical or dental school and permission of instructor
Fall modules, 5 credits

HBY 551 Biomembranes
A survey of biological membranes. Major topics to be considered include the structure and assembly of biomembranes, the mobility of the membrane components, molecular neurobiology, membrane transport, the chemiosmotic hypothesis, and receptors on biological membranes.
Prerequisite: An undergraduate course in physical chemistry
Spring, even years, 3 crfedits

HBY 552 Physiology and Pharmacology of Excitable Membranes
The origins of electrophysiological phenomena, the ionic theory of resting and action potentials, the physical and chemical properties of membrane ionic conductances, and the biophysics and physiology of sensory organs will all be discussed. This is a seminar course which stresses the understanding of electrophysiological phenomena in terms of molecular mechanisms. One semester of calculus is a sufficient math background. Open to all graduate students and to advanced undergraduates with permission of instructor.
Fall, odd years, 3 credits

HBY 553 Synapse
Biophysics, physiology and pharmacology of synaptic transmission. The neuromuscular junction will be used as a model to develop the basic concepts.
Prerequisites: Calculus, physiology or neurophysiology, physics
Spring, odd years, 3 credits

HBY 590 Special Topics in Physiology and Biophysics
Student seminars on topics to be arranged through consultation with faculty members.
Prerequisite: Permission of instructor
Fall and spring, 1-2 credits each semester, repetitive

HBY 591 Physiology and Biophysics Research
Original investigation undertaken with a member of the staff.
Prerequisite: Permission of instructor
Fall and spring, 1-12 credits each semester, repetitive

HBY 690 Seminar in Physiology and Biophysics
Seminars and discussions on major topics in physiology and biophysics by students, staff and visiting scientists.
Prerequisite: Permission of instructor
Fall and spring, 1-2 credits each semester, repetitive

HBY 694 Thesis Research in Physiology and Biophysics
Original thesis research undertaken with the supervision of a member of the staff.
Prerequisite: Permission of thesis advisor
Fall and spring, 1-12 credits each semester, repetitive

HBY 695 Practicum in Teaching in Physiology and Biophysics
Practical experience and instruction in the teaching of physiology and biophysics carried out under faculty orientation and supervision.
Prerequiste: Permission of instructor
Fall and spring, 1-4 credits each semester, repetitive

The Marine Sciences Research Center

StonyBrook

The Marine Sciences Research Center

The Marine Sciences Research Center (MSRC) is the center for research, graduate education and public service in the marine sciences for the State University of New York system. It offers the only SUNY graduate degree programs in oceanography and marine environmental sciences.

Facilities

Laboratories at the Center are well equipped and students may have access, by special arrangement, to facilities elsewhere on the campus, at the nearby Brookhaven National Laboratory and at the Marine Sciences Research Center's Laboratory at Flax Pond (local salt marsh). The Center maintains a number of small vessels and operates an 18-m research vessel, the *R/V ONRUST,* designed specifically for coastal oceanographic research. Computing facilities at the Center and University are excellent. The University Library has extensive holdings in oceanography, environmental sciences and the basic sciences.

The M.S. Program in Marine Environmental Sciences

The M.S. program offered by the Marine Sciences Research Center (MSRC) consists of a rigorous interdisciplinary approach to coastal oceanography and coastal zone management. It is designed to prepare students for positions in research, management, environmental protection and resource development. The program provides students with a firm basis for more advanced study, but more importantly it is designed to equip students with the background and tools needed for effective careers without additional training. Students may specialize in any one of the following areas: biological oceanography, chemical oceanography, geological oceanography, physical oceanography, fishery management, coastal zone management and marine environmental sciences.

The M.S. Program in Marine Environmental Sciences also offers part-time training to professionals who wish to improve or broaden their skills, or redirect their careers. Required courses are alternated yearly between day and evening, and are arranged so that during any given year half of the courses are given in the evening.

Admission Requirements

Requirements for admission to the master's program normally include: a B.A. or B.S.; coursework in mathematics through calculus; statistics; introductory courses in at least two of the following areas: physics, chemistry, biology, and earth science, with advanced work in at least one of these areas; a cumulative grade point average of at least 3.00 (B); acceptable scores on the Aptitude Tests of the GRE. There are no language requirements.

Requirements for the M.S. Degree

Every student is required to successfully complete an approved course of study consisting of 30 graduate credits, including core courses in biological, chemical, geological and physical oceanography, and courses offered by other departments in the student's basic discipline. Not more than 6 credits may be research and/or seminar. An essay of publishable quality representing original work is required. It may be original laboratory or field research, or the application of existing knowledge to develop a management strategy for a significant environmental problem. Before a student is given formal approval to begin his or her research he or she must pass a written comprehensive examination which is designed to assess the student's general knowledge of coastal processes and environmental problems of the coastal zone. Each student is expected to present a seminar on his or her research work.

B.S.—M.S. Programs

Five-year B.S.—M.S. programs are sponsored jointly by MSRC and the Department of Earth and Space Sciences, and MSRC and the College of Engineering and Applied Sciences. The joint program with the Department of Earth and Space Sciences is for students concentrating in geological oceanography, and the joint program with the College of Engineering and Applied Sciences is for students concentrating in coastal engineering and marine sciences.

Ph.D. Program in Coastal Oceanography

The Ph.D. program is designed to prepare students to effectively formulate and attack coastal oceanographic problems on applied and theoretical levels. It builds a flexible, interdisciplinary program and offers students the opportunity to extend their command of the tools of scholarship and to mature their judgment so that they may become effective, independent solvers of problems. Students will be free to emphasize their own interests whether they be in the biological, chemical, geological, physical or management aspects of the coastal zone, but they may not elect to remain ignorant of the whole. Productive work in the coastal ocean requires both a general understanding and a profound knowledge of at least one basic science.

Admission Requirements

The applicant must have an M.S. degree or have published an acceptable article in a scientific journal. Students may be admitted to the program upon completion of the Center's M.S. degree in Marine Environmental Sciences, or by transfer from other institutions. Students who transfer either must demonstrate, by examination, mastery of the material of the MSRC core courses (MAR 501, 502, 503, and 506) or must take those courses. Acceptable scores on the aptitude tests of the GRE are also required.

Requirements for the Ph.D. Degree

Candidates must meet the general requirements for the Ph.D. degree set by the Graduate School. Departmental requirements are as follows:

A. Courses: Successful completion with grades of B or better of an approved course of study consisting of core courses in biological oceanography (MAR 502), chemical oceanography (MAR 503), geological oceanography (MAR 506) and physical oceanography (MAR 501); advanced courses in oceanography; and advanced courses in the student's basic discipline, including courses offered by other departments of the University.

B. Language requirement: A working knowledge of one foreign language approved by the Marine Sciences Research Center. The Center will set the level of proficiency required.

C. Sea experience: Normally, each student will be expected to participate in oceanographic cruises aboard MSRC vessels or those of other institutions.

D. Written comprehensive examination: Each student will be required to pass written comprehensive examinations in the biological, chemical, geological and physical disciplines of marine science.

E. Oral qualifying (preliminary) examination: After submission and approval of the doctoral dissertation topic the advisor requests the Graduate Program Director to recommend an examination board and a date for the oral qualifying (preliminary) examination. The examination board shall be composed of five specialists in the field in which the student proposes to do his or her dissertation research or in closely related fields. No more than two examiners shall be named from the MSRC and the advisor shall not be one of them. Of the remaining three examiners, at least one shall be an eminent scholar who has not been recently affiliated with the State University of New York at Stony Brook. The purpose of the oral examination is to determine whether the examinee is qualified to undertake the proposed research with a reasonable prospect of a successful outcome. The board may proceed in any way it sees fit to answer this question. The student's advisor shall attend the examination, act as his or her advocate during the subsequent discussion, and be prepared to supply any information that the board may reasonably require.

F. Advancement to candidacy: The student may be advanced to candidacy for the Ph.D. degree when he or she has completed all Graduate School and Marine Sciences Research Center requirements for the degree except the dissertation. Advancement to candidacy is recommended by the Center's Graduate Program Director to the Vice Provost for Research and Graduate Studies through the Center's Director.

G. Dissertation: A dissertation is required for the Ph.D. degree. It must contain the results of original and significant investigation.

H. Defense of the dissertation: The defense of the dissertation is addressed to the candidate's research and its aims are to discover what he or she has done, what it means for the field of the marine sciences, how it will affect current ideas and what leads it suggests for future work. The examining board for the defense shall consist of five examiners recommended by the Graduate Program Director. It shall include the candidate's advisor and one scholar with relevant interests who has not been recently affiliated with the State University of New York at Stony Brook. The defense shall be open to the public. It shall begin with a presentation, by the candidate, of the candidate's work, followed by questioning by the examiners. Thereafter, the defense shall be thrown open to questions addressed to the candidate by the public.

I. Residency requirement: Normally, at least two consecutive semesters of full-time study will be required.

J. Teaching requirement: As a part of their graduate training, students will be expected to participate in the teaching activities of the University for a minimum of one semester. This requirement need not be filled within the MSRC.

K. Time limit: All requirements for the Ph.D. degree must normally be completed within seven years after completing 24 hours of graduate courses in the Department.

Faculty

Bokuniewicz, Henry J., Assistant Professor. Ph.D., 1976, Yale University: Near-shore transport processes; coastal sedimentation; marine geophysics.

Bowman, M.J., Associate Professor. Ph.D., 1971, University of Saskatchewan, Canada: Oceanography of coastal waters; water quality modelling; microstructure and turbulence.

Brinkhuis, Boudewijn H., Assistant Research Professor. Ph.D., 1975, State University of New York at Stony Brook: Seaweed productivity, physiology and ecology.

Capone, Douglas G., Assistant Research Professor. Ph.D., 1978, University of Miami: Microbial ecology and biogeochemistry.

Carpenter, Edward J., Associate Professor. Ph.D., 1969, North Carolina State University: Nitrogen cycling among plankton and ambient seawater; phyto- and zooplankton ecology.

Carter, Harry H., Professor. M.S., 1948, Scripps Institution of Oceanography: Estuarine and coastal dynamics; turbulent diffusion.

Cerrato, Robert M., Assistant Research Professor. Ph.D., 1980, Yale University: Benthic ecology; population and community dynamics.

Chuecas, Lisandro A.M., Adjunct Professor.[1] Ph.D., 1968, University of Liverpool, England: Chemical oceanography; descriptive physical oceanography.

Conover, David O., Assistant Professor. Ph.D., 1981, University of Massachusetts: Ecology of fishes; fisheries biology.

Cooley, Arthur P., Adjunct Associate Professor.[2] M.S., 1956, Cornell University: Natural history of Long Island.

Dayal, Ramesh, Adjunct Associate Professor.[3] Ph.D., 1975, Dalhousie University, Canada: Geochemistry; clay mineral-seawater interactions.

Duedall, Iver W., Associate Professor. Ph.D., 1973, Dalhousie University, Canada: Marine environmental chemistry; physical chemistry of seawater; coastal/deep sea oceanography.

Duguay, Linda E., Adjunct Assistant Professor. Ph.D., 1979, University of Miami: Physiology and ecology of marine protozoans and zooplankton.

Esaias, Wayne E., Adjunct Associate Professor. Ph.D., 1973, Oregon State University: Phytoplankton ecology; photobiology.

Falkowski, Paul G., Adjunct Assistant Professor.[3] Ph.D., 1975, University of British Columbia, Canada: Marine phytoplankton ecology; phytoplankton physiology.

Freilich, Michael H., Assistant professor. Ph.D., 1981, Scripps Institution of Oceanography: Waves and beaches; nearshore dynamics.

Fuhrman, Jed A., Assistant Professor. Ph.D., 1981, Scripps Institution of Oceanorgraphy: Marine microbial ecology; bacterioplankton production.

Hanisak, M. Dennis, Assistant Research Professor. Ph.D., 1977, University of Rhode Island: Marine botany; algal physiology and ecology; mariculture.

Herman, Herbert, Professor.[5] Ph.D., 1961, Northwestern University: Ocean engineering; undersea vehicles; marine materials.

Hopkins, Thomas S., Adjunct Assistant Professor.[3] Ph.D., 1971, University of Washington: Coastal current structure; water mass analysis; air-sea interaction.

Kinsman, Blair, Visiting Professor. Ph.D., 1960, The Johns Hopkins University: Waves and tides; estuaries.

Koppelman, Lee E., Professor and Executive Director, Long Island Regional Planning Board. Ph.D., 1970, Cornell University: Coastal zone management; planning; policy studies.

Like, Irving, Adjunct Professor.[6] LL.B., 1949, Columbia University: Environmental law.

Lopez, Glenn R., Assistant Professor. Ph.D., 1976, State University of New York at Stony Brook: Benthic ecology; animal-sediment interactions.

Macler, Bruce A., Assistant Research Professor. Ph.D., 1980, University of California, Berkeley: Microbiology; biochemistry; research diving.

Malouf, Robert E., Assistant Professor. Ph.D., 1977, Oregon State University: Shellfish biology; aquaculture.

McHugh, John L., Professor. Ph.D., 1950, University of California, Los Angeles: Fishery management; fishery oceanography; whales and whaling.

Mayer, Garry F., Adjunct Assistant Professor.[7] Ph.D., 1972, Harvard University: Pollution effects; ichthyology systematics.

Meade, Robert H., Adjunct Professor.[8] Ph.D., 1960, Stanford University: Coastal and fluvial sedimentation; ground water.

Meyers, William J., Assistant Professor.[9] Ph.D., 1973, Rice University: Carbonates; sedimentology.

Naidu, Janakiram R., Adjunct Associate Professor.[3] Ph.D., 1974, Oregon State University: Radioecology; radionuclides in the environment.

Najarian, Tavit O., Adjunct Assistant Professor.[10] Ph.D., 1975, Massachusetts Institute of Technology: Physical oceanography; water quality modelling.

O'Connor, Joel S., Adjunct Associate Professor.[7] Ph.D., 1966, University of Rhode Island: Estuarine and coastal ecology.

Okubo, Akira, Professor. Ph.D., 1963, The Johns Hopkins University: Oceanic diffusion; animal dispersal; mathematical ecology.

Peterson, William T., Assistant Professor. Ph.D., 1979, Oregon State University: Zooplankton population dynamics; fishery oceanography.

Pritchard, Donald W., Professor and Associate Director for Research. Ph.D., 1951, Scripps Institution of Oceanography: Estuarine and coastal dynamics; coastal zone management.

Reeburgh, William S., Adjunct Professor.[11] Ph.D., 1967, The Johns Hopkins University: Chemical oceanography; gases in marine sediments; sediment-water interactions.

Schubel, J.R., Professor, Director of Marine Sciences Research Center and Chairperson. Ph.D., 1968, The Johns Hopkins University: Coastal sedimentation; suspended sediment transport; coastal zone management.

Scranton, Mary I., Assistant Professor. Ph.D., 1977, Massachusetts Institute of Technology: Marine geochemistry; biological-chemical interactions in seawater.

SethuRaman, S., Adjunct Associate Professor.[3] Ph.D., 1972, Colorado State University: Marine meteorology; air-sea interactions.

Slobodkin, Lawrence, B., Professor.[12] Ph.D., 1951, Yale University: Theoretical ecology; marine ecology.

Smith, Sharon L., Adjunct Assistant Professor.[3] Ph.D., 1975, Duke University: Plankton ecology; nutrient regeneration by zooplankton.

Squires, Donald F., Professor and Director, New York Sea Grant Institute. Ph.D., 1955, Cornell University: Marine affairs and science policy.

Swanson, Robert L., Adjunct Professor.[7] Ph.D., 1971, Oregon State University: Coastal dynamics; marine policy.

Terry, Orville W., Associate Research Professor. Ph.D., 1970, State University of New York at Stony Brook: Aquaculture, especially of seaweed; wetlands management.

Vaughn, James M., Adjunct Associate Professor.[3] Ph.D., 1972, University of New Hampshire: Transport, fate and effects of viruses in the aquatic environment.

Walsh, John J., Adjunct Professor and Head, Oceanographic Sciences Division, Brookhaven National Laboratory. Ph.D., 1969, University of Miami: Upwelling ecosystems; phytoplankton ecology; ecosystems modelling.

Wang, Franklin F.Y., Professor.[5] Ph.D., 1956, University of Illinois: Ocean engineering; ocean structures; energy.

Weyl, Peter K., Professor. Ph.D., 1953, University of Chicago: Coastal zone planning; physical oceanography; paleooceanography.

Whitledge, Terry E., Adjunct Assistant Professor.[3] Ph.D., 1972, University of Washington: Nutrients; chemistry of seawater; ecosystem dynamics.

Wilson, Robert E., Associate Professor. Ph.D., 1973, The Johns Hopkins University: Estuarine and coastal ocean dynamics.

Woodhead, Peter M.J., Research Professor. B.S., 1953, Durham University, England: Behavior and physiology of fish; coral reef ecology; ocean energy conversion systems.

Wurster, Charles F., Associate Professor. Ph.D., 1957, Stanford University: Effects of chlorinated hydrocarbons on phytoplankton communites.

Zarillo, Gary A., Assistant Professor. Ph.D., 1979, University of Georgia: Beach and nearshore processes; sediment dynamics.

Estimate number of teaching, graduate and research assistant, fall 1982: 51.

[1] *University of Concepcion, Chile*

[2] *Bellport High School*

[3] *Brookhaven National Laboratory*

[4] *National Air and Space Administration*

[5] *Joint appointment, Department of Materials Science*

[6] *Reilly, Like and Schneider, Attorneys*

[7] *National Oceanic and Atmospheric Administration, Office of Marine Pollution Assessment*

[8] *U.S. Geological Survey*

[9] *Joint appointment, Department of Earth and Space Sciences*

[10] *Najarian, Thatcher & Associates, Inc.*

[11] *University of Alaska*

[12] *Joint appointment, Department of Ecology and Evolution*

Marine Environmental Sciences Courses

MAR 501 Physical Oceanography I
Seawater properties, T/S diagrams, turbulence, mixing, diffusion and advection, air-sea interaction, thermohaline and wind-driven circulation, pressure gradient, Coriolis, buoyancy and frictional forces, geostrophic and Ekman transports, waves and tides, estuaries, modeling.
Fall, 4 credits

MAR 502 Biological Oceanography
A treatment of the dependencies of biological communities on the physical and chemical properties of the marine environment with emphasis on the planktonic communities of coastal and estuarine environments. Includes lalboratory experience directed towards imparting analytical skills.
Spring, 4 credits

MA 503 Chemical Oceanography
Introduction to chemical oceanography. Topics include origin and history of seawater, physical properties of seawater, major and minor constituents, dissolved gases, the carbon dioxide system, distribution of properties in the World Ocean, chemical equilibria. Also includes laboratory exercises.
Fall, 4 credits

MAR 504 Physical Oceanography II
The course examines the fundamental principles of hydrodynamics and the relationship between these principles and the methods and results in physical oceanography. It discusses the equation of state and the conservation of mass, momentum and energy.
Prerrequisite: MAR 501
Spring, 4 credits

MAR 506 Geological Oceanography
An introduction to the geological oceanography of the World Ocean with emphasis on the coastal environment; discussions of the physical processes controlling the structure and evolution of the ocean basins and continental margins, the distribution of marine sediment and the development of coastal features. Field trip required.
Spring, 4 credits

MAR 521 General Problems of the Marine Environment
The course examines the multiple utilization of the marine environment. Ecological and economic problems that result from conflicting uses are investigated and methods for the management of marine resources are discussed.
Fall, 3 credits

MAR 522 Environmental Toxicology
The ecological and human health effects of toxic chemicals, especially chlorinated hydrocarbons, will be examined. Toxicological principles, carcinogenesis, and economic and political considerations are included.
Spring, 3 credits

MAR 523 Marine Botany
Lectures will stress ecology, morphology, physiology, reproduction and systematics of phytoplankton, macroalgae and seagrasses. Laboratory will consist of isolation techniques, physiology experiments and productivity assessment. Several field trips will be undertaken. One two-hour lecture, one two-hour laboratory per week.
Spring, 4 credits

MAR 530 Scientists in Organizations
An introduction to marine scientists in public and private organizations including an assessment of the role of the scientist in an organization and in the administration of science.
3 credits

MAR 531 Regional Planning Applied to Marine Sciences
This course will introduce the theories, techniques and literature of regional planning with special emphasis as a decision-making tool related to the marine environment.
Fall, 3 credits

MAR 532 Case Studies in Coastal Planning
This course will address the application of regional planning with the marine sciences input in the development of governmental programs for coastal zone management, water quality control and management. Long Island case studies will be the basis for this course.
Prerequisite: MAR 531
Spring, 3 credits

MAR 550 Topics in Marine Sciences
This is used to present special-interest courses, including intensive short courses by visiting and adjunct faculty and courses requested by students. Those given in recent years include Environmental Law, Nature of Marine Ecosystems, Science and Technology in Public Institutions, Plutonium in the Marine Environment and Problems in Estuarine Sedimentation.
Section 1: Tutorial
Fall and spring, variable and repetitive credit
Other sections as announced by the Center

MAR 565 Seminar Preparation
Workshop in organizing, illustrating and delivering an oral presentation. Students will practice giving short talks on their research and learn to draft their own slides. Students enrolling should have their research under way and be simultaneously enrolled in MAR 580 and MAR 501, 502, 503 and 506.
Spring, 3 credits

MAR 569 Practicum in Teaching
Prerequisite: Teaching Assistantship
Fall and spring, 1-3 credits, repetitive

MAR 572 Introduction to Scientific Research Diving
Course is designed for those desiring to perform underwater research under University auspices. Training will be to develop self-sufficiency and safety. It will include basic and advanced SCUBA theory and skills and open-water research techniques. The student is required to have all personal diving equipment, including SCUBA. Two hours of lecture, one 3-hour lab and one all-day field trip per week.
Fall, 4 credits

MAR 580 Seminar
A weekly series of research seminars presented by visiting scientists and members of the staff.
Fall and spring, 1 credit each semester, repetitive

MAR 590 Research
Original investigation undertaken with the supervision of the advisor.
Fall and spring, variable and repetitive credit

Coastal Oceanography Courses

OCN 601 Planktonic Herbivory—An Experimental Approach
Course focuses on methods and hypotheses used to investigate zooplankton as herbivores in the coastal ocean. Review of literature and experience with experimental techniques. Participation in relevant research conducted by MSRC faculty.
Prerequisite: MAR 502
Spring, 3 credits

OCN 602 The Marine Nitrogen Cycle
Course focuses on nitrogen fixation, nitrification, denitrification, nitrogen uptake and excretion by marine organisms. Emphasis is on microbial activities. Techniques and recent advances in the field are presented.
Prerequisite: MAR 502
Fall, 1 credit

OCN 603 Concepts and Practices in the Management of Shellfish Resources
Introductory review of general management concepts including emphasis on the hard clam fishery. Discussion of the possible role of aquaculture in shellfish management generally, with specific reference to the hard clam industry. Field trips to Great South Bay and hard clam aquaculture centers. Laboratory projects involving culture of hard clams from gametogenesis, spawning, early development and growth of larval clams, metamorphosis and handling of 'seed' clams. Laboratory work emphasizes hard clam biology and the state of the art of aquaculture, and focuses on management implications. Guest presentations from industry and management agencies representatives.
Prerequisite: Permission of instructor.
Spring, 3 credits

OCN 604 Diffusion in Aquatic Environment
Course focuses on environmental diffusion problems arising in the sea, lakes and rivers, such as dilution of pollutants. Main topics include classical turbulent diffusion theory, statistical theory of diffusion by random movements, dispersion in shear flow, and concentration fluctuations in diffusion. Course concludes with a study of the effect of diffusion on the space-time behavior of non-conservative properties such as chemical reactants and planktonic organisms.
Prerequisite: Partial differential equations
Fall, 3 credits

OCN 606 Design of Field Experiments
Series of seminars focusing on experimental design and planning and implementation of field observatiaons in the coastal zone. Emphasis will be directed at geological, physical, biological and/or chemical oceanographic aspects, depending on student interest and demand.
Prerequisite: Completion of core courses and permission of instructor.
Spring, 3 credits

OCN 607 Physics of Sedimentary Processes
Mathematical description of sediment transport by water. Geotechnical aspects of sedimentation such as mass motions and consolidation. Emphasis is on the application of theories to field observations.
Prerequisites: MAR 504 and 506.
Fall, alternate years, 3 credits

OCN 608 Estuarine Geochemistry
Course focuses on important processes affecting behavior of chemical species in the estuarine environment. Topics include basic properties and processes in estuarine geochemistry; conservative and nonconservative behavior of dissolved constituents during estuarine mixing; fate of heavy metals in estuaries; radioactive tracers in estuarine geochemical studies; geochemical processes at the benthic boundary layer.
Prerequisite: Permission of instructor
Fall, alternate years, 3 credits

OCN 610 Waves and Tides
Theory of surface and internal waves; wave generation and forecasting; tide theory; analysis and predictions of tides and tidal currents.
Prerequisites: MAR 501 and MAR 504
Spring, 3 credits

OCN 650 Dissertation Research
Original investigation undertaken with the supervision of research committee.
Fall and spring, variable and repetitive credit

OCN 651 Special Topics
Presentation of advanced courses, intensive short courses and seminar series on subjects of special interest. Topics will vary from semester to semester.
Section I: Tutorial
Prerequisite: Permission of instructor
Fall and spring, variable and repetitive credit

OCN 670 Practicum In Teaching
Prerequisite: Teaching Assistantship.
Fall and spring, 1-3 credits repetitive

OCN 673 Introduction to Physics of Estuaries
The distribution of the temperature, salinity, density and the velocity in estuaries is described within the framework of a classification scheme for such water bodies. Distributions of some biologically important chemical constituents in these waterways are also discussed. Examples of the effects of physical processes of motion and mixing on distribution of certain biological species are given.
Fall, alternate years, 3 credits

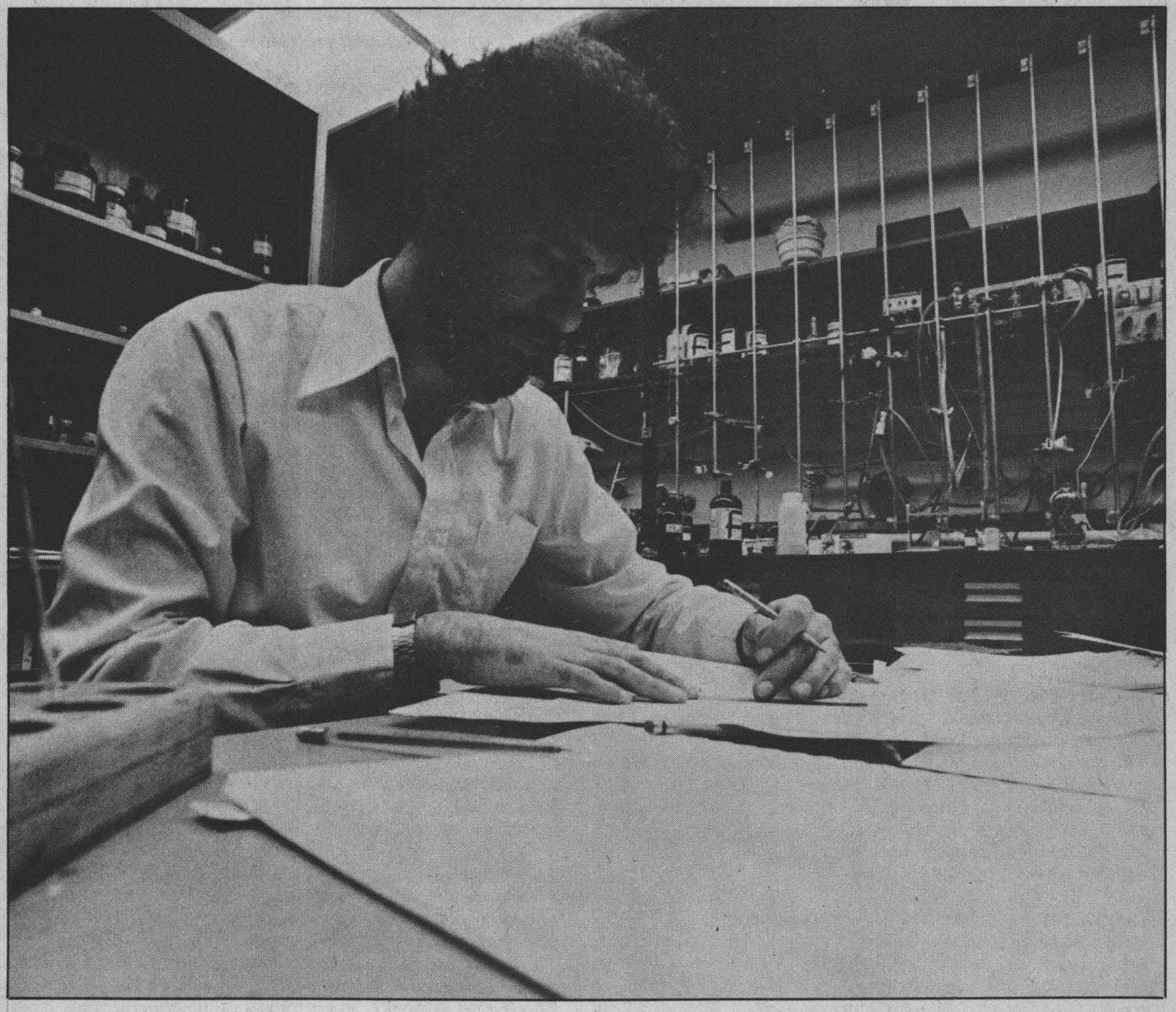
OCN 674 Estuarine Oceanography
Physical and chemical properties of estuarine waters, and the classification of estuaries by geomorphological and hydrographical parameters. Kinematics and dynamics of motion and mixing in estuaries.
Prerequisite: MAR 501, 504, and OCN 673
Spring, alternate years, 3 credits

OCN 676 Proposal Preparation
Course of independent study towards the preparation of a research proposal. Topics will be assigned, progress seminars scheduled regularly and the final proposal will be defended in an oral presentation before the faculty.
Prerequisites: MAR 501, 502, 503, 504, 506, or equivalent, and consent of instructor
Fall, 3 credits

OCN 689 Topics of Global Ecology
This course will investigate several topics in marine benthic ecology pertaining to the relations between animals, microbes and the sedimentary environment. Topics will include bioturbation, grazing, microbial gardening, role of dissolved organics, deep-sea adaptations, the nature and dynamics of detritus, and coprophagy. The course will consist of lectures by the instructors and student presentations. Students should have a solid background in ecology, invertebrate zoology and microbiology. Crosslisted with BEE 689.
Fall, 2 credits

OCN 693 Seminar on Populations and Community Ecology, Populations Dynamics in Space: Diffusion Models
This course is concerned with environmental diffusion problems arising in the sea, lakes, and rivers, such as dilution of pollutants. The main topics of the course are the classical turbulent diffusion theory, statistical theory of diffusion by random movements, dispersion in shear flow, and concentration fluctuations in diffusion. The course concludes with a study of the effect of diffusion on the space-time behavior of non-conservative properties such as chemical reactants and plankton organisms.
Prerequisites: Partial differential equation. Crosslisted with BEE 693
Fall, 2 credits

The Physical Sciences and Mathematics



StonyBrook

Department of Chemistry

Degree Programs

The Department of Chemistry offers courses of study leading to the degrees of Master of Science for students seeking an education at an advanced level in chemistry and the experience of solving a problem in chemical research, and of Doctor of Philosophy for those preparing for careers in which chemical research is a central activity. A student in the Ph.D. program may choose dissertation research in any one of the diverse areas of chemistry represented by the interests of the departmental faculty, or may choose an interdisciplinary topic under the guidance of a faculty member in another department. Coordinated activities exist with several departments, and include optional concentrations in chemical physics and chemical biology.

Admission to Graduate Study

The following are required for admission to graduate study in chemistry:

A. A baccalaureate degree in chemistry earned in a curriculum approved by the American Chemical Society, or an equivalent course of study.

B. A minimum grade point average of 2.75 (B-) in all undergraduate work, and 3.00 (B) in all courses in the sciences and mathematics.

C. Results of the Graduate Record Examination Aptitude Test.

D. Acceptance by the Department of Chemistry and by the Graduate School.

In exceptional cases, a student not meeting requirements A and B may be admitted on a provisional basis.

Requirements for the M.S. Degree

A. Successful completion of an approved course of study comprising at least thirty credits of graduate coursework.

B. Successful completion of the CHE 532 seminar and six courses selected from CHE 501 through 530, 557 through 589, 601 through 604, 623 through 683, and approved courses from other departments or from the CED program.

C. Successful completion of the CHE 590 term paper or research, thesis and thesis defense.

Requirements for the Ph.D. Degree

A. Residence: One year.

B. Courses: Successful completion of an approved course of study comprising at least six formal graduate courses of which four are selected from CHE 501 through 530, in addition to CHE 531, 532, and two semesters of CHE 610, CHE 611 or the equivalent. Continuation in the Ph.D. program is based, in part, on achievement in four 500-level chemistry courses to be taken during the student's first year. In consultation with faculty advisors each student selects a course of study to acquire a good background for research in the area of chemistry chosen.

C. Language: Reading proficiency in German, French or Russian.

D. Advancement-to-candidacy (preliminary) examination: A student is advanced to candidacy for the Ph.D. degree when all degree requirements except the dissertation have been completed. A special committee is designated for each student to aid in progress toward this step. The committee is charged with advising the student and administering the advancement-to-candidacy (preliminary) examination. This examination, normally completed within one year following qualification to the Ph.D. degree, consists of a written proposition and oral defense, a discussion of the student's research and a discussion of literature material.

E. Presentation of a departmental seminar.

F. Research, dissertation, dissertation defense and departmental colloquium.

Research

Each student selects a research advisor from among the faculty members at some time after the middle of the first semester and usually before the middle of the second semester. The research advisor also serves on the advancement-to-candidacy committee.

Specific inquires from prospective graduate students regarding research opportunities are welcomed and should be addressed to the Chairperson. The Graduate Programs in Chemistry brochure states in some detail the varied research interests of the chemistry faculty and is available from the Department.

Concentration in Chemical Physics

A field of concentration in chemical physics in provided for students whose interests lie in both chemistry and physics. A graduate student who is admitted to either the Chemistry or Physics Department may elect this course of study with the consent of the Department Chairperson. A chemistry student elects this course of study to obtain more extensive training in physics than is normally required by chemistry departments. A physics student elects this concentration to obtain more extensive exposure to chemical systems than is normally obtained in physics departments. This is a course option for graduate students in chemistry or in physics; furthermore, a student in the chemical physics concentration may select a research advisor from either Department subject to the approval of the chairpersons.

For a chemistry student the requirements are the same as for the Ph.D. in chemistry described above, with the following exceptions:

B. Courses: In addition to CHE 532 and two semesters of CHE 610, a minimum of nine formal graduate courses is required, including the following:

CHE 523 Chemical Thermodynamics
PHY 503 Mathematical Physics
Two courses from among CHE 521, 522 Quantum Chemistry I, II and PHY 511, 512 Quantum Mechanics I, II
CHE 528 or PHY 540 Statistical Mechanics
PHY 501 Classical Mechanics
PHY 505 Classical Electrodynamics
One course in chemistry from among CHE 501, 502, 503, 511 and 512

D. Advancement-to-candidacy (preliminary) examination: In some cases a hybrid of the chemistry and physics requirements may be used.

Concentration in Chemical Biology

The field of concentration in chemical biology is a course option for students whose interests lie in both chemistry and biology. A graduate student who is admitted to the Chemistry Department or another appropriate department may elect this field of concentration with the consent of the Chairperson. The course of study can provide more extensive training in biology than is normally required for a chemistry graduate degree and more extensive exposure to fundamental chemical studies for students in other departments. In addition, a student may select a research advisor in any appropriate department, subject to the approval of the chairpersons involved.

Each student will have an advisory committee consisting of members from more than one department. When research is initiated, the research advisor will join this advisory committee. The committee advises the graduate student to prepare for a research career in some area of chemical biology.

Qualification for candidacy in this course of study requires, in addition to the general requirements in chemistry, a satisfactory background in undergraduate biology as judged by the student's advisory committee or as demonstrated by satisfactory performance in coursework. The requirements are the same as for the Ph.D. program in chemistry described above with the following exception:

B. Courses: In addition to CHE 532 and two semesters of CHE 610, a minimum of seven formal graduate courses is required as specified by the student's advisory committee.

Facilities

The new Graduate Chemistry Building is a modern, seven-story (170,000 sq. ft.) structure designed for research and upper-division instructional activities. The equipment available to faculty, postdoctorals and students is outstanding. While much of it has been commercially obtained, a substantial proportion of the instrumentation in the Department has been designed and constructed at Stony Brook and represents "the state of the art" in various fields. The faculty takes great pride in the quality and sophistication of the instrumentation, and faculty members have the responsibility of maintaing certain pieces of equipment within their own research group.

The construction and maintenance of this instrumentation is effected by the faculty in conjunction with a staff of non-teaching professionals in the electronic, glass and machine shops.

Faculty

Alexander, John M., Professor. Ph.D., 1956, Massachusetts Institute of Technology: Reactions between complex nuclei; nuclear potentials; nuclear entropies.

Bates, H.A., Assistant Professor. Ph.D., 1977, University of California, Berkeley: Synthesis and structure determination of biologically significant natural products.

Bigeleisen, J., Professor. Ph.D., 1943, University of California, Berkeley: Equilibrium and kinetic isotope effects correlated with molecular structure and molecular forces.

Bonner, Francis T., Professor. Ph.D., 1945, Yale University: inorganic nitrogen chemistry; isotope effects; isotope exchange kinetics; reaction studies in aqueous systems including natural waters.

Brynes, Paul J., Assistant Professor.[1] Ph.D., 1975, Cornell University: Chemical studies of pathological processses, especially tumor promotion, cocarcinogenesis, and teratogenesis; development of new antithrombosis agents.

Chu, Benjamin, Professor and Chairperson. Ph.D., 1959, Cornell University: Laser scattering, small-angle X-ray scatterings, critical phenomena, molecular forces; configuration and dynamics of macromolecules; structure of non-crystalline media; liquid crystals.

Fowler, Frank W., Associate Professor. Ph.D., 1967, University of Colorado: Synthesis and study of heterocyclic molecules and the development of new synthetic methods.

Friedman, Harold L., Professor. Ph.D., 1949, University of Chicago: Molecular interpretation of equilibrium and dynamic properties of solutions; solvation; excess functions; transport and relaxation coefficients; spectral line shapes; scattering phenomena.

Goldfarb, Theodore D., Associate Professor. Ph.D., 1959, University of California, Berkeley: Vibrational spectroscopy; photochemical studies of isomerization in cyclic and acyclic conjugated molecules; low-temperature matrix isolation studies of reactive species; far-infrared spectroscopy.

Haim, Albert, Professor. Ph.D., 1960, University of Southern California: Kinetics and mechanisms of inorganic reactions.

Hanson, David M., Professor. Ph.D., 1968, California Institute of Technology: Effects of electric fields on the electronic spectra and energy relaxation and transfer processes of molecules and molecular solids; mechanisms of conformational change in molecular crystals and biological polymers.

Helquist, Paul M., Associate Professor. Ph.D., Cornell University: Organometallic chemistry in organic synthesis; development of synthetic techniques and total synthesis of natural products.

Herley, Patrick, Professor.[2] Ph.D., 1964, Imperial College, University of London, England: Physical (nucleation) processes occurring in the decomposition of inorganic solids.

Ishida, Takanobu, Professor. Ph.D., 1964, Massachusetts Institute of Technology: Chemistry of stable isotopes.

Johnson, Francis, Professor.[1] Ph.D., 1954, Glasgow University, Scotland: Structure and total synthesis of naturally occurring biologically active molecules; stereochemistry of unsaturated cycloaliphatics; new synthetic methods in organic synthesis; heterocyclic chemistry.

Johnson, Philip M., Professor. Ph.D., 1967, Cornell University: Optical molecular spectroscopy and the electronic structure of very reactive molecules; mechanisms of unimolecular photochemical processes; electronic properties of excited molecules; multiphoton ionization spectroscopy.

Kerber, Robert C., Associate Professor. Ph.D., 1965, Purdue University: Synthesis of organotransition metal complexes, mechanisms of their reactions; complexes of fulvenes, other polyenes; metal-stabilized carbonium ions and carbenes.

Koch, Stephen, Assistant Professor. Ph.D., 1975, Massachusetts Institute of Technology: Synthesis and structure in transition metal coordination chemistry; metal ions in biological systems; early transition metal catalysts.

Krantz, Allen, Associate Professor. Ph.D., 1967, Yale University: Chemistry of theoretically interesting molecules in inert gas matrices; mechanism of drug action and chemistry of the nervous system; viral diseases.

Lauher, Joseph W., Associate Professor. Ph.D., 1974, Northwestern University: Inorganic and organometallic synthesis of new compounds or materials with useful catalytic or solid state properties; theoretical areas of inorganic chemistry.

Lauterbur, Paul C., Professor. Ph.D., 1962, University of Pittsburgh: Nuclear magnetic resonance spectroscopy and applications to crystals, electrolyte solutions, isotope effects and biological systems; image formation by magnetic resonance, with applications in biology and medicine.

le Noble, William J., Professor. Ph.D., 1957, University of Chicago: Chemistry of highly compressed solutions, with applications such as solvation effects, carbenes, nitrenes and the question of nonclassical ions.

Okaya, Yoshi, Professor. Ph.D., 1956, Osaka University, Japan: Crystallography: development of on-line computer-controlled system for automatic collection of X-ray diffraction data, crystal structure and absolute configurationdetermination.

Porter, Richard N., Professor. Ph.D., 1960, University of Illinois: Theoretical chemistry; classical dynamics of reactive molecular collisions; quantum theory of reaction complexes; many-body and field theoretic treatment of electron correlation.

Prestwich, Glenn D., Associate Professor. Ph.D., 1974, Stanford University: Isolation, elucidation and synthesis of insect and plant natural products; termite chemical communication; chemical ecology of plant-insect interactions.

Ramirez, Fausto, Professor. Ph.D., 1949, University of Michigan: Organic and biochemical aspects of phosphate and pyrophosphate esters and their metal complexes; polynucleotides, phospholipids and biomembrane transport problems.

Schneider, Robert F., Associate Professor and Associate Vice Provost for Research. Ph.D., 1959, Columbia University: Infrared and Raman spectra of ionic halides; direct nuclear quadrupole resonance of inorganic compounds.

Seltzer, Stanley, Adjunct Professor. Ph.D., 1958, Harvard University: Organic reaction mechanism; enzyme- and photocatalyzed cis-trans isomerization; model systems for enzymatic reactions; free radical reactions; isotope effects.

Springer, Charles S., Associate Professor. Ph.D., 1967, Ohio State University: Biophysical chemistry; studies of biological membranes; physical properties and mediated cation transport; hyperfine shift nuclear magnetic resonance studies.

Stell, George R., Professor.[3] Ph.D., 1961, New York University: Statistical thermodynamics.

Sujishi, Sei, Professor and Dean for Physical Sciences and Mathematics. Ph.D., 1949, Purdue University: Organo-silicon-transition metal compounds; synthesis; new reactions; bonding properties.

Weiser, David, Associate Professor. Ph.D., 1956, University of Chicago: NPSO bonding theory; history of science, especially Newton, Dalton.

Whitten, Jerry L., Professor. Ph.D., 1964 Georgia Institute of Technology: Theoretical studies of molecular structure and bonding; correlated wave functions; excited electronic states; chemisorption on metallic and molecular solids.

Wishnia, Arnold, Associate Professor. Ph.D., 1957, New York University: Physical chemistry of biological macromolecules; structure and function of ribosomes; membrane model systems; applications of nuclear magnetic resonance.

Estimated number of teaching, graduate and research assistants, fall 1982: 100.

[1]*Joint appointment, Department of Pharmacology*

[2]*Joint appointment, Department of Material Science*

[3]*Joint appointment, Department of Mechanical Engineering*

Courses

CHE 501 Structural Organic Chemistry
An advanced treatment of bonding, conformational analysis, sterochemistry, strain and aromaticity in organic molecules is integrated with study of ^{1}H and ^{13}C NMR, IR, UV, MS and ORD-CD as experiemental tools for the organic chemist. The emphasis is on both understanding of fundamentals and their application to the solution of problems of current interest in the literature.
Fall, 3 credits

CHE 502 Mechanistic Organic Chemistry
A consideration of the most important means of dissecting the detailed pathways of organic reactions. The use of substituent and medium effects on reactions proceeding through heteropolar, free radical and isopolar transition states is discussed; some unstable intermediates and unusual molecules are included
Spring, 3 credits

CHE 503 Synthetic Organic Chemistry
A survey of the most important organic reactions from the viewpoint of synthetic utility, including many recent innovations in this field. Throughout the discussion of these methods, emphasis will be placed upon their use in the synthesis of complex organic structures.
Spring, 3 credits

CHE 511 Structural Inorganic Chemistry
Properties and reactions of inorganic compounds are considered from the viewpoint of molecular and electronic structure. The modern bonding theories used in inorganic chemistry including molecular orbital, valence bond and ligand field theories are developed using symmetry and group theory. Selected main group, transition metal and organometallic compounds are discussed. An introduction to crystallography and solid state structure will be included.
Fall, 3 credits

CHE 512 Physical Methods in Inorganic Chemistry
The modern physical chemical methods used to study inorganic compounds are surveyed. The determination of the molecular and electronic structures of these compounds using such methods as NMR, ESR, IR, Raman, photoelectron, and electronic spectroscopy and x-ray spectroscopy isemphasized.
Spring, 3 credits

CHE 513 Reaction Mechanisms in Inorganic Chemistry
Thermal, photochemical and catalytic reactions of inorganic and organometallic compounds are studied from a mechanistic viewpoint. Modern techniques used in the elucidation of mechanism are surveyed, experimental results are evaluated and theoretical interpretations are discussed in the context of thermodynamic and structural parameters.
Spring, 3 credits

CHE 521 Quantum Chemistry I
Quantum theoretical concepts are discussed. Schrodinger wave mechanics and related mathematical techniques are illustrated by treatment of systems of chemical interest. Designed to form the theoretical basis for the study of chemical bonding, molecular structure, spectroscopy and molecular collision phenomena.
Fall, 3 credits

CHE 522 Quantum Chemistry II
Problems in time-dependent quantum mechanics with the derivation of both approximate and exact solutions. The elements of group theory with applications to atomic, molecular and solid state systems.
Spring, 3 credits

CHE 523 Chemical Thermodynamics
A rigorous development of the fundamentals of thermodynamics and its application to a number of systems of interest to chemists. These systems include electrochemical cells, gases, homogeneous and heterogeneous equilibrium systems. An introduction to statistical mechanics will also be included.
Fall, 3 credits

CHE 526 Chemical Kinetics
An intensive study of rates of chemical reactions and in particular the relationship of kinetic studies to the determination of reaction mechanisms. Experimental methods will be discussed with emphasis on the determination of rate laws. The theoretical treatment will include discussions of the kinetic theory and the transition-state theory approaches to chemical kinetics.
3 credits

CHE 528 Statistical Mechanics
Statistical theory of equilibrium systems and rate processes. Ensemble theory, spatial and time correlation functions. Model systems and methods of estimating their properties. Designed to enable the student to use the current literature dealing with application of statistical mechanics to problems in chemistry.
3 credits

CHE 529 Nuclear Chemistry
Topics include the properties of radioactive substances and their use in the study of chemical problems; nuclear structure; nuclear reactions; radioactive decay and growth; interactions of radiation with matter; detection and measurement of radiation; application of radioactivity to chemical problems such as kinetics, structure and analysis; artificially produced elements.
3 credits

CHE 530 Physical Chemistry of Macromolecules
An investigation of the gross and fine structures of macromolecules and molecular aggregates in solution as revealed by hydrodynamic behavior (e.g., ultracentrifugation, viscosity), light scattering, spectroscopic properties (e.g., ultraviolet hypochromism, circular dichromism, Raman, fluorescence, magnetic resonance spectra), and the thermodynamics and kinetics of interaction with small molecules and ions. Theory of conformation changes and phase transitions.
3 credits

CHE 531 Departmental Research Seminar
Meetings at which first-year graduate students learn about the research activities of the departmental faculty.
Fall, 0 credit

CHE 532 Literature Seminar
Students select and discuss topics from the current literature.
Spring, 0 credit

CHE 551 Glass Blowing
Basic scientific glass blowing: basic sealing techniques, Vac Line lay out, set up, and repairs. T-seals: ring seals, use of cutting machine, hand torch and bench torch. Safety with glass. Open to graduate students in the sciences.
Fall, 1-2 credits

CHE 557/558 Methods and Techniques of Experimental Chemistry
Principles and practice of techniques currently used in the study of molecular properties and for the synthesis, isolation, purification and identification of compounds. Students select experiments that are organized as modules in their area of interest.
Fall (557) and spring (558), 3 credits each semester

CHE 589 Directed Study
Subject matter varies according to needs of student.
Variable and repetitive credit

CHE 590 M.S. Term Paper
Independent study leading to a term paper on a selected topic in chemistry, chemical applications or chemical pedagogy.
Summer, fall or spring, 3 credits

CHE 601 Special Topics in Synthetic Organic Chemistry
Emphasis will be placed on the systematic design of syntheses of complex organic compounds including many classes of natural products. Examples of syntheses from the literature will be analyzed and new syntheses will be devised. A sound background in organic synthetic methods (e.g., CHE 503) is a prerequisite.
Variable and repetitive credit

CHE 602 Special Topics in Physical Organic Chemistry
The subject matter varies depending on interests of students and staff. It may cover such areas as photochemistry, theoretical organic chemistry and the chemistry of unstable intermediates; the emphasis is on fundamental considerations and recent developments.
Variable and repetitive credit

CHE 603 Special Topics in Bioorganic Chemistry
The subject matter varies depending on interests of students and faculty. Possible topics would include the biosynthesis of natural products and the chemistry of enzymatic processes.
1-3 credits, repetitive

CHE 610, 611 Practicum in Teaching
Practice instruction in chemistry at the undergraduate level, carried out under faculty orientation and supervision. A minimum of two semesters of CHE 610 or 611 is required of all candidates for graduate research degrees in chemistry, unless explicitly waived by the Chairperson.
610: variable and repetitive credit; 611: zero credit, repetitive

CHE 623 Molecular Spectroscopy
A detailed description of the theory and practice of molecular spectroscopy. Topics in the interaction of molecules with electromagnetic radiation and the time evolution of molecular energy states.
2 credits

CHE 624 Magnetic Resonance
This course provides an introduction to the theory, instrumentation and characteristic applications of nuclear magnetic resonance (NMR), NMR zeugmatographic imaging, electron paramagnetic resonance (EPR) spectroscopy and to the related techniques of electron nuclear double resonance (ENDOR), electron electron double resonance (ELDOR), optical detection of magnetic resonance (ODMR), electron spin echo, saturation-recovery and saturation transfer EPR. Application to biological and material science as well as chemical problems will be discussed.
3 credits

CHE 625 Molecular Structure and Crystallography
Experimental methods in the determination of molecular structure. The emphasis will be on the determination of structure in the solid state, particularly by X-ray crystallography. Students will complete a single crystal molecular structure determination using modern diffractometer techniques.
3 credits

CHE 641 Organometallic Chemistry
A systematic presentation of the chemistry of organometallic compounds, particularly those of the transition metals. Topics will include structure, bonding, reaction mechanisms, synthesis and applications in catalysis and in organic synthesis.
3 credits

CHE 682 Special Topics in Inorganic Chemistry
Subject matter varies, depending on interests of students and staff, but will cover recent developments in inorganic chemistry.
Variable and repetitive credit

CHE 683 Special Topics in Physical Chemistry
Subject matter varies, depending on interests of students and staff, but will cover recent developments and advanced topics in physical chemistry.
Variable and repetitive credit

CHE 693 Theoretical Chemistry Seminar
1 credit, repetitive

CHE 694 Chemical Biology Seminar
1 credit, repetitive

CHE 695 Inorganic Chemistry Seminar
Discussions of current issues in inorganic chemistry.
1 credit, repetitive

CHE 696 Organic Chemistry Seminar
1 credit, repetitive

CHE 697 Physical Chemistry Seminar
1 credit, repetitive

CHE 698 Colloquium
Variable credit

CHE 699 Research
Variable and repetitive credit

Department of Earth and Space Sciences

The Department of Earth and Space Sciences (ESS) offers courses of study leading to M.S. and Ph.D. degrees, with Graduate Studies in both Astronomical Sciences and Geological Sciences. Subsumed under Astronomical Sciences are concentrations in astronomy, astrophysics and planetary sciences; subsumed under Geolocial Sciences are geochemistry, geophysics-tectonics and sedimentary geology. Grouping these diverse fields in one academic department allows students to pursue interdisciplinary interests and to engage in studies which cross traditional academic boundaries. For example, courses in planetary sciences are open to interested students specializing in Astronomical Sciences as well as those specializing in Geological Sciences. The Department occupies a modern, well-equipped building which houses the Department library, laboratories for rock processing, a machine shop with three full-time machinists, a carpentry shop and an electronics shop with two full-time electronic technicians. The campus computing facilities and the proximity of Brookhaven National Laboratory give excellent support for graduate studies in the earth and space sciences.

Admission to Graduate Study

For admission to graduate study in the earth and space sciences, the following are required:

A. A baccalaureate degree in one of the earth or space sciences, or in biology, chemistry, physics, mathematics or engineering.

B. A minimum average of B for all undergraduate coursework and a B average for courses in the sciences.

C. Results of the Graduate Record Examination Aptitude Test. The advanced exam in physics is required of Astronomical Sciences applicants.

D. Acceptance by both the Department of Earth and Space Sciences and the Graduate School.

In special cases, a student not meeting requirements A and B may be admitted on a provisional basis. Upon admission, the student will be informed of the requirements that must be satisfied for termination of the provisional status.

Graduate Studies in Astronomical Sciences

Within Graduate Studies in Astronomical Sciences, concentrations are offered in three areas: astronomy, astrophysics and planetary sciences. Courses of study are available in observational astronomy and theoretical astrophysics with emphasis in areas of exploration of the solar system, planetary atmospheres, infrared astronomy, interstellar molecules, stellar atmospheres, nuclear astrophysics and extragalactic astronomy. The organization of Graduate Studies in Astronomical Sciences within the Earth and Space Sciences Department provides for interdisciplinary curricula in meteoritics, lunar studies and solar system evolution.

A low student-to-faculty ratio is maintained and early in the course of study the graduate student is encouraged to commence research in close contact with a faculty member. Support is available for graduate students in good standing.

Facilities

Astronomy facilities on campus include a radio-astronomy data analysis laboratory, an infrared instrumentation laboratory, a molecular spectroscopy laboratory, a computer-operated microdensitometer, and a 30-cm telescope for instrument testing and laboratory course programs. Off-campus facilities include our 61-cm telescope and optical instrumentation at the Mt. Hopkins Observatory, Arizona. At the Five College Radio Astronomy Observatory at Quabbin, Massachusetts there is a 45-foot antenna with instrumentation partially supplied by Stony Brook for high-resolution spectral-line observations. One quarter of the observing time on this telescope is allocated to Stony Brook. Also, Stony Brook astronomers make regular use of the national observatories for research in infrared, optical and radio astronomy. Data from space missions such as the Voyager Project, Space Telescope, I.U.E. and the IMP series are available for analysis through faculty participation in these investigations.

Laboratory for Planetary Atmospheres Research

The Laboratory for Planetary Atmospheres Research (LPAR) comprises an interdepartmental teaching and research curriculum for students interested in the physics and chemistry of the atmospheres of the Earth and other planets. This curriculum is available to students in the College of Engineering and Applied Sciences and the Division of Physical Sciences. A graduate student in any of the departments of these divisions may, with the consent of his or her chairperson, elect to participate. The basic degree requirements are set by the department in which the student is enrolled; they are the same as those for any other student in that department. The student will normally be advised to take two or more courses from the list drawn up by the LPAR faculty in order to obtain a basic background in the atmospheric sciences.

He or she must then satisfy departmental requirements regarding a preliminary examination. However, a major portion of this examination will be devoted to problems in atmospheric physics and chemistry; at least one member of the examining committee will be from the LPAR faculty. A research advisor for the dissertation will normally be selected from the LPAR faculty, subject to the approval of the Department Chairperson.

Cooperative ESS-Physics Astrophysics Concentration

The ESS and Physics Departments participate in a cooperative Ph.D. program with a concentration in astrophysics. The basic degree requirements are set by the department in which the student is enrolled. A research advisor is chosen from either faculty subject to the approval of the department Chairpersons. The student must satisfy the requirements regarding the written preliminary examination, but the oral part will be based on topics selected by the research advisory and the committee. See also the description in the Physics section of this *Bulletin*.

Graduate Studies in Geological Sciences

Within Graduate Studies in Geological Sciences, concentrations are offered in three broad areas: geochemistry, geophysics-tectonics and sedimentary geology.

Concentration in Geochemistry

A student may concentrate on one of the basic geochemical disciplines, such as mineralogy, crystallography, experimental and theoretical phase equilibria, petrology, trace element geochemistry, isotope geochemistry or low-temperature geochemistry, or may combine these to attack such multidisciplinary problems as the origin and evolution of the moon and planets; the nature and history of the Earth's mantle; or the chemical history of the Earth's crust.

Facilities for research include an automated A.R.L. EMX-SM electron microscope; an X-ray diffraction laboratory that includes powder and single crystal diffractometers controlled by microcomputers and linked to a PDP-11/44 computer for data analysis; mass spectrometers for K-Ar, U-Pb and Rb-Sr dating, trace-element analysis and rare-gas analysis; atomic absorption for chemical analysis; a laboratory for phase-equilibrium studies at temperatures to 1500 degree C and pressures ranging from vacuum to 50,000 atmospheres; and a fully equipped J.E.O.L. scanning-transmission electron microscope (STEM).

Concentration in Geophysics-Tectonics

Courses are available in seismology, solid state geophysics and tectonophysics. Among the topics of current research interest are the structure of the crust and mantle inferred from seismic waves, gravity and isotasy studies, the elasticity and crystallography of high-pressure forms of mantle minerals, chemical and mineralogical constitution of the Earth's interior, the mechanical behavior of lithospheric plates, fault mechanics, impact cratering, thermal evolution of the Earth and planets, and planetary geophysics.

Research facilities include an experimental physical acoustics laboratory employing both ultrasonic and Brillouin scattering techniques, a high-pressure laboratory for synthesis of specimens to pressures of 100kbar, a seismology laboratory with a WWSSN microfilm and IDA tape library, a planetary photo lab including pictures from the Voyager missions to Saturn and Jupiter, an X-Y digitizer interfaced to the University's Univac computer, a microprocessor system for on-line analysis of acoustic and seismic data, portable seismic instruments, and a rock deformation laboratory, complete with both solid-media and gas-media high pressure/temperature apparatus. All of these facilities are accessible for graduate student research.

Concentration in Sedimentary Geology

The concentration in sedimentary geology emphasizes both marine and terrestrial systems, with advanced courses in physical processes, facies models, marine paleoecology, diagenesis, sedimentary geochemistry and ore formation. Active research includes studies of ancient and modern lacustrine/fluvial systems, regional carbonate diagenetic studies including trace element and stable isotope investigations, mineralogical studies of carbonates, and studies of ore mineralization in sedimentary rocks. Paleoecological investigations focus on problems of speciation and extinction in Paleozoic mollusks and brachiopods as a function of their geographic distribution.

Excellent research facilities are available for conventional and cathode luminescence petrography, scanning and transmission electron microscopy, electron microprobe analysis, X-ray diffraction and atomic absorption analysis, and rock preparation.

Requirements for the M.S. Degree

A. Residence: None.

B. Language: None.

C. Formal coursework: Successful completion with a B average of an approved course of study consisting of 30 graduate credits with a minimum of:

1. 18 academic credits and a thesis;

or

2. 30 academic credits without a thesis.

Courses which satisfy the academic credit requirements must be in the approved course of study, must be at the graduate level, and cannot be teaching or research courses.

D. Qualifying examination: Astronomy students must pass a written qualifying exam at the M.S. level. Successful completion of qualifying exams in the Department of Physics also satisfies this requirement.

E. Evaluation:

1. M.S. with thesis: Approval of the thesis by an examining committee and a public oral presentation of the results of the thesis.

2. M.S. without thesis: Passage of an oral examination on material covered in the approved course of study.

F. Departmental recommendation: When all departmental requirements are completed, the Chairperson may recommend to the Vice Provost for Research and Graduate Studies that the Master of Science degree be granted.

G. Time limit: All requirements for the M.S. degree must be completed within two years of the student's first registration at Stony Brook as a graduate student. For part-time students, this time limit may be waived by the graduate committee.

M.S. Thesis

A student taking this option must submit before the end of the first academic year of residence a thesis proposal of approximately 2-3 pages in length signed by the M.S. thesis advisor(s). The ESS faculty advisor(s) must certify satisfactory completion of the research before the graduate committee will establish an examining committee. Copies of the thesis shall be submitted to the M.S. examining committee *at least one week* before a planned M.S. examination. The committee must respond to the student within one week after receipt of the thesis. Only if the committee attests

that the thesis is well written, that it shows a competent collection and selection of data, that it adequately references the pertinent literature and that it is concise, can a date for the M.S. examination be set. The student is responsible for meeting all requirements of the Graduate School regarding the M.S. thesis.

M.S. Examination

A final, oral examination, required of all M.S. candidates, shall be given near the end of the semester in which the student completes his or her approved course of study. The examining committee shall consist of at least three faculty members appointed by the Graduate Committee. The examination may cover the entire approved course of study or may concentrate on the student's thesis.

For astronomy and planetary sciences students, a Ph.D. preliminary examination may function simultaneously as an M.S. oral examination for those taking an M.S. without thesis or research.

The M.S. exam must be administered *at least two weeks* before the end of classes in the semester during which the degree is to be conferred.

Requirements for the Ph.D. Degree

A. Residence: Two consecutive semesters of full-time graduate study.

B. Language: None.

C. Formal coursework: Successful completion of an approved course of study. The number of credit hours required is unspecified and will be set according to the student's background and interests.

D. Qualifying examination: Acceptable performance on the written Ph.D. qualifying examination. (Applicable to astronomy only.)

E. Preliminary examination: Successful defense of one to three research proposals.

1. Invitation: The Department signifies its willingness to consider a graduate student for Ph.D. candidacy by a written invitation to submit abstracts of proposed research to serve as the basis of the Ph.D. preliminary examination. This invitation will normally be tendered no later than the beginning of the fourth semester of full-time graduate study for students with a bachelor's degree or by the beginning of the third semester for students who enter the graduate program with an advanced degree. The invitation will specify the number of abstracts required and will set a time limit, normally one semester, for the completion of the several steps that constitute the preliminary examination.

2. Abstracts: The student will submit abstracts of research proposals to the graduate committee for approval. A single abstract must be endorsed, in writing, by three ESS faculty members. If more than one abstract is submitted, then each must be endorsed by two ESS faculty members. Endorsement signifies that the preparation by the student of a written proposal based on the stated topic is acceptable. One or more of the signatories must be identified as a potential sponsor(s), a designation that signifies a willingness, but not a binding commitment, to supervise the proposed research. This procedure does *not* commit a student to work with the indicated sponsor(s), but provides the student with an early indication that a potential thesis advisor is available for the proposed research topic.

3. Preliminary examination committee: Upon approval of the abstracts, the Department Chairperson, in consultation with the graduate committee, will nominate a preliminary examination committee, and a chairperson thereof, for appointment by the Vice Provost for Research and Graduate Studies. The committee will consist of five members, one of whom may be from outside the Department. The student will be informed of the membership of the committee.

4. Research proposal: Following the approval of the abstracts, the student will be instructed to prepare the proposals in depth—a process which normally takes about two months. Each proposal shall state an idea for research, indicate why it was selected and outline the procedures to be used to explore and develop it. A proposal must include a list of the principal references used in its preparation.

The prepared proposals will be submitted to the members of the examination committee, the graduate committee, and other interested faculty members. The examination committee will judge each proposal for soundness of idea, suitability as a Ph.D. topic and quality of development. Within one week after receiving the proposals, the examination committee must either A) approve the proposals and set the time and place for a preliminary examination to be held within one week; *or* B) inform the student that one or more of the proposals is/are unacceptable as written and request that it/they be resubmitted within a given time, not greater than four weeks; *or* C) reject the proposal(s) in which case there is no preliminary examination and the student is terminated. If the proposals are accepted, the student will circulate and post a notice of the time and place of the examination and the titles of the proposals as soon as possible after acceptance of the proposals by the examining committee.

5. Preliminary examination: The student will be given time at the examination to set forth briefly the research proposals, after which, in closed session, there will be questions from the committee and other faculty members. The questioning may be extended beyond the specific topics of the proposals to include related subjects. At the end of the defense, the student and all faculty members other than the committee will be excused, unless the committee requests specific information from a faculty member not on the committee. After the defense, the committee will evaluate the proposals with regard to the quality of their development and defense and the adequacy of the student's background knowledge. In summary, it will judge whether the student has demonstrated the ability to conceive, plan and carry out original and significant research. A grade of "pass" from at least three members of the committee shall constitute a successful defense. A student may pass with qualifications which must subsequently be met for a successful defense.

The chairperson of the preliminary examination committee will inform the student of the committee's decision and submit a written report of the examination (signed by all committee members) to the graduate committee. If the student does not pass the examination, the examination committee will recommend further action to the graduate committee. This recommendation will be implemented by the graduate committee, in consultation with the faculty.

F. Advancement to candidacy: Upon successful completion of the preliminary examination, including any associated qualifications, and meeting of the requirements of the course of study, the student will be considered for advancement to candidacy. This recommendation is made by the graduate committee, through the Department Chairperson, to the Vice Provost for Research and Graduate Studies. Candidacy signifies that the student has successfully completed all Graduate School and departmental requirements for the Ph.D. degree, except the dissertation.

G. Dissertation research: The student must submit a statement to the graduate committee describing the research that will be undertaken for the dissertation. A time limit for the submission of

the statement, normally less than three months after the examination, will be set by the examination committee at the time of the preliminary examination. The statement must be endorsed by the candidate's faculty advisor. If the subject of the dissertation research differs from that in the research proposals defended at the preliminary examination, the dissertation statement must be endorsed by two faculty members in addition to the thesis advisor. Thereafter, a brief oral report on the dissertation research will be presented yearly to the Department until the dissertation is completed.

H. Dissertation: The finished dissertation must be approved by a dissertation examining committee which shall consist of five members of faculty rank, at least one of whom must be outside the Department. The committee and its chairperson shall be appointed by the Vice Provost for Research and Graduate Studies on the recommendation of the Department Chairperson in consultation with the graduate committee. The chairperson must not be the supervisor of the dissertation. This committee must receive the dissertation at least two weeks before the oral defense of the dissertation. Before the oral defense can be held, the majority of the examining committee must certify in writing that the dissertation is ready to be defended. The committee will then conduct the oral defense of the dissertation. The presentation will be open to all faculty members and to others by invitation of the student.

I. Time limit: Graduate School regulations require that candidates must satisfy all requirements for the Ph.D. degree within seven years after completing twenty-four hours of graduate courses. The Department of Earth and Space Sciences further stipulates that all requirements for the Ph.D. degree must be met within three years of advancement to candidacy. Extension beyond this limit will be at the discretion of the graduate committee in consultation with the student's thesis advisor.

Responsibility

The student should become thoroughly familiar with these departmental requirements, with the advising and study plan procedures of each concentration with the graduate degree program and with the degree requirements of the Graduate School. In addition, the student should make a point of learning the function of the graduate committee and his/her relationship to it. Final responsibility for deadlines and procedures rests *solely* with the individual student.

Faculty

Bohlen, Steven R., Assistant Professor. Ph.D., 1979, University of Michigan: Geothermometry, geobarometry, metamorphic petrology.

Bokuniewicz, Henry J., Assistant Professor.[1] Ph.D., 1976, Yale University: Marine geophysics.

Bretsky, Peter W., Professor. Ph.D., 1967, Yale University: Evolution of Paleozoic benthic marine communities.

Caldwell, John J., Adjunct Associate Professor. Ph.D., 1971, University of Wisconsin: Theoretical studies of atmospheres, particularly the outer planets and Titan.

Dodd, Robert T., Professor. Ph.D., 1962, Princeton University: Chondritic meteorites; metamorphic history of the Precambrian rocks in southeastern New York.

Duedall, Iver W., Associate Professor.[1] Ph.D., 1973, Dalhousie University, Canada: Chemical oceanography.

Forman, Miriam, Adjunct Associate Professor. Ph.D., 1972, State University of New York at Stony Brook: Solar wind and cosmic ray interaction.

Hanson, Gilbert N., Professor. Ph. D., 1964, University of Minnesota: Application of radiometric and geochemical methods to petrologic and tectonic problems.

Hardorp, Johannes, Associate Professor. Ph.D., 1960, University of Hamburg, W. Germany: Stellar atmospheres; stellar rotation; Ap and Am stars.

Knacke, Roger F., Professor. Ph.D., 1969, University of California, Berkeley: Infrared astronomy; spectroscopy of planets and nebulae; galaxies and quasistellar objects; interstellar grains.

Lattimer, James M., Assistant Professor. Ph.D., 1976, University of Texas: High-energy astrophysics; gravitational collapse, supernovae, neutron star matter; geochemistry: grain formation, isotopic anomalies, chemical condensation in early solar nebula.

Liebermann, Robert C., Professor. Ph.D., 1969, Columbia University: Solid state geophysics; elastic and anelastic properties of rocks and minerals, and applications to the Earth's interior.

Lindsley, Donald H., Professor. Ph.D., 1961, The Johns Hopkins University: Application of phase equilibrium studies of silicate and oxide minerals to metamorphic and igneous petrology.

Melosh, H. Jay, Associate Professor. Ph.D., 1972, California Institute of Technology: Plate tectonics; rheology of the Earth's interior; post-seismic rebound; impact cratering; planetary surfaces.

Meyers, William J., Associate Professor. Ph.D., 1973, Rice University: Carbonate diagenesis; geochemistry; sedimentology.

Nakajima, Y., Research Associate Professor. Ph.D., 1975, Osaka University, Japan: Crystal chemistry; X-ray diffraction; electron microscopy.

Owen, Tobias C., Professor. Ph.D., 1965, University of Arizona: Solar system studies; spectroscopy of planets and comets; planetary atmospheres; participation in space missions.

Papike, James J., Adjunct Professor. Ph.D., 1964, University of Minnesota: Crystal chemistry of silicate minerals; mineralogy and petrology of planetary regoliths; planetary basalts and terrestrial metasedimentary sequences.

Peterson, Deane M., Associate Professor. Ph.D., 1968, Harvard University: Stellar atmospheres; radiative transfer; Bp stars; pre-main sequence evolution; speckle interferometry.

Prewitt, Charles T., Professor. Ph.D., 1962, Massachusetts Institute of Technology: Crystallography and mineralogy, specifically, disorder in minerals, crystalline phase transitions and crystal chemistry of oxides and sulfides.

Reeder, Richard J. Assistant Professor. Ph.D., 1980, University of California, Berkeley: Low-temperature geochemistry, mineralogy and mineral-solution equilibria.

Simon, Michal, Professor and Chairperson. Ph.D., 1967, Cornell University: Infrared astronomy; solar astronomy; physics of strong radio sources.

Smoot, Joseph P., Assistant Professor. Ph.D., 1977, The Johns Hopkins University: Sedimentary facies analysis and comparative sedimentology of modern and ancient sediments.

Solomon, Phillip, Professor. Ph.D., 1964, University of Wisconsin: Interstellar molecules; radio astronomy; physics of interstellar medium; galactic structure; stellar mass loss; quasistellar objects.

Sverjensky, D.A., Assistant Professor. Ph.D., 1980, Yale University: Mineral deposits; mineral solution equilibria at elevated temperatures and pressures; light stable isotope geochemistry.

Thurber, Clifford H., Assistant Professor. Ph.D., 1981, Massachusetts Institute of Technology: Seismology; isotasy; planetary geophysics.

Weidner, Donald J., Associate Professor. Ph.D., 1972, Massachusetts Institute of Technology: Structure of the Earth's interior as revealed by seismic waves and laboratory determinations of physical properties.

Yahil, Amos, Associate Professor. Ph.D., 1970, California Institute of Technology: Galaxies, clusters of galaxies; physical cosmology; extragalactic X-ray sources; accretion processes.

Estimated number of teaching, graduate and research assistants, fall 1982: 60.

[1]*Joint appointment, Marine Sciences Research Center*

Courses

ESS 505 Experimental Petrology Laboratory
The course is designed to give the student experience in some or all of the following techniques of experimental petrology: evacuated silica-glass tube experiments; one-atmosphere quenching experiments (with and without controlled atmospheres); 1 to 5 kbar hydrothermal systems (using oxygen buffers where necessary); gas-media experiments up to 7 kbar; solid-media piston-cylinder experiments.
Requirement: Completion of a project involving several of the above techniques; written report.
Perequisite: Permission of instructor
Fall, 1 credit

ESS 506 Theoretical Petrology
Theory of phase diagrams, Schreinemaker's Rules, heterogeneous equilibria, experimental systems of petrologic interest, properties of solutions.
Prerequisites: Metamorphic and igneous petrology and physical chemistry or thermodynamics; or permission of instructor
Spring, 3 credits

ESS 507 Petrogenesis
Discussion of the origin and evolutionary histroy of selected types of igneous and metamorphic rocks by integrating the principles of heterogeneous phase equilibria, trace element and isotopic geochemistry, crystal chemistry and geologic occurrence.
Fall, 3 credits

ESS 508 The Rock-Forming Minerals
Study of the crystal chemistry, intracrystalline cation distribution (homogeneous equilibria), stability and paragenesis of the rock-forming minerals. Special emphasis will be placed on amphiboles, feldspars, micas and pyroxenes.
Fall, 3 credits

ESS 511 Advanced Paleontology
An introductory graduate-level course that stresses an integration of practical field and laboratory study of fossil assemblages with quantitative statistical analyses of data. The actual content of the course varies from year to year; field collecting will normally be carried out in the lower or middle Paleozoic of the Central Appalachians or the Tertiary of the Atlantic Coastal Plain.
Fall, 3 credits

ESS 513 Sedimentary Processes
An examination of the physical, chemical and biological processes which combine to produce the sedimentary features preserved in rocks. Topics include the basic fluid mechanics of sediment movement, theoretical and empirical constraints of bedforms, the significance of layering and the nature and origin of syndepositional disruptions. Laboratories will emphasize the recognition of sedimentary structures in slabbed hand specimens and outcrops and their application to the reconstruction of the depositional conditions.
Fall, alternate years, 4 credits

ESS 515 Seminar In Detrital Sedimentation
Focus will be on continental margin and adjacent oceanic sedimentation. Topics: formation of continental shelves; sedimentary processes on continental slopes, including mass gravity processes and canyon formation; sedimentation on continental rises including turbite fan models; concepts of geosynclines; and relationship of continental margin sedimentation to plate tectonics.
Spring, alternate years, 3 credits

ESS 516 Paleoecology
Relation of ecological theory and practice to paleoecological problems. Topics: mode of formation of fossil assemblages; biotic diversity; communities; evolution of provinces; estimation and significance of survivorship in the fossil record; autoecology of selected fossil invertebrate groups; and spatial distribution.
Spring, 3 credits

ESS 518 Carbonate Sediments
An intensive study of the formation, deposition, lithification and diagenesis of carbonate sediments. Lectures and seminars will emphasize principles of carbonate deposition, facies relationships and chemistry. Laboratories will emphasize binocular and petrographic analysis of recent and ancient carbonates.
Spring, even years, 4 credits

ESS 520 Advanced Facies Analysis
An in-depth study of sedimentary rock packages, their lateral variability, their vertical successions and their interpretation using comparative sedimentary and integrated subenvironment models. Modern and ancient sedimentary systems will be compared and evaluated, including fluvial environments, deltas, beaches, tidal flats, basinal evaporites and lacustrine complexes.
Fall, alternate years, 3 credits

ESS 521 Isotope Geology
Radioactive decay schemes useful for determining the age of rocks and minerals. Evaluation of the various methods and consideration of problems of interpreting data. Application of radioactive isotopes and trace elements to the study of geologic processes and crustal evolution.
Fall, 3 credits

ESS 522 Planetary Sciences II
The chemical, physical and petrologic properties of meteorites are reviewed. These data and data for the Moon and the terrestrial planets are used to form a picture of the origin, chemical evolution and accretion of planetary material.
Fall, 3 credits

ESS 526 Principles of Chemical Sedimentology
A chemical approach to the study of sediments. Fundamental principles of chemical thermodynamics and kinetics, including isotope effects, as they pertain to low-temperature geochemical processes, are presented and utilized in the discussion of sedimentological processes.
Spring, alternate years, 3 credits

ESS 531 Crystalline Solids
Principles of symmetry, single crystal and powder X-ray diffraction techniques and elements of crystal structure determination are considered. Use of crystallographic data in the study of mineral systems. Laboratory in diffraction techniques includes extensive use of digital computers.
Fall, alternate years, 3 credits

ESS 532 Solid State Geochemistry
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 sillicate and sulfide crystal structures.
Fall, alternate years, 3 credits

ESS 543 Laboratory Course in Astronomical Techniques
A course designed to introduce the theory, design and operation of modern astronomical instrumentation and to familiarize the student with the use of telescopes. Current astronomical techniques will be discussed with emphasis on methods of observational measurements and reduction of data. Will emphasize optical techniques appropriate for wavelengths shorter than one micron. Will deal with infrared and radio techniques. Extensive laboratory and observing exercises may be expected.
Spring, odd years, 4 credits

ESS 548 Cosmochemistry
The chemical composition of parts of the galaxy, the cosmic rays, stars, the sun, the solar wind, comets, meteorites and other solid objects in the solar system. Relationships and evolutionary changes in chemical composition. Additional topics: 1) cosmochronology as evidenced by isotopic variations in meteorites; and 2) the interaction of cosmic rays with solid objects in the solar system.
Spring, alternate years, 3 credits

ESS 550 Global Tectonics
Geological, geochemical and geophysical evidence related to the concepts of plate tectonics and mantle convection. Kinematics and dynamics of plate motions. Origin of first-order crustal structures of continents and ocean basins. Geochemical and thermal evolution of the Earth.
Spring, 3 credits

ESS 551 Physics of the Earth I
Study of the internal structure and properties of the Earth as revealed by field and laboratory investigations. Topics to be discussed include the rotation and figure of the Earth, gravity anomalies, solid-earth tides, geomagnetism and paleomagnetism, electromagnetic induction, and heat flow and the Earth's present and past thermal states. May be taken independently of ESS 552.
Fall, 3 credits

ESS 552 Physics of the Earth II
Study of the Earth's structure and properties based on evidence from seismology and high-pressure geophysics. Topics to be discussed include fundamental principles of elastic wave theory, body and surface wave propagation in layered media, earthquake source mechanisms, free oscillations of the Earth and rheological properties of the Earth's interior. May be taken independently of ESS 551.
Spring, 3 credits

ESS 553, 554 Stellar Physics I, II
A survey of the physical principles and the results of astrophysical importance in the study of stellar structure and composition. Fall term treats the problem of stellar interiors and evolution. Specific topics include the equation of

state, nuclear reactions, stellar opacity sources and energy transfer mechanisms. Spring term treats stellar atmospheres and chemical abundance determinations. Topics will include radiative transfer, thermodynamics in the presence of a radiation field, line formation and the determination of stellar temperatures, surface gravities and compositions. Either term may be taken independently of the other. Two one-and-one-half-hour lectures per week.
Fall (533) odd years, and spring (554) even years, 3 credits each semester

ESS 556 Solid State Geophysics
Application of lattice dynamics and equations of state of solids to studies in high-pressure, high-temperature geophysics. Reviews experimental data from physical acoustics, static and shock wave compression, and theoretical results from finite strain and atomistic models.
Prerequisites: ESS 551 and 552 or permission of instructor
Spring, 3 credits

ESS 581 Astronomy for Physicists
The course is intended as an introduction to astronomy for students with a physics background. It can serve either as an elective or as a springboard for deeper involvement in the astronomy field. Topics to be covered include basic properties of stars, their structure, luminosity, nuclear processes and evolution; the interstellar medium and molecular astronomy; the structure and dynamics of galaxies and of clusters of galaxies; cosmology.
Fall, odd years, 3 credits

ESS 582 Astrophysical Processes
A diverse course that treats in depth various physical processes of importance in astrophysics. Topics include theory and astrophysical application of: hydrodynamics, MHD, plasmas, general aspects of wave propagation, explosive processes, theory of thermal and nonthermal emission of E-M radiation, radio sources, X-ray sources. Two one-and-one-half-hour lectures per week.
Spring, odd years, 3 credits

ESS 583 Galactic Astrophysics I
A study of the interstellar medium with emphasis on physical processes. Topics include kinetic theory, equation of transfer, spectral lines, non-thermal emission ionization, effects of dust, formation and spectroscopy of molecular clouds. The components of the interstellar medium and the interactions between them will be discussed in detail, as well as the process of star formation. May be taken independently of ESS 584.
Fall, even years, 3 credits

ESS 584 Galactic Astrophysics II
A study of the structure of galaxies and clusters of galaxies. Topics include the concept of stellar populations, stellar statistics and the distribution of stars in the galaxy and in velocity space, the dynamics of stars in the solar neighborhood and in globular clusters, the rotation curves of galaxies, clusters of galaxies. This course may be taken independently of ESS 583.
Fall, odd years, 3 credits

ESS 585 Physical Cosmology
Current research in cosmology will be discussed from a physical point of view. The course is intended for students with a background in undergraduate physics. Topics to be covered will be extragalactic objects of special interest, such as clusters of galaxies, radio sources and quasars; the expansion of the universe and the big bang; the cosmic microwave and X-ray background radiations; the extragalactic distance scale; observational tests of cosmology; big bang nucleosynthesis; gravitational instabilities. No astronomy prerequisite is required and the astronomy background will be developed as the course progresses.
Spring, even years, 3 credits

ESS 597 Methods of Astronomical Research
This course is designed to acquaint beginning graduate students with current research in the Department and to develop basic techniques of research in astronomy. Students work directly with one or more faculty members on short research projects that may involve using the astronomical literature, computer programming or instrumentation in one of the laboratories.
Every semester, 1 credit, repetitive

ESS 599 Research
Fall and spring, variable and repetitive credit

ESS 600 Practicum in Teaching
1-3 credits, repetitive

ESS 601 Advanced Topics in Astronomy-Astrophysics
Fall and spring, 3 credits per semester, repetitive

ESS 603 Topics in Petrology
1-3 credits

ESS 604 Topics in Geo-Cosmochemistry
1-3 credits

ESS 605 Topics in Sedimentary Geology-Paleontology
1-3 credits

ESS 607 Topics in Geophysics
1-3 credits

ESS 609 Topics in Mineralogy and Crystallography
1-3 credits

ESS 612 Seminar in Astronomy-Astrophysics
Designed to treat specific subject areas in depth, either extending material introduced at the 500 level or covering topics not presented there. Topics recently offered or anticipated in the near future include observational cosmology, atomic and molecular processes, planetary atmospheres, interstellar molecules, advanced topics in radiative transfer, interstellar gains, quasars and galactic nuclei. Two one-and-one-half-hour lectures per week.
3 credits, repetitive, topics to be announced

ESS 619 Electron Probe X-Ray Microanalysis
Theory of electron excitations of X-rays, matrix effects and practical aspects of electron probe X-ray microanalysis. Intended for advanced graduate students who need the instrumental capabilities for their thesis or research. Registration limited to a maximum of six students.
Prerequisites: Advanced graduate standing and permission of instructor
Fall and spring, 3 credits

ESS 699 Dissertation Research
Independent research for Ph.D. degree. Open only to candidates for the Ph.D. who have passed Preliminary Examination.
Each semester, variable and repetitive credit

Department of Mathematics

Master's Program

This program consists of two options: the *Secondary Teacher Option* (two years, part time) for secondary school mathematics teachers seeking permanent certification; and the *Professional Option* (one or two years, full time), designed for students who plan careers as professional mathematicians in industry, government or the academic world, including two-year college teaching.

Doctoral Program

This program (three to four years, full time), an extension of the Professional Option in the Master's Program, is designed for students who plan careers as research mathematicians and/or as college or university faculty members.

Admission to the Master's Program

Any student who presents convincing evidence that he or she will benefit from a year of graduate work in mathematics is eligible for admission. Normally that evidence will include records of prior training in mathematics and three letters of recommendation. Applicants for the Secondary Teacher Option may submit letters from current or former teachers or supervisors and are expected to have at least the equivalent of a New York State provisional certificate for teaching mathematics, grades 7-12. Applicants for the Professional Option ordinarily submit letters of recommendation from three mathematicians under whom the student has studied. Applicants for full-time study must submit Graduate Record Examination Aptitude Test scores. Each foreign applicant must also submit a TOEFL score.

An able student who has completed basic work in linear and modern algebra and in advanced calculus is prepared for entrance into the Professional Option. An applicant whose prior training is deficient may be offered provisional admission for one year, after which he or she may apply for regular admission.

For admission, a student must be accepted by both the Department of Mathematics and the Graduate School.

Requirements for the M.A. Degree

A. 30 credits in graduate courses approved by the Department.

B. Passing the comprehensive examination.

C. A nine-credit minor.

For students in the Secondary Teacher Option, the 30-credit requirement is ordinarily satisfied by the following courses: MSM 511, Fundamental Concepts of Mathematics; MSM 512, Algebra for Teachers; MSM 513-514, Analysis for Teachers I-II; MSM 515, Geometry for Teachers; MSM 516, Probability and Statistics for Teachers; MSM 518, Seminar in the Uses of Mathematics; MSM 519, Seminar in Mathematics Teaching, CEN 560, Introduction to Computing; and a three-credit elective. The comprehensive examination consists of the final examinations in MSM 512, 513, 514 and 515. The minor requirement is met by the three courses MSM 516, MSM 518 and CEN 560.

For students in the Professional Option, the courses which satisfy the 30-credit requirement are worked out individually with each student but ordinarily include MSM 530-531, Topology/Geometry I-II; MSM 534-535, Algebra I-II; MSM 542, Complex Analysis I; MSM 544, Analysis; MSM 550, Real Analysis I; and MSM 598, Teaching Practicum. Students preparing for the doctoral program ordinarily take, in addition, MSM 590-591-592, Problem Seminar I-II-III. The comprehensive examination consists of the final examinations in MSM 530, 531, 534, 535, 542, 544 and 550, or the equivalent. Well-prepared students may substitute the passing of equivalent examinations which are offered periodically. The minor program consists of three courses in an allied area such as statistics, computer science, or theoretical physics. The program for students preparing for two-year college teaching also includes the teaching and observation of mathematics courses at the two-year college level.

Admission to the Doctoral Program

A student who presents convincing evidence of significant potential for research in mathematics is eligible for admission. That evidence normally consists of an outstanding performance on the doctoral comprehensive examination or on comparable examinations at other universities. Students desiring direct admission to the doctoral program should indicate this on their applications.

Requirements for the Ph.D.

A. Passing the doctoral comprehensive examination.

B. Passing the doctoral preliminary examination.

C. Demonstrating proficiency in reading mathematics in two of the following: French, German and Russian.

D. Two consecutive semesters of full-time study.

E. Advancement to candidacy.

F. Writing an acceptable dissertation.

The Doctoral Comprehensive Examination

This examination, which is offered twice a year (at the start and finish of the spring semester), is designed to test mastery of the fundamentals of mathematics. A detailed syllabus for this examination is available upon request. Students who transfer from graduate programs in other universities may in some cases be granted exemption from this requirement at the time they are admitted. Otherwise, such students must take the doctoral comprehensive examination at their first opportunity.

The Doctoral Preliminary Examination

This examination is oral. Each student must take this examination no later than two years after passing the comprehensive examination or receiving an exemption therefrom. The chairperson of the examining committee is chosen by the student.

Professional Academic Training Program

All full-time graduate students in mathematics are required to participate in this program. It consists of supervised teaching or tutoring at the lower undergraduate levels.

Faculty

Adler, A., Professor. Ph.D., 1956, University of California, Los Angeles: Differential geometry and mathematical economics.

Ax, J., Professor. Ph.D., 1961, University of California, Berkeley: Algebraic number theory and logic and foundations of physics.

Barcus, W., Professor. Ph.D., 1955, University of Oxford, England: Algebraic topology.

Charlap, L., Professor. Ph.D., 1962, Columbia University: Homological algebra; differential geometry.

Cheeger, J., Professor. Ph.D., 1967, Princeton University: Differential geometry.

Doss, R., Professor. Ph.D., 1944, University of Cairo, Egypt: Harmonic analysis.

Douglas, R., Professor and Chairperson. Ph.D., 1962, Louisiana State University: Operator theory; functional analysis.

Ebin, D., Professor. Ph.D., 1967, Massachusetts Institute of Technology: Global analysis.

Fox, W., Associate Professor. Ph.D., 1955, University of Michigan: Complex analysis.

Geller, D.N., Assistant Professor. Ph.D., 1977, Princeton University: Analysis.

Gromoll, D., Professor. Ph.D., 1964, University of Bonn, W. Germany: Differential geometry.

Gromov, M., Professor. Ph.D., 1969, Moscow State University, USSR: Differential topology and geometry.

Hawkins, J., Instructor. Ph.D., 1981, University of Warwick, England: Ergodic theory and operator theory.

Hill, D., Professor. Ph.D., 1966, New York University: Partial differential equations; several complex variables.

Jones, L., Associate Professor. Ph.D., 1970, Yale University: Topology.

Kleinstein, J., Assistant Professor. Ph.D., 1976, Cornell University: Algebra and mathematical education.

Kra, I., Professor. Ph.D., 1966 Columbia University: Complex analysis; Kleinian groups.

Kuga, M., Professor. Ph.D., 1961, University of Tokyo, Japan: Complex manifolds; algebraic groups.

Kumpel, P., Associate Professor. Ph.D., 1964, Brown University: Algebraic topology.

Laufer, H., Professor. Ph.D., 1966, Princeton University: Several complex variables.

Lawson, H.B., Professor. Ph.D., 1968, Stanford University: Differential geometry, topology.

Lebrun, C., Instructor. Ph.D., 1980, University of Oxford, England: Complex analysis; mathematical physics.

Lister, W., Professor. Ph.D., 1951, Yale University: Algebra.

Maskit, B., Professor. Ph.D., 1964, New York University: Complex analysis, Kleinian groups.

Matelski, J.P., Assistant Professor. Ph.D., 1978, Princeton University: Complex analysis.

McDuff, M.D., Associate Professor, Ph.D., 1971, University of Cambridge, England: Operator theory; topology.

Michelsohn, M.L., Assistant Professor. Ph.D., 1974, University of Chicago: Topology, differential geometry.

Parry, W.R., Assistant Professor. Ph.D., 1976, University of California, Berkeley: Number theory.

Phillips, A., Professor. Ph.S., 1966, Princeton University: Differential topology.

Pincus, J., Professor. Ph.D., 1959, New York University: Operator theory and integral equations.

Sah, C. H., Professor. Ph.D., 1959, Princeton University: Group theory and its applications.

Spencer, J., Professor. Ph.D., 1970, Harvard University: Combinatorics.

Strasser, E., Professor. Ph.D., 1956, New York University: Combinatorial group theory.

Szusz, P., Professor. Ph.D., 1951, University of Budapest, Hungary: Analytic number theory.

Taylor, M., Professor. Ph.D., 1970, University of California, Berkeley: Partial differential equations.

Teleman, N., Assistant Professor, Ph.D., 1977, Massachusetts Institute of Technology: Differential geometry.

Thorpe, J., Professor. Ph.D., 1963, Columbia University: Differential geometry.

Zaustinsky, E., Associate Professor. Ph.D., 1957, University of Southern California: Differential geometry.

Estimated number of teaching, graduate and research assistants, fall 1982: 65.

Courses

CORE COURSES FOR TEACHER OPTION

MSM 511 Fundamental Concepts of Mathematics
The axiomatic method. The theory of sets. Introduction to mathematical logic. The construction of number systems. The philosophy of mathematics. Primarily for secondary school teachers of mathematics.
Fall, spring or summer, 3 credits

MSM 512 Algebra for Teachers
Linear algebra, the algebra of polynomials, algebraic properties of the complex numbers, number fields, solutions of equations.
Fall, spring or summer, 3 credits

MSM 513 Analysis for Teachers I
Topics in differential calculus, its foundations, and its applications. This course is designed for teachers and prospective teachers of advanced-placement calculus.
Fall, spring or summer, 3 credits

MSM 514 Analysis for Teachers II
Topics in calculus, its foundations, and its applications. Emphasis will be on integration and on numerical techniques. This course is designed for teachers and prospective teachers of advanced-placement calculus. Analysis for Teachers I is *not* a prerequisite for this course.
Fall, spring or summer, 3 credits

MSM 515 Geometry for Teachers
A re-examination of elementary geometry using concepts from analysis and algebra.
Fall, spring or summer, 3 credits

MSM 516 Probability and Statistics for Teachers
A priori and empirical probabilities, conditional probability; mean and standard deviation; random variables; financial distributions; continuous distributions; sampling; estimation; decision making.
Fall, spring or summer 3 credits

MSM 518 Seminar on the Uses of Mathematics
This seminar will explore the ways in which secondary school and elementary college mathematics is used in such diverse areas as psychology, sociology, political science, economics, business, engineering, physics, chemistry, biology and medicine. Primarily

for secondary school teachers of mathematics.
Fall, spring or summer, 3 credits

MSM 519 Seminar In Mathematics Teaching
Study of recent curricular and pedagogical developments in secondary school mathematics.
Fall, spring or summer, 3 credits

CORE COURSES FOR PROFESSIONAL OPTION

MSM 530 Topology/ Geometry I
Basic point set topology; connectedness, compactness, continuity, etc. Metric spaces, function spaces and topological manifolds. Introduction to algebraic topology; fundamental group and covering space, homology, applications.
Fall, 3 credits

MSM 531 Topology/ Geometry II
Foundations of differentiable manifolds: differentiable maps, vector fields and flows, differential forms and integration on manifolds. Stokes' theorem. Froebenius theorem. Lie derivatives. Immersions and submersions. Introduction to Lie groups and to the classical groups.
Spring, 3 credits

MSM 534 Algegra I
Linear algebra: fields, vector spaces, dimension, bases, matrices, linear maps, determinants, canonical form. Multilinear algebra: bilinear forms, Hermitian forms, spectral theorem, symmetric and tensor products, exterior products.
Fall, 3 credits

MSM 535 Algebra II
Groups: normal subgroups, Jordan-Holder theorem, fundamental theorem of Abelian groups. Rings: ideals and homomorphisms, Euclidean rings, polynominal rings, unique factorization. Fields: transcendence, algebraic extensions, primitive elements, fundamental theorem of Galois theory, applications.
Fall, 3 credits

MSM 539 Algebraic Topology
Homology and cohomology groups. Homotopy groups and the Hurewicz theorem, the universal coefficient theorem, cup and cap products. Poincare duality and introduction to spectral sequences.
Fall, 3 credits

MSM 542 Complex Analysis I
Elementary functions, holomorphic functions, Cauchy theory, power series, classification of isolated singularities, calculus of residues, open mapping theorem, Riemann mapping theorem.
Spring, 3 credits

MSM 543 Complex Analysis II
Monodromy theorem and analytic continuation. Elliptic functions. Dirichlet problem and Green's function. Conformal mappings. Introduction to Riemann surfaces and/or several complex variables.
Fall, 3 credits

MSM 544 Analysis
Elementary ordinary differential equations, existence theory, power series methods, characteristic functions, orthogonal polynomials, Fourier series.
Fall, 3 credits

MSM 546 Differential Equations
Basic concepts in ordinary and partial differential equations. Existence, uniqueness and stability theorems. Geometric theory of characteristics and the Froebenius theorem. Typical features of elliptic, hyperbolic and parabolic equations.
Spring, 3 credits

MSM 550 Real Analysis I
Lebesgue measure and integration. Rado-Nikodym theorem, Lebesgue-Stieltjes measures, Fubini and Tonelli theorems, classical Banach spaces.
Spring, 3 credits

MSM 551 Real Analysis II
Banach space, Hilbert space, Hahn-Banach and uniform boundedness theorems, topics in topological vector spaces, distribution theory.
Fall, 3 credits

MSM 566 Differential Topology
Vector bundles, transversality and characteristic classes. Further topics such as imbeddings and immersions, intersection theory, surgery and foliations.
Prerequisite: MSM 531
Fall, 3 credits

MSM 568, 569 Differential Geometry
Connections, curvature, geodesics, parallelism and completeness. Riemannian manifolds, geometry of sub-manifolds of R^n method of integral formulas, applications to global extrinsic theorems. Riemannian curvature. Gauss-Bonnet theorem, Hopf-Rinow theorem, first and second variation formulas, conjugate points and Jacobi fields, comparison theory. Curvature and fundamental group: spaces of positive and of negative curvature, space forms, Lie groups, homogeneous spaces and symmetric spaces.
Prerequisite: MSM 531
Fall and spring, 3 credits each semester

MSM 590, 591, 592 Problem Seminar I, II, III
Analyze problems and explore supplementary topics related to the other courses. Focus preparation for the preliminary exam.
Fall and spring, 3 credits each semester

MSM 598 Teaching Practicum
Seminar and workshop for new teaching assistants.
Fall, 1 credit

INTERMEDIATE COURSES

These courses are designed for second- and third-year graduate students who are preparing for the Doctoral Preliminary Examination or are starting work toward a dissertation. The only prerequisites are consultation with the teacher. Topics covered will be chosen to reflect interest of teachers and students. All of these courses may be taken for repeated credit.

MSM 602, 603 Topics In Algebra
Typical topics will be drawn from group theory, ring theory, representation theory of groups and algebras, fields and commutative algebra, homological algebra.
Fall and spring, 3 credits each semester, repetitive

MSM 608, 609 Topics In Number Theory
Typical topics will be drawn from analytic number theory, algebraic number theory, diophantine equations, transcendental number theory, with indications of methods from algebra, geometry, analysis, and logic.
Fall and spring, 3 credits each semester, repetitive

MSM 614, 615 Topics In Algebraic Geometry
Typical topics will be drawn from varieties and schemes, algebraic curves, and their arithmetics.
Fall and spring, 3 credits each semester, repetitive

MSM 620, 621 Topics In Algebraic Topology
Topics will be of current interest such as foliations, surgery, singularities, group actions on manifolds and homotopy theory.
Fall and spring, 3 credits each semester, repetitive

MSM 626, 627 Topics In Complex Analysis
Topics selected from Riemann surfaces, quasiconformal mappings, several complex variables, Fuchsian groups, Kleinian groups, moduli of Riemann surfaces and Kleinian groups, analytic spaces, singularities.
Fall and spring, 3 credits each semester, repetitive

MSM 632, 633 Topics In Differential Equations
Typical topics are hyperbolic or elliptic systems, parabolic equations, spectral theory, finite difference equations, Cauchy-Riemann equations and complex vector fields, equations with constant coefficients, solvability of linear equations, Fourier integral operators, non-linear equations.
Fall and spring 3 credits each semester, repetitive

MSM 638, 639 Topics In Real Analysis
Topics selected from functional analysis, harmonic analysis. Banach algebras, operator theory.
Fall and spring, 3 credits each semester, repetitive

MSM 644, 645 Topics In Differential Geometry
Typical topics will be drawn from areas such as comparison theorems, pinching theorems, Morse theory, characteristic classes, minimal varieties, Hodge theory, spectrum of the Laplacian geometry of general relativity.
Fall and spring 3 credits each semester, repetitive

ADVANCED COURSES

These courses are designed for students doing advanced work, especially in connection with doctoral dissertations. The only prerequisites are consultation with the teachers. The topics will be selected from the area listed under the corresponding intermediate course, and will generally be on a more advanced level. A course will normally begin in the fall and may continue in the spring. Course offerings will depend on

student demand and availability of faculty to supervise advanced work in the area. These courses may be taken for repeated credit. Each of these courses carries 3 credits.

MSM 662, 663 Advanced Topics in Algebra

MSM 666, 667 Advanced Topics in Algebraic Topology

MSM 670, 671 Advanced Topics in Complex Analysis

MSM 674, 675 Advanced Topics in Differential Equations

MSM 678, 679 Advanced Topics in Real Analysis

MSM 682, 683 Advanced Topics in Differential Geometry

OTHER COURSES

MSM 696 Mathematics Seminar

MSM 697 Mathematics Colloquium

MSM 698 Independent Study

MSM 699 Dissertation Research

Each of the above courses may be taken only with the approval of the Director of the Graduate Program. *Variable and repetitive credit*

Department of Physics

Admission to Graduate Study

For admission to graduate study in physics, the following are required:

A. A baccalaureate degree in physics, from an accredited institution.

B. A minimum grade average of B in all undergraduate coursework, and of B in physics, mathematics and chemistry.

C. Submission of results of the Graduate Record Examination Aptitude Test.

D. Acceptance by the Department of Physics and by the Graduate School.

In special cases, a student not meeting requirement A (or, in unusual cases, requirement B) may be admitted on a provisional basis. Upon entrance, the student will be informed of the requirements he or she must satisfy for the termination of the provisional status.

Retention of students in subsequent years will depend on satisfactory academic progress.

Requirements for the M.A. Degree

A. Satisfactory performance in a program of studies (30 graduate credits) approved by the Graduate Committee. Normally, such a program would include PHY 599 (Graduate Seminars), Classical Mechanics I, II, Electrodynamics, and Quantum Mechanics I, II.

B. Passing of the master's examination.

Graduate Studies in Teaching Physics

Requirements for the M.A. Degree

The Master of Arts (teaching) degree is designed for those students who plan to teach or who are teaching physics at the secondary school level. Work toward this degree will ordinarily involve two semesters of coursework and one semester of a supervised intern experience teaching physics in a secondary school.

A. 30 graduate credit-hour curriculum

1. Nine credit hours of graduate courses in physics.

2. Six credit hours of physics education courses offered by the Department of Physics.

3. Six credit hours in appropriate courses in educational psychology, philosophy or history chosen with the approval of the student's advisor.

4. Six credit hours (one semester) of supervised intern teaching in a secondary school.

5. Three credit hours of project work (PHY 580) on a topic in physics associated with classroom teaching at the secondary level. This will generally be an experimental topic. All candidates will be required to demonstrate proficiency in laboratory techniques associated with the teaching of secondary school physics.

B. Successful performance on an oral examination in which the candidate demonstrates proficiency in explaining physics at a level appropriate for secondary school students.

C. Passing of a comprehensive written examination in physics.

Credit for previous work: Students who already have provisional teaching certification or who have taken the required courses in education or the teaching internship may substitute appropriate additional courses in science, mathematics, education, or history and philosophy of science with the approval of their advisor. These course requirements will not automatically be waived, however. Credit for such courses or work done elsewhere may depend upon demonstrated proficiency.

Requirements for the Ph.D. Degree

A. One year of residence.

B. Satisfactory completion (grades A, B or S) of an approved program during each semester of residence or of part-time study.

C. Advancement to candidacy: The Department's recommendation to the Graduate School for advancement to candidacy for the Ph.D. is based on completion of the following requirements:

1. Passing of PHY 515 (Methods of Experimental Research) and of two semesters of PHY 599 (Graduate Seminars) with grades of A or B. The PHY 599 requirement is normally expected to be satisfied in the first year of graduate study.

2. Passing of the preliminary examination, which consists of two parts: (a) a written comprehensive examination, and (b) an oral examination on a broad range of topics relevant to the student's intended area of thesis research. The written examination, given at the beginning of each semester, must be passed no later than January of the second academic year of graduate study. The oral examination must be passed before the end of the second academic year.

D. Completion, with grade A or B, of two approved advanced courses in areas outside the student's thesis research.

E. Teaching experience at least equivalent to that obtained in a one-year appointment as a teaching assistant.

F. Research, dissertation and passing of the dissertation examination.

Doctoral Programs with Concentrations in Astrophysics, Biophysics and Chemical Physics

The Department of Physics participates in three Ph.D. curricula in cooperation with other departments. The basic degree requirements for a physics student enrolled in one of these programs are the same as those for other students in physics. He or she will usually be advised to take one or more courses in the cooperating department. The written part of the preliminary examination is the same as for other physics students; the oral part will ordinarily be on topics in astrophysics, biophysics or chemical physics. Subject to the approval of the Chairpersons of the two departments involved, the student's research advisor may be chosen from participating members of the cooperating department.

A student in one of these programs who expects to receive a Ph.D. from a cooperating department should consult that department's section in this *Bulletin* for degree requirements. The cooperating departments are:

Astrophysics:	Department of Earth and Space Sciences
Biophysics:	Department of Pharmacology and Department of Physiology and Biophysics, both in the School of Medicine, Health Sciences Center
Chemical Physics:	Department of Chemistry

Research and Facilities

Experimental High-Energy Physics

The proximity of the 33 GeV proton synchrotron at Brookhaven National Laboratory makes access to a first-class national facility unusually convenient. In addition, Stony Brook faculty members and students are currently conducting experiments at the Fermi National Accelerator Laboratory (Batavia, Illinois), Cornell Electron Storage Ring (Ithaca, New York) and at the Intersecting Storage Rings at CERN (Geneva, Switzerland).

Plans are under way for experiments on the new generation of colliding beam accelerators now under construction. The experimental program is varied, with topics under consideration ranging from total cross-section measurements at very high energy, through new particle searches, beauty quark investigations, and high-mass di-lepton and di-hadron studies, to measurements of neutrino-electron and neutrino-proton scattering cross-sections and neutrino oscillations. Techniques used comprise most of the available detector classes. Several new detector developments are being pursued, including a ring-imaging cerenkov detector capable of particle identification up to energies of several hundred GeV and a novel, low-cost, lead glass electromagnetic calorimeter.

Experimental Nuclear Physics

With the completion in 1982 of the Stony Brook Superconducting LINAC, Stony Brook possesses one of the most powerful university-based experimental heavy-ion nuclear research facilities in the country. The accelerator system and its associated experimental facilities occupy a separate laboratory building adjoining the Graduate Physics Building. The laboratory maintains a diversified program of nuclear research using the many and varied heavy ion beams available from the accelerator. Current research includes studies of the spectroscopy of high spin states in nuclei, resonance structure in reactions between complex nuclei, fusion between heavy ions, mass and charge distributions in heavy ion reactions, collective excitations in nuclei, fission isomerism and hyperfine interactions. Many of the experiments take advantage of the picosecond timing characteristics of the beams from the superconducting linac. Data acquisition and analysis are aided by an extensive computer system which has been built up in the laboratory. Faculty and students in the Nuclear Structure Laboratory also make extensive use of the facilities at nearby Brookhaven National Laboratory and have enjoyed many fruitful collaborations with Brookhaven scientists.

Experimental Solid State and Low-Temperature Physics

An active and expanding program of solid state and low-temperature physics is being carried out in several laboratories at Stony Brook. Areas of study include electronic structure of metals and semimetals, the Josephson effects, properties of superconducting thin films, fluctuation effects in superconductors, and physical properties of amorphous systems. Also under intensive study are some fundamental static and transport properties of liquid helium and He^3-He^4 mixtures, superfluid phenomena, and nuclear magnetic properties of solid hydrogen and hydrogen-deuterium at ultra-low temperatures. Several projects involving neutron scattering in liquid and solid helium are under way at the High Flux Beam Reactor at Brookhaven National Laboratory.

The experiments at Stony Brook make use of a wide variety of techniques, such as quantum oscillations in a 100-kilogauss magnetic field, microwave absorption and cyclotron resonance, superconducting quantum interference, and nuclear magnetic resonance at 400 MHz. Ultra-low temperatures (millikelvin range) are produced by He^3-He^4 dilution, and thin-film microstructures are fabricated by means of electron beam lithography using a scanning electron microscope.

Experimental Atomic and Molecular Physics, Quantum Electronics

There are several experiments using pulsed tunable dye lasers to excite atoms and molecules to states of interest. In one experiment the time dependence of the fluorescence from OH-free radicals in a weak magnetic field is observed. Many of the molecule's rotational states are excited and g-factors (and lifetimes) as a function of rotational quantum number are measured. In another experiment the laser light excites 3^3P helium atoms in a magnetic field of 2300 gauss which is near the crossing of the fine structure levels. The level crossing can be observed and the fine structure of this excited state can be determined to high precision. Future plans are to study Rydberg states of helium in this apparatus. In another experiment, two laser beams are crossed with an atomic beam of sodium and tuned to excite Rydberg states or to photoionize the sodium. In this way the time dependence of the excited states can be studied both by the population of the Rydberg states and by observation of coherence in the photoionization current. The effects of an electric field on the loosely bound electron are also studied.

High-Energy Theory

Studies include the phenomenology of weak and electromagnetic interactions, extensive studies on possible neutrino masses, and general comparisons between the Weinberg-Salam theory.

Serious efforts investigate QCD both in its empirical and fundamental aspects (especially the problem of infrared divergencies). A number of faculty members deal with the formal and mathematical aspects of gauge theories, problems of exact solutions and instanton solutions. A major effort is under way in supersymmetry and supergravity, the only theories in which the gravitational interactions are treated on a par with the other in-

teractions. The area intermediate between field theory and statistical mechanics is the subject of many studies which give insight in the exact structure of both fields, especially of renormalization theory. Recently, the relationship between cosmology, particle physics and statistical mechanics has become a center of interest. This connects with earlier studies on monopoles in gauge theories.

Nuclear Theory

In nuclear physics, studies range from the investigation of the origin of the nucleon-nucleon force in meson theory and the translation of this force into an effective force valid for nuclear matter and nuclei, to the interpretation of the observed complexities of nuclear structure with the aid of appropriate nuclear models. Topics of current interest include microscopic investigations of the dynamics of the fission process and studies of a variety of infinite Fermi systems including neutron stars. In anticipation of significant experimental advances in medium-energy nuclear physics, considerable attention is being given to meson-nucleon and meson-nucleus interactions.

Solid State Theory and Statistical Mechanics

Research in theoretical and solid state physics includes studies of properties of superconductors, solid surface phenomena, electron-phonon interactions, disordered solids, magnetic critical phenomena, properties of molecular crystals, and electronic properties of narrow-band materials.

In statistical mechanics there is very active research into simplified model systems on which exact computations can be done. These models are extremely useful in providing insight into complex physical situations such as phase transitions, disordered materials, and the approach to thermal equilibrium.

X-Ray and Surface Physics

The Department of Physics uses two high-intensity, rotating anode X-ray generators for investigations in EXAFS, X-ray diffuse scattering and crystallography.

A major part of the research in X-ray diffraction, surface and bulk analysis as well as X-ray microscopy will be carried out at the National Synchrotron Light Source now being completed at nearby Brookhaven National Laboratory.

Faculty

Allen, Philip B., Professor. Ph.D., 1969, University of California, Berkeley: Theoretical solid state physics: superconductors and superconductivity.

Archie, Charles N., Assistant Professor. Ph.D., 1978, Cornell University: Experimental solid state physics.

Balazs, Nandor L., Professor. Ph.D., 1951, University of Amsterdam, The Netherlands: Theoretical physics: statistical mechanics, general relativity.

Blume, Martin, Professor (part time). Ph.D., 1959, Harvard University: Theoretical solid state physics; magnetic properties of matter.

Braun-Munzinger, Peter, Associate Professor. Ph.D., 1972, University of Heidelberg, W. Germany: Experimental nuclear physics.

*Brown, Gerald E.,** Professor. Ph.D., 1950, Yale University; D. Sc., 1957, Birmingham, England: Theoretical physics; the many-body problem.

Chakravarty, Sudip, Assistant Professor. Ph.D., 1976, Northwestern University: Theoretical solid state physics.

*Courant, Ernest D.,** Professor (part time). Ph.D., 1943, University of Rochester: Theoretical physics; high-energy accelerator design.

deZafra, Robert L., Associate Professor. Ph.D., 1958, University of Maryland: Experimental atomic physics; optical pumping and double resonance; quantum electronics.

*Dresden, Max,*** Professor. Ph.D., 1946, University of Michigan: Theoretical physics; field theory; statistical mechanics; particle physics.

Eisenbud, Leonard, Professor. Ph.D., 1943, Princeton University: Theoretical physics; nuclear theory; foundations of quantum theory.

Engelmann, Roderich, Professor. Ph.D., 1966, University of Heidelberg, W.Germany: Experimental elementary particle physics.

Feingold, Arnold M., Professor. Ph.D., 1952, Princeton University: Theoretical physics; nuclear structure; beta decay.

Finocchiaro, Guido, Professor. Ph.D., 1957, University of Catania, Italy: Experimental high-energy physics.

Fossan, David B., Professor. Ph.D., 1961, University of Wisconsin: Experimental nuclear physics; nuclear structure and electromagnetic properties.

Fox, David, Professor and Director of Graduate Program in Physics. Ph.D., 1952, University of California, Berkeley: Theoretical physics; solid state theory; properties of molecular crystals.

*Goldhaber, Alfred S.,** Professor. Ph.D., 1964, Princeton University: Theoretical physics, nuclear theory; particle physics.

Goldhaber, Maurice, Adjunct Professor. Ph.D., 1936, University of Cambridge, England: Nuclear and particle physics.

Good, Myron L., Professor. Ph.D., 1951, Duke University: Experimental elementary particle physics.

Graf, Erlend H., Associate Professor. Ph.D., 1967, Cornell University: Experimental low-temperature physics.

Grannis, Paul D., Professor. Ph.D., 1965, University of California, Berkeley: Experimental high-energy physics; elementary particle reactions.

Jackson, Andrew D., Professor. Ph.D., 1967, Princeton University: Nuclear theory.

Kahn, Peter G., Professor and Chairperson. Ph.D., 1960, Northwestern University: Theoretical physics; the many-body problem; statistical properties of spectra.

Kao, Yi-han, Professor. Ph.D., 1962, Columbia University: Experimental solid state physics; electronic structure of metals and semi-metals; superconductivity.

Kirz, Janos, Professor. Ph.D., 1963, University of California, Berkeley: Experimental high-energy physics.

Koch, Peter M., Assistant Professor. Ph.D., 1974, Yale University: Atomic physics, synchrotron radiation.

Kuo, Thomas T.S., Professor. Ph.D., 1964, University of Pittsburgh: Nuclear theory.

Lambe, Edward B.D., Professor. Ph.D., 1959, Princeton University: Experimental physics; learning, problem-solving and instructional processes.

Lee, Linwood L., Professor. Ph.D., 1955, Yale University: Experimental nuclear structure.

Lee-Franzini, Juliet, Professor. Ph.D., 1960, Columbia University: Experimental elementary particle physics.

Lukens, James, Associate Professor. Ph.D., 1968, University of California, San Diego: Experimental solid state physics.

Marburger, John H., III, Professor and President of the University. Ph.D., 1966, Stanford University: Laser theory.

Marx, Michael D., Assistant Professor. Ph.D., 1974, Massachusetts Institute of Technology: Experimental high-energy physics.

McCarthy, Robert L., Associate Professor. Ph.D., 1971, University of California, Berkeley: Experimental elementary particle physics.

*McCoy, Barry M.,** Ph.D., 1967, Harvard University: Theoretical physics; statistical mechanics.

McGrath, Robert L., Associate Professor. Ph.D., 1965, University of Iowa: Experimental physics; nuclear structure.

Metcalf, Harold J., Associate Professor. Ph.D., 1967, Brown University: Atomic physics; level-crossing techniques; tunable lasers.

Mould, Richard A., Associate Professor. Ph.D., 1957, Yale University: Theoretical physics; general relativity; quantum theory of measurements.

Muether, Herbert R., Professor. Ph.D., 1951, Princeton University: Experimental nuclear physics; neutron physics.

Nathans, Robert, Professor. Ph.D., 1954, University of Pennsylvania: Experimental solid state physics.

Neal, Homer A., Professor and Provost. Ph.D., 1966, University of Michigan: Experimental high-energy physics.

*Nieh, Hwa-Tung,** Professor. Ph.D., 1966, Harvard University: Theoretical physics; elementary particles.

Paul, Peter, Professor. Ph.D., 1959, University of Freiburg, W. Germany: Experimental nuclear physics.

*Perk, Jacques,** Assistant Professor. Ph.D., 1979, University of Leiden, The Netherlands: Statistical mechanics.

Pond, T. Alexander, Professor Emeritus. Ph.D., 1953, Princeton University: Positron processes; beta and gamma decay.

*Shrock, Robert,** Assistant Professor. Ph.D., 1975, Princeton University: Theoretical physics.

Silsbee, Henry B., Professor. Ph.D., 1951, Harvard University: Experimental physics; molecular and atomic beams; magnetic resonance.

*Smith, John,** Professor. Ph.D., 1963, University of Edinburgh, Scotland: Theoretical physics; elementary particle physics.

Sprouse, Gene D., Professor. Ph.D., 1968, Stanford University: Experimental nuclear structure.

Stephens, Peter W., Assistant Professor. Ph.D., 1978, Massachusetts Institute of Technology: Experimental solid state physics; synchrotron radiation.

*Sterman, George,** Assistant Professor. Ph.D., 1974, University of Maryland: Theoretical physics.

Strassenburg, Arnold A., Professor and Acting Vice Provost for Curriculum and Instruction. Ph.D., 1955, California Institute of Technology: Experimental particle physics; high-energy instrumentation; physics education.

Swartz, Clifford E., Professor. Ph.D., 1951, University of Rochester: Experimental high-energy physics; school curriculum revision.

Toll, John S., Professor Emeritus. Ph.D., 1952, Princeton University: Scattering; elementary particle theory.

*Van Nieuwenhuizen, Peter,** Professor. Ph.D., 1971, University of Utrecht, The Netherlands: Theoretical physics; quantum field theory.

*Weisberger, William I.,** Professor. Ph.D., 1964, Massachusetts Institute of Technology: Theoretical physics; quantum field theory; particle physics.

Wilcox, Lee R., Professor. Ph.D., 1957, Stanford University: Quantum electronics.

*Yang, Chen Ning,** Einstein Professor and Director of the Institute for Theoretical Physics. Ph.D., 1948, University of Chicago: Theoretical physics; field theory; statistical mechanics; particle physics.

Estimated number of teaching, graduate and research assistants, fall 1982: 135.

**Member, Institute for Theoretical Physics*

***Executive Officer and Member, Institute for Theoretical Physics*

Courses

PHY 501 Classical Mechanics
Lagrangian and Hamiltonian formulations, variational principles, Hamilton-Jacobi theory, mechanics of fields, special relativity.
3 credits

PHY 503, 504 Methods of Mathematical Physics I, II
A selection of mathematical techniques useful for physicists. Topics will be selected from the following: linear vector spaces, matrices; Green's functions, complex analysis, differential equations, special functions, boundary value problems, integral transforms, integral equations, probability. This course should be taken only by entering graduate students who have a deficiency in this area.
3 credits each semester

PHY 505, 506 Classical Electrodynamics
Electrostatics and magnetostatics with emphasis on the solution of boundary value problems through the use of eigenfunction expansions and Green's functions; dielectrics, magnetic materials, Maxwell's equations, electromagnetic waves, wave guides, diffraction, plasma physics, special relativity, relativistic particle kinematics and dynamics, energy loss and scattering of charged particles in matter, radiation, multipole fields, spin resonance, and superconductivity.
3 credits each semester

PHY 511, 512 Quantum Mechanics I, II
Topics include basic quantum physics and mathematical apparatus, angular momentum, symmetries, semiclassical theory of radiation, Dirac theory and numerous concrete applications to atoms, nuclei, etc.
Prerequisite: Undergraduate course in quantum mechanics
3 credits each semester

PHY 515 Methods of Experimental Research
A laboratory-lecture course designed to help start beginning graduate students on a path toward independent, professional research. Students undertake three modest but original projects. Lectures cover tools, techniques, and concepts considered indispensable in the laboratory.
3 credits

PHY 520 Overview of Energy Problems
Designed to serve both as an initial course for students specializing in energy studies and as a broad survey for graduate students in other fields of the physical sciences and engineering. Topics include the availability of energy resources, physical principles and technology involved in energy production, and environmental, economic, and social problems related to energy production and use.
Prerequisite: Permission of instructor
3 credits

PHY 530 Role of Energy Resources in the World's Future
A seminar course in which students are involved in independent projects pertaining to the role of energy resources in the world's future. Topics for discussion and for projects, which will vary from year to year, will be chosen from those of current interest. Repetitive credit may be approved for an individual student.
Prerequisite: Permission of instructor
3 credits

PHY 540 Statistical Mechanics
Brief review of thermodynamics. Thermal equilibrium ensembles for classical and quantum systems. Applications to systems for which the Hamiltonian is separable; approximate treatment of nonseparable Hamiltonians.
3 credits

PHY 541 Advanced Statistical Mechanics
High-temperature properties: cluster expansions, ionized systems; low-temperature properties: elementary theory of quantum fluids, model calculations; phase transitions: transfer matrix, Ising and ferroelectric models; introduction to fluctuation and nonequilibrium phenomena.
3 credits

PHY 551 Nuclear Physics I
Basic properties of nuclei, radioactivity and electromagnetic properties; experimental techniques, accelerators and nuclear detectors; the two-body problem and nuclear forces.
3 credits

PHY 552 Nuclear Physics II
Nuclear models and their relations to properties of nuclei, theory of nuclear reactions, nuclear beta decay.
3 credits

PHY 555, 556 Solid State Physics I, II
A comprehensive introduction to solid state physics. Topics covered include crystal structures and symmetries, energy band theory, semiclassical electron dynamics and transport theory, Fermi surface measurements, optical properties, phonons and electron-phonon interactions, dielectric properties, semiconductors, magnetism, and superconductivity.
3 credits each semester

PHY 557, 558 Elementary Particle Physics I, II
Introduction to elementary particle characteristics and phenomena, symmetry and invariance principles, partial wave analysis and resonance phenomena, models for strong interaction, high-energy phenomena, weak interactions, accelerator and detector development.
3 credits each semester

PHY 563 Nuclear Astrophysics
The course covers nuclear processes underlying a star's evolution from initial hydrogen burning through nucleosynthesis and supernova explosions to the final state which may be a neutron star. Problems discussed include the generation of solar neutrinos, the production of heavy elements, the role of neutrinos in supernova explosions, and observable consequences of neutron star composition and structure.
Prerequisites: PHY 511, 512
3 credits

PHY 565, 566 Quantum Electronics I, II
Quantum electronics is a synthesis of quantum physics and electrical engineering which is introduced in two independent semesters. PHY 565: Atomic Physics. A description of simple atoms and molecules and their interaction with radiation includes atoms in strong and/or weak external fields, two-photon spectroscopy, superradiance Rydberg states, non-linear spectroscopy, coherent transients, etc. PHY 566: Optics and Information. This course is an overview of transmission line theory, communication theory and cybernetics, which (with quantum mechanics) are needed to understand modern optical technology and applications to pure and applied physics.
Prerequisites: PHY 505, 511
3 credits each semester

PHY 580 Special Research Projects
Research under the direction of a faculty member. Not open to Ph.D. candidates.
Each semester, variable and repetitive credit

PHY 581 Astronomy for Physicists
The course is intended as an introduction to astronomy for a student whose background is physics. It can serve either as an elective or as a springboard for deeper involvement in the astronomy field. Topics to be covered include basic properties of stars, their structure, luminosity, nuclear processes and evolution; the interstellar medium and molecular astronomy; the structure and dynamics of galaxies and of clusters of galaxies; cosmology.
Fall, odd years, 3 credits

PHY 585 Special Study
Reading course in selected topics.
Each semester, variable and repetitive credit

PHY 599 Graduate Seminars I, II
Special research topics centered on monographs, conference proceedings or journal articles. Topics include solid state physics, elementary particles, atomic physics and quantum electronics and nuclear physics. Both semesters are required for all first-year graduate students.
1 credit each semester

PHY 600 Practicum in Teaching
2 credits, repetitive

PHY 610, 611 Quantum Field Theory I, II
Field quantization: interacting fields; S-matrix theory; Feynman diagrams; charge and mass renormalization; dispersion relations; general field theory.
3 credits each semester

PHY 620 Relativity
General theory of relativity; cosmology.
3 credits

SEMINARS

Each semester, several seminars for advanced graduate students will be offered. These courses are intended primarily for students doing research in the area, although other students may enroll with permission of the faculty seminar leaders. Each semester carries one credit, with repetitive credit permitted.

PHY 670 Seminar in Theoretical Physics

PHY 671 Seminar in Statistical Physics

PHY 672 Seminar in Elementary Particle Physics

PHY 674 Seminar in Nuclear Physics

PHY 676 Seminar in Solid State Physics

SPECIAL TOPICS COURSES

The subject matter of each special topics course varies from semester to semester, depending on the interests of students and staff. Advanced topics will be discussed, particularly those that are of current interest. Most courses carry three credits, with repetitive credit permitted. Exceptions are noted.

PHY 680 Special Topics in Theoretical Physics

PHY 681 Special Topics in Statistical Mechanics

PHY 682 Special Topics in Solid State Physics

PHY 683 Special Topics in Radiation Physics

PHY 684 Special Topics in Nuclear Physics

PHY 685 Special Topics in Mathematical Physics

PHY 686 Special Topics in Elementary Particles

PHY 688 Special Topics in Astrophysics

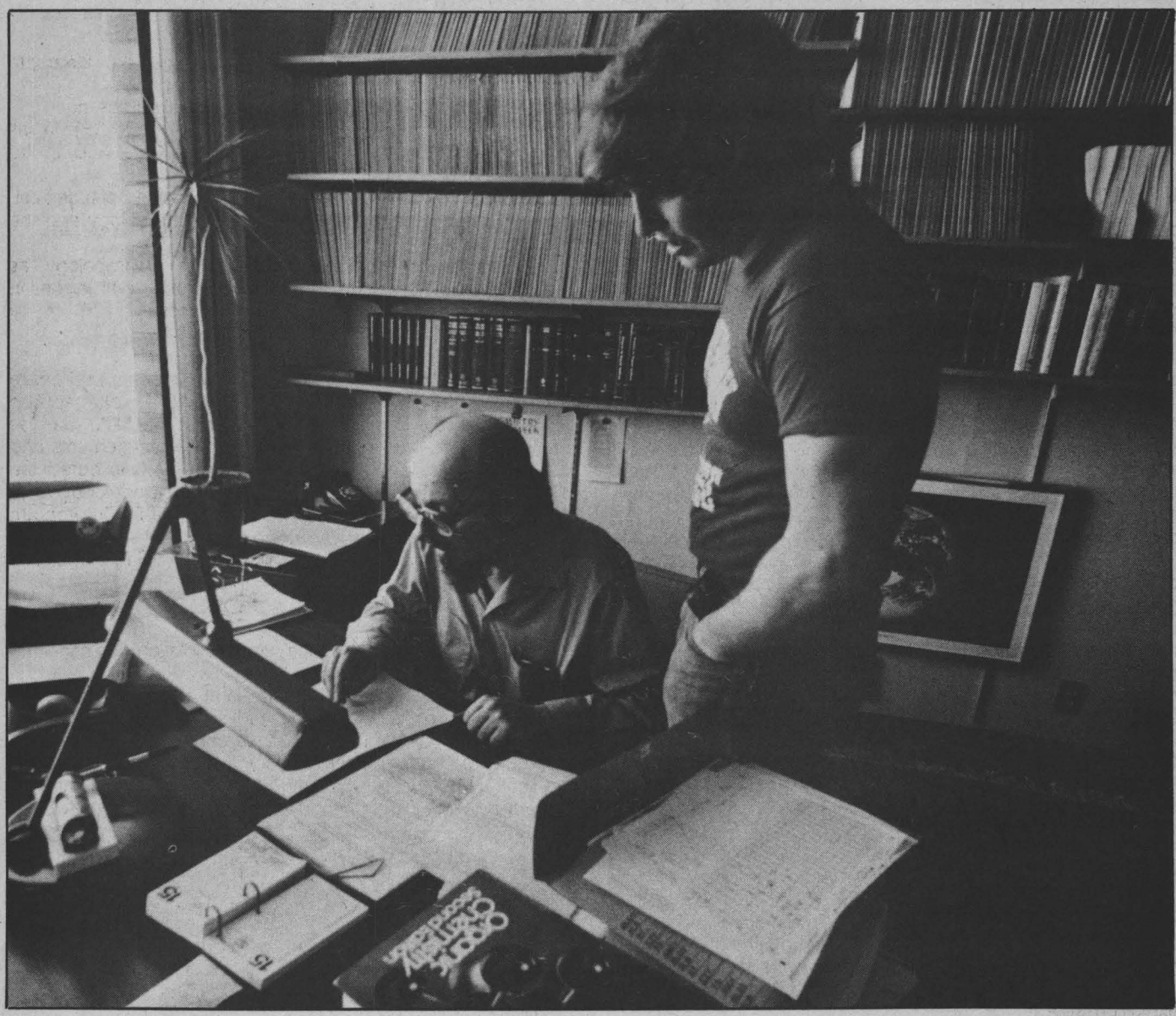
PHY 690 Special Topics in Quantum Electronics

PHY 692 Special Topics in Biophysics
2 credits, repetitive

PHY 698 Colloquium
1 credit

PHY 699 Dissertation Research
Independent research for Ph.D. degree candidates. Open only to students who have passed the Ph.D. Preliminary Examination.
Each semester, variable and repetitive credit

The Social and Behavioral Sciences



StonyBrook

Department of Anthropology

Graduate Program

The Graduate Program in Anthropology includes basic and advanced study in social and cultural anthropology, culture history and archaeology, and linguistics, leading to the M.A. and Ph.D. degrees. There is also a concentration in applied anthropology leading to an M.A. degree in anthropology.

Facilities

Laboratory space in the Social and Behavioral Sciences and Graduate Chemistry Buildings totals approximately 1000 square feet. The physical anthropology laboratory has human skeletons, copies of fossil human material and comparative primate skeletal material, as well as osteometric boards, calipers and other measuring devices available for student use.

The Department sponsors the Long Island Archaeological Project, which manages cultural resource surveys and environmental impact statements. There are well-equipped laboratories available for graduate student projects. In addition to excavation and survey equipment, there is wet chemistry space, hoods, ample storage space, computing facilities, map-drawing boards, light tables and reference collections (northeastern, southwestern and midwestern United States, various areas of Mexico and Andean South America).

The Department has a formal relationship with the Art and Archaeology Project of Brookhaven National Laboratory. Qualified graduate students are considered for training in neutron-activation analysis.

The New York-Long Island Research Room contains an expanding collection of documentary material, reports, books, maps and papers which are used by students and faculty members for reference and research in the New York-Long Island area. Ethnographic specimens from many areas, including Oceania and Central and South America, are available for study. The Patricia A. Klein Memorial Library contains books, periodicals, reprints and audio-visual materials for class and research.

Museum facilities in the Social and Behavioral Sciences Building consist of about 1100 square feet of laboratory and collection storage space, and about 900 square feet of exhibition and preparation areas. The museum has two major ethnographic collections, a large variety of audiovisual equipment, fixed and modular system exhibit cases, a carpentry workbench with basic hand tools and various equipment for graphic techniques used in exhibition work.

A well-equipped photographic darkroom is available for use by qualified students. Desk and office space is provided for all graduate students.

Admission to Graduate Study

In addition to the admission requirements of the Graduate School, the Anthropology Department requires:

A. A baccalaureate degree from an accredited college.

B. A minimum grade point average of 3.00 (B) in all undergraduate coursework, and 3.25 (where 3.00 = B) in the major field of concentration.

C. Results of the Graduate Record Examination Aptitude Test.

D. Acceptance by the Department of Anthropology and the Graduate School.

Applicants need not have majored in anthropology as undergraduates but will be expected to make up deficiencies in their backgrounds by taking additional courses.

The M.A. In Anthropology

The master of arts program is designed for students who desire anthropology training for a career in education, health, applied social sciences or community professions. The M.A. may be granted to those students who complete the requirements and who wish to terminate their studies, or who wish to obtain the M.A. as a mark of progress towards the Ph.D. It is not required for the Ph.D. candidacy. However, students in the Ph.D. program who have already been advanced to candidacy may, upon petition, receive a master's degree without submitting a master's thesis.

Requirements

A. One-year minimum residence, and completion of a minimum of 30 graduate credits.

B. The progress examination passed at an appropriate level.

C. A course of study planned and carried out with the approval of the student's M.A. guidance committee. This may require library research, laboratory study and/or fieldwork as the basis of the M.A. thesis, which must be accepted by a committee appointed by the Department. No final defense is required.

M.A. in Anthropology with Concentration in Applied Anthropology

A concentration in applied anthropology is intended primarily to prepare students to work in community, governmental and business institutions with environmental, developmental, historical, archaeological (including contract archaeological), cultural and social issues and problems.

Full-time or part-time attendance is possible. Entering students will individually plan their course of study with a member of the applied anthropology committee and request a guidance committee during the first or second semester of study. Internships and other arrangements for practical experience can be arranged.

The minimal requirement is 30 graduate credits, with an average of B, a master's project and thesis carried out under the supervision of a guidance committee consisting of three members of the faculty. At least one member of each committee shall be a member of the applied anthropology committee in the appropriate area of study. The composition of each committee shall be approved by the master's committee. The thesis is to be field- or laboratory-oriented and should be an original piece of research.

Study tracks for the applied anthropology concentration are specialized, with major emphasis in archaeology, contemporary society or another specialty as approved by the guidance committee.

The Ph.D. in Anthropology

The Ph.D. program is designed to prepare students for academic and applied research and teaching in archaeology, culture history, social anthropology and linguistic anthropology. The comparative study of civilizations, social anthropology of small-scale societies, and modern complex societies are among the specialties.

The first-year program is directed towards a foundation in general anthropology. For those students who already have a substantial background in anthropology, the first-year program may be shortened or adapted. Major fields of study are: anthropological theory, ethnography, special subjects or topics in society and culture, culture history and archaeology. By arrangement, linguistics may be substituted for one of these subjects. The progress examination is given normally at the end of the first year of graduate study. This examination is given two or three times each year, usually in September, January and April. Students entering with advanced standing may take the progress examination during their first semester. It includes a question on anthropological theory for all students and three of the following: 1) ethnography; 2) topics in society and culture; 3) culture history and archaeology; and 4) linguistics. Students with a special interest and preparation in physical anthropology may request this option, with approval of physical anthropology faculty in the Anatomy Department.

In the second year, the student proceeds to an individually designed program. He or she participates in seminars and independent study courses, to acquire a specialized background in regional and topical fields for dissertation research. Interdisciplinary programs are designed with departments in Social Science, Health Sciences, Humanities and other divisions at Stony Brook.

The second-year program includes studies in anthropological methods as appropriate to the student's field of interest. It may include studies of research procedures in anthropology, statistics, demography, field methods in anthropology, geographical and survey research, archaeological methods, linguistics and historical methods.

Preparation in a foreign language appropriate for the dissertation research is also required. The language or languages should be used in preparing the preliminary essays and tested by a procedure approved by the student's guidance committee. Research training is gained through independent study, fieldwork and assisting in departmental research projects. Fieldwork in archaeology or ethnography is required of all students. This is usually a part of dissertation research.

After successfully passing the progress examination and completing the basic program in anthropology, the student will request the appointment of a guidance committee of at least three faculty members in anthropology and other subjects as appropriate to the student's research interests. The guidance committee, with the student, draws up a Ph.D. study plan, which includes specialized study, two essays, on topical and ethnographic fields of specialization, and a dissertation research plan. For each field of specialization the student will write an essay defining the field, reviewing the literature and stating his or her views on the subject's theoretical and research problems. The student prepares a dissertation research plan which will demonstrate the ability to formulate and plan independent research. This phase of Ph.D. study usually takes 1-2 years of full-time work.

After completion of the above requirements, a preliminary examination will be administered by the guidance committee with additional faculty consultants within and outside the Anthropology Department. After satisfactory performance in the preliminary examination the student will be advanced to candidacy. Upon application, students may be granted an M.A. when successfully completing the preliminary examination and being advanced to Ph.D. candidacy. Dissertation research, including fieldwork gathering material for the dissertation, is frequently carried out away from the Stony Brook campus. Dissertation writing and submission procedures and award of the Ph.D. follow Graduate School requirements. A final defense and/or presentation to a colloquium is required.

Graduate students will gain practical experience and training in teaching and research. All graduate trainees are assigned as teaching assistants in at least one undergraduate course and they assist in all aspects of teaching.

In their third year, Ph.D. students may be given full responsibility for an undergraduate course, under the supervision of a member of the faculty.

Graduate School rules concerning transfer of credit, residence requirements, academic standing, application of CED credits, leave of absence and other requirements apply to the M.A. and Ph.D. in anthropology.

Faculty

Arens, W., Associate Professor. Ph.D., 1970, University of Virginia: Social anthropology; Africa.

Bonvillain, Nancy L., Associate Professor. Ph.D., 1972, Columbia University: Social organization; culture change; North American Indian ethnography and acculturation; language and culture; linguistics.

Carrasco, Pedro, Professor and Department Chairperson. Ph.D., 1953, Columbia University: Theory; economics; preindustrial civilizations; ethnohistory; Mesoamerica; Tibet.

Faron, Louis, Professor. Ph.D., 1954, Columbia University: Latin America, especially Chile, Peru, Panama, Mexico; kinship and marriage systems; ecology; religious systems; complex societies; ethno-history.

Gilmore, David D., Associate Professor. Ph.D., 1975, University of Pennsylvania: Complex societies; stratification; peasant culture; Europe; Mediterranean.

Glick, Paula Brown, Professor. Ph.D., 1950, University of London, England: Oceania; social anthropology; ecology and economy; multiethnic societies; politics; social change; contemporary United States.

Hicks, David, Professor. Ph.D., 1971, University of London, England; D.Phil., 1972, University of Oxford, England: Oral literature; Indonesia.

Kennedy, Theodore R., Associate Professor. Ph.D., 1974, Princeton University: Symbolic anthropology; kinship and social organization; urbanism; culture as a system of symbols in complex societies; social and cultural change; Afro-American culture; U.S. and the Caribbean.

Lanning, Edward, Professor. Ph.D., 1960, University of California, Berkeley: Pre-history; ecology; New World.

Newton, Dolores, Assistant Professor and Museum Curator. Ph.D., 1972, Harvard University: Teaching museum; relation of material culture to social organization; culture history; Brazil; North America.

Starr, June, Associate Professor. Ph.D., 1970, University of California, Berkeley: Political anthropology; anthropology of law; social change; culture and personality; women in culture; Middle East and North Africa.

Stevenson, Robert, Associate Professor. Ph.D., 1965, Columbia University: Political systems; ecology; cultural evolution; theory; Africa; China.

Stone, Elizabeth C., Assistant Professor. Ph.D., 1979, University of Chicago: Old World pre-history; Near East; state development; the food-producing revolution; ancient economic and social systems.

Weigand, Phil C., Professor. Ph.D., 1970, Southern Illinois University: Early civilizations and urbanization; archaeology; ethnography; culture history; culture change and theory; Near East; Mesoamerica; southwestern U.S.A.

Wheeler, Margaret C., Associate Professor. Ph.D., 1957, Yale University: Physical anthropology; urban anthropology; Jewish culture; culture of poverty; North America.

Estimated number of teaching, graduate and research assistants, fall 1982: 25.

Courses

ANT 500 Social and Cultural Anthropology
Study of the forms of social organizations: family, kinship, economic, political and religious, as found among simple and complex societies. A basic graduate-level course designed for students whose previous background is in other fields.
Variable and repetitive credit

ANT 501 Development of Anthropological Theory
Survey of the development of anthropological theory from the 18th-century Enlightenment to the present. There is a major emphasis on materialist, evolutionary and ecological approaches.
3 credits

ANT 502 Development of Anthropological Theory
Surveys post-19th-century development of theory, stressing the influence of English and French social anthropology upon American anthropology.
3 credits

ANT 503 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.
3 credits

ANT 504 Development Anthropology
An examination of the processes of social and cultural change, especially as they affect the peoples of emergent and modernizing nations. Theories of development, change and modernization; historical case studies; and contemporary political and economic problems are discussed.
3 credits, repetitive

ANT 505 Anthropological Method
A course for advanced graduate students which examines the scientific foundations of anthropology, explanation, methods of research and analysis of data. Various examples and types of anthropological method, such as ethnohistory, case method analysis and genealogies, will be considered. The emphasis will be on the relation between problem and method, and the preparation of research proposals.
Prerequisite: One year of graduate study
1-3 credits

ANT 506 Readings and Research In African Ethnology
Intensive readings in research in select problems of African ethnology. Particular attention is given to aspects of social and ecological anthropology as well as culture history.
3 credits, repetitive

ANT 507 Middle Eastern Anthropology
Emphasis on Islam and Arab unity as a way to understanding continuity and change in modern Middle East. Topics include ethnic and religious minorities, state/local relations, nomads, agriculturalists and town dwellers. The course is taught within a historical framework.
3 credits, repetitive

ANT 508 Seminar in Latin American Cultures
Research and discussion about selected topics in the culture and social structure of Indian and peasant communities in America.
3 credits, repetitive

ANT 509 Seminar in European Ethnography
Seminar investigation and discussion of selected topics and problems concerning European societies and cultures. The perspective of culture history is employed as well as that of current fieldwork.
3 credits, repetitive

ANT 510 Studies in Asian and Pacific Ethnography
Readings in the culture and societies of Asia and the Pacific. The ethnography of a selected area, e.g., Indonesia, China, South Asia, Polynesia, and/or a cultural field of study, e.g., nonliterate peoples, complex institutions, religions, will be the special topic of concentration offered.
3 credits

ANT 511 Problems in Old World Prehistory
This course will present an in-depth analysis of some of the ma-

jor problems which face archaeologists in the Old World. Emphasis will be on the various theoretical models currently in use to explain these events by archaeologists. Topics might include the food-producing revolution in the Near East and Southeast Asia; the elaboration of the Neolithic way of life that led to the development of civilization; the nature of civilization in the Near East, the Indus Valley, etc.; or a discussion of the non-civilized Bronze Age cultures of Europe, Africa and Asia. The specific topics may vary from year to year.
3 credits, repetitive

ANT 512 Comparative Civilizations
A comparative study of the processes of socio-cultural evolution from the beginnings of sedentary life to the achievement of early civilization in the Near East, Egypt, the Indus Valley, China, Meso-America and the Andean area. The seminar will focus upon theories of the formation of complex societies and will cover such topics as urbanization, demography, irrigation, craft specialization, militarism, trade and exchange.
Prerequisite: Graduate standing or permission of instructor
3 credits

ANT 513 Origins of Agriculture
This course will trace the history of anthropological thought on the origins of agriculture and will assess the evidence for this transformation from the Old and New Worlds. The course will not only explore areas where early agriculture is evidenced, but will also contrast these areas with those where agriculture was a later development. Emphasis will be on the environmental, technological, biological, social and cultural processes associated with the "Neolithic Revolution."
3 credits

ANT 514 Problems in New World Archaeology
The seminar will stress problems in research methods, culture history, technology, economy, ecology and interpretation in the indigenous, pre-European New World. Depending upon the professor, either Meso-America or the Andean areas will be used as the organizing example. The comparative analysis of institutions, within a developmental context, will be among the goals of the seminar. The seminar format will require full student participation, including the formal presentation of a research paper.
Prerequisites: Graduate status; permission of instructor
3 credits

ANT 520 Readings in Topical Problems
Topics will be selected on the basis of the needs of the graduate program. Seminars may consider such topics as: social systems and their models, kinship and marriage, family structure, ecology and economy, political systems, ritual, religious belief, myth, symbols.
3 credits, repetitive

ANT 522 Male-Female Roles in Cross-Cultural Perspective
An anthropological approach to sex roles and gender identity in cultural ideology and behavior. Comparative study will examine status and role in family, social, economic, political and religious contexts, both traditionally and as they have changed under modern conditions.
Prerequisite: Graduate status
3 credits

ANT 525 Methods in Ethnography and Social Anthropology
An examination of the methods used by ethnographers and social anthropologists in observation, data collection and analysis. Ethnography is discussed as field inquiry and the organization of data for a monograph. Different interests, aims and results will be studied as they characterize ethnographers and social anthropologists. Contemporary studies of social relations will be stressed.
1-3 credits

ANT 526 Anthropological Geography: Theory and Applications
Field geographical techniques and skills necessary for anthropologists will be examined from the point of view of ecological evalutations in the progressive formation of cultural landscapes. Settlement pattern analysis (zonal and community), cartographic techniques, aerial-photographic analysis, soil typing, determinants for plant and animal communities, and succession principles will be presented in terms of their geomorphological articulations with cultural ecology.
1-3 credits

ANT 527 Field Methods and Techniques in Archaeology
The course will be held during the summer only. It will consist of field- and laboratory work on an aspect of Long Island's archaeological heritage. Students' time will be divided between surveying and excavation in the field and artifact analysis in the laboratory. Such techniques as map and air photo reading, survey instruments, stratigraphy, conservation, typology construction, etc. will be taught. Students will be exposed to the full range of excavation, survey and laboratory methods and techniques.
Prerequisite: Graduate standing or permission of instructor
3-9 credits

ANT 528 Kinship and Social Organization
The significance of kinship systems and their relationship to other social institutions (e.g., political, economic, religious) in selected societies will be examined through the use of ethnographies and theoretical statements by important contributors to the field.
3 credits

ANT 529 Ecology and Social Organization
The relation between societies and their environment: evaluation of resources, technology, land tenure, subsistence, local groups, economy, kin and political relations will be examined. Examples will include food collecting, hunting, agricultural, pastoral and mixed economies.
3 credits, repetitive

ANT 540 Readings in Ethnography and Ethnology
A survey of the more important and better-documented cultures and societies of selected world ethnographic areas and the implications of data from these for current approaches and problems in ethnology.
3 credits, repetitive

ANT 550 Readings in Cultural History
Applications of the ecological and sociological approaches to the study of evolutionary process and culture history.
3 credits, repetitive

ANT 551 Economic Anthropology
Economic life of primitive peoples and precapitalistic civilization with emphasis on the integration of the economy with technology and with social and political institutions.
3 credits

ANT 553 Political Anthropology
Political anthropology deals with selected readings illustrating major trends of anthropological political theory, including study of factions, leadership, volunteer associations, patron-client ties, agrarian revolutions and class conflict. A selected number of monographs will be analyzed in detail, and their relation to diverse political models will be explored.
3 credits

ANT 554 Readings in Law and Anthropology
Selected readings in anthropological approaches to the study of legal behavior, including the study of dispute settlement and use of law courts, aggressive behavior in the local community and the treatment of social misfits. Focus will be on relations between community members, and between the local community and the nation-state. Anthropological studies of law courts will also be utilized.
3 credits

ANT 556 Psychological Anthropology
An examination of the relationship between culture and personality and between intrapsychic and sociocultural dynamics: Freudian and other psychological concepts and theories as they have been used by anthropologists to enrich their study of cultural variation, socialization, character formation, religion and myth, social change, ethno-psychiatry, etc. in both simple and complex societies. Both cross-cultural and in-depth single society approaches will be explored.
Prerequisite: ANT 501
3 credits

ANT 557 Seminar in Comparative Religion
Various theoretical and methodological problems in the cross-cultural study of ritual and belief will be examined. Students will be encouraged to review critically a broad spectrum of ethnographic materials in the study of these peoblems. Emphasis will be on religious systems not generally covered in the nonanthropological literature of religion.
3 credits

ANT 558 Symbolism
This course deals with the analysis of the variant forms by which symbolism reveals itself, and considers such oral literature, ritual, architecture, jural classification and cosmologies of a range of cultures, especially those characteristic of illiterate and ancient peoples. Different techniques of interpretation will be employed—structural, functional, historical and psychological—so as to give a well-balanced account of symbolism.
3 credits

ANT 559 Urban Anthropology
A cross-cultural approach to the study of contemporary complex and urban societies, and the processes of change and urbanization. It will deal with the organization of groups, social institutions and communities: education, politics, economics, associations, family, work, religion, health, urban-rural relations. Concepts and processes of complex society and urbanization, such as networks, enclaves, tribalization, detribalization, migration, acculturation, assimilation, stratification, race, minorities and ethnicity will be considered.
3 credits

ANT 560 Readings in Descriptive Linguistics
This course is concerned with the methods and theories of linguistic analysis. The primary focus is on learning analytic techniques in phonology, morphology, syntax and seminars.
3 credits

ANT 561 Peasant Societies and Cultures
The concept of peasantry will be examined from political, religious and social class viewpoints as well as from the more traditional economic view. These agricultural peoples, who are essentially preliterate and preindustrial are described and analyzed especially in relation to the national societies of which they form a part.
3 credits

ANT 571 Syntax
A study of the fundamental notion of a grammar and the application of the general method of modern syntax to specific problems. Crosslisted with ESL 521.
3 credits

ANT 572 Phonetics
Articulatory, acoustic and physiological phonetics with some attention paid to speech perception. Crosslisted with ESL 522.
3 credits

ANT 575 Contrastive Analysis
The course offers a survey of linguistic typology and examines the ways in which linguistic subsystems may legitimately be compared across languages, thus providing a basis for devising strategies for teaching one language to speakers of another language. Crosslisted with ESL 525.
3 credits

ANT 576 Analysis of an Uncommonly Taught Language
Working from primary and secondary sources, students will construct an outline of the phonology, morphology and syntax of a language previously unknown to them. Crosslisted with ESL 526.
3 credits

ANT 577 Selected Topics in Linguistics
Crosslisted with ESL 532.
3 credits

ANT 600 Practicum in Teaching
Variable and repetitive credit

ANT 601, 602 Research Seminar in Anthropological Theory
Variable and repetitive credit

ANT 604 Tutorial in Anthropological Theory
Variable and repetitive credit

ANT 610 Individual Research
Variable and repetitive credit

ANT 620 Research Seminar in Topical Problems
Variable and repetitive credit

ANT 640 Research Seminar in Ethnography and Ethnology
Variable and repetitive credit

ANT 650 Research Seminar in Cultural History
Variable and repetitive credit

ANT 660 Language as an Analytical Tool
Variable and repetitive credit

ANT 680 Special Seminar
Selected topics in cultural and social anthropology. Topics covered will reflect current interests of faculty and graduate students.
1-3 credits

ANT 699 Research Seminar in Fieldwork Problems
Variable and repetitive credit

Department of Economics

The Department of Economics offers the M.A. degree under two options described below, as well as a graduate program leading to the Ph.D. degree.

The M.A. Program in Economics

Option A

Students admitted to the Ph.D. program are expected to have the aptitude for and an intention of obtaining the Ph.D. degree. For students who must terminate their enrollment before obtaining the Ph.D., the M.A. will be awarded under the following conditions:

1. Thirty hours of resident graduate credits (exclusive of teaching practicum) in which a grade of B or better has been received.
2. Not more than three years since first registration as a graduate student.

Students pursuing the Ph.D. program may wish to change their course to Option B prior to obtaining the M.A. Such students should consult the Graduate Program Director.

Option B

Graduate Studies in Economic Policy Analysis leads to a terminal M.A. degree in economics following a distinct and self-contained course of study. This is designed for students who seek a graduate education in economics for professional reasons and who do not intend to become students in the doctoral program. This curriculum in economics presents surveys of methods of economic analysis and major problems of economic policy. A bachelor's degree is required for admission, but no prior training in economics is necessary. Completion of this program of study does not generally permit the student to transfer into the Ph.D. program. Students wishing to make such a transfer should consult the Department as soon as possible about how to do so with a minimal loss of time.

The Master of Arts degree will be awarded upon the completion of 30 hours of graduate course credit with an average grade of B. Only one grade of C is acceptable and it must be offset by a grade of A in another course.

The basic core (which also provides the prerequisites for courses indicated as requiring prerequisites) consists of ECO 573, Prices and Markets; ECO 580, National Income, Employment and Money; and ECO 574, Applied Econometrics. Student programs will be planned to meet individual needs, guided by academic advisors. With the consent of the Department, students in Graduate Studies in Economic Policy Analysis may enroll in a research seminar and write a master's thesis, but a thesis is not required. Students may transfer six credits earned in CED economics courses towards their M.A. degree. Courses in related social sciences, mathematics or other disciplines may be given credit towards the degree where such courses serve a useful part of the student's career objectives. Up to six transfer credits from other institutions may also be counted towards the degree with the approval of the Department and the Graduate School.

The Ph.D. Program in Economics

The Department of Economics offers a Ph.D. program whose goal is the learning of rigorous economic theory and quantitative methods and their creative application. The applications emphasize foci in two broad overlapping areas: public sector economics and the analysis of economic systems. Public sector economics deals with a variety of problems relating to labor markets and demography, to public finance, to urban, education, environmental and resource economics and to monetary and fiscal stabilization. It rests upon the theory of general equilibrium, public goods, externalities, behavior under uncertainty and welfare. Analysis of economic systems relates to economic behavior under conditions other than those prevailing in modern industrialized market economies, including topics in economic development, history and planning. It rests upon the theory of economic adjustment mechanisms and on game and team theory as well as on welfare and general equilibrium theory. These applications are accompanied by a strong program in advanced (mathematical) economic and econometric theory.

Students' coursework is supplemented by independent study and research seminars. Emphasis is placed on achieving competence in doing independent research rather than on formal course requirements. Each student's program is fitted to his or her individual interests and needs, and close student-faculty relations are encouraged.

Admission to the Ph.D. Program

For admission to the Ph.D. program, the following are required:

A. A baccalaureate degree, with an average of at least B in the undergraduate major subject.

B. Proficiency in a year course in introductory differential and integral calculus, demonstrated by a grade of at least B in such courses. Additional courses in mathematics or statistics will be helpful to students.

C. Results from the Graduate Record Examination Aptitude Test.

D. Acceptance by the Department of Economics and by the Graduate School. Students who do not meet all these requirements may also apply if they feel that special circumstances should be considered.

Requirements for the Ph.D. Degree

The Ph.D. program is based on attaining competence rather than on registering for a predetermined number of courses. The following areas of proficiency are required of all students:

A. Mathematics: Proficiency may be established by a grade of at least B in ECO 590 or its equivalent, or in a special examination. This requirement should normally be met during the first semester of study. It must be met before any comprehensive examinations are taken.

B. Core fields are microeconomics, macroeconomics and quantitative methods: Proficiency is established by passing a comprehensive examination in each field. Most students will find it necessary to take the basic courses offered by the Department. Students must pass the microeconomics and one other comprehensive examination by the beginning of their third year; and they must pass all three by January of their third year in order to remain in the program. The three comprehensive examinations in aggregate will constitute the preliminary examination required by Graduate School regulations as a condition for advancement to candidacy. Comprehensive examinations are written; they may be supplemented by oral examinations at the discretion of the examining committee.

C. Optional fields: Students offer two optional fields in their plans of study. Proficiency is demonstrated by a grade of B or better in each of two courses. One field must be selected from among the following: labor economics, public sector economics, economic systems, advanced micro theory, advanced macro theory, advanced econometrics. The other field may be chosen from this list, or from among other fields offered by the Department. Students may also select the fifth field from among courses in other departments or develop a field based on individual reading programs under faculty supervision. Such arrangements require approval in advance by the Ph.D. Program Committee.

D. Languages: The Department requires demonstration of proficiency in a foreign language only in cases where the dissertation research involves knowledge of a foreign language for successful completion. In such cases, the dissertation advisor will notify both the student and the members of the graduate committee, who will arrange the details of the language proficiency examination.

E. Residency: Although the University residence requirement is for at least two consecutive semesters of full-time study, the Economics Department recognizes that normally students should plan on four semesters of full-time residency in order to prepare themselves adequately for the comprehensive examinations.

F. Advancement to candidacy: Upon successful completion of the mathematics, the language (if necessary) and the comprehensive examinations in the core fields, the student will be admitted to candidacy for the Ph.D. degree. A student who selects a dissertation topic involving language competency after advancement to candidacy must, however, fulfill the language requirement subsequent to such advancement.

G. Departmental seminars: Attendance at departmental seminars is considered an important and integral part of a student's progress towards the doctorate. Seminars are presented on a regular basis by faculty, visitors and graduate students, and students are strongly urged to attend.

H. Doctoral dissertation: Each candidate for the Ph.D. must complete a dissertation. The prospectus must receive approval of the thesis advisor and members of the thesis committee. Within one year of advancement to candidacy, each student is expected to present a workshop seminar on his or her dissertation progress. Final approval will be by a committee including the candidate's principal advisor, two other Department members and one member from another department. The results of the dissertation will be presented at a colloquium convened for that purpose.

Additional Information

Teaching: The Department is committed to achieving a high quality of teaching and encourages all graduate students to acquire teaching experience during their graduate study.

Early completion: In order to encourage early completion of all degree requirements, departmental approval will be required to continue a student's program if it extends more than five years from the time of entry.

Certification of Ph.D. candidates: Students who satisfactorily complete all Ph.D. requirements except for the dissertation and who find it impossible to complete the dissertation may apply for a certificate of completion of all but thesis requirements.

Faculty

Ames, Edward, Professor. Ph.D., 1952, Harvard University: Theory of economic systems; economic history; general equilibrium dynamics.

Ariga, Ken, Assistant Professor. Ph.D., 1981, Yale University: Macroeconomic theory; international economics.

Dawes, William, Lecturer and Director of Undergraduate Studies. Ph.D., 1972, Purdue University: Econometrics; economic history.

Denci, Michael S., Adjunct Assistant Professor and Assistant Vice Provost for Graduate Studies. M.S., 1961, Columbia University.

Dusansky, Richard, Professor. Ph.D., 1969, Brown University: Macroeconomic theory; applied microeconomics; public sector economics.

Entine, Alan D., Adjunct Associate Professor. Ph.D., 1963, Columbia University.

Hause, John C., Professor. Ph.D., 1962, University of Chicago: Theory of measurement and econometric estimation in human capital; industrial organization and applied microeconomics.

Hendricks, Ken, Lecturer. Ph.D. expected 1982, University of Wisconsin-Madison: Decision theory; international trade.

Hoffman, Charles, Professor Emeritus. Ph.D., 1954, Columbia University.

Hool, Bryce, Associate Professor. Ph.D., 1979, University of California-Berkeley: Macro theory; general equilibrium theory.

Hurd, Michael D., Associate Professor. Ph.D., 1972, University of California-Berkeley: Labor economics; econometrics.

James, Estelle, Professor. Ph.D., 1961, Massachusetts Institute of Technology: Applied welfare economics; human resources.

Kristein, Marvin M., Associate Professor. Ph.D., 1955, New School for Social Research: Health economics; financial markets.

Lee, Young Goo, Assistant Professor. Ph.D., 1981, University of Minnesota: Macroeconomic theory; monetary theory.

Locay, Luis, Lecturer. Ph.D. expected 1982, University of Chicago: Household economics; economic demography; monetary economics.

Muench, Thomas J., Professor. Ph.D., 1965, Purdue University: Mathematical economics; econometrics; urban economics.

Nairay, Alain, Assistant Professor. Ph.D., 1981, Yale University: Econometric theory.

Neuberger, Egon, Professor. Ph.D., 1958, Harvard University: Comparative systems; Soviet and East European economics.

Sanderson, Warren C., Associate Professor. Ph.D., 1974, Stanford University: Economic demography; economic history; labor economics.

Staley, Charles, Associate Professor. Ph.D., 1956, Massachusetts Institute of Technology: International economics; history of economic thought.

Walker, Mark, Associate Professor. Ph.D., 1970, Purdue University: Economic theory; decision theory.

Willis, Robert J., Professor. Ph.D., 1971, University of Washington: Labor economics; economic demography.

Winn, John N., Assistant Professor. Ph.D., 1981, University of Texas: Econometrics.

Wooders, Myrna H., Assistant Professor. Ph.D., 1976, University of Minnesota: Microeconomic theory; public sector; urban economics.

Zschock, Dieter K., Associate Professor. Ph.D., 1967, Tufts University: Development economics; labor economics.

Zweig, Michael, Associate Professor. Ph.D., 1967, University of Michigan: Political economy; labor economics.

Estimated number of teaching, graduate and research assistants, fall 1982: 52.

Courses

PH.D. PROGRAM IN ECONOMICS

ECO 500 Microeconomics I
The first semester of a one-year course, ECO 500 deals with traditional microeconomic theory, including consumer time choice theory, theory of production, cost curves, market equilibrium, market forms and general equilibrium.
Fall, 4 credits

ECO 501 Microeconomics II
A continuation of ECO 500, focusing on decision making under certainty, risk and uncertainty. Topics include linear programming, nonlinear programming, the Kuhn-Tucker theorem, utility theory, game theory, group decision making and Arrow's impossibility theorem.
Spring, 4 credits

ECO 502 Applied Microeconomic Problem Solving
A course which emphasizes the development of analytical frameworks required in the application of economic analysis. The students are expected to develop analysis with guidance from the instructor. Open to all non-first-year Ph.D. students.
Prerequisite: ECO 501
2 credits

ECO 510 Macroeconomics I
The first semester of a one-year course in the theory of income and employment, including examination of principal determinants of aggregate levels of income and employment, interactions of product and money markets, and analysis of changes in the level of economic activity over time, growth and inflation.
Fall, 4 credits

ECO 511 Macroeconomics II
A continuation of ECO 510.
Spring, 4 credits

ECO 520 Mathematical Statistics
The first semester of a one-year course in quantitative methods. Statistical methods and their properties of particular usefulness to economists. Topics include probability theory and its empirical application; univariate and multivariate distributions; limiting distributions; point and interval estimation.
Spring, 4 credits

ECO 521 Econometrics
A continuation of ECO 529. The application of mathematical and statistical methods to economic theory, including the 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 econometric studies.
Fall, 3 credits

ECO 527 Operations Research I
Offered concurrently with MSA 530. Elementary maxima and minima problems and the Lagrange multiplier. Linear programming including the simplex technique. The transportation problem. Queuing problems under different assumptions on input, service mechanism and queue discipline. Dynamic programming. Basic ideas of inventory theory.
3 credits

ECO 528 Operations Research II
Offered concurrently with MSA 538. Non-linear programming and programming under uncertainty; introduction to statistical decision theory and game theory. Monte Carlo techniques. Applications such as inventory theory or traffic theory according to the interest of the class.
Prerequisite: ECO 527
3 credits

ECO 590 Mathematical Foundations of Contemporary Economic Theory I
Examination of those topics in set theory, topology and linear algebra that are relevant to economic theory. Application of these topics to economic theory will be developed as time permits.
Fall, 4 credits

ECO 598 Economic Fundamentals
Directed work for individuals or small groups enrolled in graduate programs, on topics in which students are inadequately prepared at the time of admission. Credit in this course will be part of a student's work load but may not count towards a degree.
Variable and repetitive credit

ECO 599 Research in Special Topics
Variable and repetitive credit

ECO 600 Advanced Microeconomic Theory I
Topics will be selected from the following: neoclassical and modern consumer choice theory, optimization theory, general equilibrium theory, stability theory, game theory, etc. Necessary mathematical concepts will be developed as needed.
Prerequisites: ECO 501 and ECO 591, or the equivalent
2 credits

ECO 601 Advanced Microeconomic Theory II
Continuation of ECO 600.
2 credits

ECO 607 Production and Technology
Economic aspects of research, development and technological change. Survey of historical and econometric literature and their relation to economic theory.
Spring, 2 credits

ECO 608 Development of Economic Analysis
Detailed analytical study of the origin and development of the major schools and theoretical problems and approaches of economics. The physiocratic, classical, Marxist and neoclassical economists and theories are studied, with emphasis on primary source material.
2 credits

ECO 609 Studies in Economic Theory
2 credits

ECO 610 Advanced Macroeconomic Theory I
Topics will be selected from the following: Neoclassical and modern theories of resource allocation over time; concepts of efficiency, Pareto-optimality and optimality in growth models; Austrian, neoclassical and Cambridge theories on the concept of capital, and the aggregation problem; the microeconomic foundations of macroeconomics; monetary theory and temporary equilibrium analysis. Necessary mathematical concepts will be developed as needed.
Prerequisites: ECO 501 and ECO 511
2 credits

ECO 611 Advanced Macroeconomic Theory II
A continuation of ECO 610.
Prerequisite: ECO 610
2 credits

ECO 613 Business Cycles, Stabilization Policies and Forecasting
An analysis of modern theories of the business cycle and the use of alternative stabilization policies to reduce the undesirable effects of cycles. Emphasis will be on the selection of optimal policies and the role of forecasting in the implementation of policy.
2 credits

ECO 619 Studies in Macroeconomics
2 credits

ECO 620 Advanced Econometrics I
Foundations of econometric theory, emphasizing the problems of model formation, identification, estimation, hypothesis testing and model evaluation. Topics will be selected from the following areas: general linear models, non-linear models, multivariate analysis, time series analysis, simultaneous equations systems.
Prerequisite: ECO 521 or permission of instructor
2 credits

ECO 621 Advanced Econometrics II
A continuation of ECO 620.
2 credits

ECO 622 Seminar In Applied Econometrics
A survey of econometric studies with illustrations from the current literature of various econometric techniques and the critical evaluation of numerical results. Topics include problems of quantification and measurement, the structure and use of explanatory economic models, analyses of consumer behavior, aspects of firm behavior (e.g., investment), econometric models.
Prerequisites: ECO 521; ECO 501 and ECO 511 are recommended, or permission of instructor
2 credits

ECO 623 Data Analysis and Economic Applications
Survey of major sources of data in economics; and theoretical hypotheses and statistical methods for organizing and analyzing such data. Statistical models for quantitative data as well as qualitative choices are presented. Computer usage is expected.
Prerequisite: ECO 521
Fall, 2 credits

ECO 629 Studies In Quantitative Methods
2 credits

ECO 630 Welfare Foundations of Public Sector Economics
This is a one-semester course designed to explore, in a concise manner, the micro basis of public sector economics. Emphasis is placed on the contrast between optimization in the private and public sectors, externalities, "second best" social optima, "public" goods; collective choice, public investment criteria and optimal pricing in the public sector.
2 credits

ECO 631 Seminar In Public Sector Economics
Analytic and econometric approach to selected issues in public sector economics drawn from the areas of urban economics, medical economics, environmental economics, welfare economics and public finance. This course may be taken as a continuation of ECO 630, but 630 is not a prerequisite.
2 credits

ECO 633 Applied Welfare Analysis
Development of selected topics in advanced welfare theory, including intertemporal resource allocation, uncertainty, preference transformation and collective choice. Theoretical aspects of income distribution. Efficiency and equity of alternative economic systems. This course may be taken as a continuation of ECO 630, but 630 is not a prerequisite.
2 credits

ECO 635 Public Finance
Analytical and econometric analysis of selected topics in public finance, such as optimal taxation and income distribution, optimal taxation and resource allocation; social security, retirement and savings behavior; shifting and incidence of corporate, property and payroll taxes.
Prerequisite: ECO 631 or permission of instructor
Fall, 2 credits

ECO 640 Advanced Labor Economics Theory I
This is primarily a course in advanced labor economics theory. There will, however, be some attention to empirical work. Topics will include labor contracts, the theory of equalizing differentials, human capital, labor supply, life cycle behavior and income distribution.
Prerequisite: ECO 501
2 credits

ECO 641 Advanced Labor Economics Theory II
This is a continuation of Economics 640. There will, however, be more emphasis on empirical application. Topics to be covered are economic demography, unemployment and job turnover, labor demand, unionism, and signaling and screening.
Prerequisite: ECO 640
2 credits

ECO 646 Economics of Health
Theoretical and econometric analysis of selected aspects of the health care delivery system, such as the demand for medical services, the supply and distribution of physician services, the utilization of non-physician medical personnel, alternative models of hospital behavior, third-party insurance reimbursement and national health insurance and cost and price inflation in the hospital and long-term care sectors.
2 credits

ECO 650 International Trade
Contemporary international trade history including comparative advantage models, trade and growth, welfare aspects of international trade, tariff theory and the theory of customs unions. Relevant empirical studies are surveyed to show how trade theory is tested and expanded.
2 credits

ECO 651 International Finance
Contemporary balance of payments and exchange rate theory, including monetarist, Keynesian and elasticity theories, policy models, international liquidity and capital flows. Relevant empirical work is included.
2 credits

ECO 654 Foundations of Urban Economics
Analysis of the nature and functioning of urban areas. The theoretical foundations of urban economics are developed: theories of the consumer and housing producer in economic space, land rent and use, urban structure, and the size distribution and growth of urban areas are developed. Emphasis is placed on methodology and hypotheses generated by the theories.
Prerequisite: ECO 501
2 credits

ECO 655 Problems In Urban Economics
The theories developed in Economics 542 are applied to specific urban problems. Urban problems such as poverty, housing, slums and urban renewal, urban transportation, financing local government and environmental quality are analyzed. A great deal of emphasis is also placed on methodology. Economics 654 is recommended though not a prerequisite.
2 credits

ECO 660 Comparative Economic Systems
A systematic treatment of systems analysis, stressing decision making, information and motivation. A conceptual framework is developed for analyzing (1) market, centrally planned and planned market models, (2) the model and the reality of Soviet-type centrally planned economies and the reforms in these economies, (3) the model and reality of worker management and (4) measurement of quality of system performance.
Fall, 2 credits

ECO 661 Theory of Economic Systems
Introduction to the theory of social preference and choice functions. Voting systems. Informationally decentralized systems. Centralized and coercive systems. Team theory.
Prerequisite: ECO 500 or permission of instructor
2 credits

ECO 662 Economic Development I
Analysis of the major issues in development and the principal theoretical contributions of economists to developmental problems. An effort will be made to examine the relevance of existing economic theories of development in the light of post-World War II experience, and with regard to the growth of multidisciplinary insights into widely variable institutional patterns of economic organization.
2 credits

ECO 663 Economic Development II
A continuation of ECO 662, this course examines issues of development policy and plan formulation and implementation. Special attention will be devoted to selected regional, national and sectoral cases.
Prerequisite: ECO 662 or permission of instructor
2 credits

ECO 669 Studies In Economic Systems
1-6 credits

ECO 690 Seminar In Applied Economics
Preparation, presentation and discussion of student and faculty research in applied economics. Topics covered by student papers will usually be related to students' long-term research interests. Open to second- and third-year students in Ph.D. program and to interested faculty.
1-6 credits

ECO 691 Seminar In Economic Theory
Preparation, presentation and discussion of student and faculty research in economic theory. Topics covered by student papers will usually be related to students' long-term research interests. Open to second- and third-year students in Ph.D. program and to interested faculty
1-6 credits

ECO 692 Research Workshop In Systems and Development
Preparation, presentation and discussion of student and faculty research on theoretical and applied topics in the fields of comparative systems and economic development. Topics covered by student papers will usually be related to students' long-term research interests. Open to second- and third-year students in Ph.D. program and to interested faculty.
1-6 credits

ECO 698 Practicum In Teaching
1-6 credits

ECO 699 Dissertation Research
1-9 credits

M.A. PROGRAM IN ECONOMICS

ECO 552 Economics of Money and Banking
An analysis of the structure and operations of the U.S. monetary and banking systems, of their influence on domestic and foreign economic policy formation, and of the theoretical foundations of monetary policies.
3 credits

ECO 559 International Trade and Finance
An introduction to the major theoretical and policy aspects of international trade, protection, customs unions, exchange rates, capital movements and the balance of payments.
3 credits

ECO 573 Prices and Markets
Price determination and the laws of supply and demand. The response of private enterprise to market conditions. The relation of labor and financial markets to the production process. Introduction to the concept of general economic equilibrium.
Prerequisite: CET 511 or equivalent
3 credits

ECO 574 Applied Econometrics
An introduction to estimation and hypothesis testing for economic and public policy models. A review of basic statistical topics is followed by an introduction to regression analysis, econometric models and economic forecasting.
Prerequisite: An introductory statistics course or permission of instructor
3 credits

ECO 576 Public Finance and Taxation
Major elements of taxation and public expenditures, including theories of public goods and the satisfaction of public wants. The effects of taxation on efficiency of resource allocation, general welfare, income redistribution and ecoomic growth. The U.S. tax structure, including federal, state and local levels and intergovernmental fiscal relations.
Prerequisite: ECO 573 or permission of instructor
3 credits

ECO 579 Labor Economics
The course surveys the composition and functioning of the labor market; wage determination and wage differentials; wages, productivity and inflation; unionism and its economic impact, governmental intervention; unemployment and poverty in the modern economy.
3 credits

ECO 580 National Income, Employment and Inflation
The determination of national output and income; factors affecting employment and price levels and the rate of economic growth. The role of government in a market economy, specifically the function of fiscal and monetary policies in attaining the objective of full employment, price stability and economic growth.
Prerequisite: CET 511 or equivalent
3 credits

ECO 588 The Economics of Developing Countries
An introduction to the processes and problems of economic development in less developed countries with mixed economic systems. Models of economic development are examined with a view to isolating key factors involved in the development process. The merits of alternative strategies of economic development in raising the levels of production and welfare in less developed countries are evaluated.
3 credits

ECO 599 Research in Special Topics
Research in special topics in economic theory or applied economics either individually or in a seminar setting.
Prerequisites: 12 credits in the program or the equivalent, and permission of the program director and a supervising faculty member
Variable and repetitive credit

Department of History

Admission to Graduate Study

For admission to graduate study in history, the following are required:

A. An official transcript of undergraduate record.
B. Letters of recommendation from three previous instructors.
C. Results of the Graduate Record Examination Aptitude Test.
D. A baccalaureate degree in history or its equivalent.
E. A minimum grade point average of 2.75 (B–) in all undergraduate coursework, and 3.00 (B) in history courses.
F. Acceptance by the Department of History and the Graduate School.

In special cases, students not meeting requirements D and E may be admitted on a provisional basis.

With the approval of the Vice Provost for Research and Graduate Studies and the History Department, a student holding an M.A. degree from another accredited institution may be admitted directly to the Ph.D. program at Stony Brook.

Master of Arts Degree

Advising

Upon registration, M.A. candidates will be assigned advisors in their anticipated area of study (e.g., U.S., Europe, Latin America). The students will work out fields of study and schedules of appropriate courses with their advisors.

Courses

The M.A. program is designed to provide background in the Department's three major areas of concentration (U.S., Europe, Latin America) for students in each field. It will also provide training in research and writing skills. To achieve these goals, the M.A. curriculum consists of required courses which full-time students are expected to complete in one academic year. These courses are as follows:

1. HIS 500: Introduction to Historiography.
2. HIS 501-502, 521-522, 545: Introductory field seminars surveying the literature and controversies in each of the major fields (U.S., Europe and Latin America).
3. HIS 510-511, 530-531, 541-542: One-year sequence reading-research seminars to introduce students to the literature and methods of broad areas such as social or intellectual history. The first semester is introductory reading and discussion oriented toward formulation of a research topic. The second will concentrate on production of a research paper.
4. HIS 582: Exam preparation workshop, a study group under faculty supervision which will help the student prepare for the special emphasis (e.g., political history) within his or her M.A. examination field.

For students holding an assistantship (and, therefore, enrolled in HIS 581, Supervised Teaching) required courses will amount to the full 30 credits; those without assistantships (and, therefore, without HIS 581) will make up the needed 6 credits through directed readings with individual faculty members.

The M.A. degree will be awarded upon satisfactory completion of the specified required courses, at least 30 graduate credits, and upon demonstration in an oral examination of competence in a field of history.

Examination

A committee of three faculty members, chosen by the student in consultation with his or her M.A. advisor, will assess the student's knowledge of his or her field in an oral examination. This examination will be taken in the student's final semester of M.A. work.

Field of Examination

The M.A. examination field is a substantial area of study in which a significant historical literature exists and in which significant questions are raised. A field may be defined geographically or topically. Aspects of the field may be selected for special emphasis, but knowledge of the general contours of the whole field will always be assumed by the examiners. The examination field selected should be submitted to the graduate committee for approval.

Samples

- United States, with emphasis upon political/constitutional (or intellectual, diplomatic or social) history.
- Europe since 1815, with emphasis upon Britain, France and Germany.
- Modern Europe, with emphasis upon intellectual history, 1715-1890.
- Latin America since independence, with emphasis on Brazil, Argentina and Mexico.
- Expansion of Europe, 1500-1750 or 1750-recent times.

Doctor of Philosophy Degree

The Ph.D. is the highest professional degree granted by the History Department. Candidates for the degree must hold an M.A. awarded either by the State University of New York at Stony Brook, or by another institution which it recognizes. Candidates must have been formally admitted to the Ph.D. program in history and have an advisor/thesis director who has agreed in writing, even if conditionally, that he or she will guide the student through the Ph.D. qualifyfing examinations and direct the dissertation. A Ph.D. preparation committee, made up of members of the graduate faculty in fields in which the student has an interest, will prescribe the nature of a student's work. A foreign language re-

quirement will be set by this committee, and will in no case be less than a reading knowledge of one foreign language. The Ph.D. preparation committee will assist the student in defining and mastering two fields of knowledge:

Field 1, Dissertation Field: An area of historical knowledge which encloses the student's expected research interest, and which comprises a field sufficiently broad for the purpose of undergraduate teaching. Example: Modern European History, with emphasis upon 19th-century Germany.

Field 2, Comparative Field: An area of study comprising a second, distinct field based on selected historical problems or themes and the methods used in studying them. The topics chosen should cover more than one country or region. In Field 2, the Department will offer four options which reflect the faculty's strengths and interests:

1. Social history, with emphasis on, e.g., women, urbanization, industrial working class, blacks, peasantry, the family.
2. Intellectual history, with emphasis on, e.g., ideas, popular culture, political economy.
3. Political history, with emphasis on, e.g., institutions, parties or movements, ideologies, foreign policy.
4. History of science and technology, with emphasis on, e.g., intellectual or social history of physical or biological sciences, history of medicine.

Coursework

A student's program should be planned in consultation with his/her Ph.D. preparation committee. In every case, however, it must include two graduate seminars beyond the M.A., one of which must be a research seminar in the dissertation field. In addition, each student is required to take a thesis workshop in order to prepare a thesis prospectus. These course requirements must be met before qualifying (preliminary) examinations are taken. All students holding full or partial traineeships must register for three credits of HIS 581, Supervised Teaching, in each semester in which they hold such an appointment. Students who have not held a traineeship in the course of their graduate careers must take HIS 581 for at least one semester during their Ph.D. program. Full-time students are expected to take their qualifying (preliminary) examinations at the end of their third and not later than the end of their fourth semester of post-M.A. work.

Ph.D.-level seminars are of three types: *Reading* (numbered above 500), which are principally discussion and written analysis of selected historical works; *Research* (numbered above 600), which provide the opportunity for original research and writing of a substantial paper based on the research; and *Methods* (numbered above 500), which examine social science or other methods pertinent to historical research through discussion and written analysis of works incorporating the methods. Reading and research seminars, depending on their content, may be appropriate preparation for either Field 1 or Field 2; methods seminars are most suitable for Field 2. In addition to regular courses, students may take directed readings with faculty members to cover specialized fields.

All Ph.D. students will be required to take the thesis workshop (HIS 695) in order to help them prepare their dissertation prospectuses. This prospectus should contain an explanation of the research problem under investigation, a summary of the relevant secondary literature, an statement of hypothesis and an outline of both research sources and methods the student expects to employ. The prospectus must be acceptable to both the instructor of the thesis workshop and to the student's Ph.D. committee. The workshop should be completed either before or in the same semester as the qualifying (preliminary) examination. Completion of the workshop and the dissertation prospectus are required for advancement to candidacy.

Qualifying (Preliminary) Examinations

The Ph.D. examination will be an oral examination covering both the dissertation and comparative fields, each given equal emphasis. The examining committee will take into consideration the student's overall graduate record before recommending advancement to candidacy.

Foreign Languages

Proficiency in at least one foreign language must be demonstrated before a student may be advanced to Ph.D. candidacy. The student and his or her Ph.D. committee will decide which language is most suitable, with the approval of the graduate committee.

Supervised Teaching

Teaching assistants in the History Department are expected to perform either research or teaching functions in the Department, up to a maximum of 12 hours a week.

Those who are teaching will enroll in HIS 581, Supervised Teaching, for three units per semester of degree credit. Their work will be supervised by the member of the faculty to whom they are assigned.

All doctoral students beyond the M.A. level, whether teaching assistants or not, are expected to perform some kind of supervised teaching during their graduate career.

Advancement to Candidacy

After the student has passed the qualifying examination, the Department shall propose to the Vice-Provost for Research and Graduate Studies that the student be advanced to Ph.D. candidacy.

Dissertation

A dissertation is required for the Ph.D. degree. All students will be required to complete a preliminary dissertation prospectus before taking their qualifying examination.

After advancement to candidacy, a student will register for dissertation credits in consultation with his or her advisor. The student will select a dissertation topic within the major field. At present, the Department offers dissertation fields in United States, Modern European and Latin American history, and Expansion of Europe.

The dissertation must, upon completion, be approved by a dissertation examining committee of at least four members of the faculty, appointed by the Vice Provost for Research and Graduate Studies. This committee must include the dissertation supervisor and must include at least one person from outside the Department.

Before final approval can be granted, the student must present the results of the dissertation research at an informal dissertation colloquium convened for that purpose by the Department and open to interested faculty members and graduate students.

Time Limit

All requirements for the Ph.D. degree must be completed within seven years after completing 24 hours of graduate courses in the Department. In rare instances, the Vice Provost for Research and Graduate Studies will entertain a petition to extend this time limit, provided it bears the endorsement of the Chairperson of the Department.

For further details, see the appropriate section of the Graduate School regulations.

Faculty

Alin, Per, Associate Professor. Ph.D., 1961, University of Vienna, Austria: Ancient Greek and Roman history; prehistoric Aegean, Cypriot Iron Age.

Angress, Werner T., Professor. Ph.D., 1953, University of California, Berkeley: Modern Europe; Germany; political and labor history; Jews in modern Germany.

Barnhart, Michael A., Assistant Professor. Ph.D., 1980, Harvard University: U.S. foreign relations; twentieth-century U.S.; modern Japan.

Bottigheimer, Karl S., Associate Professor. Ph.D., 1965, University of California, Berkeley: Tudor-Stuart England and Ireland; the English Civil War; overseas expansion.

Burner, David, Professor. Ph.D., 1965, Columbia University: Twentieth-century U.S.; political and social history.

Chinchilla-Aguilar, Ernesto, Professor. Ph.D., 1952, Escuela Nacional de Antropologia de Mexico: Central America and the Caribbean; colonial history.

Cleland, Hugh G., Associate Professor. Ph.D., 1957, Case-Western Reserve University: U.S. labor and socialism; innovative teaching; visual materials in U.S. history.

Cowan, Ruth S., Associate Professor. Ph.D., 1969, The Johns Hopkins University: History of science, biology and technology; women in modern society.

Fox, Daniel, Adjunct Associate Professor. Ph.D., 1964, Harvard University: U.S. history; social welfare and government institutions.

Garber, Elizabeth, Associate Professor. Ph.D., 1966, Case-Western Reserve University: History of science, physics and thermodynamics; European intellectual and social history.

Kuisel, Richard F., Professor. Ph.D., 1963, University of California, Berkeley: Modern Europe; France; political economy; business; public administration.

Lampard, Eric E., Professor. Ph.D., 1954, University of Wisconsin: Economic history; urban history; U.S. and modern European cities.

Landsman, Ned, Assistant Professor. Ph.D., 1979, University of Pennsylvania: U.S. colonial; local history; Anglo-American world.

Lebovics, Herman, Associate Professor. Ph.D., 1965, Yale University: Modern Europe; intellectual and social history; Germany and France.

Lee, Robert H.G., Associate Professor. Ph.D., 1963, Columbia University: China and the Far East; Manchuria; borders and cultural contacts.

Lemay, Helen R., Associate Professor. Ph.D., 1972, Columbia University: Medieval and Renaissance intellectual history; paleography.

Lida, Clara, Associate Professor.[1] Ph.D., 1969, Princeton University: Spain and Latin America; labor and political history.

Main, Jackson T., Professor. Ph.D., 1949, University of Wisconsin: Colonial and revolutionary U.S.

Marker, Gary A., Assistant Professor. Ph.D., 1979, University of California, Berkeley: Russian social and intellectual history.

Miller, Wilbur R., Associate Professor. Ph.D., 1973, Columbia University: Nineteenth-century U.S. social and urban history; crime, police, criminal justice; Civil War and Reconstruction.

Owens, Leslie H., Associate Professor.[2] Ph.D., 1972, University of California, Riverside: Afro-American History; U.S. southern history.

Pratt, John W., Associate Professor. Ph.D., 1960, Harvard University: U.S. constitutional and legal history; New York history.

Rosenthal, Joel T., Professor. Ph.D., 1963, University of Chicago: Medieval history; medieval England; social history.

Semmel, Bernard, Professor. Ph.D., 1955, Columbia University: Modern British history; European intellectual history; liberalism; imperialism; socialism.

Stein, Stephen J., Associate Professor. Ph.D., 1974, Stanford University: Latin America; Peru; social history and popular culture.

Taylor, William R., Professor. Ph.D., 1956, Harvard University: Nineteenth- and twentieth-century U.S. history; cultural and intellectual history.

Tomes, Nancy J., Assistant Professor. Ph.D. 1978, University of Pennsylvania: Nineteenth-century U.S. social; medicine and psychiatry; women and family.

Weinstein, Fred, Professor. Ph.D., 1962, University of California, Berkeley: Psychohistory; theory in history; Russian history.

Weltsch, Ruben, Associate Professor. Ph.D., 1961, University of Colorado: Eastern Europe; the Reformation; Hapsburg Empire.

Williams, John A., Associate Professor. Ph.D., 1963, University of Wisconsin: British Empire; Africa; the Commonwealth; expansion of Europe.

Estimated number of teaching, graduate and research assistants, fall 1982: 28.

[1]*Joint appointment, Department of Hispanic Languages and Literatures*

[2]*Joint appointment, Africana Studies Program*

Courses

HIS 500 Historiography
Introduction to historiography through reading and writing about the philosophy of history, historical methods and major historians. Term paper on historian of choice. Required for all M.A. students.
3 credits

HIS 501 Introduction to Early Modern Europe
Field seminar in Early Modern European history, 1450-1789. Surveys the major historical problems and interpretations from the Renaissance to the coming of the French Revolution. Required for M.A. students in European history.
3 credits

HIS 502 Introduction to Late Modern Europe
Field seminar in Late Modern European history, 1789-1945. Surveys the major historical problems and interpretations from the French Revolution through the Second World War. Required for M.A. students in European history.
3 credits

HIS 521 Introduction to United States History to the Civil War
Field seminar in U.S. history from the founding of the British colonies to the beginning of the Civil War. Surveys the major topics and interpretations. Required for M.A. students in U.S. history.
3 credits

HIS 522 Introduction to United States History since the Civil War
Field seminar in U.S. history from the Civil War to the Cold War. Surveys the major topics and interpretations. Required for M.A. in U.S. history.
3 credits

HIS 545 Introduction to Latin American History
Field seminar in Latin America. Surveys major issues and controversies from the colonial period to modern times. Required for M.A. in Latin American history.
3 credits

HIS 510-511 Reading and Research Seminar in European History
A one-year sequence designed to develop research skills. First semester focuses on background reading, identifies a research problem and prepares a prospectus and bibliography. Second semester concentrates on research and writing the project. This sequence is offered in broad topic areas such as intellectual

history and stresses a comparative perspective. Required for M.A. in European history.
3 credits fall semester, 6 credits spring semester

HIS 530-531 Reading and Research Seminar in United States History
One-year sequence. See description of HIS 510-511. Required for M.A. in American history.
3 credits fall semester, 6 credits spring semester

HIS 541-542 Reading and Research Seminar in Latin American History
One-year sequence. See description of HIS 510-511. Required for M.A. in Latin American history.
3 credits fall semester, 6 credits spring semester

HIS 581 Supervised Teaching
Teaching practicum that usually accompanies a student's traineeship.
3 credits

HIS 582 M.A. Examination Workshop
A study group under faculty supervision that focuses on preparing specific fields for the M.A. examination. A tutorial approach is used when insufficient numbers or special attention merits it. No written assignments. Required for all M.A. students.
3 credits, repetitive

HIS 583-586 Directed Readings for M.A. Candidates
Specialized tutorials based on contractual relationship between individual student and faculty. Required for M.A. students.
Variable and repetitive credit

READING COLLOQUIA FOR M.A. AND PH.D STUDENTS

The following are specialized reading colloquia that vary with student demand and faculty interest.
3 credits each

HIS 503, 504 Reading Colloquia in Ancient and Medieval History

HIS 505-509, 515-517 Reading Colloquia in European History since 1500

HIS 512 Reading Colloquium in the History of Science

HIS 523-529, 532-534 Reading Colloquia in United States History

HIS 535 Reading Colloquium in History and Public Policy

HIS 543-544 Reading Colloquia in Latin American History

HIS 552-555 Reading Colloquia in English History

HIS 561 Reading Colloquium in East Asian History

HIS 590 Reading Colloquium in Historical Methods

HIS 593 Reading Colloquium in Psychoanalysis and History

RESEARCH SEMINARS

Research seminars provide advanced training for Ph.D. students in the practice of historical research and writing. They are offered on the basis of student need and the availability of faculty. At least one research seminar is scheduled for each major field, i.e. U.S., European, and Latin American history, in the course of an academic year.
3 credits each

HIS 600 Research Seminar in Social History

HIS 601, 602 Research Seminar in Ancient and Medieval History

HIS 603-610, 615-617 Research Seminars in European History since 1500

HIS 621-634 Research Seminars in United States History

HIS 641-645 Research Seminars in Latin American History

HIS 652-655 Research Seminars in English History

HIS 661 Research Seminar in East Asian History

HIS 682-686 Directed Readings for Ph.D. Candidates
Specialized tutorials based on contractual relationship between individual student and faculty member.
Variable and repetitive credit

HIS 695 Thesis Workshop on Ph.D. Candidates
Required of all Ph.D. candidates in order to prepare a dissertation prospectus. This seminar should be completed either before or in the same semester as the qualifying examination. Offered once each year in the spring semester.
3 credits

HIS 699 Research for Ph.D. Candidates
Dissertation research under direction of advisor.
Variable and repetitive credit

Department of Political Science

Master's Program in Political Science

Objectives: The M.A. program in political science with Graduate Studies in Public Affairs is designed to provide individuals with the analytical training and policy expertise to make them effective public administrators. Courses are scheduled entirely in the evening to accommodate those interested in attending on either a full-or part-time basis.

Admission Requirements

A. A baccalaureate degree or its equivalent.

B. A minimum grade point average of 3.00 in the undergraduate major; in exceptional cases, students who cannot meet the G.P.A. requirement may be admitted on a provisional basis.

C. Three letters of recommendation.

D. (For students seeking full-time status) The Graduate Record Examination Aptitude Test scores (Qualitative and Quantitative).

E. Acceptance by both the Department of Political Science and the Graduate School.

Degree Requirements

The Department awards the master's degree to all candidates who have successfully completed 24 credits of formal graduate coursework and six credits of internship in a public sector agency. Students may substitute additional coursework or a master's thesis for the internship requirement where appropriate. The required core courses consist of two year-long sequences: POL 533 and POL 535 concentrate on the formulation, implementation and evaluation of public policy; POL 510 and POL 511 cover basic research methods and statistics for public policy analysis. Under exceptional circumstances, a student may petition the M.A. Studies Director for permission to waive the requirement for POL 511. It is up to the M.A. Studies Director, after consultation with the relevant faculty member(s), to grant or refuse such a request, and to indicate appropriate alternative courses as a substitute.

Ph.D. Program in Political Science

The Department of Political Science offers Ph.D. training in two areas of concentration: (1) political psychology, and (2) public policy.

Political Psychology

The political psychology concentration is interdisciplinary. All students take formal coursework in both political science and psychology. The focus is on experimentation. In addition to formal training in experimental methods, students are apprenticed throughout their course of training to ongoing laboratory research projects. The Department's nine laboratories, four of which are computer-based, are equipped to record verbal, pychophysical, psychophysiological and behavioral responses to auditory, visual and tactile stimuli.

The substantive concerns of the political psychology concentration include, but are not confined to, those facets of psychology that can be applied to the study of political behavior: e.g., communication and interaction, group influence, attribution, attitude change, social cognition, public opinion, psychophysiological and psychophysical measurement, multidimensional scaling, cognitive processes, decision making, the political organization of planned environments and the influence of environmental design on political structures.

Public Policy

The doctoral concentration in public policy has several goals: (1) to provide students with an introduction and an in-depth exposure to the latest analytical and methodological skills in the study of public policy, (2) to expose students to a wide-ranging introduction to contemporary theories of the policy process, (3) to encourage the student's development as a productive member of the political science profession specializing in research and/or teaching in the field of public policy, and (4) to provide these students with the requisite skills for participating in and advising on actual public policy decisions. In addition to the required coursework (see Degree Requirements), the concentration is structured so as to give the student considerable opportunities to design his or her own individual policy specialization and to participate in public policy research with individual faculty members.

Admission Requirements

Applicants for admission to the Ph.D. program in political science must meet the following requirements (in addition to those set forth in the appropriate section of Graduate School requirements):

A. Submission of G.R.E. Scholastic Aptitude Test scores (Verbal and Quantitative) from the Graduate Record Examination Board.

B. Prior training that includes basic work in at least two of the following:

1. Political science
2. Psychology
3. Mathematics or statistics
4. Economics or sociology.

C. In those cases where the departmental admissions committee deems it desirable, personal interviews with departmental representatives.

D. Acceptance by both the Department of Political Science and the Graduate School.

Degree Requirements

Candidates must meet the general requirements for the Ph.D. degree set by the Graduate School. Departmental requirements are as follows:

A. Required courses (all students): The Department of Political Science recognizes two broad goals in the education and training of graduate students: (1) to provide broad substantive knowledge and methodological expertise important for all professional and productive political scientists, regardless of the particular area of concentration, and (2) to provide the student with the opportunity to specialize in a particular area of concentration in which he or she expects to work, to teach and to conduct research at the end of the period of graduate study. With regard to the former, all students enroll in the following graduate courses:

Foundations in Political Science: The Department offers graduate seminars in the following foundation areas: (1) Political Behavior, (2) American Politics, (3) Public Policy, (4) Comparative Politics, (5) Methods of Political Analysis. The fifth area, Methods of Political Analysis, is composed of two required graduate courses in statistics and research methods.

Students should anticipate enrolling in these seminars early in their graduate careers.

In the first year of graduate study, all students enroll in the two-semester statistics sequence designed to introduce them to basic and advanced statistical and quantitative methods in political research. This sequence is a central element in graduate training and serves as the foundation in research methods from which more advanced work in research methods, for both political psychology and public policy, develop.

B. Course requirements—political psychology concentration: The course requirements in the highly structured concentration in political psychology fall into four clusters.

1. The Political Psychology Sequence: All students, during their first 18 months in the concentration, must complete a three-course sequence in political psychology. After an introduction to experimental design, the first two courses review the literature from social, cognitive, experimental and psychophysiological psychology instructive for attacking problems in political behavior. The third course continues the emphasis on experimental design and gives special attention to laboratory instrumentation.

2. The Foundation in Political Science Sequence: All graduate students are required to take the seminars in the five foundation areas described in Section A above. These courses provide students with an introduction to the broad questions of political analysis and the acquistion of substantive knowledge necessary for the formulation of research problems and the teaching of undergraduate courses in these areas.

3. The Quantitative Methods Sequence: All new students enroll in the two-semester statistics sequence described in Section A above.

4. Advanced Topics in Political Psychology: Each student will select at least five advanced courses in substantive areas of psychology that have applicability to political science: e.g., social psychology, cognitive psychology, psychophysiology, and psychophysical and multidimensional scaling. The advanced courses in these areas will normally include both graduate courses offered by the Psychology Department and independent research courses with those faculty members with whom the student wishes to do specialized work.

C. Course requirements—public policy concentration: For the public policy Ph.D. concentration, it is useful for the student in planning graduate coursework to think in terms of the following four sequences:

1. The Graduate Public Policy Sequence: The faculty of the Department of Political Science offers three graduate seminars in public policy which provide the core work in public policy, one introductory and two dealing with more advanced topics. The student should plan to enroll in these seminars when they are first offered. The introductory seminar (Foundations in Public Policy) provides the student with an introduction to contemporary theories of and research on public policy. The advanced seminar provides the opportunity for more intensive analysis as well as the setting for beginning research projects by the student. The Special Topics seminar is offered periodically by different faculty members on selected topics—e.g., decision making, implementation, impact, evaluation, regulation, institutions. The student may enroll in this seminar more than once as long as the topic is different.

Finally, the student should anticipate enrolling in independent research with a faculty member with whom he or she would like to work in the longer term. Preferably, this should be done at the beginning of the third semester of graduate work. The student will then, on several occasions, enroll in independent research with that faculty member. In that capacity, students should anticipate conducting their own research projects and preparing research reports.

2. The Foundations in Political Science Sequence: All graduate students are required to take the seminars in the five foundation areas described in the section on Degree Requirements. These courses provide students with an introduction to the broad questions of political analysis and the acquisition of substantive knowledge necessary for teaching undergraduate courses in these areas.

3. The Quantitative Methods Sequence: All new students enroll in the two-semester statistics sequence described in Section A above. In addition, a one-semester calculus course (usually, Math 121) is required; and this should be taken early in the graduate career. Finally, the Department requires two additional semesters of advanced graduate work in quantitative methods. These courses are usually taken outside the Department. Students in the public policy concentration are strongly advised to satisfy this additional requirement by enrolling in econometrics courses. The particular courses should be chosen in consultation with the student's faculty advisor.

4. The Policy Specialization Sequence: The student should select one or possibly two substantive areas in public policy in which he or she will specialize. This specialization (or specializations) should be chosen with considerble care, for it is likely to provide the substantive focus for both teaching and research in the future. Depending on the particular course of study, as many as five or six electives may be chosen with this specialization in mind. These policy electives will ordinarily be chosen from (1) the courses offered in Graduate Studies in Public Affairs (master's level), or (2) graduate courses in particular areas outside the Department (e.g., health sciences, economics).

D. Student evaluation: Graduate students in the Ph.D. program are evaluated by a variety of criteria from the very beginning of graduate work. Unlike the experiences which students would likely have had in undergraduate schools, graduate training is constituted by a much richer and broader set of intellectual and professional activities and demands. In this context, grades serve as only one of several criteria by which the Department evaluates the performance of its graduate students. It is worth emphasizing that graduate students are not viewed as simply fifth- or sixth-year undergraduate students but rather as the newest members of an intellectual community. As such, their contribution to the intellectual vitality of the Department is critical. The Department has an

especially strong responsibility to provide an accurate and fair evaluation of the student's performance throughout the graduate career—from the standpoints of the student's, the Department's and the profession's interest. Students will be informed of the precise date of any examination at least two months prior to the date on which that examination is to take place. The methods of evaluation are institutionalized in the following ways:

1. Course grades: The grades which students receive in courses serve as one of several components in the overall evaluation of student performance.

2. Performance as graduate assistants: Students in the Ph.D. program serve as graduate assistants throughout their graduate training. The Department considers this kind of activity to be an integral part of graduate work, providing students with experiences both in the classroom and on faculty research projects. Students may be assigned at various points in their graduate careers as teaching assistants or as research assistants. Graduate students must have at least two semesters' experience in each capacity (research and teaching). In making assignments, the Department considers both the interests of the students and the needs of the Department. The faculty members under whom each student works provide a formal evaluation of the student's performance and that evaluation becomes a part of the student's permanent file.

3. First-year evaluation: Graduate students in the Ph.D. program are formally evaluated in the middle of the second semester of graduate work. The first-year evaluation committee for each student is composed of faculty members with whom the student has worked, both in courses and in a teaching/research capacity. The committee's charge is to make one of the following three possible determinations with regard to the student's progress: (a) recommend continuation of graduate study toward the Ph.D., or (b) recommend that the student be allowed to continue toward an M.A. but not to continue in the Ph.D. program, or (c) recommend that the student not be permitted to enroll in additional graduate courses in the Department. The student's performance in an oral examination before the committee may be required. The first-year evaluation also serves as the basis for the decision on whether the student is to receive financial support during subsequent semesters of graduate work.

4. Comprehensive (preliminary) examinations for the Ph.D.:

a. Timing of examinations: Students making normal progress toward the Ph.D. should anticipate taking comprehensive (preliminary) examinations no later than the end of the third year of coursework. Examinations are offered twice during each academic year, once in November and once in May. Written examinations in four fields compose the doctoral comprehensive examinations.

b. Examination fields: In order to become a candidate for the Ph.D. degree, the student is examined in four fields. A distinction is made between two types of examinations: 1) foundation examination (offered in each of the five foundation areas described in Section A, above), and 2) advanced examination (offered in each of the two Ph.D. concentrations, political psychology or public policy). Students specializing in political psychology are required to take the advanced examination in political psychology and the foundation examination in methods of political analysis and two additional foundation areas. Students specializing in public policy are required to take the advanced examination in public policy and the foundation examination in methods of political analysis and two additional foundation areas, except that students specializing in public policy may not take the foundation examination in public policy as a separate examination. In each case, the total number of written examinations is four.

5. Doctoral examination committee: The student, in consultation with his/her faculty advisor and the Director of Graduate Studies, selects a committee of four faculty members, three from the Department of Political Science and one with whom the student has worked from outside the Department. The committee should be selected no later than three months prior to the taking of comprehensive (preliminary) examinations. This committee will ordinarily continue to serve as the student's dissertation committee after the comprehensive (preliminary) examinations, although some changes may be made according to the student's needs and interests. It is the responsibility of the student's doctoral examination committee (not including the outside member) to certify the performance on the written examinations. That committee may, at its discretion, require that an oral examination follow the written examinations if such additional information is deemed necessary in making a judgment. Students must pass examinations in *all* four fields in order to be admitted to candidacy for the Ph.D. degree. Students failing comprehensive (preliminary) examinations on the first try may be permitted to retake examinations during the next examination period (usually about six months). In no case will a reexamination be given earlier. Only one retake of examinations is permitted. Failure on the second try means dismissal from the Ph.D. program.

E. Dissertation defense: Dissertation colloquium organized and administered by the candidate's doctoral committee, open to all interested faculty members and graduate students (of any department or institution), who may also participate in the discussion if they wish.

The Department will also administer *equivalency examinations* in cases where a candidate believes he or she is sufficiently skilled in the areas described above to justify proceeding without further formal training, but this will be done only in exceptional cases. It will normally require intensive formal training to attain the level of competence expected of candidates in those areas.

F. Doctoral dissertation: A student is formally admitted to candidacy after completing all the above requirements save, of course, the dissertation defense, and after submitting an acceptable dissertation proposal which shows how the student will apply work previously done and/or work yet to be done to meeting the Department's stringent dissertation requirement.

The dissertation is a substantial and significant piece or collection of original work that conclusively demonstrates the student's ability to contibute new knowledge to the scientific literature on politics. In form, the dissertation is either a single monograph, two or more full-length articles, or the equivalent. In the case of dissertations comprising two or more articles, the topic may vary from one to another. The quality of the dissertation must be demonstrated by 1) approval of the candidate's dissertation examining committee, after an informal dissertation colloquium, *and* 2) acceptance of the monograph or the articles for publication by publishers or in journals deemed appropriate by the dissertation examining committee, or alternatively, if the dissertation examining committee so recommends, attestation of publishable quality by *two* appropriately qualified scholars outside the Department invited by the committee to review the dissertation. Acceptance of the dissertation after the colloquium constitutes the last formal requirement before award of the degree.

Faculty

Abramowitz, Alan I., Associate Professor. Ph.D., 1976, Stanford University: American government and politics; public opinion; voting behavior; political parties; interest groups; legislative institutions and processes; the Presidency.

Cover, Albert D., Assistant Professor. Ph.D., 1976, Yale University: American politics and institutions; legislative politics; congressional elections and functions.

Cowart, Andrew T., Professor. Ph.D., 1971, University of Michigan: Comparative public policy; econometric approaches to the study of public policy; public budgeting.

Enelow, James M., Assistant Professor. Ph.D., 1977, University of Rochester: Formal political theory; models of decision making.

Falkin, Gregory, Assistant Professor. Ph.D., 1977, Cornell University: Applied policy research; computer simulation.

Hamill, Ruth, Assistant Professor. Ph.D., 1981, University of Michigan: Social cognition; law and psychology.

Herstein, John, Assistant Professor. Ph.D., 1979, Carnegie Mellon University: Political psychology; models of decision-making.

Koppelman, Lee E., Professor. Ph.D., 1967, New York University: Planning; energy policy; local government and intergovernmental relations.

Lodge, Milton G., Professor. Ph.D., 1967, University of Michigan: Political psychology; scaling; political cognition.

Myers, Frank E., Professor and Dean of the Division of Social and Behavioral Sciences. Ph.D., 1965, Columbia University: Comparative politics; political theory; political change.

Norpoth, Helmut, Associate Professor. Ph.D., 1974, University of Michigan: Electoral behavior and political parties; legislative behavior; quantitative methods.

Petrick, Richard, Assistant Professor. Ph.D., expected 1982, University of Minnesota: State and local public policy; American politics; comparative public policy.

Scarrow, Howard A., Professor. Ph.D., 1954, Duke University: Comparative politics; political parties.

Schneider, Mark S., Associate Professor. Ph.D., 1974, University of North Carolina: Urban public policy; urban service delivery; administration and public policy.

Scholz, John T., Assistant Professor. Ph.D., 1977, University of California, Berkeley: Policy implementation and evaluation; regulation; economic development and comparative policy analysis.

Segal, Jeffrey A., Assistant Professor. Ph.D., expected 1982, Michigan State University: American institutions, constitutional and public law, judicial behavior and civil liberties, research methodology.

Travis, Martin B., Professor. Ph.D., 1948, University of Chicago: International law and international relations; Latin America; the Middle East.

Tursky, Bernard, Professor.[1] Diploma, 1954, Lowell Institute, Massachusetts Institute of Technology: Political psychology; psychophysiology; scaling.

Williams, Jay C., Jr., Professor. Ph.D., 1955, University of Chicago: Political theory; political propaganda.

Estimated number of teaching, graduate and research assistants, fall 1982: 24.

[1]*Joint appointment, Department of Psychology*

Courses

M.A. PROGRAM COURSES

Courses are open to qualified students from other programs with permission of the M.A. Program Director.

POL 510 Statistical Methods for Public Policy Analysis
An introduction to the basic analytic techniques necessary to the analysis of governmental programs and agencies. Students will be introduced to computer programming and statistical analytic techniques, as well as to alternate sources of information from which crucial data on public events and programs can be drawn and analyzed.
Fall, 3 credits

POL 511 Research Methods for Public Policy Analysis
A workshop following the Statistical Methods course in which students will engage in actual problem-solving research, utilizing such techniques as cost/benefit analysis, social and economic indicators, and program evaluation. The course will emphasize the application of quantitative and qualitative methods to the analysis of public sector problems.
Prerequisite: POL 510
Spring, 3 credits

POL 531 Topics in Public Affairs: Planning
Topics in Public Affairs will address the planning process as a decision-making tool in the implementation of public policy in housing, land-use, transportation and environmental management. The course will include intergovernmental roles and the impact of citizen participation on policy changes.
3 credits

POL 532 Police in Urban America
Examines the development and organization of urban police forces in America. It focuses on an analysis of the causes and consequences of the discretionary use of coercive power in a decentralized organization, and examines historical and contemporary efforts to reform police behavior and to change police policy. Competing theories of the determinants of police behavior, including psychological, organizational, occupational, political and cultural explanations, will also be compared.
3 credits

POL 533 Administration and Public Policy
A systematic introduction to the principles of public administration and public policy, with an emphasis on the formulation of legislative and administrative decisions. A major part of the course is devoted to student projects which analyze the formulation of a governmental program of policy.
Fall, 3 credits

POL 534 Intergovernmental Relations and Policy Delivery
This course focuses on the formulation, implementation and impact of intergovernmental policy. Several policies will be examined in depth, including grant-in-aid programs, General Revenue Sharing, Housing and Community Development and Employment programs. The historical, economic and political foundations of intergovernmental policy delivery will be examined.
3 credits

POL 535 Public Policy Analysis and Evaluation
This course concentrates on the strategies and methods of public policy analysis and evaluation. Topics covered in the course will include developing a research strategy and design, choosing measures, analyzing data and communicating results. Students will develop a program evaluation of their own and partially conduct their research during the semester. Finally, the course will consider the role of evaluation research in a political context and the role of the policy analyst in the public sector.
Prerequisite: POL 533 or permission of M.A. Program Director
Spring, 3 credits

POL 536 Introduction to Budgeting
This course will examine the United States federal, state and local budgeting procedures. Special emphasis will be placed upon the current federal practices and upon the probable impact of proposed changes.
3 credits

POL 537 Government Regulation of Business
This course examines the scope of government regulation of business in the U.S. today—regulation both at the federal and state levels, and

regulation by both "economic" and "social" agencies. The course will compare alternative explanations for the success and failure of various regulatory agencies, and examine proposed reforms, including the likely consequences of deregulation.
3 credits

POL 538 Urban Politics
This course concentrates on urban and suburban growth; the decentralization of metropolitan areas; land use policy and reforming metropolitan policy making. Several additional policy areas, such as education, finance and police will be considered. Political phenomena, including parties and ethnic groups, will also be discussed.
3 credits

POL 539 Law for Administrators
A professional course aimed at preparing individuals training for or already engaged in an administrative career to meet the growing legal scrutiny to which the actions of administrators are now subject. The course will focus on the legal responsibilities and obligations of administrators and will help them to determine more efficiently when professional legal counselling may be necessary.
3 credits

POL 540 Accounting for the Public Sector
Students in this course will learn the basic principles of preparing public sector agency budgets and reviewing budgets prepared by others. Concepts of fiscal control, accountability, and responsibility will be discussed, as will ways of using the budget as a means of program control. Students will be exposed to relevant practices with regard to both operating and capital budgets.
3 credits

POL 543 Environmental Politics and Policy
Federal environmental legislation, such as the National Environmental Policy Act, the Coastal Zone Managment Act and the Federal Pure Waters Management Act will be examined. The policies, politics and administrative activities of federal, state and local levels will be considered. Finally the interaction of the public sector, the private sector and citizen groups in the implementation of environmental policy will be discussed.
3 credits

POL 580 Special Projects/Internships
This work, tailored to fit the needs of individual students, may include participation in student-faculty research teams or internship assignments in a local, state or federal public sector agency.
6 credits each semester

POL 599 Independent Study
This course can be arranged between a student and faculty member for the purpose of allowing the student to pursue independently supervised research, at the master's level.
Fall, spring and summer, variable credit

DOCTORAL PROGRAM IN POLITICAL SCIENCE

Course offerings: all courses are 3 credits unless otherwise specified.

POL 550 Foundations: American Politics
A review of the basic political science literature of American politics, with emphasis on electoral behavior, parties and groups.
Fall

POL 551 Foundations of Political Science: Political Behavior
A review and analysis of the political behavior literature, including such topics as attitude formation and change, belief systems, political socialization, demographic and small group influences on political beliefs and conduct, political leadership, voting, elite vs. mass politics, decision-making, personality and politics, political conformity and protest.
Prerequisite: POL 550
Spring

POL 552 Foundations: Public Policy
A systematic introduction to the study of public policy in the United States. This course investigates the formulation of public policy and the political and social forces that structure that formulation. Techniques for the study of policy implementation and the evaluation of policy effects are also introduced. In addition to the procedures of policy analysis, substantive policy areas such as education, welfare and environmental preservation will be investigated.
Fall

POL 553 Foundations: Comparative/International
Survey and critical evaluation of the major theoretical approaches, issues and problems in comparative political analysis. The course examines such problem areas as political development, empirical democratic theory, and political socialization among others, along with detailed examination of one or more selected non-American political systems.
Prerequisite: POL 552
Spring

POL 560 Political Psychology I
Survey of the political psychology literature, with emphasis on the application of conceptual and methodological approaches from social and experimental psychology to the analysis of political behavior.
Fall

POL 561 Political Psychology II
Continuation of POL 560, with emphasis on the psychophysical, psychophysiological and behavioral measurement of political variables.
Prerequisite: POL 560
Spring

POL 562 Laboratory and Field Instrumentation
This course is an introduction to real-time applications of minicomputers in laboratory experimentation. The following major topics will be discussed: 1) Review of experimental design, techniques (factoral, Latin, square, etc.); 2) Introduction to the PDP-11 operating system (use of the job control language and packages); 3) The design and use of laboratory instrumentation; 4) A review of programming techniques and the Fortran IV language on the PDP-11/03 computer. In addition, each student will design and conduct a series of laboratory experiments which will illustrate the capabilities and problems of computer experimentation.
Fall

POL 601 Teaching Methods and Practicum
A course designed to prepare students for undergraduate teaching. Students will be assigned to one of the basic undergraduate courses as a teaching assistant. In addition to teaching in weekly discussion groups, students will meet weekly with the professors in each basic undergraduate course to discuss teaching skills, the prepartation of lecture material and the construction of exams.
Prerequisites: POL 550, 551
Fall

POL 602 Teaching Methods and Practicum
A continuation of POL 601.
Prerequisite: POL 601
Spring

POL 603 Applied Data Analysis I
The application of statistical and mathematical models to the analysis of political data, with emphasis on methodological assumptions and problems.
Prerequisites: PSY 501 and PSY 502 or equivalent
Fall

POL 604 Applied Data Analysis II
The application of statistical and mathematical models to the analysis of political data with emphasis on methodological assumptions and problems.
Prerequisite: POL 603
Spring

POL 610 Research Practicum I
A course involving students actively in an ongoing research project under the direction of the principal investigator. Students will participate in all stages of the research project and be required to prepare a research report on one aspect of the project.
Prerequisites: POL 550, 551, 552, 553
Fall

POL 611 Research Practicum II
A continuation of POL 610. Students will actively participate in either a second research project, where they will again prepare a research report, or continue their participation in the same project, where they will then be assigned a subset of data for analysis or carry out a specific research aim of the project.
Prerequisite: POL 610
Spring

POL 620 Research Colloquium
Students will participate in weekly departmental colloquia where they will serve as discussants of research reports presented by individual faculty members or outside investigators reporting on current research.
Prerequisite: POL 553
Fall

POL 621 Research Colloquium
A continuation of POL 620 except that in this course students will present formal papers on their research projects (POL 610-611) and faculty members will serve as discussants.
Prerequisite: POL 620
Spring

POL 625 Advanced Topics Seminar in Comparative Politics I
Readings and research papers on topics in comparative politics. Particular attention is given to concepts and methods identified with the field.
Prerequisite: POL 553
Fall

POL 626 Advanced Topics Seminar in Comparative Politics II
Readings and research papers on topics in comparative politics. Particular attention is given to concepts and methods identified with the field.
Prerequisite: POL 553
Spring

POL 630 Psychophysiological Methods
Covers organization of the human nervous system and its interaction with physiological response systems. Studies methods of recording and analyzing psychophysiological response measures. Examines the application of psychophysiological response measures and patterns to the study of individual attitudes and behavior. Crosslisted with PSY 566.
Fall

POL 658 Political Attitudes and Attitude Change
The content, structure, determinants and behavioral consequences of political attitudes are examined. Particular focus will be given to testing hypotheses about attitude formation and change. Attitude research methods will be studied for the purpose of empirically testing hypotheses.
Fall

POL 660 Advanced Topics in Political Behavior
Review of the literature and methods related to a single topic or problem in contemporary political science, e.g., voting behavior, issue formation, interest groups, political economy or personality.
Prerequisites: POL 550, 551, 552, 553
Fall, alternate years

POL 661 Advanced Topics in Political Behavior
Review of the literature and methods related to a single topic or problem in contemporary political science, e.g., voting behavior, issue formation, interest groups, political economy or personality.
Prerequisities: POL 550, 551, 552, 553
Spring, alternate years

POL 662 Group Decision Models
Topics to be discussed include the theory of games, individual choice theory and social choice theory. The purpose of the course is to show how these models aid our understanding of politics.
Spring

POL 663 Campaigns & Voting
This course will include readings on the impact of campaigns on the vote. Included in the course will be analyses on voting behavior, with special emphasis on the impact of campaign techniques upon persuasion and turnout. Useful prerequisites include statistical and computer (SPSS) methods.
Spring

POL 664 Political Information Processing
Surveys contemporary psychological models of information processing, with emphasis on experimental applications to the analysis of the content and structure of political concepts.
Spring

POL 665 Advanced Topics in Political Analysis
A semester course reviewing the literature and methodology of specific areas of political science research. The course will relate directly to research applications and provide students an opportunity to apply advanced research tools to selected substantive problems.
Prerequisite: POL 553
Fall, alternate years

POL 666 Advanced Topics in Political Analysis
A continuation of POL 665.
Prerequisite: POL 665
Spring, alternate years

POL 667 Dimensional Analysis
The course provides training—in both theory and applications—in the several statistical methods collectively labelled dimensional analysis. These include unfolding, Guttman scaling, factor analysis and multidimensional scaling. Particular emphasis will be on the family of methods associated with multidimensional scaling, including related techniques for analysis of variance, multiple regression, and principal components analysis, in situations where variables may be measured at the ordinal or categorical level. Students will be expected to apply methods to actual research problems.
Prerequisite: Training in basic statistics
Spring

POL 670 Advanced Topics in Public Policy Analysis I
An intensive examination of the major substantive and methodological concerns involved in the investigation of the public policy process. Program evaluation methodologies will be investigated as well as the political milieu within which these evaluations must be utilized.
Prerequisite: POL 552
Alternate years

POL 671 Advanced Topics in Public Policy Analysis II
A continuation of POL 670. The skills learned in POL 670 will be applied to the actual examination and evaluation of government policy in a substantive area of concern chosen jointly by the instructor and the student.
Prerequisite: POL 670
Alternate years

POL 672 Urban and Suburban Growth Policy
The processes of urban and suburban community growth are the central concern of this course. Growth policies enacted by local, state and national governments are examined. The course is concerned with both historical processes of growth and past government policies, as well as those conditions and policies presently being practiced.
Prerequisite: POL 538
Spring

POL 673 Advanced Topics Seminar in American Politics I
Seminar in American institutions and processes, focusing current research in such areas as congress, the supreme court, presidency, political parties or bureaucracy.
Prerequisite: POL 550
Fall

POL 674 Advanced Topics Seminar in American Politics II
Seminar in American institutions and processes, focusing current research in such areas as congress, the supreme court, presidency, political parties or bureaucracy.
Prerequisite: POL 550
Spring

POL 675 Advanced Topics in Government Institutions
An intensive examination of the major substantive and methodological problems involved in the study of political institutions and processes.
Prerequisites: POL 551, 553
Alternate years

POL 676 Advanced Topics in Governmental Institutions
A continuation of POL 675. An intensive examination of a second substantive area of political institutions and processes.
Prerequisite: POL 675
Alternate years

POL 680 Independent Study
Prerequisite: POL 611
Fall and spring, variable credit

POL 681 Independent Study
Prerequisite: POL 611
Fall and spring, variable credit

POL 699 Doctoral Dissertation Research
Prerequisite: POL 611
Fall and spring, variable credit

Department of Psychology

The Graduate Program in Psychology offers the M.A. degree in Graduate Studies in General Psychology (with restrictions described below) and the Ph.D. degree in psychology in six distinct Graduate Studies which are specified and described below.

Facilities

In addition to the faculty's individual research laboratories for human, animal and physiological research, a number of other facilities are involved in research and graduate training. The *Psychological Center* is the training and service unit for Clinical Psychology, providing psychological services and consultation to the community, and a site for graduate practica and internships. The *Point of Woods Laboratory School* houses a small special education class for elementary school students with attention-deficit disorders or hyperactivity, as well as assessment and treatment projects for other children. A branch of *Suffolk Child Development Center,* a private school for young autistic, retarded, aphasic and developmentally delayed children, is located on campus. The *University Preschool,* sponsored by the Department, enrolls children from 18 months to 5 years of age, permitting both research and observation. The *Marital Therapy Clinic* provides therapy for couples and individuals in the community who are experiencing relationship difficulties. The *Sex Therapy Center* in the Department of Psychiatry is also a site for research and training of psychology graduate students. There are currently three PDP-8 and one PDP-12 computers in the Department's laboratories, as well as five microcomputers being used for grant-sponsored research. In the Political Psychology area there are four MINC-11 and one PDP-12 computers used for psychophysiological and psychophysical research in the *Laboratory for Behavioral Research.* Within the Department, there are four CRT terminals for use with the central campus computer, and in the Division's *Social Science Data Laboratory,* there are ten additional terminals and printers for use with the central computer. In addition to the animal laboratories housing rats and pigeons, the *Greenhouse* offers exceptional facilities for experimental and observational research on marmoset monkeys, birds and fish. There are also opportunities on Long Island for field research on birds and smaller marine animals, and for observational research at zoological parks in the metropolitan area. The Department maintains well-equipped electronics and machine shops.

M.A. in Psychology

Applications are not accepted for the M.A. in psychology. Students may apply to Interdisciplinary Graduate Studies in Social and Behavioral Sciences for a terminal M.A. degree in psychology, permitting a concentration in psychology. Students unable to complete their doctoral studies in one of the graduate studies below may receive an M.A. in psychology with Graduate Studies in General Psychology, and doctoral students may receive an M.A. in the course of their training as described below.

The Ph.D. Program in Psychology

This program, begun in 1966, is registered by the State Department of Education for licensure in New York State. The faculty offers six graduate studies in Clinical, Developmental, Experimental, Psychobiology, Social and General Psychology, and students apply for admission to one or more of the first five of these areas. During the fall 1980 semester there were 165 full-time graduate students in the Department, and by the end of the semester 225 Ph.D. degrees had been awarded since the Program began. During that semester there were 55% female, 10% minority, and 7% foreign full-time students.

Admission to Graduate Studies

A. A baccalaureate degree with either a major in psychology, or a program providing adequate preparation for the intended area of study (ordinarily including statistics, research methodology and/or psychology laboratory, and learning).

B. An average of B (3.00) or better in all graded academic undergraduate coursework.

C. Two official copies of all previous college transcripts, with certified English translations of any transcripts in a foreign language.

D. Letters of recommendation from three instructors or academic advisors; and, for applicants to Clinical Psychology, three supplementary recommendation forms.

E. Results from the Graduate Record Aptitude Examination are required; Advanced Test results are strongly recommended for undergraduate psychology majors.

F. Foreign nationals must provide TOEFL scores (unless their native language is English or they attended college where English was the language of instruction) and subsequently the International Student Financial Affidavit.

G. Acceptance by the Department and Graduate School.

Students who do not meet these requirements may also apply if they feel that special circumstances should be considered.

Requirements for the Ph.D. Degree

The award of the Ph.D. signifies both a scholarly mastery of the field of psychology and the ability to conduct independent research. In addition to he Graduate School's degree requirements, students must satisfy the following requirements (and

any additional requirements of their area of studies):

A. Residence: Minimum residence of two years and the equivalent of three years of full-time graduate study is ordinarily required. Unless admitted as part-time students, residents must register for full-time study until advanced to candidacy. Full-time study is at least 12 credits during the first year of graduate study and 9 thereafter.

B. Preliminary examination: This "examination" ordinarily must be completed by the end of the fifth semester of study and consists of two parts. The *general examination* includes the completion of certain required courses (below) and a review/research paper suitable for submission to a refereed journal. The *specialty examination* is designed individually for each student; its form depends upon the student's area of graduate studies.

C. Successful completion of an approved program of study with a grade of B in each required course: Two semesters of quantitative methods and three core courses selected from at least two areas outside the student's area of graduate studies are required. The core courses currently include: Behavior Deviation (Clinical); Proseminar in Developmental Psychology (Developmental); Classical Theories and Animal Learning, Cognition and Memory, Sensation and Perception, and Measurement and Scaling (Experimental); Neuropsychology, and Comparative Behavior (Psychobiology); Contemporary Issues in Social and Community Psychology (Social); and History of Psychology (General). In addition, two semesters of First-Year Lectures (0 credits) are required. Following admission, students with graduate training elsewhere can petition to satisfy course requirements on the basis of their previous graduate work.

D. Supervised teaching and research experience from admission through the fourth year: The program requires both research and instructional experience during each semester, rather than having students serve *either* as teaching assistants *or* as research assistants. This requirement can be waived or modified for students holding fellowships, serving as full-time interns or as graduate instructors, or being supported by research grants.

E. Two semesters of substantial direct instruction in classroom or laboratory: During these semesters, graduate students must receive teacher evaluations by their students.

F. Advancement to candidacy: Upon successful completion of the preliminary examination and requirements of their area of studies, the faculty of the student's area must recommend advancement to candidacy for the Ph.D.

G. Approval of the dissertation proposal and successful oral defense of the completed thesis.

First-year evaluation: Progress of each first-year graduate student is reviewed at the end of the academic year by the entire faculty. The purpose of this review is to allow the student to withdraw without an excessive investment of time when, in the opinion of the faculty, the student would not pass the preliminary examination at the Ph.D. level or produce a suitable dissertation. Any student whose performance is below the standard of the Ph.D. established by the Department may be dismissed or asked to withdraw. Under certain circumstances a student may be permitted to obtain a terminal Master of Arts degree after passing the general examination at the M.A. level, satisfactorily completing the required courses and 30 graduate credit hours of study culminating in an M.A. thesis.

M.A. degree in the course of doctoral studies: The Department will recommend granting an M.A. degree to students who have successfully completed the general examination and other second-year requirements, and completed a research paper (which need not be presented in the form of a thesis), upon the recommendation of the faculty in the student's area of graduate studies.

Graduate Studies in Psychology

In all areas the primary emphasis is on research training, through research advisement and apprenticeship. Students are encouraged to immediately become involved in ongoing research and to engage in independent research when sufficient skills and knowledge permit, with the goal of becoming active and original contributors. At the end of the first year at the latest, a student may choose a new research advisor, who may not be the student's initial advisor and may be outside the sutdent's area.

Clinical Psychology

Clinical training prepares the student for the interrelated roles of behavioral scientist and professional practitioner, and is guided by the premise that clinical psychology is an intergral part of psychology. Behavior therapy is a dominant theme, but the faculty members are open to incorporate into their teaching and practice any technique that is sufficiently operationalized to be tested empirically. Interests of the faculty range from individual therapy, both child and adult, through family and group approaches, to intervention at the community or organizational level, but do not include psychodynamic, non-directive, or Gestalt approaches. Stony Brook's specialization in clinical psychology is fully approved by the American Psychological Association.

*Developmental Psychology**

Developmental faculty members represent a variety of theoretical perspectives and research interests. A major area of research is in early social, cognitive and behavioral development, with particular concerns for empathy, sharing and other prosocial behavior; attachment relationships; self-control; memory development; conditioning processes in infants; and neurometric assessment of learning-disabled children. Students also become familiar with applications of developmental psychology in practical settings, but the goal of child therapy would be better served in the clinical area.

*Experimental Psychology**

Trains the student both in research and teaching, and in a variety of content areas. Diverse approaches to experimental psychology, from the behavioral to the cognitive, are represented. In particular, there are four major foci: animal behavior, cognitive processes, scaling and measurement, and sensation and perception.

*Psychobiology (Comparative and Physiological)**

Physiological research concerns the function of the brain in the control of movements, sensory processes and cognitions in animals and humans, using a variety of techniques. Studies in experimental neuropsychology are conducted with brain-damaged and -dysfunctional subjects, primarily children. Research interests in animal behavior generally address the role of learning and cognitive processes in the evolution of social behavior.

*Social Psychology**

Located in the intersection of all the human sciences, social psychology requires the ability to breach narrow disciplinary boundaries, and at Stony Brook involves exploring innovative directions in addition to providing training in mainstream theories and methods. Current research emphases include theoretical and applied work on race, sex and age prejudice, relationship of

inequality and social class to psychological variables, quality of the environment, and studies of the social context of psychology.

General Psychology
Applications are not accepted for a Ph.D. in psychology with Graduate Studies in General Psychology. Students unable to complete their doctoral studies in one of the Graduate Studies above may receive a Ph.D. in psychology with Graduate Studies in General Psychology.

Changes in Area
Transfer between areas of graduate studies requires approval of a formal application.

*Applications for part-time study, ordinarily requiring registration for six graduate credit hours until advancement to candidacy, will be considered. Note that only students pursuing full-time study are eligible for financial assistance.

Faculty

Baars, Bernard, Assistant Professor. Ph.D., 1977, University of California at Los Angeles: Cognitive psychology, including psychology of language, artificial intelligence approaches to psychological theory and testability of these theories.

Birns, Beverly, Affiliate Professor.[1] Ph.D., 1963, Columbia University: Child cognitive development; cognitive development related to social class and sex differences; sex roles.

Bramel, Dana, Professor. Ph.D., 1960, Stanford University: Interpersonal perception and attitudes, with emphasis on racism, social class and psychoanalytic approaches.

Carr, Edward G., Associate Professor. Ph.D., 1973, University of California, San Diego: Research with psychotic and retarded children including studies of language acquisition, analysis and remediation of severe behavior problems and observational learning.

Cohen, David, Affiliate Professor.[2] Ph.D., 1963, University of California, Berkeley: Research on cellular mechanisms of conditioning; neural control of the heart.

Coulter, Xenia, Lecturer and Director of Undergraduate Studies. Ph.D., 1974, Princeton University: Basic processes of memory; learning and motivation in adult and immature organisms, specifically "infantile amnesia" and why certain types of learning seem to be especially resistant to forgetting.

Cross, David, Associate Professor and Director of Resources. Ph.D., 1965, University of Michigan: Psychological scaling and measurement theory with emphasis on psychophysics, especially the analysis of contextual factors that influence magnitude judgments; multivariate scaling applied to sensation, perception, social attitudes and opinions.

Dube, Ernest Fred, Affiliate Assistant Professor.[3] Ph.D., 1976, Cornell University: Cross-cultural studies of cognition as well as research on attitudes and racism; the psychology of politics.

Dwyer, James, Assistant Professor. Ph.D., 1975, University of California, Santa Cruz: Health effects of herbicides on Vietnam veterans and the Vietnamese; determinants of black/white and male/female income differences in the U.S.; social stratification and alienation; structural equation models; causal inference from longitudinal designs; racial antagonism and the economy.

D'Zurilla, Thomas, Associate Professor. Ph.D., 1964, University of Illinois, Urbana: Effects of training in social problem-solving skills on social competence and maladaptive behavior; development of assessment measures of social problem-solving skills.

Emmerich, David S., Associate Professor. Ph.D., 1967, Indiana University: Sensory psychology and perception including psychoacoustics, psychophysics, reaction time studies, signal detection theory and generally how we perceive the world.

Emmerich, Helen Jones, Lecturer. Ph.D., 1972, University of Illinois: Memory development; visual memory; motivational factors in children's learning, memory and reading.

Friend, Ronald, Associate Professor. Ph.D., 1969, University of Toronto, Canada: Prejudice; racism; sexism; intergroup conflict; interpersonal processes; critiques of current methodology, theory and research in social psychology, research in field settings and political uses of social psychology.

Gagnon, John, Affiliate Professor.[4] Ph.D., 1969, University of Chicago: Behavior; marriage and the family; social change.

Geer, James H., Professor. Ph.D., 1963, University of Pittsburgh: Research on human sexuality using genital measures, emphasizing the relationship between subjective and physiological measures; sex as a model for the study of emotion.

Gerwirtz, Jacob, Professor. Ph.D., 1948, State University of Iowa: Operant learning, imitation, attachment and dependency; the environmental control of infant behavior, infant response and control of parental behavior; developmental psychology in pediatric settings.

Gilchrist, Alan, Assistant Professor. Ph.D., 1975, Rutgers University: Visual perception of surface color, illumination, depth, motion, size and form.

Goldfried, Marvin, Professor. Ph.D., 1961, State University of New York at Buffalo: Cognitive-behavioral assessment; the delineation of common therapeutic principles across theoretical orientations.

Green, Richard, Affiliate Professor.[5] M.D., 1961, The Johns Hopkins University School of Medicine: Human sexuality and gender identity.

Hay, Dale F., Assistant Professor. Ph.D., 1976, University of North Carolina: Social development in infancy, particularly the origins of sharing, cooperation and peer relations, as well as research on imitation.

Johnson, Marcia K., Professor. Ph.D., 1970, University of California, Berkeley: Human memory, especially reality monitoring (distinguishing real from imagined events); general issues in learning and memory such as the role of interpretive schemas in the acquisition and forgetting of information.

Kalish, Harry I., Professor and Chairperson. Ph.D., 1952, University of Iowa; Biofeedback and the role of fear as a mediating variable.

Kaye, Herbert, Associate Professor. Ph.D., 1964, Brown University: Infancy and perceptual development; learning in infancy; early language; brain-behavior relationships; neurometric assessment.

Krasner, Leonard, Professor. Ph.D., 1950, Columbia University: Application and evaluation of environmental design (behavioral and enivronmental psychology, informal education, architecture and social planning/networking); approaches to community setting and organizations; behavioral approach to the study of values ethical belief systems of scientists.

Levine, Fredric M., Associate Professor and Director of Psychological Center. Ph.D., 1965, Northwestern University: Clinical implications of perceptual events; control of involuntary motor responses (e.g., tics, stuttering); response patterns of peer-victimized youngsters.

Levine, Marvin, Professor. Ph.D., 1959, University of Wisconsin: Spatial problem solving, in particular determining how people use spatial information to reach a specified destination; psychological systems, especially a comparison of oriental and western views of human nature.

Lidsky, Theodore I., Associate Professor. Ph.D., 1973, University of Rochester: The neural control of movement.

Liebert, Robert M.; Professor. Ph. D., 1966, Stanford University: Delivery systems for behavioral intervention; field experiments in moral development and/or observational learning; functional aspects of verbal communication.

Lockwood, Randall, Assistant Professor. Ph.D., 1976, Washington University: Mammalian behavior; social behavior; social ecology.

Logue, Alexandra W., Assistant Professor. Ph.D., 1978, Harvard University: Learning and motivation, particularly self-control, quantitative analysis of choice, history of behaviorism and implications of illness-induced food aversion learning for learning theory and for the treatment and prevention of feeding disorders.

LoPiccolo, Joseph, Affiliate Associate Professor.[6] Ph.D., 1969, Yale University: Clinical outcome studies in the treatment of sexual dysfunction.

Menzel, Emil, Professor. Ph.D., 1958, Vanderbilt University: Comparative psychology, with an emphasis on primate communication and learning.

Morrison, H. William, Associate Professor and Director of Graduate Studies. Ph.D., 1962, University of Michigan: Psychological measurement, judgment, and decision processes; display and visualization of multivariate relations; distribution-free statistics; computer-assisted instruction.

Neale, John M., Professor. Ph.D., 1969, Vanderbilt University: Research on schizophrenia and life stress.

O'Leary, K. Daniel, Professor. Ph.D., 1967, University of Illinois: Etiology and treatment of marital discord, spouse abuse, and hyperactivity; effects of marital discord on childhood problems.

O'Leary, Susan, Assistant Professor (part-time). Ph.D., 1972, State University of New York at Stony Brook: Evaluation of behavioral interventions and diagnostic issues with hyperactive children; theoretical and applied research on self-control; punishment with children at on-campus or local public schools.

Pomeranz, David, Associate Professor. Ph.D., 1963, University of Rochester: Environmental psychology; group treatment approaches for agoraphobia; issues in training of psychotherapists.

Rachlin, Howard, Professor. Ph.D., 1965, Harvard University: How organisms allocate their time under various restrictions such as time limitation; removing or adding the possibility of an activity, or making one activity contingent on another.

Ross, Alan O., Professor. Ph.D., 1953, Yale University: Clinical child psychology with an emphasis on child behavior therapy, learning disabilities and reading problems; selective attention and its relationship to learning disabilities; ethical, professional and organization issues in psychology.

Silverman, Wendy, Assistant Professor. Ph.D., 1980, Case Western Reserve University: Development of affection in children; empathy in children; the use of modeling; the behavioral treatment of children's medical and dental fears; behavioral treatment of pediatric problems.

Silverstein, Brett, Assistant Professor. Ph.D., 1976, Columbia University: The interaction between economic, social, cognitive and physiological factors affecting eating in the U.S.; the development of critical thinking and political attitudes in American students.

Springer, Sally, Associate Professor. Ph.D., 1971, Stanford University: Cognitive psychology and neuropsychology, particularly brain mechanisms underlying cognitive functions such as speech and language, and hemispheric asymmetry of function in both neurologically normal and brain-damaged populations.

Squires, Nancy, Assistant Professor. Ph.D., 1972, University of California, San Diego: Evoked potential measures of sensory and cognitive functions of the human brain, both in normal and clinical populations (particulary the mentally retarded).

Stamm, John, Professor. Ph.D., 1950, University of Southern California: Developmental neuropsychology; electrophysiology of cortical dysfunctions in learning-disabled children.

Sternglanz, Sarah, Adjunct Assistant Professor. Ph.D., 1972, Stanford University: Human ethology; sex roles; social learning theory; female academic and career success.

Stone, Arthur, Adjunct Assistant Professor. Ph.D., 1978, State University of New York at Stony Brook: Psychological stress and somatic illness.

Tursky, Bernard, Affiliate Professor.[7] Diploma, 1954, Lowell Institute, Massachusetts Institute of Technology: Psychophysiology; behavioral medicine; biofeedback; pain perception; laboratory instrumentation and methodology; the application of psychological methodology to the study of political attitudes and behavior.

Valins, Stuart, Professor. Ph.D., 1964, Columbia University: Social ecology with an emphasis on group and individual processes.

Waters, Everett, Associate Professor. Ph.D., 1977, University of Minnesota: Human infancy as well as personality and social development; longitudinal studies of social competence, psychometric methods and ethological perspectives on human development.

Waters, Harriet Salatas, Assistant Professor. Ph.D., 1976, University of Minnesota: Cognitive development, particularly memory development, encoding and retrieval processes, production of prose and metaphors, and social cognition.

Weintraub, Sheldon, Adjunct Associate Professor. Ph.D., 1968, University of Minnesota: Identification of childhood precursor patterns predictive of later psychopathology; the role of family factors in the development of psychopathology in children.

Whitehurst, Grover, Associate Professor. Ph.D., 1970, University of Illinois: Observational and operant learning processes in the acquisition of language and other complex skills; the analysis of communication skills in childhood.

Wyers, Everett, Professor. Ph.D., 1955, University of California, Berkeley: Comparative psychology; the evolution of behavior and animal learning.

[1]*Interdisciplinary Social Sciences Program*

[2]*Neurobiology and Behavior Program*

[3]*Africana Studies Program*

[4]*Department of Sociology*

[5]*Department of Psychiatry*

[6]*Department of Psychiatry*

[7]*Department of Political Science*

Courses

PSY 500 Quantitative Background
For students with inadequate mathematical background and /or aptitude who will take PSY 501 and 502. Includes review and practice on topics in algebra, logic sets and relations, functions and elementary probability, as well as individually assigned remedial work on more elementary topics as required.
Prerequisite: Undergraduate statistics
Fall, 3 credits

PSY 501 Foundations of Scientific Psychology
The application of the scientific method in psychology and the statistical analysis of data. Required of all Ph.D. students in psychology.
Prerequisite: Undergraduate statistics
Fall, 3 credits

PSY 502 Quantitative Methods
The application of linear equations to the testing of causal models and the description of complex relationships among observations. Special attention is devoted to equation models for longitudinal data, variables with measurement error, and computer programs for multiple regression.
Prerequisite: PSY 501
Spring, 3 credits

PSY 503 Experimental Design
Examination of properties of common experimental designs in psychology, together with the study of appropriate statistical analyses. Topics include factorial, hierarchical, Latin square and incomplete designs. Statistical procedures include analysis of variance, linear contrasts, analysis of covariance and selected post-hoc procedures. This is an advanced course in design and statistics.
Prerequisite: PSY 502
Fall, 3 credits

PSY 504 First-Year Lectures
Presentation and discussion of current research progress and interests.
Fall and spring, 0 credit each semester

PSY 505 Structural Equation Modelling
Extension of the approach to model testing that is developed in PSY 502; the application of stochastic linear equation models to a wide variety of research situations. Special attention is given in this seminar to models of measurement error, quasi-experimental and longitudinal designs, and estimation of structural models that incorporate measurement hypotheses.
Prerequisite: PSY 502
Fall, 3 credits

PSY 507 Distribution-Free Statistics
Statistical inference when the exact form of population distributions is not specified, or when interval scale measures are not available. These techniques will be compared with "classical" methods.
Fall and spring, alternate years, 3 credits

PSY 510 History of Psychology
Intensive reading in the history of psychology from original sources. Emphasis will be on class discussion and relation to modern problems.
Spring, 3 credits

PSY 511 Classical Theories and Animal Learning
A consideration of the basic principles of learning. Analysis of the leading theories of learning as well as areas of controversy and dispute.
Fall, 3 credits

PSY 512 Cognition and Memory
An introduction to research and theory related to human learning and information processing. A reveiw of major historical contributions as well as critical review of contemporary developments.
Spring, 3 credits

PSY 514 Sensation and 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.
Fall, 3 credits

PSY 515, 516 Research Practicum in Experimental Psychology
A review of the basic literature of experimental psychology. Emphasis will be placed on a research project which each student will formulate and complete within the year.
Fall and spring, 3 credits each semester

PSY 522 Children's Learning
The literature relating to learning processes in children will be covered. Respondent, operant and observational learning will be major topics. The experimental analysis of behavior will be stressed.
Fall or spring, alternate years, 3 credits

PSY 524 Cognitive Development
The information in this course will integrate and expand some of the research and new methods available in the study of complex human processes such as language, memory and growth of logical thinking.
Fall or spring, alternate years, 3 credits

PSY 525 Processes of Socialization
An examination of psychological factors in the socialization of children. Emphasis is placed both on various forms of learning (classical and instrumental conditioning as well as observational learning), and also on biological and maturational factors that may influence social development.
Fall or spring, alternate years, 3 credits

PSY 533 Principles of Therapeutic Intervention
A critical review of various therapeutic intervention procedures, and an examination of their theoretical bases and empirical support. Special focus will be placed on those procedures having relevance for clinical behavior therapy.
Clinical students only
Corequisite: PSY 601
Fall, 3 credits

PSY 534 Behavior Assessment: Theory, Research and Practicum
Techniques of psychological measurement and assessment as they relate both to theoretical formulations and to specific clinical problems.
Clinical students only
Corequisite: PSY 601
Spring, 3 credits

PSY 537 Methods of Intervention: Child and Adolescent
Strategies, methods and techniques used in broadly construed behavioral approach to working with children and adolescents in clinic, home, school, institutional and community settings.
Clinical students only
Corequisite: PSY 602
Spring, 3 credits

PSY 538 Methods of Intervention: Adult
Strategies, methods and techniques used in a broadly construed behavioral approach to working with adults in clinic, family, work, institutional and community settings.
Clinical students only
Corequisite: PSY 602
Fall, 3 credits

PSY 540, 541 Proseminar in Developmental Psychology
Survey of the facts and theories of human and animal development.
Fall and spring, 3 credits each semester

PSY 542 Proseminar in Developmental Methodology
Survey of techniques and procedures employed in the study of development.
Prerequisite: PSY 541
Fall, 3 credits

PSY 543 Biobehavioral Development
This course will cover areas relevant to growth and physiology as they relate structurally to psychological functioning during development. Among the topics considered will be behavioral genetics, developmental sensory physiology, psychological aspects of infancy, early neurological characteristics and infant assessments of normal and abonormal functioning.
Fall or spring, alternate years, 3 credits

PSY 545 Behavior Deviation
Theory and research on abnormal behavior such as neuroses, schizophrenia, addiction, sexual dysfunction and childhood problems. Coverage of models of deviance, assessment, diagnosis and treatment approaches. Broad approach to topic with stress on behavioral theories and presentation of biological and psychodynamic points of view. A departmental core course.
Fall, 3 credits

PSY 546 Measurement and Scaling
A historical introduction to the measurement of psychological variables and a survey of contemporary scaling methods with an emphasis on psychophysical scaling and experimental applications.
Fall or spring, alternate years, 3 credits

PSY 550, 551 Topics in Social Psychology
Content varies from year to year as function of staff and student interests. Recent topics include environmental psychology, group dynamics, history of social psychology, society and health, aggression, politics of social psychology, research methods, attitude change and social inequality.
Fall and spring, variable and repetitive credit each semester

PSY 553 Social/Community Practicum
Provides supervised experiences in a variety of community settings, including mental health centers, social action and self-help organizations and alternative institutions.
Prerequisite: Permission of instructor
Fall and/or spring, variable and repetitive

PSY 555 Contemporary Issues in Social and Community Psychology
A critical survey of salient aspects of current social and community psychology, including historical background and political-economic factors affecting these fields.
Fall or spring, 3 credits

PSY 560 Neuropsychology
The functions of the normal and pathological primate brain in behavior. Consideration of anatomical, electrophysiological (EEG) and pharmacological correlates of behavioral functions as perception, attention, motivation, learning, memory, cognition and language. The behavioral consequences of various forms of brain pathology will be discussed.
Spring, 3 credits

PSY 561, 562 Physiological Methods
Basic bioelectric principles and techniques, stereotaxic techniques, lesioning methods, pharmacological methods, and histological techniques will be presented and practiced. Basic methods for bioelectric stimulation and recording will be emphasized. This course will be taught in conjunction with PSY 563, 564.
Fall and spring, 3 credits each semester

PSY 563, 564 Physiological Methods Lab
Experience in practical application of techniques for manipulating the physiological substrate in relation to behavior in an experimental setting. Emphasis will be placed on individual projects, library research and seminar reports.
Fall and spring, 3 credits each semester

PSY 583, 584 Experimental Psychology Colloquium
Seminars on current research problems directed by students, staff and invited scientists.
Fall and spring, 0-3 credits each semester, repetitive

PSY 590 Theories of Child Development
This course is oriented toward analyzing three classes of developmental theory (analytic, cognitive and behavioral approaches) and relating the basic structure of each class of theory to current notions of philosophy and science.
Spring, 3 credits

PSY 599 Instructional Methods for Child Development
The purposes of this course are (1) to introduce the student to literature on college teaching, (2) to aid the student in formulating instructional objectives, (3) to consider instructional methodologies and (4) to provide the student with systematic feedback on his or her teaching performance.
Fall and spring, 3 credits each semester

PSY 600 Teaching Methods and Practicum
Ordinarily a working seminar for students teaching or assisting in some particular course(s), particularly PSY 101, 102, 211 or 303, with emphasis on delineation of course objectives, the preparation and presentation of special materials or topics, and the evaluation of teaching methods.
Prerequisites: Appointment as teaching assistant or graduate instructor and permission of instructor
Fall and spring, 1-3 credits, repetitive

PSY 601 First-Year Clinical Practicum
Exposure to the application of clinical methods.
Corequisites: PSY 533, PSY 534
Fall and spring, 1 credit each semester

PSY 602 Second-Year Clinical Practicum
Supervised experience in the application of clinical methods.
Corequisite: PSY 537, PSY 538
Fall and spring, 1 credit each semester

PSY 603 Advanced Clinical Practicum
Supervised experience in clinical practice for advanced students in the clinical program.
Fall and spring, variable and repetitive credit

PSY 604 Clinical Psychology Internship
Qualified students in the clinical program carry supervised clinical responsibilities in settings approved by the faculty.
Fall and spring, variable and repetitive credit

PSY 605 Orientation to Clinical Psychology
Ethics, professional issues and ongoing faculty research. Required of all first-year clinical students.
Fall and spring, 0 credit each semester

PSY 608 Clinical Neuropsychology Internship
Qualified students specializing in neuropsychology carry out supervised responsibilities in an approved clinical neuropsychology facility.
Fall and spring, variable and repetitive credit

PSY 610, 620 Seminars in Selected Topics
Topics will be selected on the basis of the needs of the graduate program and research interests of the staff.
Prerequisite: Permission of instructor
Fall and spring, 1-3 credits, repetitive

PSY 621 Seminar In Teaching Methods
Theory and pragmatics of good college teaching. Topics include lecturing, uses of discussion, types of evaluation of students and teachers, factors affecting undergraduate learning, ethics, student-faculty relations, course administration and audio-visual devices.
Prerequisite: Matriculated psychology graduate student
Fall or spring, 3 credits, repetitive

PSY 630 Strategies of Intervention with Children
Introduces the student to the literature on the approaches to a variety of institutional concerns with children's education and rearing. Coverage will include those systematic programs designed to foster social skills, cognitive skills, and motor and perceptual development. Course designed especially for developmental psychology students who wish to pursue training in applied settings.
Prerequisite: Permission of instructor
Fall or spring, 3 credits

PSY 631 Evaluation of Intervention Strategies
A rigorous, methodologically oriented course which will familiarize the student with the research designs, tests and behavioral assessment techniques, and practice in test construction required to evaluate developmental intervention at the progams or systems level.
Prerequisite: PSY 630 or permission of instructor
Spring, 3 credits

PSY 571, 572 Comparative Behavior
Comparative methods for the observation and measurement of animal behavior. Both naturalistic and laboratory methods will be discussed. This course will be taught in conjunction with PSY 573, 574.
Fall and spring, 3 credits each semester

PSY 573, 574 Comparative Behavior Lab
The use of detection response techniques, conditioning techniques, and habituation methods in the study of adaptive behavior will be practiced using a wide variety of vertebrate and invertebrate species.
Fall and spring, 3 credits each semester

PSY 575 Psychobiology of Primates
An advanced general course in the behavior of Old World monkeys and apes. Emphasis will be placed on social organization, communication, development and learning, especially under naturalistic conditions; but beyond this, topics are selected to reflect the most important current advances in the area.
Prerequisite: Permission of instructor
Fall or spring, 3 credits

PSY 581, 582 Comparative Physiological Colloquium
Colloquium presentations on current research problems by advanced students, staff and visiting scientists. Lecture and seminar each week.
Fall and spring, 3 credits each semester

PSY 638 Psychophysiological Methods
Covers organization of the human nervous system and its interaction with physiological response systems. Studies methods of recording and analyzing phychophysiological response measures. Examines the application of psychophysiological response measure and patterns to the study of individual attitudes and behavior. Crosslisted with POL 638.
Spring, 3 credits

PSY 696 Readings
Prerequisite: Permission of instructor
Variable and repetitive credit

PSY 698 Research
Prerequisite: Permission of instructor
Variable and repetitive credit

PSY 699 Doctoral Research
Prerequisite: Advancement to candidacy
Variable and repetitive credit

Department of Sociology

Facilities

The Sociology Department has a Microsociology Laboratory for research and education in such areas as child development, group processes, social interaction and communications.

M.S. Degree in Sociology with Graduate Studies in Applied Sociology

This course of study is designed to provide basic understanding of the theoretical perspectives and research methods of the discipline. Emphasis is given to the research tools of sociology, including use of available data such as the census, design and analysis of surveys, evaluation research and observation techniques. The curriculum is adaptable to students' ongoing experiences and career goals, including teaching of sociology or other relevant subjects in the high school or community college, and the planning, implementation and evaluation of various types of social programs in business, public agencies or voluntary organizations. The degree requirements of 30 graduate credits may be completed in one year (including summer session) of full-time study, or extended over a longer period of part-time study. Courses are scheduled late in the day or in the evening to avoid conflicts with employment.

Requirements for admission to Graduate Studies in Applied Sociology will normally include:

A. A baccalaureate degree.
B. Six hours of undergraduate sociology.
C. A B (3.0) average or above (desirable).
D. Graduate Record Examinations.
E. Personal interview.
F. Acceptance by both the Department of Sociology and the Graduate School.

A program of full-time study will normally include the following:

Fall semester: SOC 514, SOC 546 and SOC 580.

Spring semester: SOC 581 and two graduate courses in sociology selected by the student in consultation with the Director of Graduate Studies.

Summer session: SOC 598; a six-credit seminar on sociological analysis, involving participation in either a collective research project on a topic chosen during the spring and/or an individual research project adapted to the individual's particular interest.

Variations in the curriculum may be arranged with the permission of the Director of Graduate Studies.

Admission to the Doctoral Program in Sociology

Requirements for admission will normally include:

A. A baccalaureate degree or its equivalent, as attested to by transcripts of previous academic work.
B. Satisfactory results on Graduate Record Examinations.
C. Satisfactory recommendations from former instructors.
D. Acceptance by both the Department of Sociology and the Graduate School.

Applicants with a master's degree or other advanced work from other institutions must submit all the material cited above and their master's thesis or its equivalent. Credit is not ordinarily given toward the Ph.D. for graduate work done elsewhere. (Exceptions are occasionally made upon petition for students who enter the program with demonstrably high levels of expertise in subjects required for the Ph.D.) Certain requirements may be waived if proof of comparable work at other institutions is submitted.

Requirements for the Ph.D. Degree

A. Residence: Minimum residence is generally one year of full-time study. Students may be admitted to the Ph.D. program on a part-time basis, but these arrangements usually require that the students appear on campus during certain periods of the normal working day. Full-time study entails 12 or more graduate credit hours per semester. Since a graduate traineeship is considered part of the academic program, credit hours will be given for supervised teaching. Credit hours may also be given for individual research work outside formal courses but under the supervision of a faculty member.

B. Courses: All full-time students are required to take at least eight courses during their first year. These must include two two-course sequences, one in sociological theory (SOC 505 and 506) and one in statistics and research methods (SOC 501 and 502). Ordinarily, two of the eight courses (one each semester) will consist of independent readings or, for those holding graduate traineeships, teaching experience under the supervision of a faculty member.

C. M.A. requirement: This requirement is designed to demonstrate that a student has basic knowledge and professional competency in the field of sociology. The student must complete one of the following two options for the M.A. degree:

Option 1 — The Three Papers: In this option, a student can meet M.A. requirements and proceed to the second half of doctoral work through the submission of three papers written under faculty supervision. These should normally be completed before the beginning of the third academic year; each of the three papers is designed to allow the student to demonstrate a different competence. Each paper should be more substantial than a

seminar paper and less substantial than an M.A. thesis; two substantive areas must be represented in the three papers. The areas to be covered by the papers will be the following:

1. Theory paper: An attempt to say something original, focused on theoretical questions, *i.e.,* how they should be addressed or refined. Evaluating alternative theoretical positions in light of available evidence or data is an acceptable possibility in such a paper.

2. Empirical paper: Should include some justification for why this particular manipulation of data is necessary or desirable. Of the three papers, this is the one that is intended to look most like a research report. A wide variety of methods is permitted.

3. Analytic review of the state of the art in some substantive area in sociology. This paper can take various forms, for example:

a) A review essay (see *Journal of Economic Literature* or *Psychological Review).*

b) An essay which outlines a field for use in teaching a graduate seminar.

Upon successful completion of all of the above requirements, along with completion of 30 hours of graduate credit, the Department will recommend to the Vice Provost for Research and Graduate Studies that the student be awarded the M.A. degree as a sign of progress toward the Ph.D.

Option 2—Comprehensive Examination and M.A. Research Report: In this option, the adequacy of a student's general preparation is evaluated by means of a written comprehensive examination. This examination, to be taken between the beginning of the fifth and the beginning of the sixth semester of graduate study, must be passed at the standard set by the Department for Ph.D.-level work. A student who fails to pass this examination at the required level, but whose performance is satisfactory in all other respects, may, under special circumstances, be permitted to take a terminal M.A. by completing 30 credits of graduate coursework and submitting an acceptable research report. Upon passing the comprehensive examination the student must submit a research report that demonstrates ability to analyze empirical data and to present findings clearly and systematically. Upon successful completion of all of the above requirements, along with completion of a minimum of 30 hours of graduate credit, the Department will recommend to the Vice Provost for Research and Graduate Studies that the student be awarded the M.A. degree as a sign of progress toward the Ph.D. Recipients of the terminal M.A. will not be granted permission to continue.

D. Teaching requirement: Graduate training includes supervised teaching experience. After completing C, above, students are required to enroll in the teaching practicum to prepare to teach their own course, under supervision, the following semester. Ordinarily, this requirement should be fulfilled during the third year of graduate study.

E. Requirements outside of the Department: The student must choose one of three possible options: (1) to demonstrate proficiency in a modern foreign language by passing a suitable examination, *or* (2) to demonstrate proficiency in mathematics by passing a suitable examination, *or* (3) to pass with at least a B average a program of three graduate courses in other departments determined in consultation with the student's advisor and approved by the Director of Graduate Studies.

F. Preliminary examination: This takes the form of an oral examination in the student's specialty to be given only after all the above requirements have been met. It is designed to appraise the student's depth of knowledge in the broad area from within which he or she has selected a dissertation topic and will include a consideration of the dissertation proposal. The content of this area is to be defined individually for each student. It consists of a generally recognized, broad subfield and must deal with related materials from other subfields.

G. Advancement to candidacy: The Department's recommendation that a student be advanced to candidacy for the Ph.D. is based on passing the preliminary examination.

H. Doctoral dissertation: It must be an independent piece of research and scholarship representing an original contribution, the results of which are worthy of publication. Upon oral defense and acceptance of the dissertation, the Department will recommend to the Vice Provost for Research and Graduate Studies that the student be awarded the Ph.D. degree.

The progress of every student will be evaluted by the Department at the end of the first full year of graduate study. Those whose performance and ability are clearly below the standard for Ph.D. established by the Department will be asked to withdraw before they have made a costly investment of time. If more than seven years have elapsed since the student completed 24 hours of graduate courses and the acceptance of his or her Ph.D. dissertation, the student's Ph.D. candidacy may lapse, and he or she can be required to take another set of examinations.

After the first year, a progressively larger proportion of a student's time will be spent as a participant in research activities, under the supervision of faculty members. Ordinarily, a student with adequate preparation and involved in full-time study should be able to earn a Ph.D. within four years from the time he or she begins graduate work.

Students who arrived with an M.A. degree in sociology or with three semesters of work in the discipline will be expected to complete some of the requirements above more quickly than indicated.

Faculty

Arjomand, Said Amir, Assistant Professor. Ph.D., 1978, University of Chicago: Comparative sociology; historical and political sociology; theory; religion.

Barthel, Diane, Assistant Professor. Ph.D. 1977, Harvard University: Urban and community sociology; race and ethnicity; sex roles.

Chase, Ivan D., Assistant Professor. Ph.D., 1972, Harvard University: Comparative social stratification; social inequalities; comparative stratification in human and animal groups; social structure.

Cole, Stephen, Professor. Ph.D., 1967, Columbia University: Science; professions; methodology.

Collver, O. Andrew, Associate Professor. Ph.D., 1964, University of California, Berkeley: Complex organizations; demography; ecology.

Coser, Lewis A., Distinguished Professor. Ph.D., 1954, Columbia University: Theory; conflict and violence; intellectual life; knowledge; political sociology; social control.

Coser, Rose L., Professor.[1] Ph.D., 1957, Columbia University: Medical sociology; family; organizations; socialization.

Feld, Scott, Assistant Professor. Ph.D., 1975, The Johns Hopkins University: Methodology; political sociology; research methods.

Feldman, Kenneth A., Professor. Ph.D., 1965, University of Michigan: Social psychology; higher education.

Gagnon, John H., Professor.[2] Ph. D., 1969, University of Chicago: Deviant behavior; socialization; social change; sexual behavior.

Goode, Erich, Professor. Ph.D., 1966, Columbia University: Deviance; religion; criminology.

Goodman, Norman, Professor and Chairperson. Ph.D., 1963, New York University: Social psychology; family; socialization.

Granovetter, Mark, Associate Professor.[3] Ph.D., 1970, Harvard University: Theory, political and economic sociology; stratification and formal models.

Hallowell, Lyle, Assistant Professor. Ph.D., 1980, University of Minnesota: Criminology; deviance; law; social problems.

Hare, Bruce, Assistant Professor. Ph.D., 1975, University of Chicago: Education; social psychology; life cycles.

Henry, Paget, Assistant Professor. Ph.D., 1976, Cornell University: Theory; class; political and social change.

Lang, Gladys E., Professor. Ph.D., 1954, University of Chicago: Mass communications; social movements; collective behavior.

Lang, Kurt, Professor. Ph.D., 1953, University of Chicago: Collective behavior; the military; mass communications.

Perrow, Charles, Professor.[3] Ph. D., 1960, University of California, Berkeley: Complex organizations; social change; political sociology.

Polsky, Ned, Associate Professor.[3] B.A., 1948, University of Wisconsin: Criminology and deviance; arts.

Roos, Patricia, Assistant Professor. Ph.D., 1980, University of California, Los Angeles: Social stratification; demography; labor force; women's roles.

Rule, James B., Professor. Ph.D., 1969, Harvard University: Theory; political sociology; social control.

Schwartz, Michael, Associate Professor. Ph.D., 1971, Harvard University: Mathematical models; historical and political sociology.

Selvin, Hanan, Professor. Ph.D., 1956, Columbia University: Methodology; higher education; statistics; the family.

Tanur, Judith, Associate Professor. Ph.D., 1972, State University of New York at Stony Brook: Statistics; methodology; social psychology.

Tyree, Andrea, Associate Professor. Ph.D., 1968, University of Chicago: Demography; social stratification; occupations.

Weinstein, Eugene A., Professor. Ph.D., 1954, Northwestern University: Experimental social psychology; family; methodology.

Williams, Richard, Assistant Professor. Ph.D., 1981, State University of New York at Binghamton: Race and ethnic development; media.

Yago, Glenn, Assistant Professor. Ph.D., 1980, University of Wisconsin, Madison: Urban; community; political and economic sociology.

Zeitz, Gerald, Assistant Professor. Ph.D., 1976, University of Wisconsin, Madison: Organizations; theory; political sociology.

[1]*Joint appointment, Department of Community and Preventive Medicine*

[2]*Joint appointment, Department of Psychology*

[3]*On leave, academic year 1982-83*

Courses

SOC 501, 502 Research Design and Statistics
A review of the main statistical techniques used in sociological research. Discussion of and practical experience in the design of sociological research.
3 credits each semester

SOC 503 Multivariate Analysis of Social Data
The general linear model and multivariate analysis, including dummy variable analysis, multiple covariance, multivariate analysis of variance, and factor analysis.
Prerequisite: SOC 502 or permission of instructor
3 credits

SOC 505, 506 Sociological Theory
A review of the intellectual development of the discipline, its epistemological foundations, current major theoretical orientations, and newly developing perspectives.
3 credits each semester

SOC 508 Experimental Methods
The design, conduct, analysis of laboratory and field experiments.
3 credits

SOC 509 Field Work
Practicum in field interviews and observations; problems of rapport, reliability and validity.
3 credits

SOC 511 Population Analysis
A survey of demographic theory and research. Determinants and consequences of population size, growth rates, composition and spatial distribution, family formation, fertility, mortality, and migration.
Prerequisite: One course in statistics
3 credits

SOC 513 The Metropolitan Community
Determinants and consequences of the growth of urban settlements. Their demographic composition and spatial structure. Problems in metropolitan community organization.
3 credits

SOC 514 Sociological Methods
An introduction to the logic of research and data analysis. Emphasis on concepts of association, elementary causal analysis, sampling, and problems of measurement. Applications to the interpretation of data encountered in the school curriculum and the mass media.
4 credits

SOC 521 Social Interactions
The study of interaction in formal and informal settings. The reciprocal influence among group structure, norms, and interactive processes. A prior course in social psychology is assumed.
3 credits

SOC 522 Socialization and the Self
Socialization as a continuous process throughout the life-cycle. Social and cultural sources of identity. Self-other systems as a form of social control. A prior course in social psychology is assumed.
3 credits

SOC 523 Sociology of Education
Relationship between education and other institutions. Internal dynamics of the school and the classroom.
3 credits

SOC 531 Stratification
Causes and consequences of the unequal distribution of wealth, power, prestige and other social values in different societies. Changes in the stratification system as a result of industrialization and revolution.
3 credits

SOC 532 Complex Organizations
Division of labor, communication and decision making in large and formally administered organizations, such as industrial concerns, governmental agencies, political parties, trade unions, schools, hospitals and prisons.
3 credits

SOC 541 Conflict and Violence
Conflict and violence as related to social change. Examination of community controversies, social movements, uprisings and war.
3 credits

SOC 542 Deviance
Survey of recent research literature on various kinds of deviance (crime, delinquency and morally stigmatized behavior). Controversial issues in theory and research methods.
3 credits

SOC 545 Social Movements and Collective Behavior
Unorganized collectives and their role in change. Studies of specific social movements and other collective behavior episodes.
3 credits

SOC 546 Sociological Perspectives on American Society
Analysis of American social structure. Political and economic institutions and their bearing on social problems. Students attend the lectures of CES 581 and a supplementary seminar.
4 credits

SOC 549 Social Change
The image of technological, generational and cultural forces on social organization from a historical and comparative perspective.
3 credits

SOC 556 Political Sociology
The study of political institutions and of the politically relevant actions and attitudes of individuals and groups. Particular stress will be placed on the reciprocal relationships between social movements and political institutions.
3 credits

SOC 561 Sociology of Intellectual Life
A comparative and historical analysis of the social conditions leading to the development of intellectual professionals.
3 credits

SOC 562 Sociology of the Arts
The relations between social structure, social change and the development of major art forms.
3 credits

SOC 563 Sociology of Science
The relations between science and society; social influences on the choice of problems and methods; the social organization of scientific research.
3 credits

SOC 564 Communications
The social organization of the communications industry; the effects of mass communication.
3 credits

SOC 571 Sociology of Health and Medicine
Social factors in health and illness; the socialization of health practitioners; the social organization of hospitals, clinics and other facilities.
3 credits

SOC 580/581 Practicum in Applied Sociology
Sociological inquiry into aspects of American life and social problems, with emphasis on evaluation studies and policy planning in education, race relations, mass communications, deviance, environment and community issues. During the spring semester students design a teaching unit or a research project on a topic of their own choice.
4 credits

SOC 590 Independent Study
Intensive reading, under supervision of one or more instructors of material not covered in the formal curriculum.
Variable and repetitive credit

SOC 591, 595 Special Seminars
Topics to be arranged. The seminar will be built around actual research activities of students and faculty.
3 credits each semester

SOC 598 Research
Execution of a research project under the supervision of one or more faculty members.
Variable and repetitive credit

SOC 603 Advanced Topics in Quantitative Analysis
Mathematical and statistical methods in the analysis of quantitative data.
Prerequisites: SOC 501 and 502
3 credits

SOC 604 Advanced Topics in Qualitative Analysis
The use of personal documents, official records, field observations and interviews.
3 credits

SOC 606 Sociological Theory Construction
Modes of conceptualization and theory construction. Problems in developing a theory.
Prerequisites: SOC 361 and 362 or permission of instructor
3 credits

SOC 691 Practicum in the Teaching of Sociology
Lectures, discussions and case studies of effective teaching. Designed especially for graduate teaching assistants.
3 credits

SOC 698 Dissertation Research
Variable and repetitive credit

Interdisciplinary Graduate Studies in Social and Behavioral Sciences

These graduate studies, intended for students whose interests span more than one discipline, are jointly sponsored by the anthropology, history, political science, psychology and sociology programs, and lead to a Master of Arts degree awarded through the program in which the student concentrates. Students with narrower interests might apply to enter more specialized curricula such as anthropology, applied anthropology, economic policy analysis, history, history teaching, public affairs and applied sociology, offered by the various departments at the M.A. level.

Interdisciplinary graduate studies may prove useful for individuals who are considering reentering the labor market or continuing their education after an interruption of several years, as well as for recent graduates dissatisfied with the breadth or depth of their undergraduate training. Applicants should recognize that an M.A. in a social or behavioral science does not ordinarily qualify a graduate for any particular position. Students seeking professional or career training should therefore apply to a Ph.D. or more specialized M.A. program. However, the M.A. may strengthen a student's subsequent application to a Ph.D. program, or enhance an individual's credentials for a position.

Admission to Graduate Studies

For admission to Interdisciplinary Graduate Studies in Social and Behavorial Sciences, the following are required:

A. A baccalaureate degree.

B. Two official copies of all previous college transcripts, with certified English translations of any transcripts in a foreign language.

C. Letters of recommendation from three instructors or academic advisors.

D. Results from the Graduate Record Aptitude Examination.

E. Foreign nationals must provide TOEFL scores (unless their native language is English or they attended college where English was the language of instruction) and subsequently the International Student Financial Affidavit.

F. Acceptance by the Interdisciplinary Graduate Studies and Graduate School.

Students who do not meet these requirements may also apply if they feel that special circumstances should be considered.

Degree Requirements

A. Course requirements: The degree requires 30 graduate credit hours in an approved program of study, with at least a 3.00 average in all courses counted toward the degree. The student must choose a department of concentration in which to take a minimum of 12 and a maximum of 18 credits. In addition, an approved three-credit course in quantitative or research methods, such as PSY 501 or SOC 514, is required; this methods course is not counted within the 12-18 hours concentration. In addition to courses from the Division of Social and Behavioral Sciences, students may receive permission to count graduate courses from applied mathematics, biological sciences, computer science, industrial management, philosophy, technology and society, urban and policy sciences, or other fields toward degree requirements. Registration for courses may require permission of the instructor or the department's graduate office.

B. Limitations on credit hours counted toward degree:

1. No more than 6 credit hours of C grades.

2. No more than a total of 6 credit hours from individual readings, individual research, teaching practica and/or colloquium courses (except reading colloquia in history).

3. No more than 6 credit hours from Continuing Education courses or courses crosslisted with CED, whether these courses are within or outside the department of concentration.

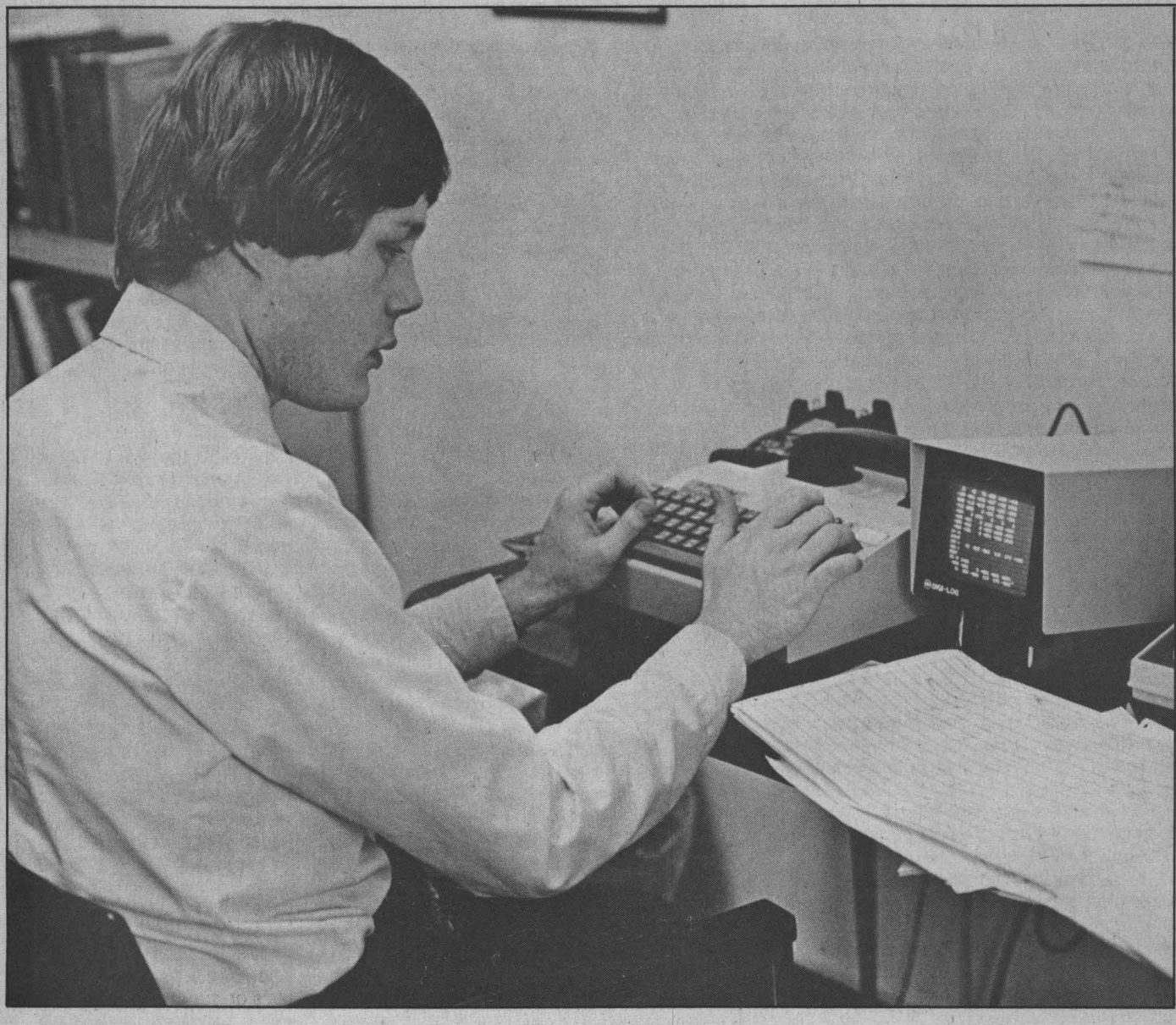
4. No more than 6 approved graduate credits from another institution, nor more than 12 credits earned prior to admission.

5. Students who accumulate 12 credit hours of C, F or U grades will ordinarily be dismissed.

C. Residence: Students may register for full- or part-time study, and there is no residence requirement. However, students must register during each semester and complete degree requirements within three years.

D. Other requirements: A master's thesis may be submitted upon making necessary arrangements with a faculty sponsor, a second reader, and the department of concentration, but it is not required. The department of concentration may require a comprehensive examination. No practicum in teaching is required.

The Urban and Policy Sciences



StonyBrook

Directories

STATE UNIVERSITY OF NEW YORK

General Statement

State University's 64 geographically dispersed campuses bring educational opportunity within commuting distance of virtually all New York citizens and comprise the nation's largest, centrally managed system of public higher education.

When founded in 1948, the University consolidated 29 State-operated, but unaffiliated, institutions. In response to need, the University has grown to a point where its impact is felt educationally, culturally and economically the length and breadth of the State.

More than 380,000 students are pursuing traditional study in classrooms or are working at home, at their own pace, through such innovative institutions as Empire State College, whose students follow individualized and often nontraditional paths to a degree. Of the total enrollment, more than 100,000 students are 24 years or older, reflecting State University's services to specific constituencies, such as refresher courses for the professional community, continuing educational opportunities for returning military personnel, and personal enrichment for more mature persons.

State University's research contributions are helping to solve some of modern society's most urgent problems. It was a State University scientist who first warned the world of potentially harmful mercury deposits in canned fish, and another who made the connection between automobile and industrial smoke combining to cause changes in weather patterns. Other University researchers continue important studies in such wide-ranging areas as immunology, marine biology, sickle-cell anemia and organ transplantation.

More than 1,000 public service activities are currently being pursued on State University campuses. Examples of these efforts include special training courses for local government personnel, State Civil Service personnel and the unemployed, participation by campus personnel in joint community planning or project work, and campus-community arrangements for community use of campus facilities.

A distinguished faculty includes nationally and internationally recognized figures in all the major disciplines. Their efforts are recognized each year in the form of such prestigious awards as Fulbright-Hayes, Guggenheim and Danforth Fellowships.

The University offers a wide diversity of what are considered to be the more conventional career fields, such as engineering, medicine, literature, dairy farming, medical technology, accounting, social work, forestry and automotive technology. Additionally, its responsiveness to progress in all areas of learning and to tomorrow's developing societal needs has resulted in concentrations which include pollution, urban studies, computer science, immunology, preservation of national resources and microbiology.

SUNY programs for the educationally and economically disadvantaged have become models for delivering better learning opportunities to a once-forgotten segment of society. Educational Opportunity Centers offer high school equivalency and college preparatory courses to provide young people and adults with the opportunity to begin college or to learn marketable skills. In addition, campus-based Educational Opportunity Programs provide counseling, developmental education and financial aid to disadvantaged students in traditional degree programs.

Overall, at its EOC's, two-year colleges, four-year campuses and university and medical centers, the University offers 3600 academic programs. Degree opportunities range from two-year associate programs to doctoral studies offered at 12 senior campuses.

The 30 two-year community colleges operating under the program of State University play a unique role in the expansion of educational opportunity, by:

- Providing local industry with trained technicians in a wide variety of occupational curriculums;
- Providing transfer options to students who wish to go on and earn advanced degrees, and;
- Providing the community with yet another source for technical and professional upgrading as well as personal enrichment.

During its brief history, State University has graduated more than 705,000 alumni, the majority of whom are pursuing their careers in communities across the State.

State University is governed by a Board of Trustees, appointed by the Governor, which directly determines the policies to be followed by the 34 State-supported campuses. Community colleges have their own local boards of trustees whose relationship to the SUNY board is defined by law. The state contributes one-third to 40 per cent of their operating cost and one-half of their capital costs.

The State University motto is: "To Learn—To Search—To Serve."

Directories, Maps, Index

StonyBrook

cooperatively in small groups, all of which are important skills for the policy analyst.
Fall and spring, 3 credits each semester

UPS 543/544 Modelling Techniques in the Public Sector
The course develops the mathematical and computational tools useful in the analysis of public-sector problems and applies them to areas ranging from the design of local service delivery to the modelling of national policy issues. Topics include linear and integer programming, networks and queuing. Applications to school busing, facility location, environmental and energy issues.
Spring, 3 credits

SECOND YEAR

UPS 518 Operations Research for the Public Sector
Documented applications of operations research techniques to the public sector. Among specific areas modelled are emergency services, sanitation, environmental protection, crime prevention, the criminal justice, blood banking, energy supply and demand, manpower scheduling and education. Techniques discussed include queuing theory, simulation and Markov processes.
Fall, 3 credits

UPS 520 Econometrics for Policy Making
A course on the use of statistics and mathematics to analyze economic problems in the public sector. The emphasis is on the relevance of a tool to a practical situation and a good appreciation of the main problems that occur when policy makers and econometrics work together.
Spring, 3 credits

UPS 536 Critical Issues in Urban Policy
This course examaines the financial and economic bases of a series of urban problems including transportation, employment, health, housing and fiscal management. Macro- and micro-economic theory will provide the framework for analysis.
Fall, 3 credits

UPS 542 Technology and Public Policy
Designed to provide students interested in entering careers in public service with an opportunity to deal with public policy and operational management issues that involve technology as a primary component.
Spring, 3 credits

UPS 552 Advanced Data Analysis
Advanced statistical techniques for analyzing data in the context of public policy making. Classical approaches to hypothesis testing, estimation, regression and time series analysis are discussed and contrasted with exploratory procedures. Statistical decision analysis is presented and illustrated by examples chosen from the field of public policy. Emphasis throughout is on public sector applications of statistical concepts.
Spring, 3 credits

UPS 555 Techno Policy Seminar
Two topics in public policy are examined in depth, chosen from among energy, transportation, health, criminal justice, child welfare and educational finance. A range of solutions is compared and evaluated.
Fall, 3 credits

UPS 560 Urban and Regional Planning Models
Overview of urban and regional development process; theoretic basis for model construction, including the land use impact of transportation; activity allocation models as a tool for forecasting; a survey of submodels on each economic sector; demographic, residential, industrial and public service; the use of gaming in community planning.
Prerequisite: MSM 102 or permission of instructor
3 credits

UPS 562 Public Policy and the Educational System
This course explores the relationship between public policy and the behavioral principles of the educational system. Several conceptual and mathematical models of the system's dynamics are examined along with the accompanying constraints on educational policy.
Prerequisite: Permission of instructor
3 credits

UPS 581 Management of Organizations in the Public Sector
How can organizations in the public sector be made more effective? Focus of the course is on the concept of appropriateness of fit between managerial strategy and organizational structure. Theory is drawn from Taylorism, the Hawthorne studies, job redesign, management by objectives.
Fall, 3 credits

UPS 585 Program Evaluation
How to design experiments that will provide valid inferences for program effectiveness. Accumulating evidence, combining data from mixed sources, monitoring performance and modifying existing programs, cost/benefit analysis, survey, research and other analytical methods. Examples from criminal justice, municipal services, educational innovation, health care.
Fall, 3 credits

UPS 586 Advanced Program Evaluation
This course is designed to provide practical exposure and experience with the development and analysis of program evaluation studies. The course assumes a basic knowledge of program evaluation methodology (UPS 585), so that lectures on techniques or concepts will be held to a minimum. Emphasis will be placed on case studies and a class project.
Spring, 3 credits

UPS 588 Economics and Public Policy
The influence of macroeconomic theory on public policy is the major focus of this seminar. Issues such as employment and inflation, growth of national product, fiscal and monetary policies and the management of macroeconomic problems will be analyzed.
Spring, 3 credits

UPS 590 Professional Development for Public Policy Analysis
What are the ethical questions facing those who exercise public authority? What criteria are available as guides? What is the calculus of resignation—when do you leave an organization and when do you stay to disagree with policy?
Spring, 1 credit

UPS 591 Special Topics in Urban and Policy Sciences
Designed to accommodate innovative subject matter on an experimental basis and provide the opportunity of offering courses taught by visiting faculty.
Fall and spring, 3 credits each semester, repetitive

UPS 592 Energy Policy
An overview of the major international and domestic energy issues, emphasizing the difficulties of policy formulation, and the interactions with national security and economic development concerns.
Spring, 3 credits

UPS 593 The Legal Process
This course will teach students basic theories and principles of substantive and administrative law. Students will learn the uses of law in the planning, analysis and management of public systems. They will also experience where and how to find the law they will need for professional practice as public-sector policy makers and implementors. It is not a pre-law course as such; it is a professional course.
Fall, 3 credits

UPS 595 Individual Directed Research in Urban and Policy Sciences
Designed to accommodate independent research projects on an individual basis with faculty guidance.
Fall and spring, variable and repetitive credit

UPS 596 Small Group Studies in Urban and Policy Sciences
Designed to accommodate ad hoc small group student research projects on an experimental basis. Projects will be designed by UPS faculty and students. Topics will be announced at the beginning of each semester.
Fall and spring, 1-3 credits each semester

UPS 597 Practicum in Teaching
Instruction in the Department under the supervision of the faculty. May not be included in the courses taken in fulfillment of degree and requirements.
Fall and spring, variable credit

E. Acceptance by both the W. Averell Harriman College for Urban and Policy Sciences and the Graduate School.

Although not required, examples of an applicant's creative work will be considered. These might include previous or professional project reports or published articles.

Applications should be made by March 1, although earlier submissions are encouraged. Applications are reviewed between January and March for the following fall semester. Decisions concerning aid will be made not later than the March 1 deadline for applications.

Application forms may be obtained by writing to:
Education Director
W. Averell Harriman College for Urban and Policy Sciences
State University of New York at Stony Brook
Stony Brook, NY 11794

Requirements for the Master of Science Degree

A. 48 credits, usually taken over four regular semesters. An exception is the special Advanced Credit Curriculum described above. For this curriculum, the degree requirements are: a) a graduate degree from SUNY at Stony Brook in a department or school other than the Harriman College; b) 30 prescribed credits in the Harriman College plus an internship.

B. An overall 3.00 average.

C. An internship, including faculty approval of the intern report.

Faculty

Altman, Stanley M., Associate Professor. Ph.D., 1967, Polytechnic Institute of Brooklyn: Management information systems; developing strategies for improving frameworks for analyzing and implementing public policy.

Carlucci, Carl, Lecturer.* M.S. 1974, State University of New York at Stony Brook: Management information systems.

Carroll, T. Owen, Associate Professor. Ph.D., 1968, Cornell University: Energy systems; educational finance; mental health.

Chan, Yupo, Associate Professor. Ph.D., 1972, Massachusetts Institute of Technology: Transportation; land use analysis; technology assessment; public policy.

Cohen, Ruth, Assistant Professor. M.A., 1968, Brooklyn College; M.S., 1980, State University of New York at Stony Brook: Evaluation and improvement of service delivery.

Cohn, Barbara, Lecturer.* B.A., New York University: Analysis of municipal services.

Kamer, Pearl M., Associate Professor.* Ph.D., 1976, New York University: Regional economic planning.

Meier, Peter, Associate Professor. Ph.D., 1970, University of Massachusetts: Energy policy.

Nathans, Robert, Professor and Director, Institute for Energy Research. Ph.D., 1954, University of Pennsylvania: Energy modeling and policy analysis.

Schepers, Oliver, Lecturer.* M.B.A., 1970, Drury College; M.A. 1972, Sangamon State University: Health reimbursement; mental health systems; public policy formulation and implementation; organizational behavior.

Sexton, Thomas T., Assistant Professor. Ph.D., 1979, State University of New York at Stony Brook: Operations research, specifically, as applied to the analysis of transportation problems.

Silkman, Richard H., Assistant Professor. Ph.D., 1978, Yale University: Public policy toward education and health.

Thorsen, Thomas, Lecturer.* B.A., 1967, C.W. Post College: Improvement of governmental management at local level.

Weiner, Harry, Associate Professor and Dean, W. Averell Harriman College for Urban and Policy Sciences. S.M., 1970, Massachusetts Institute of Technology: Redesign of organizational structures to improve programmatic capabilities.

Weinstein, Joan, Assistant Professor. M.A., University of California at Berkeley: Improving interpersonal relations and reducing inter-group conflict in large bureaucracies.

Young, Dennis R., Professor and Director, Institute for Urban Science Research. Ph.D., 1969, Stanford University: Organization of public services and the evaluation of their performance.

Estimated number of teaching, graduate and research assistants, fall 1982: 30.

**Adjunct faculty*

Courses

FIRST YEAR

The first-year curriculum is required of all students and is designed to provide a commonly shared analytic base upon which the students build a specialization in the second year. However, in instances where the student can demonstrate prior mastery of a particular area in the first-year curriculum, exemption is permitted and an advance course in that area is taken.

Prerequisite for all UPS graduate courses: UPS graduate student or permission of instructor

UPS 515, 516 Data Analysis
The uses and limitations of mathematical techniques, especially in the development of a sophisticated approach to the use of data in advocating alternative policies, computer simulation of models, regression analysis, linear programming, optimization concepts.
Fall and spring, 3 credits each semester

UPS 531 Political and Administrative Decision Making
Theory and practice of public-sector decision making. Group decision models, bargaining and coalition theory, public choice, economic organization of public agencies, regulation exit and voice theory, metropolitan governance and the role of formal planning.
Fall, 3 credits

UPS 533, 534 Economic Theory for Public Analysis I, II
The techniques and approaches of microeconomic reasoning are applied to issues of public policy. The theory of the market and the price system is closely examined for the purpose of identifying those areas where neoclassical economics is helpful to the public-sector analyst and manager. Special attention is paid to cost-benefit analysis and models of economic behavior.
Fall and spring, 3 credits each semester

UPS 541 Workshop in Urban and Policy Sciences
Under faculty supervision, groups of students work for clients in local agencies on public policy issues in a variety of areas such as energy, housing and health. The course is intended to provide students with an opportunity to apply the analytic skills they have learned in the classroom to real problems. Other purposes are to give them practice in writing, speaking and working

The W. Averell Harriman College for Urban and Policy Sciences

The W. Averell Harriman College for Urban and Policy Sciences prepares students for careers in the public sector as managers and analysts. The curriculum differs from the traditional "public administration" approach in that great emphasis is placed on the practical quantitative methods that have been derived over the past few decades from economics, statistics, computer science, engineering and the natural sciences. Graduates are expected to be skillful in exploring data, modeling complex processes, analyzing bureaucratic organizations, evaluating programs—all with a view toward improving the quality of public service.

Graduates generally make their careers in resource-allocating agencies at the federal, state and local level, as well as in consulting firms that serve those agencies. Substantive areas treated in the curriculum, and in which graduates specialize, include education policy, energy management, transportation, health care and social policy.

A Master of Science degree is awarded upon successful completion of the program.

Curriculum

First Year

All students take year-long courses in data analysis, modeling for policy making, and economic analysis, plus one semester-long course in political and administrative decision making and another devoted to a workshop in which the classroom theory is brought to bear on one or more real problems of public policy.

Internship

All students must successfully complete an internship in a public agency. These positions are obtained with the help of the College and generally pay $125-$150 per week. Most internships are done during the summer between the first and second year, although outstanding students in some cases may do semester-long internships through the Federal Graduate Cooperative Program, the New York State Assembly Fellowship and the New York City Urban Fellowship.

The purpose of the internship is to provide practical experience in applying theoretical knowledge to difficult problems in the real world. An extensive intern report is required. The Stony Brook Foundation awards a cash prize for the best report of the year.

Second Year

While first-year courses average 40-50 students, the second-year courses generally have about half that number. The second-year courses offered in the Harriman College are of two general kinds: advanced methodology courses and detailed treatment of a substantive public policy problem. During the year, students may take up to three courses in the graduate departments of other colleges at the University.

Special Advanced Credit Curriculum

The purpose of this curriculum is to enhance the analytic and managerial skills of students specializing in particular academic or professional disciplines in departments and schools of the State University of New York at Stony Brook, other than the Harriman College. These skills will open new career opportunities in the public and non-profit sectors. Those enrolled in this curriculum take 30 credits in the Harriman College over two semesters, and then work in a paid summer internship in a government agency or nonprofit organization. For example, this program may be of interest to a candidate for the degree of Master of Social Work who is interested in managing a social services agency, or a candidate for the Ph.D. in history who is interested in policy analysis. Such students can earn the Master of Science in urban and policy science through one year of coursework and internship.

Research

In addition to preparing students for careers in the public sector, the Harriman College carries on policy research, the aim of which is to provide elected and appointed government officials with information and analysis that will contribute to improving the quality of public decision making and implementation. Research is done by the faculty of the College and other parts of the University, and with other institutions. Harriman College students also play an important role. The program is carried out through the two research institutes of the Harriman College: the Institute for Urban Sciences Research and the Institute of Energy Research.

Admission

The Harriman College is designed for ambitious and able students who are capable of applying what they learn toward the solution of public sector problems. Each student is asked to forward with the application a statement of career objectives and the way he or she expects to realize these objectives through the program. A personal interview with the dean is encouraged.

In addition, students must satisfy the following admissions requirements:

A. A baccalaureate degree with a minimum grade point average of 3.00. In exceptional cases, students not meeting this requirement may be admitted on a provisional basis.

B. Aptitude for quantitative analysis, demonstrated through previous coursework, standardized tests or practical experience.

C. Submission of Graduate Record Examination Aptitude scores.

D. Three letters of recommendation, one of which, if possible, should be from a professional working in a public agency or community or private organization, who is capable of evaluating the applicant's motivation and potential for public sector work; the three letters of recommendation should also include at least one from a college faculty member, counselor or administrator.

Beverly Harrison, B.A., J.D.
Special Assistant to the President for Affirmative Action

Charles W. Kim, B.S., M.S., Ph.D.
Associate Vice Provost for Graduate Studies

Richard Koehn, B.A., Ph.D.
Dean, Division of Biological Sciences

Paul Madonna, B.A., M.A., D.Ed.
Assistant Vice President for Administration; Business Manager

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Assistant Vice President; Director of Management Systems

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Associate Provost

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Dean, Division of Social and Behavioral Sciences

D. Terence Netter, B.A., M.A., L.S.T., M.F.A.
Director, Fine Arts Center

Lester G. Paldy, M.S.
Dean for Continuing Education

Donald S. Petrey, B.S., Ph.D.
Dean, Division of Humanities and Fine Arts

Robert Schneider, A.B., M.A., Ph.D.
Associate Vice Provost for Research

Jerry K. Schubel, B.S., M.A.T., Ph.D.
Director, Marine Sciences Research Center

John Brewster Smith, B.S., M.S.
Dean of Library Services and Director of Libraries

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Assistant Provost

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Dean, Division of Physical Sciences and Mathematics

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Dean, W. Averell Harriman College for Urban and Policy Sciences

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Vice Provost for Research and Graduate Studies (Acting)

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Assistant Vice Provost for Graduate Studies

Michael S. Denci, M.S.
Assistant Vice Provost for Graduate Studies

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Phyllis A. Reed, M.A.
Assistant to the Vice Provost for Graduate Studies

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Assistant for Sponsored Research

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Thomas O. Murphy, M.A.
Assistant for Sponsored Research

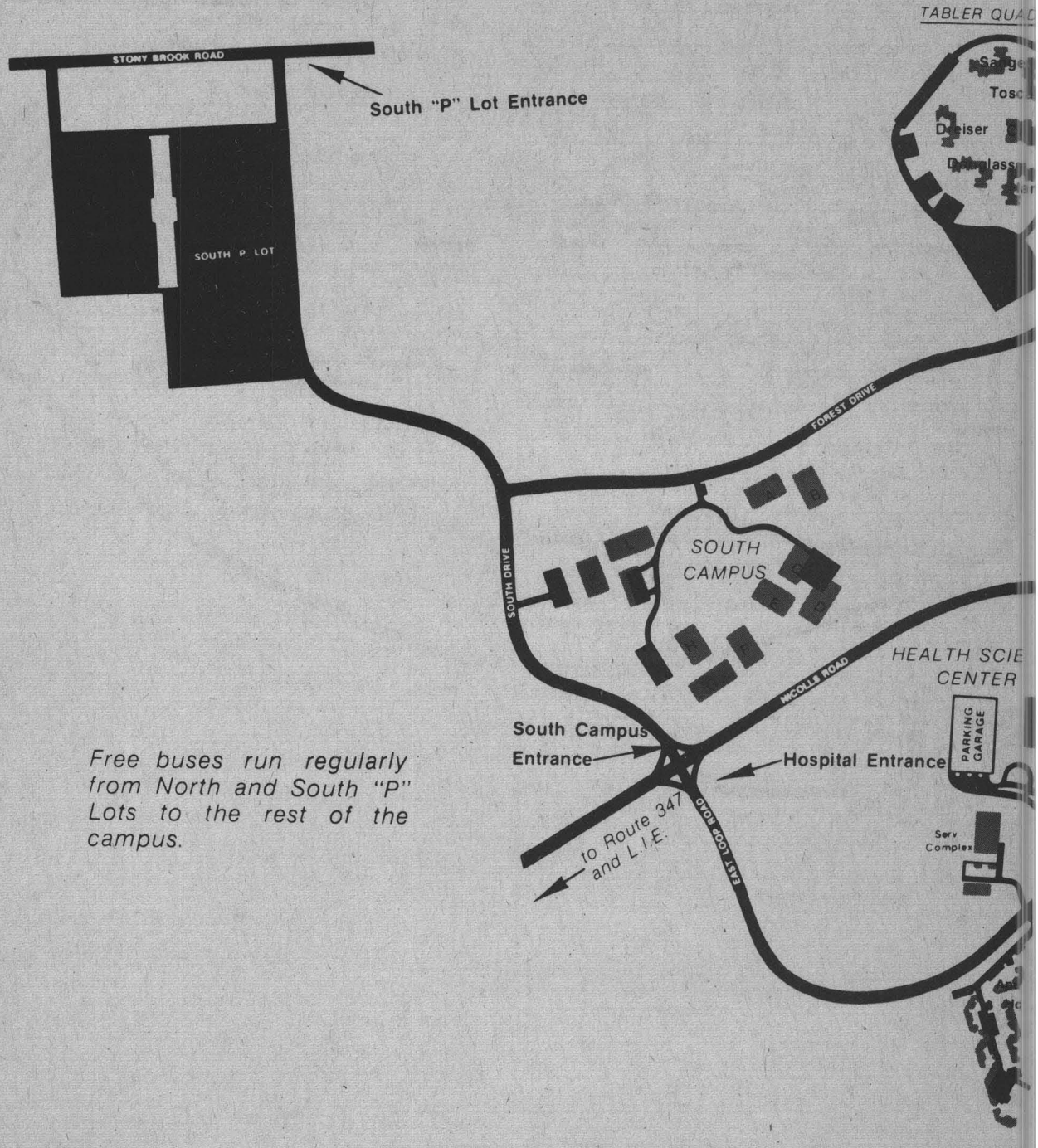
Kathryn S. Rockett, M.B.A.
Assistant Director, Research Administration

Peter M. Saal, M.S./L.S.
Assistant for Sponsored Research Information

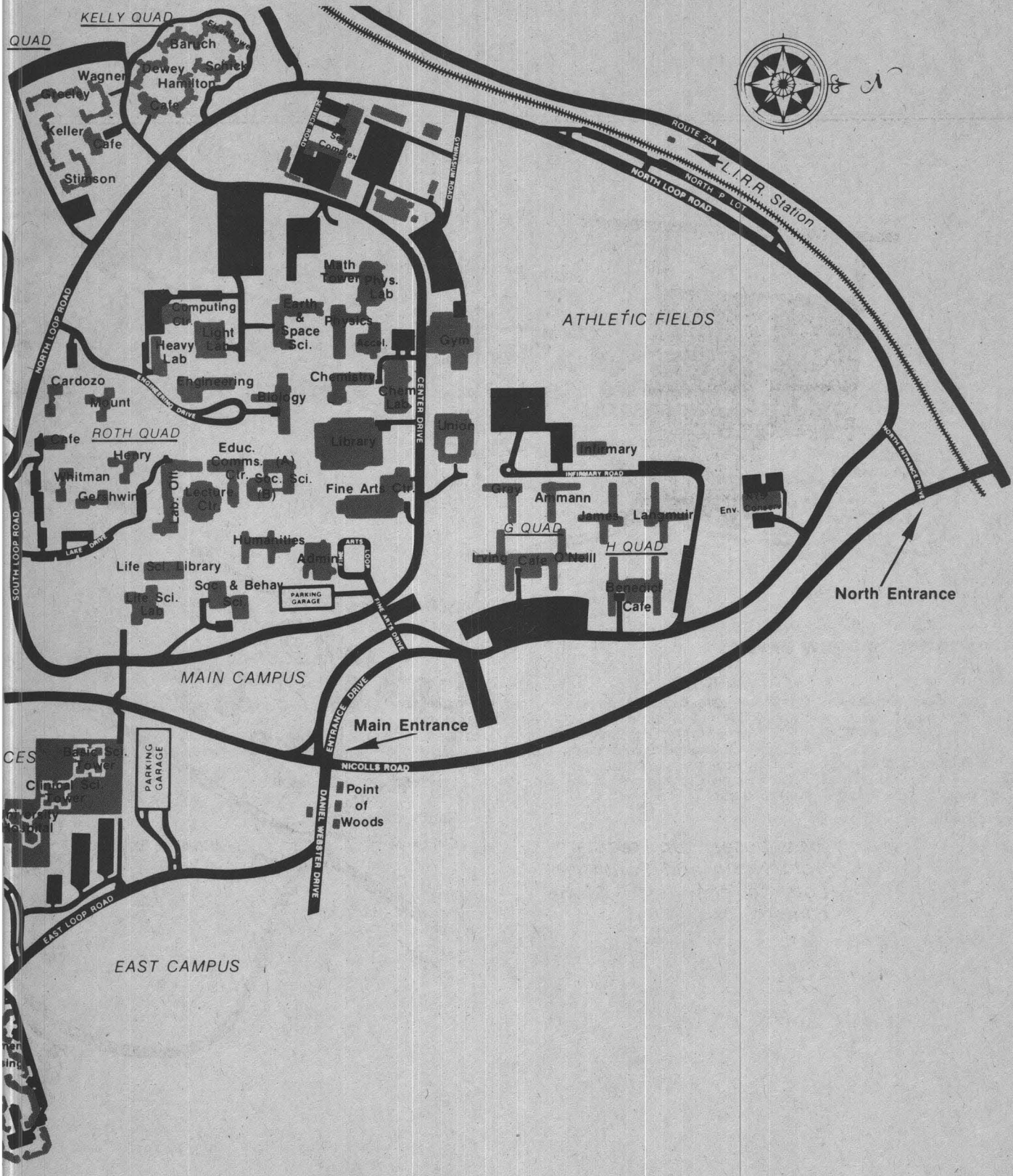
Robert F. Schneider, Ph.D.
Associate Vice Provost for Research

Karen L. Warren, B.A.
Assistant for Sponsored Research

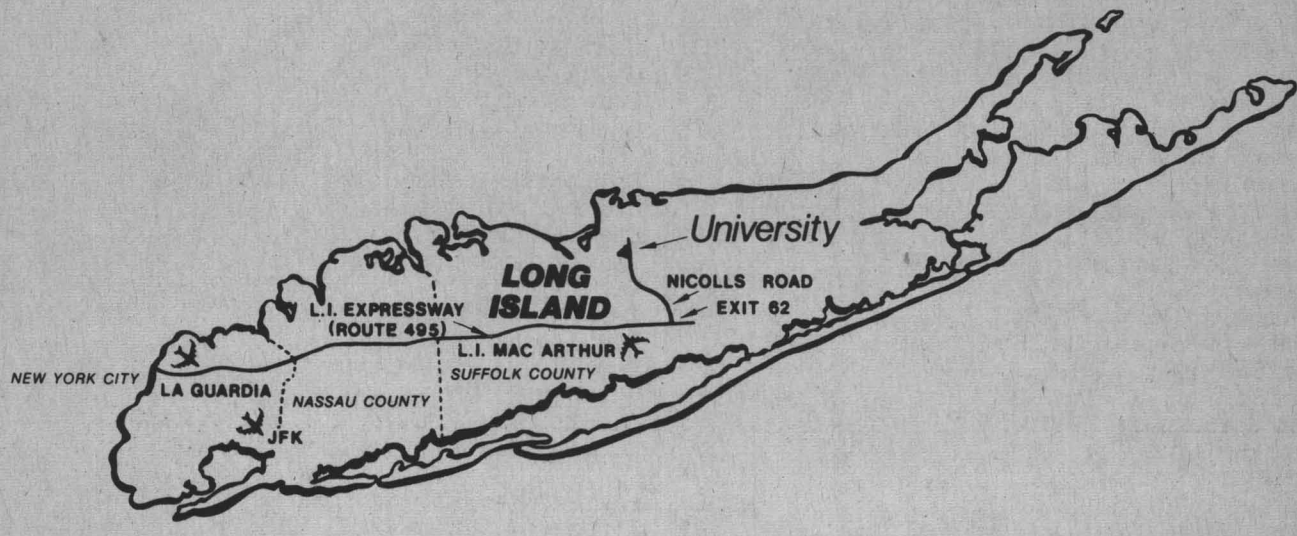
Campus Map



Free buses run regularly from North and South "P" Lots to the rest of the campus.


KELLY QUAD
QUAD
Baruch
Dewey
Hamilton
Schiff
Wagner
Cheeney
Cafe
Keller
Cafe
Stimson
ROUTE 25A
L.I.R.R. Station
NORTH LOOP ROAD
NORTH P LOT
SCHUMACHER ROAD
Math
Tower
Phys. Lab
Computing Ctr.
Light Lab
Earth & Space Sci.
Physics
Heavy Lab
Accel.
Gym
ATHLETIC FIELDS
NORTH LOOP ROAD
Cardozo
Mount
Engineering
Biology
Chemistry
Chem. Lab
CENTER DRIVE
Cafe
ROTH QUAD
Henry
Whitman
Gershwin
Educ. Comms. Ctr. (A)
Soc. Sci. (B)
Lect. Ctr.
Fine Arts Ctr.
Library
Union
Infirmary
INFIRMARY ROAD
Gray
Ammann
James
Lattamuir
Env. Science
NORTH ENTRANCE DRIVE
G QUAD
H QUAD
Irving Cafe
O'Neill
Benedict Cafe
North Entrance
LAKE DRIVE
SOUTH LOOP ROAD
Humanities
Admin.
FINE ARTS LOOP
Life Sci. Library
Soc. & Behav. Sci.
Life Sci. Lab
PARKING GARAGE
FINE ARTS DRIVE
MAIN CAMPUS
ENTRANCE DRIVE
Main Entrance
NICOLLS ROAD
PARKING GARAGE
Point of Woods
DANIEL WEBSTER DRIVE
EAST LOOP ROAD
EAST CAMPUS

Map of Long Island



Transportation to Stony Brook

BY CAR

Take the Long Island Expressway (Route 495) east from the Queens Midtown Tunnel (Manhattan) or from the Throgs Neck or Whitestone Bridges (Bronx). Take Exit 62 and follow Nicolls Road (Route 97) north for nine miles.

BY RAILROAD

Take the Long Island Rail Road's Port Jefferson line from Penn Station (Manhattan) or Flatbush Ave. (Brooklyn). Change at Jamaica or Huntington, per timetable, for Stony Brook. Cross tracks for free campus bus.

BY AIR

Land at Kennedy or LaGuardia Airports, 50 miles west of campus, or at Long Island MacArthur Airport (USAir: 516-588-7771). 10 miles south of campus. MacArthur has 24-hour limousine and taxi service to campus.

BY BUS

Use the Coram Bus Service, which provides routes from Coram, Port Jefferson, Lake Grove, Smithhaven Mall, St. James and East Setauket to about 10 stops on campus. For schedules, rates and routes, call 516-732-5518.

Campuses

University Centers
State University of New York at Albany
State University of New York at Binghamton
State University of New York at Buffalo
State University of New York at Stony Brook

Colleges of Arts and Science
Empire State College
State University College at Brockport
State University College at Buffalo
State University College at Cortland
State University College at Fredonia
State University College at Geneseo
State University College at New Paltz
State University College at Old Westbury
State University College at Oneonta
State University College at Oswego
State University College at Plattsburgh
State University College at Potsdam
State University College at Purchase

Colleges and Centers for the Health Sciences
Downstate Medical Center at Brooklyn
Upstate Medical Center at Syracuse
College of Optometry at New York City
(Health Sciences Center at Buffalo University Center)*
(Health Sciences Center at Stony Brook University Center)*

Agricultural and Technical Colleges
Agricultural and Technical College at Alfred
Agricultural and Technical College at Canton
Agricultural and Technical College at Cobleskill
Agricultural and Technical College at Delhi
Agricultural and Technical College at Farmingdale
Agricultural and Technical College at Morrisville

Specialized Colleges
College of Environmental Science and Forestry at Syracuse
Maritime College at Fort Schuyler
College of Technology at Utica/Rome
(Fashion Institute of Technology at New York City)**

*Statutory Colleges****
College of Agriculture and Life Sciences at Cornell University
College of Ceramics at Alfred University
College of Human Ecology at Cornell University
School of Industrial and Labor Relations at Cornell University
College of Veterinary Medicine at Cornell University

Community Colleges

(Locally-sponsored, two-year colleges under the program of State University)

Adirondack Community College at Glens Falls
Broome Community College at Binghamton
Cayuga County Community College at Auburn
Clinton Community College at Plattsburgh
Columbia-Greene Community College at Hudson
Community College of the Finger Lakes at Canandaigua
Corning Community College at Corning
Dutchess Community College at Poughkeepsie
Erie Community College at Williamsville, Buffalo and Orchard Park
Fashion Institute of Technology at New York City**
Fulton-Montgomery Community College at Johnstown
Genesee Community College at Batavia
Herkimer County Community College at Herkimer
Hudson Valley Community College at Troy
Jamestown Community College at Jamestown
Jefferson Community College at Watertown
Mohawk Valley Community College at Utica
Monroe Community College at Rochester
Nassau Community College at Garden City
Niagara County Community College at Sanborn
North Country Community College at Saranac Lake
Onondaga Community College at Syracuse
Orange County Community College at Middletown
Rockland Community College at Suffern
Schenectady County Community College at Schenectady
Suffolk County Community College at Selden, Riverhead and Brentwood
Sullivan County Community College at Loch Sheldrake
Tompkins Cortland Community College at Dryden
Ulster County Community College at Stone Ridge
Westchester Community College at Valhalla

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Vice Chancellor for Finance and Business

* The Health Sciences Centers at Buffalo and Stony Brook are operated under the administration of their respective University Centers.

** While authorized to offer such baccalaureate and master's degree programs as may be approved pursuant to the provisions of the Master Plan, in addition to the associate degree, the Fashion Institute of Technology is financed and administered in the manner provided for community colleges.

*** These operate as "contract colleges" on the campuses of independent universities.

STATE UNIVERSITY OF NEW YORK AT STONY BROOK

Members of the Council

Subject to powers of State University trustees defined by law, the operations and affairs of the State University at Stony Brook are supervised locally by a ten-member Council. Nine are appointed by the Governor; the tenth, a student member with all the rights and responsibilities of the other members, is elected by the student body. All positions listed are correct as of Februay 1, 1982.

R. Christian Anderson,
Chairman
Brookhaven

Aaron B. Donner
Bay Shore

Leonard Eichenholtz
Valley Stream

L. Donald Jaffin
Manhasset

Donald J. Leahy, M.D.
Douglaston

Betty G. Ostrander
Southampton

Greta M. Rainsford, M.D.
Hempstead

Ena D. Townsend
Central Islip

Andrew E. Ullmann
Cold Spring Harbor

Officers of Administration

All positions are correct as of February 1, 1982.

John H. Marburger, III, B.A., Ph.D.
President

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Vice President for University Affairs

Michael Elliott, B.A., M.S.
Vice President for Hospital Affairs;
Executive Director of the University Hospital

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Vice President for Campus Operations

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Vice President for Administration

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Provost

J. Howard Oaks, A.B., D.M.D.
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Robert R. Sokal, B.S., Ph.D.
Acting Vice Provost for Research and Graduate Studies

Arnold Strassenburg, B.S., M.S., Ph.D
Acting Vice Provost for Curriculum and Instruction

Emile Adams, A.A., B.A.
Assistant Vice President for Student Affairs

Richard Brown, A.A.S., B.A., C.P.A.
Assistant Vice President for Administration; Controller

Daniel M. Fox, A.B., A.M., Ph.D.
Assistant Vice President for Health Sciences
(Academic Affairs)

Sanford M. Gerstel, B.C.E., M.A., M.B.A., P.E.
Assistant Vice President for Campus Operations

Edward J. Gunnigle, B.S., LL.B., LL.M.
President and Executive Director, Stony Brook Foundation

Stewart Harris, B.S., M.S., Ph.D.
Acting Dean, College of Engineering and Applied Sciences

Index

Additional Information

For general information about graduate programs and/or application, please write or phone:

The Graduate School
State University of New York at Stony Brook
Stony Brook, NY 11794
(516) 246-5945

For assistance in obtaining updated information for the 1983-84 academic year, call the Graduate School Office (516/246-5945) or the Office of University Affairs (516/246-6570.)