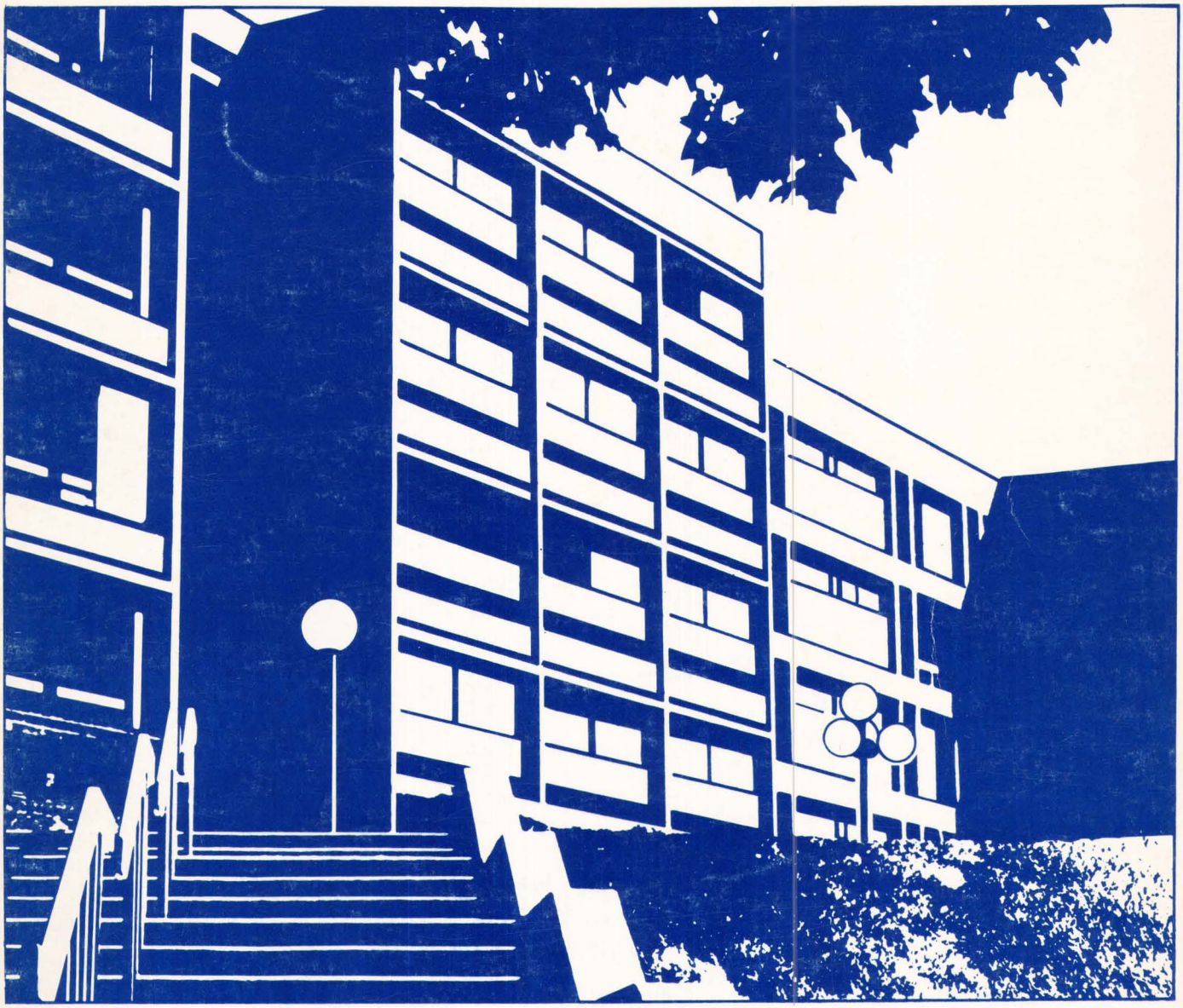
1984-86 Graduate Bulletin

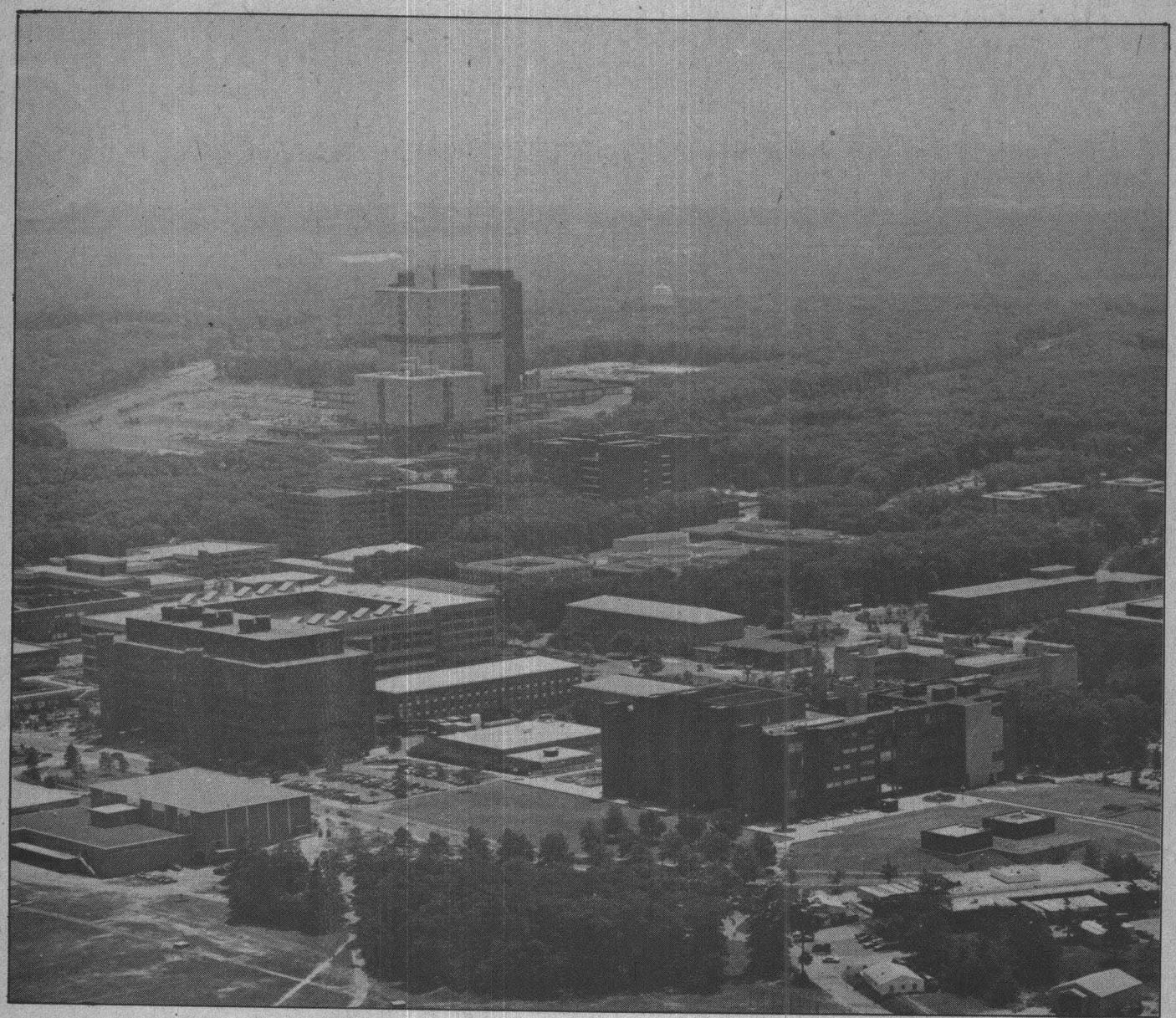
State University of New York at Stony Brook



StonyBrook

1984-86 Graduate Bulletin

State University of New York at Stony Brook



StonyBrook

Press Date: January 27, 1984

The University represents that the information in this publication is accurate as of the press date. Courses listed in this *Bulletin* are subject to change through normal academic channels. New courses and changes in existing coursework are initiated by the cognizant departments or programs, approved by the appropriate curriculum committees, approved by the appropriate academic dean and the Vice Provost for Research and Graduate Studies. Circumstances may require that a given course be withdrawn, or that alternative offerings be made.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, Continuing Education (CED) and Health Sciences students.

Photos by Dan Cornish, Pat Costello, Tom Giacalone, HSC Photography Services and Charles Marshall.

Contents

Academic Calendar

Fall Semester 1984

Monday, August 20: Foreign students arrive.

Monday-Friday, August 20-24: Final registration and payment (or proper deferral) of fees for all students not previously registered (scheduled announced prior to registration). Foreign student orientation.

Wednesday-Friday, August 22-24: Residence halls open for new student check-in.

Friday-Sunday, August 24-26: Residence halls open for returning student check-in.

Monday, August 27: Classes begin; late registration begins with $20 late fee assessed.

Monday, September 3: Labor Day (no day or evening classes).

Monday, September 10: End of late registration period. Last day for all students to drop a course without tuition liability.

Friday, September 21: Last day for graduate students to add or drop a course. Last day to file for December graduation; graduate students (except CED) file at Graduate School Office; CED students file at CED Office.

Thursday-Friday, September 27-28: Rosh Hashanah recess (no classes on September 26 after 4:30 p.m.)

Thursday, October 11: Last day for payment of deferred fall semester fees.

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

Wednesday, October 24: Fall quarter housing period ends.

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

Tuesday, November 6: Election Day (classes in session).

Monday, November 12: Advance registration for spring semester begins (schedule announced prior to registration).

Tuesday, November 20: All classes will follow Thursday's schedule.

Wednesday, November 21: Thanksgiving recess begins at close of classes.

Monday, November 26: Classes resume.

Friday, December 7: Bills for spring semester mailed to preregistered students.

Friday, December 14: Last day of classes; last day to withdraw from the University. Last day for graduate students to submit theses and dissertations to Graduate School for December graduation.

Monday, December 17: Final examinations begin; final grades due in Registrar's Office 48 weekday hours after last class meeting or scheduled examination.

Friday, December 21: Final examinations end; fall semester ends; residence halls close for fall semester; winter recess begins at close of examinations.

Saturday, December 22: Intersession housing begins.

Spring Semester 1985

Monday, December 31: Last day for mail payments of spring semester fees for preregistered students.

Friday, January 4: Last day for departments to submit Completion Statements for December master's and doctoral degree candidates.

Monday, January 7: Last day for preregistered students to pay spring semester fees in person without late payment penalty.

Tuesday, January 15: Foreign students arrive.

Tuesday-Friday, January 15-18: Final registration and payment (or proper deferral) of fees for all students not previously registered (schedule announced prior to registration).

Wednesday, January 16: Intersession housing ends.

Friday-Sunday, January 18-20: Residence halls open for returning students.

Monday, January 21: Classes begin; late registration period begins with $20 late fee assessed.

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

Friday, February 15: Last day for graduate students to add or drop a course; 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.

Friday, March 8: Spring recess begins at close of classes.

Friday, March 15: Spring quarter housing period ends.

Monday, March 18: Classes resume.

Friday, March 22: 5Last day for removal of Incomplete and NR (No Record) grades from the fall semester.

Monday, April 15: Advance registration for fall semester begins (schedule announced prior to registration). Bills for fall semester to be mailed approximately June 1 with payment due during latter part of July.

Friday, April 19: Last day for graduate students to submit theses and dissertations to Graduate School for May graduation.

Monday, April 22: Registration begins for summer session with fees payable at time of registration.

Friday, May 10: Last day of classes; last day to withdraw from the University.

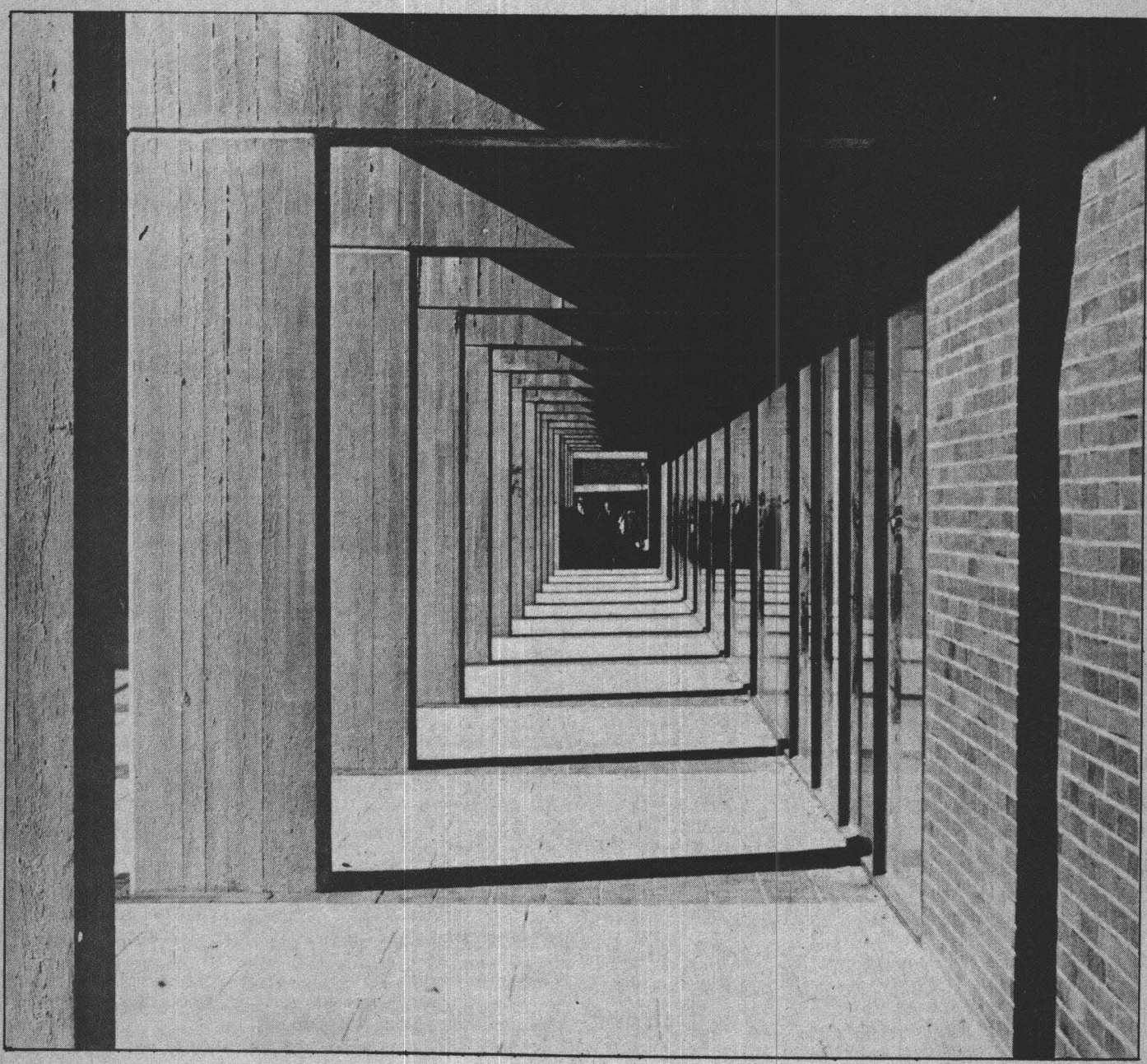
Monday, May 13: Final examinations begin; final grades due in Registrar's Office 48 weekday hours after last class meeting or scheduled examination.

Friday, May 17: Final examinations end; spring semester ends. Residence halls close for all except graduating seniors and summer residents.

Sunday, May 19: Commencement; all residence halls close.

Friday, May 24: Last day for departments to submit Completion Statements for May master's and doctoral degree candidates.

General Information



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 100 undergraduate and graduate degree programs. 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 1280, the student body from 1000 to over 16,000 and the annual operating budget from about $3 million to $194 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 35 different graduate studies areas as well as in the five Schools of the Health Sciences Center and the Center for Continuing Education. The doctoral degree is offered in 26 areas, the M.A. in 19 areas, and the M.S. in 10 areas. There are also a Master of Music degree, a Master of Fine Arts degree, a Doctor of Musical Arts degree and a Doctor of Arts degree in Foreign Language Instruction. 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. degrees by the School of Allied Health Professions and the School of Nursing. The Center for Continuing Education offers an evening program leading to the degree of Master of Arts in Liberal Studies (MA/LS), which is designed primarily for working adults who can only attend school on a part-time basis. At the undergraduate level, many departmental major programs and interdisciplinary programs leading to the B.A., B.S. and B.E. 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 engneering, the Van de Graaff nuclear accelerator, the Administration Building, Lecture Center, Laboratory-Office Building, Educational Communications Center, Computing Center, Stony Brook Union, Gymnasum 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 provides additional housing near the Health Sciences Center.

South of the academic cluster is the 26-acre Ashley Schiff nature preserve. Beyond these woods and linked by shuttle bus service to the rest of campus are 11 functionally adaptable single-story buildings housing the Marine Sciences Research Center and the School of Dental Medicine.

The Health Sciences Center comprises academic and support areas and University Hospital, a 540-bed facility that admitted its first patients in 1980. Preliminary authority has been granted for the construction of a permanent facility for the School of Dental Medicine in proximity to the clinically oriented area of the campus.

Parking is available for 9100 cars, including a 2000-car surface parking lot for commuting students, two 970-car parking structures for the Health Sciences complex, as well as a 980-car structure serving the academic buildings.

Students

Stony Brook's recent enrollment was about 16,000 (11,000 undergraduates and 5,000 graduate students, including about 2,000 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 1280 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; University Professor Louis Thomas, former Chancellor of Memorial Sloan-Kettering Cancer Center; Distinguished Professors Lewis Coser in Sociology and Seymour S. Cohen in Pharmacology; Distinguished Teaching Professors John Truxal in Engineering and Elof Carlson in the Biological Sciences; Pulitzer Prize-winning poet Louis Simpson in English; poet-playwright Amiri Baraka; poet-essayist June Jordon; nuclear magnetic resonance pioneer Paul C. Lauterbur; John Russell Brown, former director of London's National Theatre; musician-scholar Charles Rosen; and author Thomas Flanagan in English, winner of a National Book Critics Circle of Fiction award for "The Year of the French." Stony Brook's distinguished faculty is also proud to include ten members of the National Academy of Arts and Sciences, nine members of the National Academy of Sciences and one member of the National Academy of Engineering. More than 300 scholars from 40 countries research and teach at Stony Brook for various periods of time throughout the year.

Research

The State University of New York at Stony Brook is a University Center and as such has research and scholarly activity among its major missions. At Stony Brook, one of the primary activities is graduate education. Faculty members are expected to seek external support for these activities insofar as such funding is available and required; research and other scholarly activities are part of the faculty obligation whether sponsored or not. A substantial proportion of graduate students are supported on externally funded projects. In 1966 the Board of Trustees adopted a policy that requires the unrestricted public dissemination of the conduct, progress and results of research or research-related programs. This policy prohibits classified research, regardless of the source of support.

In fiscal year 1984, Stony Brook's sponsored project expenditures are expected to exceed $40 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 800 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.

The local administration and management of research and other sponsored activities depend on campus offices in both the academic and administrative areas. The Office of Research Administration under the Vice Provost for Research and Graduate Studies has the responsibility for preaward aspects of sponsored projects. It provides information about opportunities for funding; reviews proposals to external sponsors for consistency with federal, state, campus and sponsor regulations; provides reports on sponsored activities to administrative and departmental offices; coordinates the activities of committees that deal with special features of research; and endorses proposals and all other communications to sponsors on behalf of the campus and the Research Foundation of the State University of New York.

All campus projects that 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). If such prior approval has not been obtained for degree-related work, delays may occur in the awarding of a graduate degree. (It is SUNY policy that the campus may not require the participation of students as subjects in human research.) Questions regarding human subjects should be addressed to the Staff Officer for Assurances in the Office of Research Administration.

In addition, all projects requiring the use of animals, recombinant DNA or radioactive materials, ionizing radiation, lasers and so forth also require prior review and approval by the appropriate University committees. Questions relating to these areas should also be addressed to the Staff Officer for Assurances.

Academic publications edited or published at the University include: *Advances in Learning and Behavioral Disabilities, Anthropology, Archives of Sexual Behavior, Biological Psychiatry, Black on White, Bulletin of Research in the Humanities, Circuits, Systems, and Signal Processing, Developmental Review, Evolution, Gastrointestinal Radiology, Gradiva, Heat Transfer, Journal of Applied Behavior Analysis, Journal of College Science Teaching, Journal of Education Technology Systems, Journal of Literary Translation, Journal of Urban Analysis, Magnetic Resonance in Medicine, Marine Biology Letters, Materials Letters, Medieval Prosopography, Mental Retardation & Developmental Disabilities, Physics and Chemistry of Minerals, The Physics Teacher, Previews of Heat & Mass Transfer, Quarterly Review of Biology, Slavic & Eastern European Arts, Socio-Economic Planning Sciences, Surface Technology, Symbolic Interaction 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 1.4 million bound volumes and 1.9 million publications in microformat.

Other library facilities of note are the Senator Jacob K. Javits collection of private papers and memorabilia, 200 million items establishing one of the nation's leading archives of 20th century congressional papers, 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

The Stony Brook Computing Center is the hub of a growing network of equipment located across the campus that provides a variety of services to the end user.

Administrative needs are served by a Sperry 1100/62 with 8 million characters of main memory, 5 billion characters of disk storage, driving a network of terminals. This is tied via a communications link to other SUNY computers.

Large-scale research and instructional needs are met by a Sperry 1100/82 with 12 million characters of main memory and 10 billion characters of storage. With the administrative machine, it shares four high-speed printers and six tape drives, as well as supporting two remote printers and over 100 terminals at public access sites.

A series of high-speed networks containing 160 powerful DEC microcomputers is being installed across the campus for student use. These will offer laser printing for student word processing as well as software designed for academic use.

The Center is currently open to students over 80 hours weekly. Extended hours are available at the end of each semester. The equipment itself operates around the clock

Consulting services are available to aid with use of the large array of software.

Plans are already underway for implementing significant further upgrades to the system in accordance with a master plan.

Special Centers and Institutes

The *Allergic Diseases Center* diagnosis, treats and conducts research into immunological disorders; the *Bach Aria Festival and Institute* consists of forty young professional musicians on fellowship who study and perform the music of Bach with the members of the Bach Aria Group: performances, lectures, master classes, workshops and open rehearsals are all available to the public; 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; its slide archive is located in the Rare Book Room of the Health Sciences Library.

The *Creative Arts Center* maintains a collection of poetry and fiction as well as video and audio cassette recordings of writers reading from their own works and sponsors readings by established and younger writers, lectures and symposia on the relationships of the humanities to the other disciplines.

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 toward associate, bachelor's and master's degrees without formal class attendance; 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 60,000 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 Mental Health Research* is a specialized research facility within the Department of Psychiatry and Behavioral Science. It is dedicated to research related to an understanding of psychiatric disorders ranging from basic neurobiological research to applied clinical studies; The *Institute for Technology Policy in Development* is an organized research unit of the State University that works with U.S. and international agencies and developing country counterparts 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 13 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 Policy Analysis and Public Management, 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 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; *Laboratory for Personal Computers in Education* explores methods of using microcomputers for providing interactive learning; activities include courseware development, evaluation studies, computers in education courses and master's degrees; 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 *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 MSRC operates the nation's first and only Aquaculture and Fisheries Experiment Station; 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 school children; 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 that is unique among university-based facilities and provides beams for a wide variety of nuclear experiments; The *Research Group for Human Development and Educational Policy* studies student and faculty development as well as academic organization at Stony Brook and other institutions of higher education across the country 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. *Research Center for Health Promotions/Disease Prevention in Allied Health* was established by the U.S. Public Health Service to create and distribute resources in the Northeast to assist educators and practioners in maintaining good health and prevention of disease.

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 Center for Religious Studies* arranges conferences and seminars and offers a setting in which visiting scholars can work. Center faculty are available to supervise research projects or to teach occasional courses in other departments. 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 that 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 Center* is a state-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, countywide 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. *William Butler Yeats Archive* has available for research purposes a comprehensive microfilm collection of Yeats' manuscript materials.

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 7500 people (full-time and part-time) on a campus payroll that exceeds $100,000,000 annually, Stony Brook is Long Island's sixth largest employer. It is estimated that the University generates close to a 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 private and public 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 the State-designated Center for Advanced Technology in medical biotechnology, with $2 million annually in public and private funding, and the Center for Industrial Cooperation, the University makes technical and academic resources available to serve the high technology and other industries that form Long Island's economic base. The W. Averell Harriman College for Policy Analysis and Public Management 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, respectively, to help solve problems. The Economic Research Center provides applied economic analysis and forecasting. University Hospital, Suffolk County's only tertiary-care hospital, offers a unique range of sophisticated health care services, and specialized clinics are 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 pusuing specific 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, the University's development office.

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 visitors to the campus have included authors Alex Haley, Mary McCarthy, Czeslaw Milosz, and Isaac Asimov; scientist-writer Paul R. Ehrlich; dancer-actress Gwen Verdon; and human rights leader Eleanor Holmes Norton.

Art galleries in the Fine Arts Center in the Library, 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.

Stony Brook's Fine Arts Center, which opened in 1978, is a fully equipped facility for education in music, theatre, and fine arts, and is already recognized as the most important performing arts center in Suffolk County. It includes on 1,100-seat Main Theatre, a 400-seat Recital Hall, three experimental theatres, and a 4,700-square-foot Art Gallery. These facilities are used jointly by the professional artists, musicians, dancers, and theatre groups who are part of the subscription series offered each year at the Fine Arts Center, and by the art, music and theatre students at Stony Brook.

The Fine Arts Center schedules more than 50 major events during the year. In addition, more than 200 recitals and concerts are given which are open to the public with no admission charge. Highlilghts of the past season included performances by Marilyn Horne, Dance Theatre of Harlem, the St. Louis and the Prague

Symphony Orchestras, the Beaux Arts Trio, the Emerson Quartet and I Musici as well as performances by the Stony Brook Concert Band, Chamber Symphony and Symphony Orchestras, Chamber Singers and University Chorus and four productions by the Department of Theatre Arts' University Theatre.

Besides the free concerts, special student discounts are available and an arrangement has been made for students to purchase tickets for Main Theatre events which are not sold out. "Student rush" tickets are $3, and go on sale a half-hour before curtain time. The Fine Arts Center provides the social atmosphere for a large university where the campus community—undergraduates, graduate students, faculty, and staff—can mingle with the hundreds of residents who come from a broad area around the University to enjoy and applaud a growing list of exciting events.

Stony Brook fields varsity teams in 20 intercollegiate sports competing through the National Collegiate Athletic Association (NCAA), the Eastern Collegiate Athletic Association (ECAC) and the Association of Intercollegiate Athletics for Women. The year 1983 saw the addition of men's lacrosse and football and women's soccer to the ranks of Division III teams. The 1982-83 men's swimming team produced four All-Americans, the women's swim team one and the 1983 women's cross-country team its first.

The campus student newspaper, *Statesman,* is published 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 magizine; *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 religious and social services and activities in a Catholic "parish" atmosphere for the campus community. United Protestant Campus Ministry at Stony Brook is the ministry of five Protestant denominations in the Stony Brook area (Episcopal, Methodist, Reformed, Presbyterian and United Church of Christ) and is the regional ministry of L.I. United Campus Ministries, Inc. The Protestant Chaplain offers a ministry of worship services, counseling, programs, social action and retreats. B'nai B'rith Hillel-Jewish Association for College Youth 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 (basketball, summer softball and graduate swim hours). The organization 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 that enhance the academic environment. It is open to all students, faculty and staff members. The Union is also the home of the Commuter Center.

The Union is a place to relax, to gather with friends, faculty and students. It is a place to view 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 accommodiate 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. Info-Line, a prerecorded taped information service, is also located at the Information Center. Inquiries concerning the University ranging from admission policies to campus events can be answered by dialing 246-3639.

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, 8a.m. to 1a.m.; Thursday and Friday, 8a.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.

Call for information concerning the Union's summer session hours. 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 Services

The University Health Service, located in the Infirmary, concerns itself with student health needs. It is available to faculty and staff on an emergency basis. The University Health Service hours of operation are Monday through Friday 8:00 a.m. - 6:00 p.m. At other times, students are requested to use the Emergency Department of University Hospital on a fee-for-services basis: therefore, adequate health insurance is important. Information on University-sponsored student health insurance is available at the Infirmary Building. The Walk-in Clinic is staffed by physicians, physician assistants and nurses. Specialty services for psychiatric, 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 diffculties. 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.

American Living Institute

Stony Brook offers a "Summer Institute for American Living," a program of courses and activities in American language 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 accompaning 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 students and alumni with their career planning concerns 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 abilities to career aspirations.

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 different career areas can be obtained by working with agencies and organizations that seek student volunteers.

Group workshops are held to assist students and alumni in writing resumes and developing individual strategies 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 academic departments in order to provide career-related information.

The Career Development Resource Library has information pertaining to 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 a computerized system for self-evaluation and career identification called DISCOVER, 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 career information tapes 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) 246-7024.

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), Delta Nu Chapter of *Sigma Gamma Epsilon* (earth sciences) and the Stony Brook Chapter of *Sigma Pi Sigma* (physics).

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, sexual orientation, 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:

Marion Metivier
Special Assistant to the President for Equal Opportunity
and Affirmative Action
Administration Building 474
SUNY at Stony Brook
Phone: (516) 246-3462

Minority Students

To help achieve a diverse community, SUNY at Stony Brook encourages applications from women and minorities. The University, with the special assistance of the Affirmative Action Office, is making a concerted effort to recruit qualified minority applicants. Minority faculty and staff at Stony Brook are regarded highly by colleagues locally, in the state and nationwide. Minority students who plan to attend Stony Brook will find that many opportunities exist on campus to express and identify with their cultural heritage.

Minority students at Stony Brook have made academic excellence a part of their goal and have been graduated to assume responsible roles in society.

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 Traffic Office, Room 192, 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 the Student Judiciary, Room 347, 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.

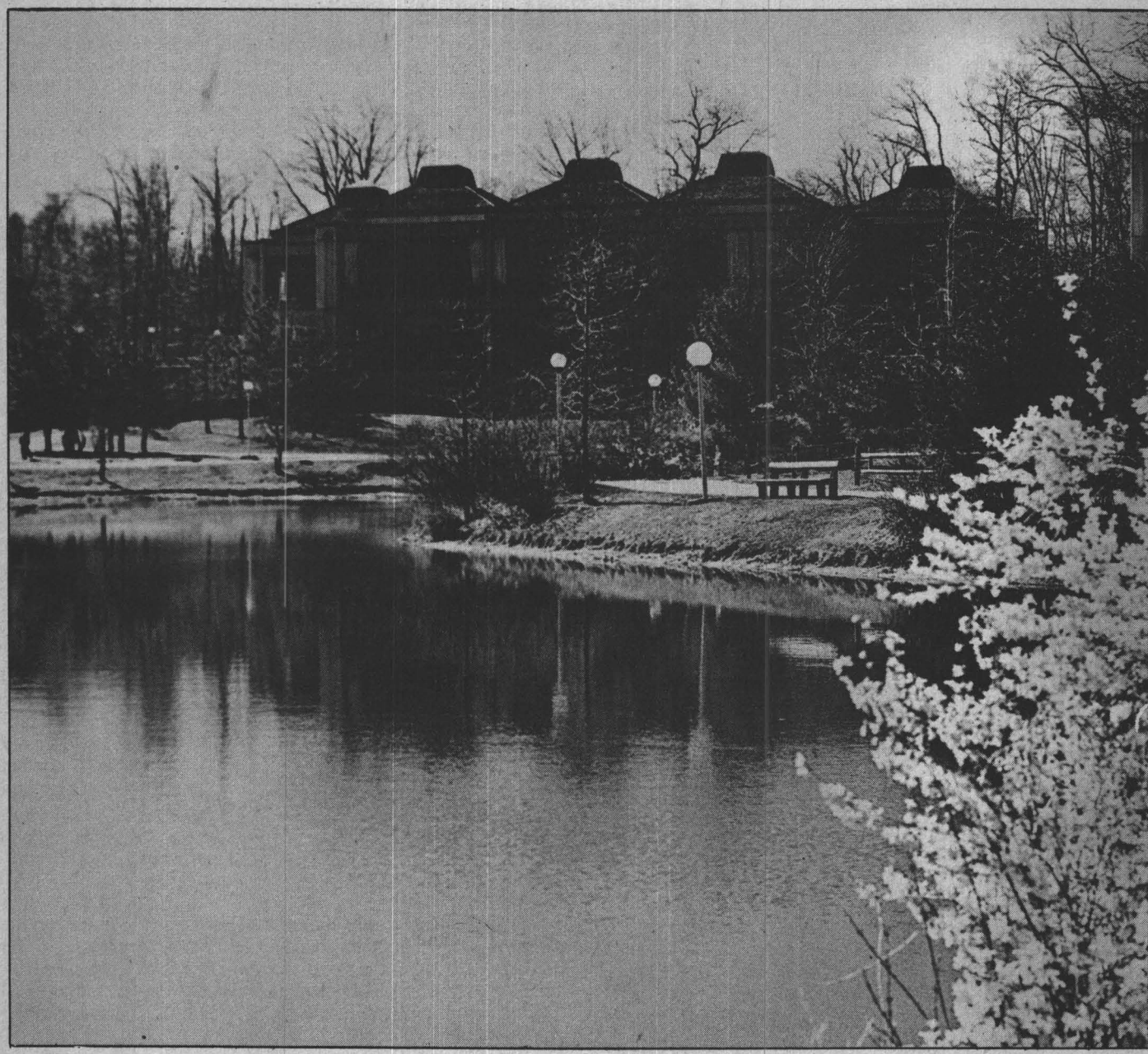
Student Conduct Code

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 the Student Judiciary, Room 347, Administration Building.

Telephone Directory

It is the policy of the State University at Stony Brook to publish a Campus 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



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 are charges are subject to change without further notice.*

Charge or Fee

	First Semester	Second Semester	Year
Application Fee			*$35.00*
Tuition			
Full-time graduate student			
N.Y. State resident	$1075.00	$1075.00	$2150.00
Out-of-state resident	1867.50	1867.50	3735.00
Part-time graduate student (11 credits or less)			
N.Y. State resident, per semester credit hour	90.00	90.00	
Out-of-state resident, per semester credit hour	155.50	155.50	
Professional schools (Medicine, Dental Medicine)			
N.Y. State resident	2775.00	2775.00	5550.00
Out-of-state resident	4425.00	4425.00	8850.00
Fifth Pathway	4500.00	4500.00	9000.00
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	775.00	775.00	1550.00
Board			*Fee to be announced*
Activity Fee[2] (Full-time students, except professional)	16.10	16.10	32.20
Cooking Fee (Residents not on Board Plan)			
Halls	140.00	140.00	280.00
Suites	90.00	90.00	180.00
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
Add/Drop 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 deffered 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 Master Card payments may be made in person or by mail. Mail payments must include an Authorization for Use of Visa/Master Card form. Students with approved tuition waivers, room waiver or activitly 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 the 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 certifiction 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 applicaton 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 Rehabilation 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, P.O. Box 619, Stony Brook, N.Y. 11790-1351. 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

The Apartment Complex

The Apartment Complex is designed to house graduate and married students. Two- and three-bedroom apartments will be available in addition to a limited number of one-bedroom apartments. Single students have the option to share a bedroom in either the two- or three-bedroom apartments. Married students, however, are most often housed with their spouse and a second married couple in a two-bedroom apartment. A limited number of one-bedroom apartments may be available. Selected apartments have also been partially adapted for individuals with mobility impairments.

The three-bedroom apartments have two full bathrooms (one and one-half bathrooms in two-bedroom apartments), a kitchen, dining area and a living room. All apartments are furnished. The apartment rental rates vary and may be obtained by contacting the Apartment Complex Office at (516) 246-8240.

Dormitory Housing

A limited number of single occupancy rooms are available for unmarried graduate students in Stage XII. Keller International College, located in Stage XII Quad, is committed to the intergration of foreign and American graduate and undergraduate students. It is important to note that only a limited number of residence halls are open for occupancy duing the Intersession period. If you will require accommodations during this period, please state so on your housing application so that appropriate arrangements can be made.

Note: All housing assignments in the Apartment Complex as well as in the dormitories are made on a first-come, first-served basis, according to the date the housing application is received in the Office of Residence Life. Spaces are limited, and room assignments cannot be guaranteed. For this reason, applicants are encouraged to apply at the earliest possible date. In addition, priority for housing will be given to those applicants living beyond a commuting radius, established by the University. This commuting radius is based on zip code zones and is approximately 15 to 20 miles from the University.

Housing Charges

Dormitory

The rent for each person occupying a single space in Stage XII is currently $1550 per academic year and is payable on a semester basis (subject to change).

Apartment Complex

Apartment rental rates vary according to apartment size and the number of occupants. Rates may be obtained by contacting the Apartment Complex office at (516) 246-8240. A $100 nonrefundable room deposit is required in order to ensure a space once a room assignment has been offered.

Off-Campus Housing

The Off-Campus Housing Service provides information concerning rentals of rooms, apartments and houses in the local area. All landlords listing property with the University must sign a statement assuring nondiscrimanatory practices; listings do not become available until such assurance is received. The Off-Campus Housing Service and the University may not become party to landlord-tenant disputes.

The common price per month for a furnished room is $175-$200. Kitchen privileges are often 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 $135-$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 $275 - $300 per month. A studio apartment in one of the apartment facilities is usually $350-$375. 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 ranes in price from $350-$450 per month. Utility costs, except electricity, are often included in the price. There are also listings for house rentals in the area. These rentals range from $300 to $900 per month, not including utilities. The price depends on the number of rooms in the house, the condition of the house, and its distance from the campus. For more specific information, feel free to contact the Off-Campus Housing Service, located in Room 146 of 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 11794-1301. 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 withdrawls 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	0	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 registrtion 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 Univeristy 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 withdrawls 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 11794-0501.

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 "National Direct Student Loans, College Work Study Programs and TAP"). 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 1984 will not exceed a set limit ($7883) for the academic year. If a student receives tuition asisstance 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 $7883 in 1984 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 $6000 in 1984 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.

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 $7500 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.

The Mortimer Kreuter Scholarship Award

The Mortimer Kreuter Scholarship is awarded each year by a Fund committee to a mature person who needs financial assistance in order to return to or continue his or her undergraduate or graduate education. The scholarship is administered by the Stony Brook Foundation. For information, contact the Office of Continuing Education.

The Elisabeth Luce Moore Fellowship

The Elisabeth Luce Moore Fellowship in International and Religious Studies is presented annually by the Stony Brook Foundation to a deserving Stony Brook student who demonstrates outstanding academic potential and gives promise of contributions of unusual stature to the fostering of international understanding and/or to the appreciation of religious values. For information, contact the Scholarship Awards Committee.

The Raymond E. Jones Award

The Raymond E. Jones Award is presented annually to an exchange student who has made an outstanding contribution in scholarly achievement, creative endeavor or teaching excellence. For information, contact the International Exchange Office.

The John Gassner Memorial Award

This award is presented to a senior or graduate student who has achieved a degree of superiority in the area of dramatic criticism or dramaturgy. For further information, contact the chairperson, Theatre Arts Department.

Alumni Scholarship

The Alumni Scholarship will be awarded to a graduate student who is active in campus affairs and who has demonstrated achievements benefiting the University environment.

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 in the State of New York. The fellowships and tuition waivers are available for qualified students.

Applications are open to graduate students who have 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 mangement 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, Life Sciences Library, Room 10.

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 Book 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 Award

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 $8000 for the calendar year with waiver of tuition.

National Direct Student Loan (NDSL) and College Work Study Programs (CWSP)

The Financial Aid Office offers assistance from the National Direct Student Loan (NDSL) and the College Work Study Program. Funds from these programs are awarded on the basis ofdemonstrated financial need.

The National Direct Student Loan (NDSL) is a low interest loan. Graduate students may borrow at a 5% interest rate with repayment beginning six months after graduation or departure from school. Repayment may extend over a 10-year period. The average NDSL for graduate students that have demonstrated financial need is $1250.00 per academic year.

College Work Study Program (CWSP) provides jobs for graduate students who have demonstrated financial need. The average CWSP position entails 12 hours of work per week. Because funds are limited, only students who apply within the stated deadlines will be considered for College Work Study Program or National Direct Student Loan.

Application Procedures and Deadlines

Complete the Financial Aid Form (sides 1 and 2). The Financial Aid Form must be filed in sufficient time to be received and date stamped at the College Scholarship Service (CSS) in Princeton, New Jersey by mid-March. The Stony Brook Insititutional Application must be completed. In particular, the Statement of Education Purpose/Registration Compliance and Applicant's Statement must be signed. This form is due in the Financial Aid Office by mid-March. Income documentation must be received in the Financial Aid Office by end of April. The deadline for entering graduate students is 30 days after their date of acceptance into the University. Students are urged to contact the Financial Aid Office for the exact dates for filing which were referred to above.

Guaranteed Student Loan (GSL) Program

The Guaranteed Student Loan Program is administered by the New York State Higher Education Services Corporation through the Financial Aid Office and a participating bank. The maximum amount available through this program is $5,000 per year to an aggregate maximum of $25,000, including what the student borrowed as an undergraduate, subject to financial need. There is a ½% loan fee charge at disbursement, plus a 5% origination fee. Repayment at 9% begins six months after the student leaves school.

Application Procedures

The student should obtain a loan application from a participating lending institution (bank, credit union, etc.). 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.

To be eligible for a guaranteed loan a student must be: l) a U.S. citizen or permanent resident alien, a paroled refugee, or an asylum applicant (I-94 permit); and 2) enrolled in or admitted to an approved program, at least half-time, at an approved college, university or other postsecondary institution.

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*

*Including undergraduate loans

Responsibilities of Recipients

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

ALAS is administered by the New York State Higher Education Service Corporation 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 12% 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.

New York State Tuition Assistance (TAP) Program

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, toward 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.) The minimum achievement standards are based on cumulative grade point average and the number of credits earned each semester. The chart that follows provides a detailed analysis of the State Education Department's requirements.

Standard of Satisfactory Academic Progress
for Purpose of Determining Eligibility for Student Aid.

Calendar: Semester — Programs: All Graduate-Level Programs

Before being certified for this payment	1st	2nd	3rd	4th	5th	6th	7th	8th
A student must have accrued at least this many credits*	0	6	12	21	30	45	60	75
With at least this grade point average	0	2.0	2.5	2.75	3.0	3.0	3.0	3.0

** This includes successful completion of credit-equivalent work as set forth in 145-2.1 of the Commissioner's Regulations.*

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 rquired to complete the program following the summer session) or students who will complete their program of grduate study during the sumer 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 appied 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 automatically 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 eight weeks after filing, the student is advised to follow up. Students who fail to apply or who 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 eight 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
$ 2,000 or less	0 reduction
$ 2,001 — $9,500	$6.67% of the excess over $2000
$ 9,509 — $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
$ 1,000 or less	0 reduction
$ 1,001 — $3,000	25% of the excess over $1000
$ 3,001 — $5,666	$500
$ 5.667 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 1984 costs ranged from $489 for the minimal plan to $665 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 $2.80 to $6.45. 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 $2.75 to $4.95 per meal. The Union Cafeteria is open Monday to Friday, from 8 a.m. to 8 p.m. Prices range from $2.80 to $6.45 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 from $65 to $100 per semester. Students who elect to do this may expect to spend between $40 and $50 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 $500 for 9 months (September-May). This figure is included in the basic student aid budget.

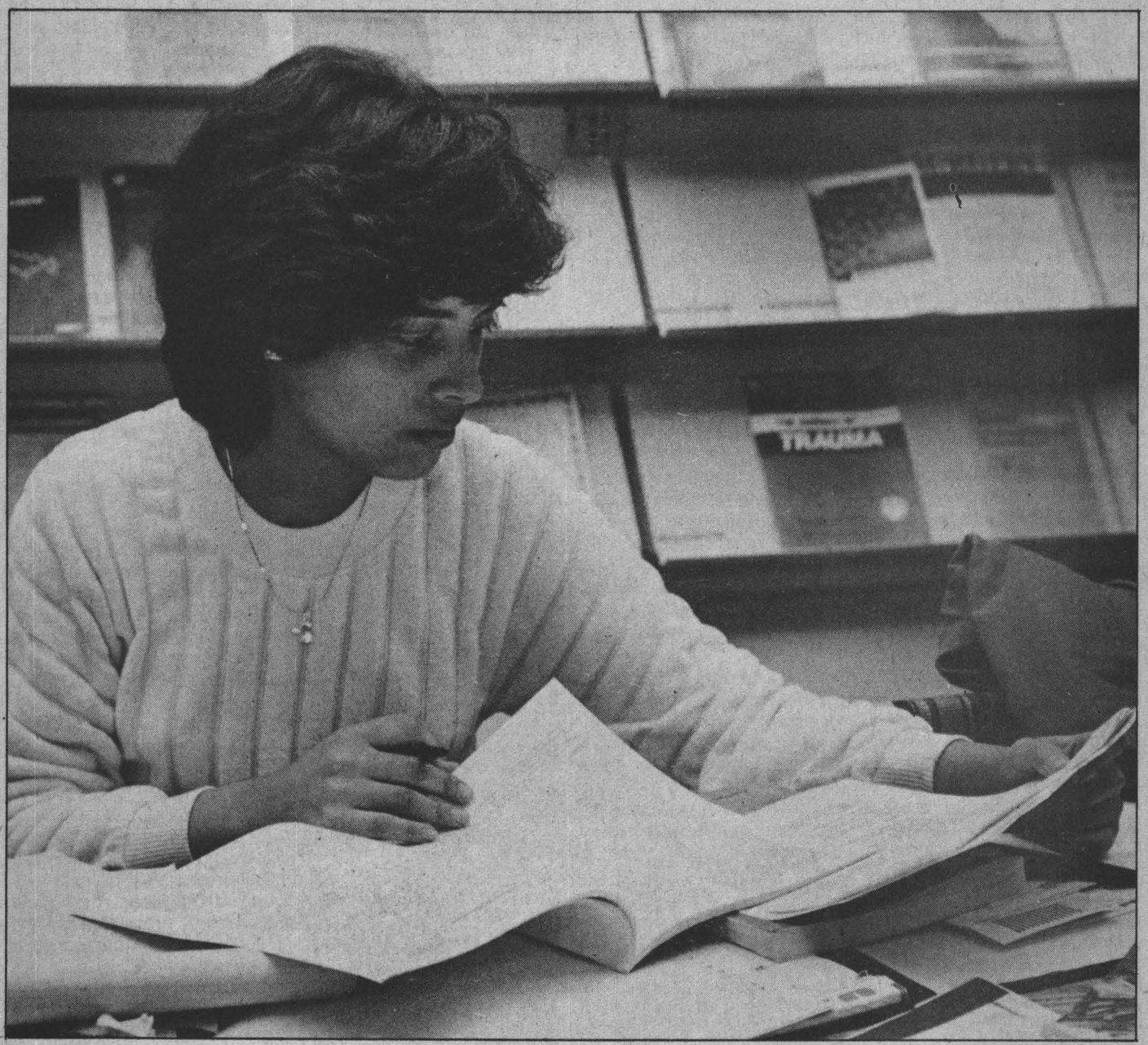
Miscellaneous Expenses

The average estimated personal expense is $800 for 9 months. This figure is used for the basic student aid budget.

Travel Expenses

The average estimated expense is $400 for 9 months on campus for a student residing in a dorm. The average estimated expense is $1400 for 9 months for a student residing with parents and commuting to the campus.

Admission Requirements



Applicants may be admitted to the Graduate School to pursue the M.A., M.F.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 $35.00*

B. An offical 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 General Test (some programs also require the advanced test).

F. Proficiency of English for foreign students (see "Foreign Students" section).

G. After acceptance, each student is required to file with the University Health Service a completed and satisfactory health history and physical examination form. Transfer students may submit copies of their health forms from their former schools provided they contain the information required by the University Health Service and are less than two years old.

To be admitted to the Graduate School, an applicant must have the preparation and ability which, in the judgement 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 be 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 for part-time students, or an overall B average for full-time students.

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 11794-4433.

Students should consult the information in the separate section about the Center for Continuing Education for the requirements for admission into the Master of Arts in Liberal Studies program.

*All applicants are required to pay the application fee except those students who reapply for admission within one academic year. The application fee may be waived in cases where there is documentation from a financial aid administrator or other appropriate college or university official substantiating that a particular U.S. student is needy or that the payment of the application fee would create a financial hardship. Students with an exceptionally high overall GPA also may be eligible for a waiver. These students should contact the Graduate School for additional information.

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 550 for admission. 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 included in foreign students' application material, must be submitted for this purpose before I-20 documents are sent to the students.

I-20 Documentation

Government regulations require that every foreign student attend the institution issuing the I-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. Complete information is available and students are urged to contact the Office of Foreign Student Affairs.

Student Status

Part-Time Students

Part-time students admitted to the Graduate School will register for no more than 11 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 G1 or G2 (91, 92, 93, 94, 95), depending on the program to which they have been admitted and their previous graduate training. If having earned less than 24 graduate credits at another institution before being admitted, a student will be classified as G1 (91, 93). If having earned more than 24 graduate credits before being admitted, a student will be classified as G2 (92, 94).

Full-Time Students

Students admitted for full-time study to the Graduate School will normally register for 12 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 will be expected to participate in supervised teaching and research. Students holding such appointments will register for nine regular graduate credits in addition to the participation in teaching and research. Full-time graduate students are classified as either G1 or G2 (91, 92, 93, 94, 95), depending on the program to which they have been admitted and their previous graduate training. If a student has earned less than 24 graduate credits at another institution before being admit-

ted, he or she will be classified as G1 (91, 93). If a student has earned more than 24 graduate credits at another institution before being admitted, he or she will be classified as G2 (92, 94).

Graduate Record Examination

The Graduate Record Examination General Test is required of all prospective graduate students. 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.

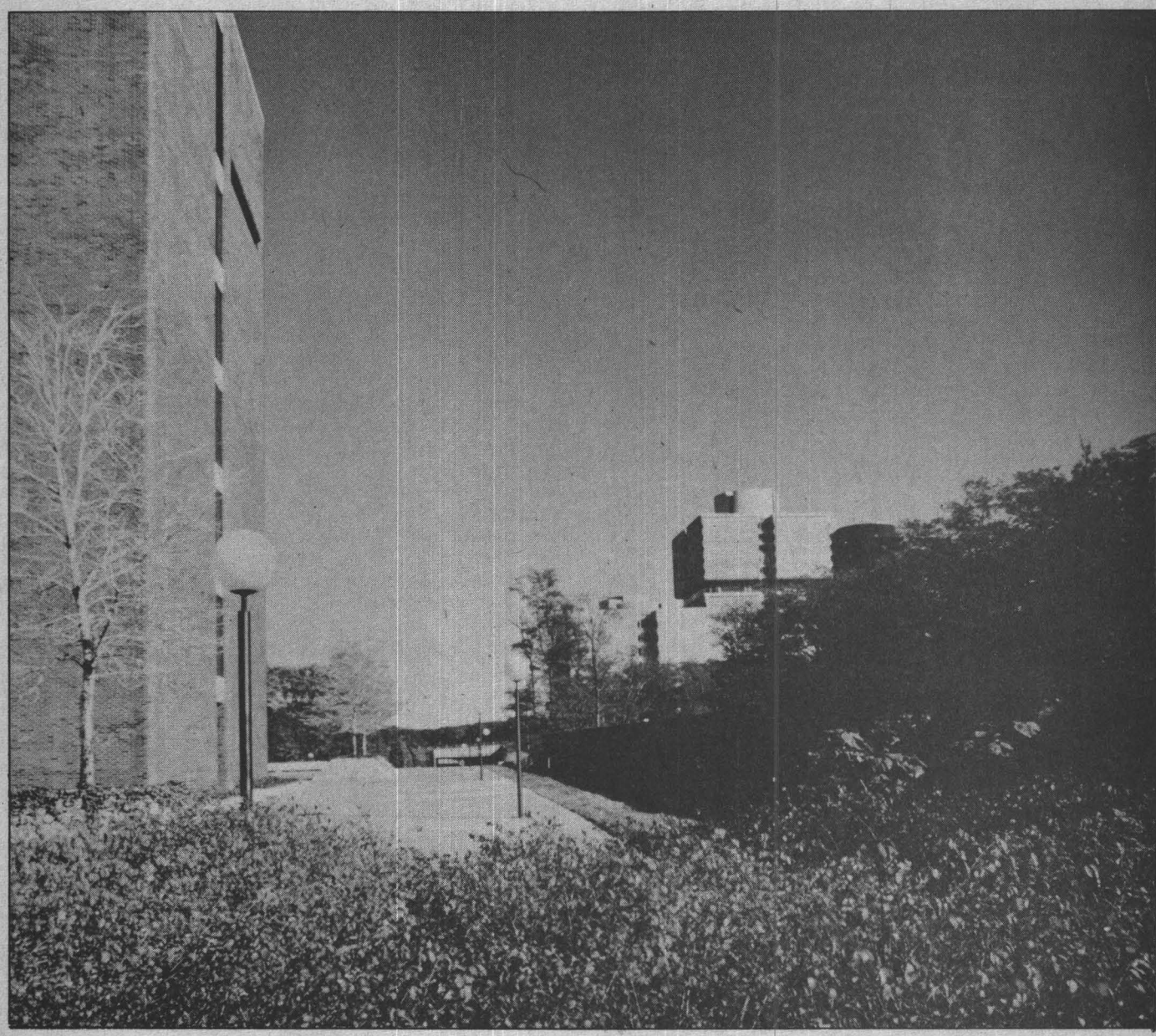
Admission of Undergraduates to Graduate Courses

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 admittted 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.

Bachelor's/Master's Programs

Five-year bachelor's/master's programs are available in several of the academic departments. Some are joint programs between two departments or colleges. At the end of the program, students may qualify for both the bachelor's and master's degrees. For further information, please contact the specific department of interest.

Academic Regulations and 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 the academic regulations and procedures for the Master of Arts in Liberal Studies Program, consult the semester bulletins of the Center for Continuing Education.

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 nonteaching 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 responsibiliy 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.

Graduate Curricula

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. **Concentrations** 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. Enrollment in other than registered approved programs may jeopardize a student's eligibility for certain student aid awards.

A complete list of offical degree programs and HEGIS numbers can be found in the index of this *Bulletin.*

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 a 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 disseration 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 at $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.

Currently registered 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 disseration 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 intstitutions 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 disseration.
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. Grades earned in transferred courses are not counted as part of the overall grade point average at Stony Brook.
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 Brook 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 the 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– (3.67), B+ (3.33), B (3.00), B– (2.67), C+ (2.33), C (2.00), C– (1.67), F (0.00). Pass/No Credit (P/NC) and grades of D *are not approved grades* for graduate students. Plus and minus grades 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 for 84-85: March 22 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 "I/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 tothe 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 report 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 "N/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. Final grades appearing on a student's academic transcript at the time of his or her graduation cannot be changed to any other grade subsequent to the graduation date. A final grade may not be changed on the basis of work completed after a term has ended.

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 Univeristy have been exhausted, inquires or complaints may be filed with the Family Educational Rights and Privacy Act Office, Department of Health and Human Services, 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 Educational 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 officals 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 officals 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 officals 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 the Board of Higher Education of the City of New York, or any community college.

Academic Probation

When a student's cumulative graduate grade point average falls below B (3.0) for grades earned in courses numbered 500 and above taken at Stony Brook, the student shall be placed on probation. If the student's overall graduate average has been raised to B (3.0) by the end of the next semester of enrollment after being first notified of probation, the student will be returned to regular status. A student on academic probation who fails to achieve a 3.0 cumulative GPA by the end of the second semester on probation will normally not be permitted to re-enroll.

If admitted on probation, a student must earn an overall graduate average of at least B (3.0) during the first semester of enrollment to be permitted to re-enroll in the subsequent semester. In this case, the student is considered to have achieved regular status. A student admitted on probation who fails to earn a B (3.0) average in the first semester will normally not be permitted to re-enroll.

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.

Grievance Procedures

Students encountering difficulties with departmental or Graduate School policy or procedure should discuss the problem first with their advisor and the Director of Graduate Studies of their department. If difficulties continue to be unresolved, the student should follow the guidelines available in the Graduate School Office for further appeal.

Advancement to Candidacy

A student may be advanced to candidacy after having completed Graduate School and departmental requirements other than the dissertation or its equivalent. Students on academic probation cannot be advanced to candidacy. Advancement to candidacy is granted by the Vice Provost for Research and Graduate Studies upon recommendation of the Director of Graduate Studies.

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 initating it if, of necessity, the student must leave graduate study. Students may withdraw from the University up to the last day of classes.

Students are urged to discuss all withdrawls 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

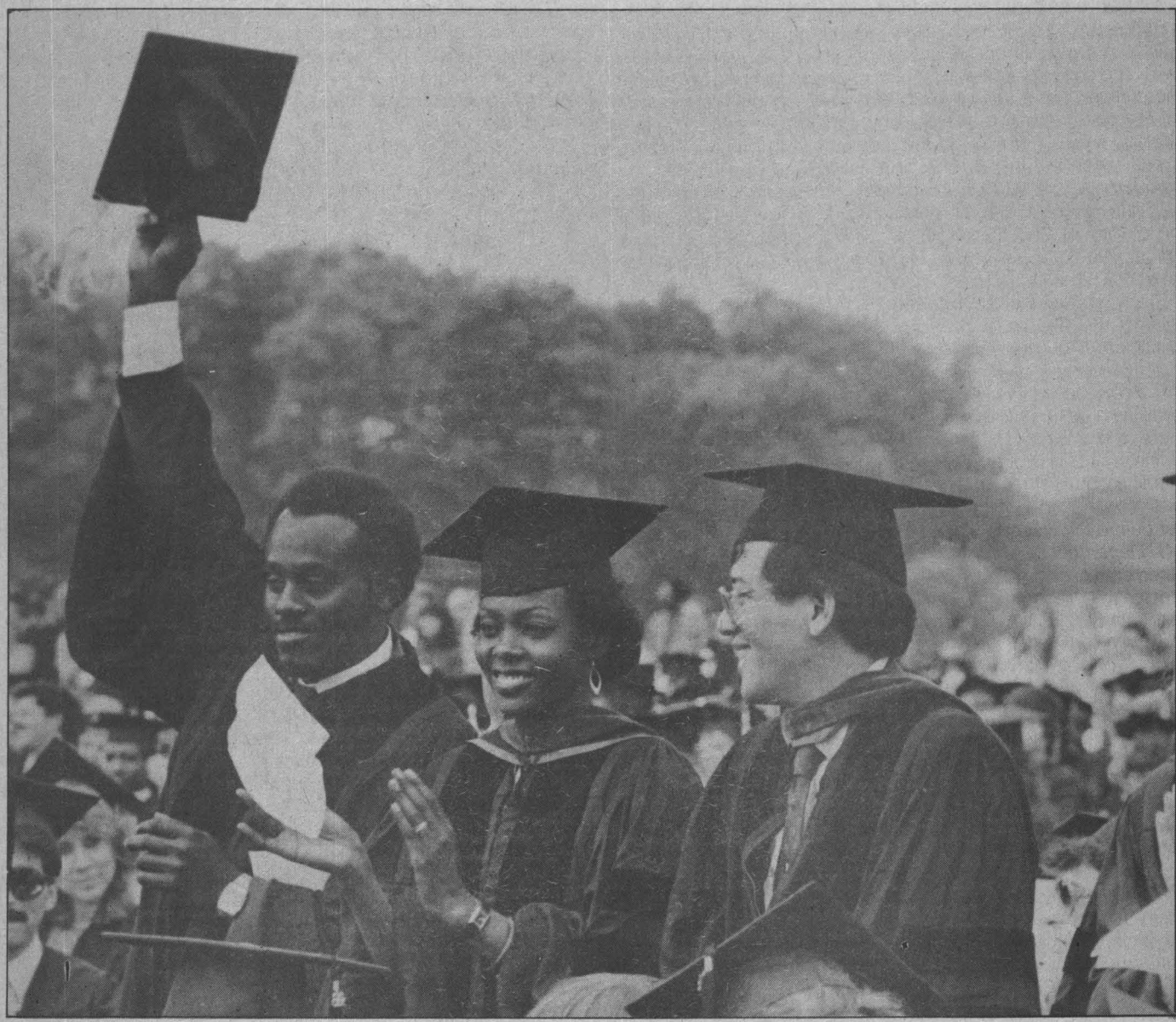
Leaves are granted for a maximum of one year at a time, renewable upon request for the second year. A student on academic probation may be granted a leave of absence only if he or she recognizes that re-enrollment is subject to conditions imposed by the Graduate School and his or her department. These conditions will be specified in writing at the time the leave is approved. The semesters in which a student is on an *approved* leave of absence do not count in the calculation of the time limit for the degree. 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 in 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 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. The academic department will then complete a Readmission Form and submit it to the Graduate School for approval.

Degree 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 Fine Arts, Master of Music and Master of Science

The granting of the master's degree is based upon the completion of any special departmental requirements in addition to the items listed below:

A. Courses and grade point average: A student must achieve a 3.0 overall grade point average for a minimum of 30 credits of graduate work to receive a master's degree.

B. Language proficiency: Though 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 requirements and the evaluation of any stated proficiency. Students must comply with their departmental requirements.

C. Teaching: Practicum in teaching under supervision is required.

D. Thesis and comprehensive examination: 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 to be filed with the Graduate School, it must be prepared in accordance with the guidelines presented in the booklet titled "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.

E. Degree application: Students must submit a signed degree card to the Graduate School in accordance with published deadlines. If degree requirements are not met, students must reapply for any subsequent awarding periods.

F. Registration: Degree candidates must be registered for at least one credit in the semester in which the diploma is awarded. There is one exception. If a student is registered in any given semester but fails to complete the degree requirements within the deadlines, he or she may reapply to graduate in the next semester or term without registering again *provided* all requirements are met *before* the first day of classes of the next semester or term.

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

H. 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 in the semester publications from the CED office.

The Ph.D. Degree

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. 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.

A. Courses and grade point average: The student will follow an approved program of courses determined to meet his or her needs and to satisfy departmental requirements. A student must achieve a minimum 3.0 overall grade point average in graduate courses taken at Stony Brook in order to receive a doctoral degree.

B. 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. It 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 examination. 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.

C. 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.

D. Advancement to candidacy: The student may be advanced to candidacy when all Graduate School and departmental requirements for the degree other than the dissertation have been completed. Students on academic probation cannot be advanced to candidacy. Advancement to candidacy is granted by the Vice Provost for Research and Graduate Studies upon recommendation of the department.

E. Dissertation: A dissertation is required for the Ph.D. degree. It must convey in a clear and convincing manner the results of an orginal 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 titled "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.

F. Dissertation examining committee: 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 includes the dissertation supervisor(s), at least one person from outside the department or graduate program, and a chairperson. There must be at least two faculty members from the department or program on the committee.

G. Dissertation defense: 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 the dissertation research at an informal dissertation colloquium convened for that purpose by the department and open to interested faculty and graduate students.

Approval of the dissertation defense will be indicated by the Dissertation Committee signatures on a committee approval form which comprises page (ii) of the dissertation manuscript.

H. Teaching: A practicum in teaching under supervision is required.

I. Residence requirement: 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.

J. Degree application: The student must submit a signed degree card to the Graduate School in accordance with published deadlines. If degree requirements are not met, students must reapply for any subsequent awarding periods.

L. Departmental recommendation: When all departmental requirements are completed, the chairperson or graduate program director may recommend to the Vice Provost for Research and Graduate Studies that the Ph.D. degree be granted.

K. Registration: Degree candidates must be registered for at least one credit in the semester in which the diploma is awarded. There is one exception. If a student is registered in any given semester but fails to complete the degree requirements within the deadlines, he or she may reapply to graduate in the next semester or term without registering again provided all requirements are met before the first day of classes of the next semester or term.

M. Time limit: The candidate must satisfy all requirements for the Ph.D. degree within seven years after completing 24 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.

The Doctor of Arts Degree in Foreign Language Instruction

Admission to the Graduate School does not automatically qualify a student as a candidate for the D.A. degree. Formal recommendation of advancement to candidacy for the D.A. 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 D.A. degree engages in a creative research project leading to a dissertation. 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.

A. Courses and grade point average: The student will follow an approved program of courses determined to meet his or her needs and to satisfy departmental requirements. A student must achieve a minimum 3.0 overall grade point average in graduate courses taken at Stony Brook in order to receive a doctoral degree.

B. Language proficiency: Student's must have a master's degree or its equivalent with specialization in one of the following languages: French, German, Italian, Russian, Spanish, or TESOL.

C. Practicum: Teaching an elementary or intermediate course in the major is required.

D. Intership: Team-teaching a course of literature, advanced language or culture for one semester is required.

E. Externship: Full-time teaching for one semester, three courses, at the secondary or college level is required.

F. Comprehensive examination: 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.

G. Advancement to candidacy: A student may be advanced to candidacy when Graduate School and departmental requirements other than the dissertation or its equivalent have been completed. Students on academic probation cannot be advanced to candidacy. Advancement to candidacy is granted by the Vice Provost for Research and Graduate Studies upon recommendation of the Director of Graduate Studies.

H. 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 student has completed all coursework and has been reviewed by the doctoral committee, which will make the final determination for recommendation for conferral of the degree of Doctor of Arts in foreign language instruction. The dissertation must be prepared in accordance with the guidelines presented in the booklet titled "Guide to the Preparation of Theses and Dissertation" available from the Graduate School. The State University of New York at Stony Brook does not allow multiple authorship for a dissertation.

Approval of the dissertation will be indicated by the doctoral committee signatures on a committee approval form which comprises page (ii) of the dissertation manuscript.

I. Residence requirement: 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 satifactorily 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.

J. Degree application: The submission of a signed degree card to the Graduate School in accordance with published deadlines. If degree requirements are not met, students must reapply for any subsequent awarding periods.

K. Departmental recommendation: When all departmental requirements are completed, the chairperson or graduate program director may recommend to the Vice Provost for Research and Graduate Studies that the D.A. degree be granted.

L. Registration: Degree candidates must be registered for at least one credit in the semester in which the diploma is awarded. There is one exception. If a student is registered in any given semester but fails to complete the degree requirements within the deadlines, he or she may reapply to graduate in the next semester or term without registering again provided all requirements are met before the first day of classes of the next semester or term.

M. Time limit: The candidate must satisfy all requirements for the D.A. degree within seven years after completing 24 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 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 comprehensive examination again before being permitted to continue work.

The Doctor of Musical Arts Degree

Admission to the Graduate School does not automatically qualify a student as a candidate for the D.M.A. degree. Formal recommendation of advancement to candidacy for the D.M.A. 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. 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.

A. Courses and grade point average: The student will follow a program of courses determined to meet his or her needs and to satisfy the departmental requirements. A student must achieve a minimum 3.0 overall grade point average in graduate courses taken at Stony Brook in order to receive the D.M.A. degree.

B. Contract toward candidacy: The student must fulfill the specific requirements of his or her contract toward candidacy.

C. Language proficiency: Although the Graduate School itself does not require proficiency in a foreign language, the departments have the responsibility for their foreign language requirements and the evaluation of any stated proficiency. Students must comply with their departmental requirements.

D. Advancement to candidancy: The student may be advanced to candidacy when all Graduate School and departmental requirements for the degree other than the doctoral recital have been completed. Students on academic probation cannot be advanced to candidacy. Advancement to candidacy is granted by the Vice Provost for Research and Graduate Studies upon recommendation of the department.

E. Doctoral recital: The doctoral recital must demonstrate a distinguished level of performance. A cassette recording of it is to be kept permanently in the University Library. In addition, an official copy of the program and the original program notes must be submitted to the Graduate School.

F. Teaching: A practicum in teaching under supervision is required.

G. Residence requirement: 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 requiements 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.

H. Degree application: The student must submit a signed degree card to the Graduate School in accordance with published deadlines. If degree requirements are not met, students must reapply for any subsequent awarding periods.

I. Departmental recommendation: When all departmental requirements are completed, the chairperson or graduate program director may recommend to the Vice Provost for Research and Graduate Studies that the D.M.A. degree be granted.

J. Registration: Degree candidates must be registered for at least one credit in the semester in which the diploma is awarded. There is one exception. If a student is registered in any given semester but fails to complete the degree requirements within the deadlines, he or she may reapply to graduate in the next semster or term without registering again provided all requirements are met before the first day of classes of the next semester or term.

K. Time limit: The candidate must satisfy all requirements for the D.M.A. degree within seven years after completing 24 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.

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 titled "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.

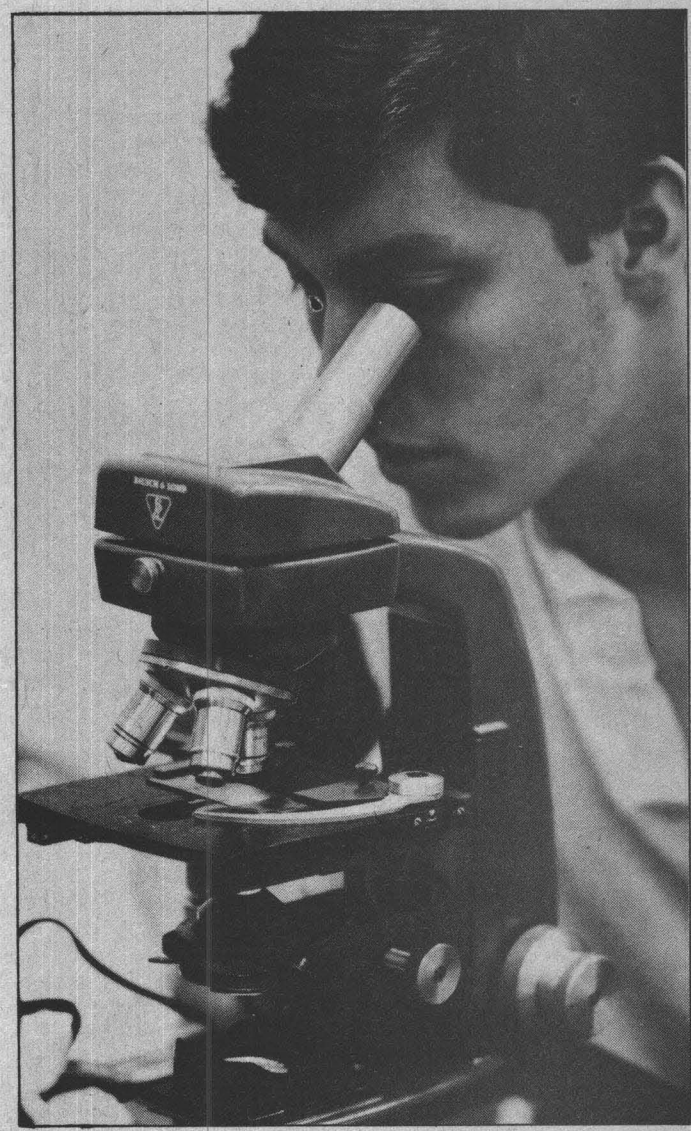
The University reserves the right to alter these regulations without notice.

College of Arts and Sciences

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 Graduate Program Director.



Cellular and Developmental Biology (BCD)

Graduate Program Director: Benjamin Walcott
Department of Anatomical Sciences
Health Science Center, T-8 (516)444-3130

Graduate Studies in Cellular and Developmental Biology leading to the Ph.D. degree in Biological Sciences 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 that 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 continous 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

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.

Degree Requirements

Requirements for the M.A. Degree

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, presenting and defending a research thesis, and fulfilling the minimum requirements of the Graduate School.

Requirements for the Ph.D. Degree

A. 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 Molecular 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 students generally must work in four different laboratories during the two semesters. The particular laboratories involved will be decided in consulation with the student and with approval of the Executive Committee.
7. At least three approved elective graduate courses.

Students must achieve a B or better in all required courses and must maintain a B average in undergraduate and graduate elective courses.

B. 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.

C. 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).

D. 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.

Faculty

Arnheim, Norman, Associate Professor.[2] Ph.D., 1965, University of California, Berkeley: Control of the RNA transcription and recombination of mammalian repeated genes.

Bennet, John, Scientist.[8] Ph.D., 1971, University of Queensland, Australia: Chloroplast structure, functional and development in higher plant; chloroplast protein phosphorylation.

Bingham, Paul M., Assistant Professor.[2] Ph.D., 1979, Harvard University: Regulation of transcription in and transposon biology of developing multicellular organisms.

Bogenhagen, Daniel, Assistant Professor.[5] M.D., 1977, Stanford University: Molecular genetics of transcriptional control, mitochondrial DNA and for *Xenopus* 5S RNA.

Bohn, Martha C., Assistant Professor.[4] Ph.D., 1979, University of Connecticut: Hormonal effects on the developing nervous system; neurotransmitter phenotypic expression.

Brink, Peter R., Assistant Professor.[1] Ph.D., 1976, University of Illinois, Urbana-Champaign: Cell-to-cell communication; electrophysiology of invertebrate nervous system.

Brugge, Joan S., Assistant Professor.[3] Ph.D., 1975, Baylor College of Medicine: Mechanism of tumor induction by avian sarcoma virus; regulation of cellular growth control.

Bulloch, Karen, Assistant Professor.[6] Ph.D., 1980, University of California, San Diego: Role of the autonomic nervous system innervation of the thymus gland in its development and function.

Cirillo, Vincent P., Professor.[2] Ph.D., 1953, University of California, Los Angeles: Mechanisms of membrane transport processes in yeast and bacteria.

DeBlas, Angel L., Assistant Professor.[4] Ph.D., 1978, Indiana University: Neurochemistry; synaptic function; molecular mechanisms of cellular recognition during synaptogenesis; monoclonal antibodies to neural antigens.

Delihas, Nicholas, Professor.[3] Ph.D., 1961, Yale University: Structure, function and phylogeny of 5 S ribosomal RNA; RNA-protein interactions.

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., Professor.[2,9] Ph.D., 1966, Pennsylvania State University: Structure and function of eukaryotic and organelle tRNAs and tRNA genes.

Edmunds, Leland N., Professor.[1] Ph.D., 1964, Princeton University: Cell division cycles and circadian oscillators in *Euglena.*

Erk, Frank C., Professor.[2,10] Ph.D., 1952, Johns Hopkins University: Pattern formation and regulation in *Drosophila* development.

Fisher, Paul A., Assistant Professor.[5] Ph.D., M.D., 1980, Stanford University: Structure and function of the cell nucleus; enzymology of eukaryotic DNA synthesis.

Gilbert, Susan H., Assistant Professor.[1] Ph.D., 1975, Emory University: Energy transduction in muscle; structure-function correlates of thick filament shortening.

Katz, Eugene R., Associate Professor.[3,11] Ph.D., 1969, University of Cambridge, England: Biochemical genetics and development in cellular slime molds.

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 thylakoidal components; circadian rhythms of photosynthesis.

Ledbetter, Myron, Senior Cell Biologist.[8] Ph.D., 1958, Columbia University: Relationship of fine structure to function in plant cells, especially the relationship of microtubules to the formation of cell wall.

Lucas, Joseph J., Assistant Professor.[3] Ph.D., 1972, University of Pennsylvania: Nuclearcytoplasmic interaction in eukaryotic cells, studied by techniques of enucleation with cytochalasin B and nuclear transplantation.

Lyman, Harvard, Associate Professor.[1] Ph.D., 1960, Brandeis University: Control mechanisms in the biogenesis, development and replication of chloroplasts and other cellular organelles.

Marcu, Kenneth, Associate Professor.[2] Ph.D., 1975, State University of New York at Stony Brook: Regulation of expression of eukaryotic multigene families by genetic recombination (immunoglobulin genes and trypanosome surface antigen genes).

Merriam, Robert W., Associate Professor.[4] Ph.D., 1953, University of Wisconsin: Role of actins in the structure and function of eggs and early embryos.

Moos, Carl, Associate Professor.[2] Ph.D., 1957, Columbia University: Contractile proteins of muscle; molecular mechanisms of contraction and control.

Palatnik, Carl M., Research Assistant Professor.[1] Ph.D., 1975, State University of New York at Stony Brook: Gene regulation in eukaryotic development; relationship between growth control and cytoskeletal protein synthesis.

Panessa-Warren, Barbara J., Research Assistant Professor.[1] Ph.D., 1974, New York University: Cellular processing and storage of calcium and other divalent cations in relation to ultrastructure; high-resolution imaging of hydrated cells and organelles; analytical electron beam and X-ray induced microanalysis.

Prives, Joav, M., Assistant Professor.[1] Ph.D., 1969, McGill University, Montreal, Canada: Regulation of surface membrane and synaptogenesis; control of acetylcholine receptor synthesis and topological distribution; role of peripheral cytoskeleton in the regulation of cell surface properties.

Sciaky, Daniela, Associate Geneticist.[8] Ph.D., 1977, Washington State University: The *Agrobacterium tumefacines* Ti plasmid as a vector for engineering plants and for analysis of plant genes.

Scott, Sheryl A., Associate Professor.[4] Ph.D., 1976, Yale University: Developmental neurobiology; development of sensory innervation patterns.

Spector, Ilan, Assistant Professor.[1] Ph.D., 1967, University of Paris, France: Expression of ionic channels in excitable cells in tissue culture; role of microfilaments in morphogenesis of nerve cells.

Strickland, Sidney, Associate Professor.[5] Ph.D., 1973, Michigan State University: Biochemistry of differentiation and development.

Taichman, Lorne B., Associate Professor.[7] Ph.D., 1971, University of Wisconsin; M.D., 1965, University of Toronto, Canada: Regulation of differentiation in epithelial keratinocytes; use of viruses as probes for keratinocyte differentiation; differentiation mutants of cultured keratinocytes.

Walcott, Benjamin, Associate Professor and Graduate Program Director.[1] Ph.D. 1968, University of Oregon: Neural control of secretion; neuroimmunology, relation of CNS to immune system; cell biology of sensory systems; electron microscopy.

Williams, David L., Associate Professor.[5] Ph.D., 1972, University of Illinois: Hormonal control of gene expression; molecular biology of atherosclerosis.

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.[3] Ph.D., 1962, University of Gottingen, Federal Republic of Germany: Structure and function of cellular and viral nucleic acids and proteins; the replication of poliovirus.

Zieve, Gary W., Assistant Professor.[1] Ph.D., 1977, Massachusetts Institute of Technology: Biochemical and ultrastructural analysis of cell motility with emphasis on cell division and intracellular transport.

Number of teaching, graduate and research assistantships, fall 1983: 24

[1] *Department of Anatomical Sciences*
[2] *Department of Biochemistry*
[3] *Department of Microbiology*
[4] *Department of Neurobiology and Behavior*
[5] *Department of Pharmacololgical Sciences*
[6] *Department of Neurology*
[7] *Department of Oral Biology and Pathology*
[8] *Brookhaven National Laboratory*
[9] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1973-74.*
[10] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1981-82.*
[11] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1974-75.*

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 data 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; 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 intergrated view of the cell development 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)

Chairperson: Lawrence B. Slobodkin
Life Sciences Building 650 (516) 246-6160

Graduate Program Director: Lev R. Ginzburg
Life Sciences Building 650 (516) 246-8249

Graduate Studies in Ecology and Evolution provides training which leads to the Ph.D. and in special cases to the M.A. During the first year, students take courses in ecology, evolution and biometry. Advanced courses and seminars are taken in subsequent years. Research opportunities include a broad spectrum of theoretical, laboratory and field problems involving diverse groups of terrestrial, freshwater and marine organisms in geographic regions ranging from the tropics to the Arctic. Graduate Studies in Ecology and Evolution also includes diverse approaches to ecological and evolutionary problems, stressing population biology in its experimental, field-oriented and mathematical 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 applied ecology and are actively involved in ecologically based social action in the Long Island area and on a national and international scale. Students who earn degrees are qualified for positions in academic or research institutions and also for careers in government agencies, conservation organizations and environmental consulting companies. A more detailed description of Graduate Studies in Ecology and Evolution, including degree requirements and specific research interests of staff members, may be requested by contacting the Program Director, Graduate Studies in Ecology and Evolution. Potential applicants are also encouraged to contact staff members with whom they may wish to work.

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 26-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. There are also other opportunities for field studies both in this country and abroad. 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

Graduate Studies in Ecology and Evolution usually only admits a student whose goal is the Ph.D. degree. Admission requirements, in addition to Graduate School admission requirements, include the following:

A. A baccalaureate degree in biology, chemistry, mathematics or other courses of study that provide an appropriate background for advanced training in ecology and evolution.

B. Formal coursework in genetics, ecology and the biology of a particular group of organisms.

C. Report of Graduate Examination scores and for international students, TOEFL scores.

D. Acceptance by Graduate Studies in Ecology and Evolution and by the Graduate School.

Degree Requirements

Requirements for the M.A. Degree

Graduate Studies in Ecology and Evolution usually does not accept a student whose goal is an M.A. degree. However, a student already in graduate studies may be awarded an M.A. degree upon satisfaction of the following requirements in addition to the minimum Graduate School requirements:

A. Completion of an approved course of study including 30 graduate credit hours.

B. Preparation of a research thesis.

Requirements for the Ph.D. Degree

A. Course Requirements

1. During the first year in residence, students are normally required to take Principles of Ecology (BEE 550), Principles of Evolution (BEE 551), Biometry (BEE 552) and Research Areas in Ecology and Evolution (BEE 556).

2. Students must take a minimum of three other graduate courses, other than seminars, within this or other departments of this or other universities.

3. Colloquium in Ecology and Evolution (BEE 671-672) must be taken each year.

4. A minimum of one graduate seminar per year is required under normal circumstances.

5. The faculty feels that each student will require advanced training in various ancillary disciplines appropriate to the student's chosen field or 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 studies in mathematics, statistics, computer sciences, biochemistry or other areas.

B. 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.

C. Language Requirements

The language requirement will be established by the student's advisory committee and will not exceed reading knowledge of two foreign languages.

D. 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 faculty.

E. 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.

F. Dissertation Committee

Students select a temporary advisor during the first semester in residence and a permanent advisor is usually selected during the third semester. The advisory committee, consisting of the permanent advisor and at least two other faculty in Gradute Studies in Ecology and Evolution, is nominated by the student in consultation with her or his permanent advisor and must be approved by the program director.

G. 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.

H. 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.

I. 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.

J. Time Limit

The time limit imposed by the Graduate School is observed by Graduate Studies in Ecology and Evolution. Students must satisfy all requirements for the Ph.D. degree within seven years after completing twenty-four credit hours of graduate courses in Graduate Studies in Ecology and Evolution.

Faculty

Arnheim, Norman, Associate Professor.[2] Ph.D., 1965, University of Calfornia, Berkeley: Structure and genetic behavior of ribosomal DNA in mammals.

Battley, Edwin H., Associate Professor. Ph.D., 1956, Stanford University: Thermodynamics of microbial growth; ecological energetics; microbial ecology; nitrification and denitrification in aquatic systems.

Bell, Michael A., Assistant Professor. Ph.D., 1976, University of California, Los Angeles: Evolutionary biology; population genetics; ichthyology; paleobiology and geographic variation.

Bentley, Barbara L., Associate Professor. Ph.D., 1974, University of Kansas: Nitrogen fixation; plant ecology; plant-animal interactions; tropical ecology.

Bingham, Paul, Assistant Professor.[2] Ph.D., 1979, Harvard University: Regulation of transcription in developing multicellular organisms; the role of transposons in evolution and speciation.

Carpenter, Edward J., Professor.[3] Ph.D., 1969, North Carolina State University: Nitrogen cycling in the marine environment; physiology of nitrogen incorporation by marine algae; phytoplankton ecology.

Chase, Ivan, Assistant Professor.[5] Ph.D., 1972, Harvard University: Social behavior; dominance hierarchies; cooperation; resource distribution.

Creel, Norman, Associate Professor.[1] Ph.D., 1967, Eberhard-Karls University, Tubingen, Federal Republic of Germany: Quantitative taxonomy of primate populations; polyfactorial inheritance; primate evolution.

Eanes, Walter F., Assistant Professor. Ph.D., 1976, State University of New York at Stony Brook; Population and biochemical genetics of *Drosophila;* molecular evolution.

Farris, James S., Assoicate Professor. Ph.D., 1968, University of Michigan: Theory of phylogenetic inference.

Fleagle, John G., Associate Professor.[1] Ph.D., 1976, Harvard University: Primate evolution; comparative anatomy; behavioral ecology.

Futuyma, Douglas J., Professor.[6] Ph.D., 1969, University of Michigan: Ecological genetics; coevolution of species, especially of plants and insects; effects of evolution on the structure of ecological communities.

Ginzburg, Lev, Professor and Graduate Program Director. Ph.D., 1970, Agrophysical Institute, Leningrad, U.S.S.R.: Evolutionary theory; mathematical population genetics; theoretical and applied ecology.

Hechtel, George J., Associate Professor.[7] Ph.D., 1962, Yale University: Systematics and zoogeography of marine demospongiae.

Koehn, Richard K., Professor. Ph,D., 1967, Arizona State University: Population genetics; enzyme function and adaptation in natural populations.

Levinton, Jeffrey S., Professor. Ph.D., 1971, Yale University: Marine benthic ecology; population genetics of bivalve mollusks; paleoecology.

Lopez, Glenn R., Assistant Professor.[3] Ph.D., 1976, State University of New York at Stony Brook: Marine and freshwater benthic ecology; animal-microbe-sediment interactions; detritus.

Okubo, Akira, Professor.[3] Ph.D., 1963, Johns Hopkins University: Oceanic diffusion; animal dispersal; mathematical ecology.

Peart, David R., Assistant Professor. Ph.D., 1976, University of California, Davis: Plant ecology; experimental and theoretical approaches to population and community ecology.

Prestwich, Glenn D., Associate Professor.[4] Ph.D., 1974, Stanford University: Chemical ecology of termites; hormone and pheromone receptor biochemistry and physiology of insects.

Riley, Monica, Professor.[2] Ph.D., 1960, University of California, Berkeley: Macromolecular evolution in bacteria.

Rohlf, F. James, Professor. Ph.D., 1962, University of Kansas: Multivariate data analysis techniques applied to problems in taxonomy and ecology; computer modeling; applied ecology.

Slobodkin, Lawrence B., Professor. Ph.D., 1951, Yale University: Evolutionary strategy with reference to species diversity, timing of responses, adaptive mechanisms of *Hydra*.

Smolker, Robert E., Associate Professor. Ph.D. 1955, University of Chicago: Applied ecology; ornithology; public interest environmental law.

Sokal, Robert R., Professor. Ph.D., 1952, University of Chicago: Numerical taxonomy; theory of systematics; geographic variation; spatial models in ecology and evolution.

Thomson, James D., Assistant Professor. Ph.D., 1978, University of Wisconsin: Pollination biology; plant reproductive systems; community ecology.

Williams, George C., Professor. Ph.D. 1955, University of Califorina, Los Angeles: Evolution of life-history strategies; ecology and population genetics of marine fishes.

Number of teaching graduate and research assistants, fall 1983: 31

[1] *Department of Anatomical Sciences*
[2] *Department of Biochemistry*
[3] *Marine Sciences Research Center*
[4] *Department of Chemistry*
[5] *Department of Sociology*
[6] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1973-74*
[7] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1981-82.*

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 and the fossil record.
Fall, 4 credits

BEE 552 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 evoluntionary theory. The effects of mutation, recombination, selection and migration are studied. Modern concepts in both theoretical and experimental population genetics are covered.
Prerequistes: 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 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 563/OCN 563 Mathematical Marine Ecology
Advanced and specialized study of mathematical problems in marine ecology. Topics concerned include population dynamics models, compartmental modelling, diffussion-reaction equations, catastrophe-chaos problem, biofluid mechanics and stochastic modelling.
Spring, even years, 2-3 credits

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 and Modeling Techniques in Biology
An introduction for advanced biology, mathematics, and physics majors to assembly language and FORTRAN programming applications in ecology, population genetics, and taxonomy. Mathematical methods used in modeling of biological phenomena. Both analytical and simulation techniques will be emphasized.
Prerequisites: A year of calculus; either BIO 151, 152 or PHY 102 or 104
Fall, 3 credits (not offered in 1984-85)

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 enviroment.
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

Genetics (BGE)

Graduate Program Director: Eugene R. Katz
Life Sciences Building 156 (516) 246-4044

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 student 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 department 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 Life Sciences Building, which has excellent facilities and equipment. The other Health Sciences departments are situated directly across the road in the 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

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.

Degree Requirements

Requirements for the M.A. Degree

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, presenting and defending a research thesis, and fulfilling the minimum requirements of the Graduate School.

Requirements for the Ph.D. Degree

In addition to the requirements of the Graduate School, the following are required:

A. 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 student's 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.

B. Comprehensive (Preliminary) Examination

At the beginning of the fourth semester, the student will take a written comprehensive (preliminary) examination covering all areas of genetics.

C. 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.

D. Advancement to Candidacy

After successful completion of all required and elective courses, the comprehensive (preliminary) examination and the thesis proposal examination, the student will be recommended to the Graduate School for advancement to candidacy.

E. 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.

F. 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 (BI0 600).

G. 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.

Faculty

Anderson, Carl W., Geneticist.[6] Ph.D., 1970, Washington University: Protein synthesis; molecular biology of transformation and productive infection by DNA tumor viruses.

Arnheim, Norman, Associate Professor.[2] Ph.D., 1965, University of California, Berkeley: Recombinant DNA approaches to human chromosomal abnormalities, genetic behavior of multigene families.

Bingham, Paul M., Assistant Professor.[2] Ph.D., 1979, Harvard University: Regulation of transcription in and transposon biology of developing multicellular organisms.

Bogenhagen, Daniel F., Assistant Professor.[10] M.D., 1977, Stanford University: Molecular genetic analysis of the initiation of transcription of *Xenopus* 5S RNA genes and of mammalian mitochondrial DNA.

Brugge, Joan S., Assistant Professor.[3] Ph.D., 1975, Baylor College of Medicine: Mechanism of tumor induction by avian sarcoma virus; regulation of cellular growth control.

Burr, Benjamin, Geneticist.[6] Ph.D., 1969, University of California, Berkeley: Maize controlling elements; molecular cloning, storage protein genes of maize.

Burr, Frances A., Associate Botanist.[6] 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.

Dunn, John J., Microbiologist.[6] Ph.D., 1970, Rutgers Universtiy: Synthesis, processing, and translation of mRNA.

Eanes, Walter F., Assistant Professor.[4] Ph.D., 1976, State University of New York at Stony Brook: Population and biochemical genetics of *Drosophila*.

Ginzburg, Lev R., Assoicate Professor.[4] 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.[7] Ph.D., 1969, Columbia University: Animal virus genetics, nonsense mutations and suppression; genetic analyses of viral gene functions.

Hicks, James B., Senior Staff Investigator.[7] 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.[5] 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., Assoicate Professor and Graduate Program Director.[3] Ph.D., 1969, University of Cambridge, England: Genetic control of development in Dictyostelium discoideum.

Klar, Amar J.S., Staff Investigator.[7] Ph.D., 1975, University of Wisconsin: Mating locus of yeast; regulation of silent genes; mechanism of transposition.

Koehn, Richard K., Professor.[4] Ph.D., 1967, Arizona State University: Evolutionary genetics of natural populations and evolution of physiological variation using marine bivalves and mice.

Lucas, Joseph J., Assistant Professor.[3] 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.[7] Ph.D., 1927, Cornell University: Maize controlling elements, evolutionary genetics.

Oliver, Donald B., Assistant Professor.[3] Ph.D., 1980, Tufts University School of Medicine: Investigation of protein localization in *E. coli* using genetic methods.

Palatnik, Carl M., Assistant Professor.[1] Ph.D., 1975, State University of New York at Stony Brook: Molecular genetics of *Dictyostelium discoideum*.

Perucho, Manuel, Assistant Professor.[2] Ph.D., 1976, University of Madrid, Spain: Isolation and characterization of human tumor genes.

Rapaport, Felix T., Professor.[8] 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.[6] Ph.D., 1959, Yale University: Genetics of repair and recombination in *Haemophilus influenzae*.

Setlow, Richard, Professor.[6] Ph.D., 1947, Yale University: DNA repair in eukaryotic cells in culture; the study of genetic disorders involving repair deficiencies.

Sokal, Robert R., Leading Professor.[4] Ph.D., 1952, University of Chicago: Spatial variations of gene frequencies and morphometric variation using human populations.

Sternglanz, Rolf, Associate Professor.[2] Ph.D., 1967, Harvard University: DNA replication in bacterial and eukaryotic systems; DNA topisomerases.

Strathern, Jeffrey N., Staff Investigator.[7] Ph.D., 1977, University of Oregon: The mating locus interconversions of yeast.

Strickland, Sidney, Associate Professor.[10] Ph.D., 1972, Michigan State University: Mechanisms of gene expression and hormonal control in mammalian development.

Studier, William F., Senior Biophysicist.[6] Ph.D., 1963, California Institute of Technology: Genetic analysis of bacteriophage T7 gene regulation.

Tamanoi, Fuyuhiko, Senior Staff Investigator.[7] Ph.D., 1977, Nagoya University, Japan: *In vitro* mutagenesis as a probe for oncogene function.

Tegtmeyer, Peter, Professor.[3] M.D., 1960, Saint Louis University: Genetic analysis of SV40, genetics of virus reproduction and cellular transformation.

Trunca, Carolyn, Assistant Professor.[9] Ph.D., 1972, University of Wisconsin: Cytogenetics, human reciprocal translocations and risk estimates of disease.

Wimmer, Eckard, Professor.[3] Ph.D., 1962, University of Gottingen, Federal Republic of Germany: Structure and biological function of ribonucleic acids and proteins of picornaviruses and RNA tumor viruses and their host cells.

Number of teaching, graduate and research assistants, fall 1983: 18

1 *Department of Anatomical Sciences*
2 *Department of Biochemistry*
3 *Department of Microbiology*
4 *Department of Ecology and Evolution*
5 *Department of Medicine*
6 *Brookhaven National Laboratory*
7 *Cold Spring Harbor Laboratory*
8 *Department of Surgery*
9 *Department of Obstetrics-Gynecology*
10 *Department of Pharmocological Sciences*

Courses

BQE 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

BQE 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 each semester

BQE 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 each semester

BQE 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 each semester

BQE 599 Research
Original investigation undertaken under the supervision of a member of the staff.
Fall and spring, 1-8 credits, variable

BQE 699 Dissertation Research
Original investigations undertaken as part of the Ph.D. program under supervision of a member of the staff.
Prerequisite: Advancement to candidacy
Fall and spring, 1-9 credits, variable

Molecular Biology (BMO)

Chairperson: Masayori Inouye
Life Sciences Building 450 (516) 246-5043

Graduate Program Director: Rolf Sternglanz
Life Sciences Building 472 (516) 246-7691

Graduate Studies in Molecular Biology offers a full graduate program leading to the Ph.D. degree in Biological Sciences. The course of study is designed to prepare the student to formulate and attack biological problems at the molecular and cellular levels. 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 basis of gene expression, metabolic control mechanisms, membrane biochemistry, contractile systems and ultrastructure.

The faculty of the program is drawn from several departments; it comprises all the members of the Department of Biochemistry plus faculty members from the Department of Chemistry and from the School of Medicine.

Facilities

A full range of modern facilities and equipment is available for research in molecular biology.

Admission

Graduate Studies in Molecular Biology requires the following in addition to the Graduate School admission requirements:

A. A bacalaureate 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.

Degree Requirements

Requirements for the M.A. Degree

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, submitting and defending a master's thesis and fulfilling the minimum requirements of the Graduate School.

Requirements for the Ph.D Degree

A. Course Requirements

Core courses:

1. Graduate Biochemistry I, II (BMO 520, 521), a two-semester course.
2. Molecular Genetics (HBM 503).
3. Physical Biochemisty (BMO 512).
4. Experimental Biochemistry (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.
5. Three elective courses in molecular biology or related fields.
6. Enrollment every semester in three seminar courses: Collquium 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, posdoctoral fellows and advanced students present informal progress reports on their current research activities.

B. Qualifying Examination

At the beginning 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 intergrate basic concepts and information from the core courses and to apply them to current problems in molecular biology.

C. 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 exaination. The qualifying examination and the proposition examination together constitute the preliminary examination specified in the regulations of the Graduate School.

D. 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.

E. 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.

F. 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.

G. 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.

H. 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.

Faculty

Arnheim, Norman, Associate Professor.[1] Ph.D., 1965, University of Calfornia, Berkeley: Gene expression in mammalian multigene families.

Bauer, William R., Professor.[4] Ph.D., 1968, California Institute of Technology: Interaction of DNA-binding proteins with circular and linear DNAs; morphogenesis of vaccinia virus.

Bingham, Paul M., Assistant Professor.[1] Ph.D., 1979, Harvard University: Regulation of transcription in and transposon biology of developing multicellular organisms.

Carlson, Elof A., Distinguished Teaching Professor.[1] Ph.D., 1958, University of Indiana: Human genetics; mutational mosaicism; retinoblastoma; phenoxyacetic acid mutagenesis.

Cirillo, Vincent P., Professor.[1] Ph.D. 1953, University of California, Los Angeles: Mechanisms of membrane transport processes in yeast and bacteria.

Cohen, Seymour, Distinguished Professor.[5] Ph.D., 1941, Columbia University: Comparative biochemistry; function of polyamines.

Dudock, Bernard S., Professor.[1,10] Ph.D., 1966, Pennsylvania State University: Characterization of organelle genomes; structure and function of tRNA and tRNA genes.

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.[1,11] Ph.D., 1952, Johns Hopkins University: Pattern formations and mutagenesis in *Drosophila;* developmental genetics of dermatoglyphic pattern specifications in humans.

Freundlich, Martin, Associate Professor.[1] Ph.D., 1961, University of Minnesota: *In vivo* and *in vitro* studies on regulation of gene expression in bacteria.

Inouye, Masayori, Professor and Chairperson.[1] Ph.D., 1963, Osaka University, Japan: Membrane biogenesis and gene expression in *Escherichia coli;* cell division and morphogenesis of *Myxococcus xanthus.*

Jesty, Jolyon, Associate Professor.[3] Ph.D., 1972, Oxford University, England: Biochemistry of control mechanisms in coagulation.

Kaplan, Allen P., Professor.[3] M.D., 1965, State University of New York, Downstate Medical Center: Biochemical mechanisms of allergic reactions.

Krikorian, Abraham D., Associate Professor.[1] Ph.D., 1965, Cornell University: Development of higher plants; physiological control of morphogenesis in higher plants.

London, Erwin, Assistant Professor.[1] Ph.D., 1979, Cornell University: Structure and function of biological membranes; lipid-protein and protein-protein interactions.

Marcu, Kenneth B., Associate Professor.[1] Ph.D., 1975, State University of New York at Stony Brook: Genetic recombination in eukaryotic multigene systems and molecular mechanisms for oncogene activation.

McLaughlin, Stuart G., Professor.[6] Ph.D., 1968, University of British Columbia, Canada: Biophysics of natural and synthetic membranes.

Moos, Carl, Associate Professor.[1] Ph.D., 1957, Columbia University: Contractile proteins of muscle; mechanism of contraction and its regulation; actin-myosin interaction.

Morrison, Sidonie, Assistant Professor.[3] Ph.D., 1973, Oxford University, England: Kinetic aspects of blood coagulation.

Perucho, Manuel, Assistant Professor.[1] Ph.D., 1976, Complutense University of Madrid, Spain: Islolation and characterization of human tumor genes.

Riley, Monica, Professor.[1] Ph.D., 1960, University of California, Berkeley: Macromolecular evolution and mechanisms of genetic recombination in bacteria.

Sambrook, Joseph F., Adjunct Professor.[1] and Senior Staff Investigator.[8] Ph.D., 1965, Australian National Universtiy: Molecular genetics of DNA tumor viruses.

Sarma, Raghupathy, Associate Professor.[1] Ph.D., 1963, University of Madras, India: X-ray crystallography to determine the structure of immunoglobulins, lysozymes, and other molecules of biological interest.

Schecter, Nisson, Assistant Research Professor.[7] Ph.D., 1971 Western Michigan University: Molecular basis of heme growth and regeneration.

Schmidt, Jakob, Associate Professor.[1] Ph.D., 1970, University of California, Riverside; M.D., 1966; University of Munich, Federal Republic of Germany: Molecular biology of synaptic transmission; structure and function of nicotinic acetylcholine receptors in muscle and brain.

Setlow, Richard B., Adjunct Professor and Senior Biophysicist.[9] Ph.D.[1] 1947, Yale University; DNA damage and repair; carcinogens and radiation.

Shaw, Elliot N., Adjunct Professor.[1] and Senior Biochemist.[9] Ph.D.,[4] 1943, Massachusetts Institute of Technology: Protein chemistry of proteolytic enzymes (purification, structure and function); synthetic inhibitor of proteases.

Simon, Sanford R., Associate Professor.[1] Ph.D., 1967, Rockefeller University: Structure-function relationships in normal and modified hemoglobins, $Na^+ + K^+$/ATPase and ionophorous antibiotics, using spectroscopic and kinetic techniques.

Simpson, Melvin V., American Cancer Society Professor.[1] Ph.D., 1949, University of California, Berkeley: Mitochondrial DNA; mechanism of replication, replicative enzymes, evolution; mechanism of maternal inheritance.

Springer, Charles S., Jr., Associate Professor.[2] Ph.D., 1967, Ohio State University: Magnetic resonance studies of biological membranes.

Sternglanz, Rolf, Associate Professor and Graduate Program Director.[1] Ph.D., 1967, Harvard University: DNA replication in bacterial and eukaryotic systems; DNA topoisomerases.

Studier, William F., Adjunct Professor[1] and Senior Biophysicist.[9] 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: Hormonal regulation of gene expression; molecular biology of plasma lipoproteins and atherosclerosis.

Wu, Cheng-Wen, Professor.[5] M.D., Ph.D., 1969, Case Western Reserve: Mechanism and regulation of gene transcription; DNA-protein interactions.

Wu, Felicia, Associate Professor.[5] Ph.D., 1969, Case Western Reserve: Role of metal ions in gene expression; mechanism of action of antitumor drugs.

Number of teaching, graduate and research assistant, fall 1983: 42

[1] *Department of Biochemistry*
[2] *Department of Chemistry*
[3] *Department of Medicine*
[4] *Department of Microbiology*
[5] *Department of Pharmacological Sciences*
[6] *Department of Physiology and Biophysics*
[7] *Department of Psychiatry*
[8] *Cold Spring Harbor Laboratory*
[9] *Brookhaven National Laboratory*
[10] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1973-74.*
[11] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1981-82.*

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 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/BNB 540 Molecular Approaches to the Nervous System
An advanced course for critical evaluation of biochemical, molecular biological and cellular electrophysiological analysis of neuronal function and synaptic transmission. The format emphasizes discussion and evaluation of recent research findings by all participants.
Prerequisites: BMO 520, BNB 561 or permission of instructor
Spring, alternate years, 2 credits

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 2 credits each semester, variable

BMO 512 Physical Biochemistry
Theoretical principles and expermental 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 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 Graduate Biochemistry I
Several topics in modern biochemistry will be treated at an advanced level. Topics covered will include: protein structure, enzyme kinetics and mechanisms, metabolism of carbohydrates, amino acids and lipids, biomembranes, membrane transport and bioenergetics.
Prerequisite: Introductory Biochemistry
Fall, 4 credits

BMO 521 Graduate Biochemistry II
Topics in the molecular biology aspects of biochemistry will be covered, including nucleic acid replication, transcription and protein synthesis in both *in vivo* and *in vitro* systems.
Prerequisite: Introductory Biochemistry
Spring, 2 credits

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 molecilar 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, postdoctoral 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)

Chairperson: David Cohen
Life Sciences Building 550 (516) 246-6821

Graduate Program Director: Sheryl A. Scott
Life Sciences Building 550 (516) 246-6821

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, physiology and biophysics.

All major disciplines of neuroscience are represented, and graduate training emphasizes the acquisition of broad knowledge of neuronal structure and function. This includes the basic properties of nerve cells, communication among neurons, developmental neurobiology, neurochemistry and the cellular basis of integrative functions of the nervous system, including behavior.

Facilities

Research facilities are extensive and include the necessary equipment for virtually all aspects of neurobiology research. Members of the department have access to conventional equipment for neurophysiology and neuroanatomy, a core neurochemistry facility, transmission and scanning electron microscopes, computers, electronic and machine shops and well-equipped darkrooms.

Admission

Graduate Studies in Neurobiology and Behavior requires the following in addition to the Graduate School requirements:

A. A bacalaureate degree, including the following preparation: mathematics through differential and integral calculus, at least one year each of physics, inorganic chemistry and organic chemistry, and two years of biological sciences. Physical chemistry is recommended but 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 examination.

Degree Requirements

Requirements for the M.A. Degree

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, a research thesis and fulfilling the minimum requirements of the Graduate School.

Requirements for the Ph.D. Degree

A. Course Requirements

1. Basic biology
   a. Biochemistry (BIO 361, HBC 531 or BMO 520). This requirement can be waived if the student can demonstrate that a sufficient course has been successfully completed.
   b. Cell Biology (BIO 310 or BCD 656). This requirement can be waived if the student can demonstrate that a sufficient course has already been taken.
2. Introduction to Neurobiology and Behavior I, II (BNB 561, BNB 562). A two-semester course taught by members of the Department of Neurobiology and Behavior in which the student is introduced to a broad variety of topics in neurobiology. These will be taken in the fall and spring semesters of the first year.
3. Advanced Neurobiology and Behavior (BNB 531, BNB 532). Four of these one-semester courses given by various faculty members are required to be taken consecutively 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.
4. Medical Neuroanatomy (HBA 534). This requirement can be waived if the student can demonstrate that a sufficient course has been successfully completed.
5. Electives. Two courses in various biological (graduate level), physical or mathematical sciences must be selected by the student in consultation with the student's grade advisor.

B. Preliminary Examination

In January or February of the second year after admission, each student must take the preliminary examination. The examination will consist of both written and oral parts and will include contents from courses required prior to the preliminary examination. Synthesis of information will be stressed in this examination.

C. Advancement to Candidacy
The faculty will recommend a student to the Graduate School for advancement to candidacy upon satifactory completion of all course requirements, the preliminary examination and dissertation proposal.

D. Ph.D. Dissertation
A dissertation that 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.

E. 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 supported by a teaching assistantship, the student must participate in teaching each semester the assistantship is held.

F. Residence Requirement
The University requires at least two consecutive semesters of full-time study. The demands of the course of study necessitate a longer period of residence.

Faculty

Adams, Paul R., Associate Professor. Ph.D., 1974, London University: Biophysics of ion channels in nerve and muscle cells.

Bohn, Martha C., Assistant Professor. Ph.D., 1979, University of Connecticut: Developmental neuroendocrinology.

Cabot, John B., Associate Professor. Ph.D., 1976, University of Virginia: Neural control of the cardiovascular system.

Carlson, Albert D., Professor.[5] Ph.D., 1960, University of Iowa: Physiology of invertebrate nervous systems; insect neuropharmacology; neural control of flash patterns by fireflies.

Carnevale, Nicholas, Assistant Professor.[4] Ph.D., M.D., 1974, Duke University: Neuronal excitability and impulse propagation; electrical interactions among peripheral nerve fibers; dendrite electrotonus.

Cohen, David H., Professor and Chairperson. 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.

Evinger, Craig, Assistant Professor. Ph.D., 1978, University of Washington: Physiology of movement; neural control of eye movements.

Halegoua, Simon, Assistant Professor. Ph.D., 1978, State University of New York at Stony Brook: Biochemistry of neural development.

Karten, Harvey J., Professor.[1,2] M.D., 1959, Albert Einstein College of Medicine: Avian nervous system; comparative neuroanatomy.

Levine, Joel, Assistant Professor. Ph.D., 1980, Washington University, St. Louis: Role of cell surface molecules in the differentiation and development of the central nervous system.

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.

McLaughlin, Stuart, Professor.[6] Ph.D., 1968, University of Columbia, Canada: Biophysics of excitable membranes.

Mendell, Lorne, Professor. Ph.D., 1965, Massachusetts Institute of Technology: Spinal physiology, modifiability of spinal circuitry.

Moore, Robert Y., Professor.[4] M.D., 1957, Ph.D., 1962, University of Chicago: Organization, development and plasticity of central monoamine neuron systems; central monoamine neuron systems; central neural mechanisms in circadian rhythm regulation.

Newsome, William, Assistant Professor. Ph.D., 1979, California Institute of Technology: Neural basis of visual perception and visually guided behavior.

Scott, Sheryl A., Associate Professor and Graduate Program Director. Ph.D., 1976, Yale University: Developmental neurobiology.

Sherman, Murray S., Professor. Ph.D., 1969, University of Pennsylvania: Structure and function of mammalian visual system.

Yazulla, Stephen, Associate Professor. Ph.D., 1971, University of Delaware: Electrophysiology and ultrastructure of the retina in vertebrates.

Zipser, Birgit, Adjunct Associate Professor.[3] Ph.D., 1972, Albert Einstein College of Medicine: Molecular basis of neuronal connectivity; invertebrate CNS; monclonal antibodies; electrophysiology and biochemistry.

Number of teaching, graduate and research assistants, fall 1983: 13

[1] *Department of Anatomy*
[2] *Primary appointment with Department of Psychiatry*
[3] *Primary appointment with Cold Spring Harbor Laboratory*
[4] *Primary appointment with Department of Neurology*
[5] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1982-83*
[6] *Primary appointment with Department of Physiology and Biophysics.*

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 Approaches to the Nervous System
An advanced course for critical evaluation of biochemical, molecular biological and cellular electrophysiological analysis of neuronal function and synaptic transmission. The format emphasizes discussion and evaluation of recent research findings by all participants.
Prerequisite: BMO 520, BNB 561 or permission of instructor
Spring, 2 credits, alternate years

BNB 547 Readings in Neurophysiology
Discussion and critical evaluation of neurophysiological research published in biological journals. Critical analyses of techniques, methodology and conclusions of the research 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 and organization of brain stem and cortex.
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 investigation 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 (BIO)

Graduate Program Director: George Hechtel
Life Sciences Bulding 130 (516) 246-5031

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).

Admission

For admission to the M.A. Program in Biological Sciences the following, in addition to the minimum Graduate School requirements, are required:

A. 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 sttus. 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.

B. All applicants must complete an application form available from the Student Information Office, Division of Biological Sciences, Life Sciences Building, SUNY at Stony Brook, Stony Brook, New York 11794-5200. That form, in addition to routine information, requests a concise statement of career goals and a tentative program of study.

C. Three letters of recommendation are required. 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 superviors.

D. Two copies of all previous college transcripts.

E. Applicants are also required to take the Graduate Record Examination (including both the general 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. Letters, transcripts and applications should be sent to the Student Information Office, Biological Sciences.

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.

Degree Requirements

Requirements for the M.A. Degree in Biological Sciences

In addition to the requirements of the Graduate School, the following are required:

A. Course Requirements

The M.A. in biological sciences requires completion of an approved course of study, a project 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.

B. Master's Project

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 accepted by a project committee appointed by the program.

C. Residence Requirement

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 minmum schedule require the consent of the Director of Graduate Studies.

Faculty

All Division of Biological Sciences faculty are members of Graduate Studies in Biology.

Courses

BIO 500 Natural History of Intertidal Organisms
Adaptations, reproductive strategies, classification, evolution, and ecology of selected intertidal organisms. Emphasis on local invertebrate fauna. visits to course exhibits requred.
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 cred

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 laboratory, 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

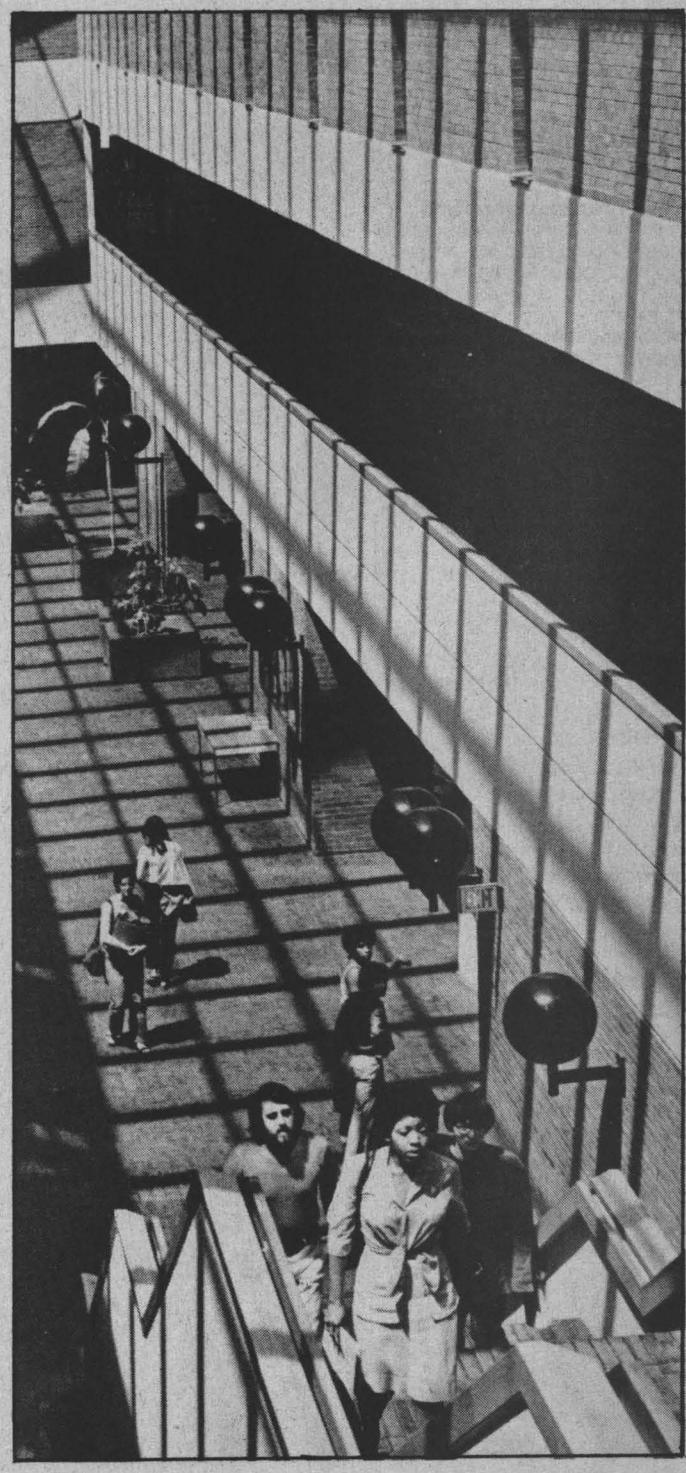
BIO 601 Practicum in Teaching
Participation in the presentation of a biology course, under supervision of the course director.
Fall, spring, 1-3 credits, repetitive

Note: Additional courses are available from the offerings of other graduate programs.

DIVISION OF HUMANITIES AND FINE ARTS

The Division of Humanities and Fine Arts consists of departments of Art, English, French and Italian, Germanic and Slavic Languages and Literatures, Hispanic Languages and Literature, Music, Philosophy, and Theatre Arts; it also contains Programs in Comparative Literature and in Religious Studies. The Ph.D. is offered in Comparative Literature (through the Department of English), English, Hispanic Languages and Literature, Music and Philosophy. The Doctor of Arts is offered through the language departments. All units except Religious Studies offer the M.A., and the Department of Theatre Arts offers the M.F.A. The Department of Music offers the Master of Music and the Doctor of Musical Arts degrees, in addition to the M.A. and Ph.D. The Department of Philosophy offers a Master's Program in Philosophical Perspectives in addition to the M.A. and Ph.D.

The departments of Art, Music and Theatre Arts bridge the gap between studio and peformance work on the one hand and humane scholarship on the other by emphasizing historical and critical studies. The language departments focus both on traditional scholarship and on practice and research in language teaching. The Department of English has programs in the teaching of writing as well as in literary criticism. Philosophy addresses practical interests in philosophical subjects through its Master's Program in Philosophical Perspectives as well as traditional theoretical concerns. The Division of Humanities and Fine Arts thus provides opportunities for concerete linkings between theoretical and applied interests. Details are found in the program descriptions that follow.



Art (ARH)

Chairperson: Aldona Jonaitis
Fine Arts Center, 2221 (516) 246-7068

Graduate Program Director: James H. Rubin
Fine Arts Center, 4213 (516) 246-7073

The M.A. in Art Criticism is an integrated curriculum of art history, criticism and theory. It offers the graduate student a unique opportunity for innovative study in art criticism and traditional study in art history. It reflects the growing belief among leading scholars that the studies of art history and art criticism are inseparable, that the unity of art history and art criticism in the history of art is indisputable and that the role of art criticism in the history of art is central, especially in the modern period. The goals of the program are: the development of the critic-historian, who can combine the various fields of art historical study — connoisseurship, iconography, period research, and the study of individual artists — with a critical consciousness and awareness of large intellectual issues involved in such study; the study of the history of art criticism; the development of alternative perspectives on art; the development of practicing art critics; the interdisciplinary study of 19th and 20th century art. In addition to these goals, the M.A. in Art Criticism can be considered a unique preparation for Ph.D. degrees in art history or other fields elsewhere. The Department of Art offers graduate courses ranging from the art of primitive and ancient cultures through the art history and criticism of the present. Part-time study is permissible within this degree program.

Facilities

Since 1975 the Department of Art has enjoyed the resources of a new Fine Arts Center. This grand structure of 226,026 square feet includes numerous studio facilities, classrooms for lectures and seminars, a slide library and a magnificent art gallery space which is devoted primarily to exhibitions of contemporary art. The department also publishes a journal titled *Art Criticism,* devoted to the study and practice of art .criticism. Campus libraries contain 1,400,000 bound volumes and 1,900,000 publications in microformat. Proximity to New York City makes available numerous libraries, museums, galleries and publishing institutions of that city.

Admission

In addition to the requirements of the Graduate School, the following are required for admission to the M.A. Program in Art Criticism:

A. A baccalaureate degree with an art history major or minor. (This requirement may be waived at the discretion of the graduate studies committee.)

If a student with no art history major or minor wishes to enter the program, he or she would be allowed to demonstrate basic competency through the comprehensive written and oral examinations, or by taking a specified number of undergraduate courses in the department prior to full admission to the program.

B. Undergraduate grade point average of B.

C. Graduate Record Examination General Test Scores.

D. All applicants will be required to submit a brief essay outlining their interests, expectations and reasons for applying to the program. This essay will include career as well as intellectual expectations.

E. Acceptance by the departmental graduate studies committee and final approval by the Graduate School.

Degree Requirements

Requirements for the M.A. Degree in Art Criticism

A. Course Requirements

The student will be required to complete successfully 36 credits of graduate work, as outlined in the list of courses below:

1. ARH 502 History of 19th Century Art Criticism and Theory (3 credits)
2. ARH 503 HIstory of 20th Century Art Criticism and Theory (3 credits)
3. ARH 546 Topics in 20th Century Art (3 credits)
4. ARH 540 Methodologies of Art History (3 credits)
5. Two to three of the following, one of which has to be a criticism course (6-9 credits):
   ARH 501 History of Renaissance and Baroque Art Criticism and Theory
   ARH 591 Practicum in the Writing of Art Criticism
   ARH 541 Topics in Ancient Art (3 credits)
   ARH 542 Topics in Medieval Art (3 credits)
   ARH 543 Topics in Renaissance ARt (3 credits)
   ARH 544 Topics in Baroque Art (3 credits)
   ARH 545 Topics in 19th Century Art (3 credits)
   ARH 547 Topics in Primitive Art (3 credits)
6. Two to three electives in the Humanities and/or Social Sciences (6-9 credits), one of which should be in philosophy (e.g., PHI 500, 505, 524, 525, 570, 574). Other possible electives include: SOC 562, EGL 570, MUS 503, 539, 540, CLT 501.
7. ARH 598 Thesis (6 credits)

B. Comprehensive Examinations

These tests of basic competency will include questions examining the student's knowledge of particular periods in the history of art and individual artists and works of art as well as essay quesions designed to test the student's knowledge of the theoretica and critical issues at stake in a particular art. The student mus take these examinations at the end of the second semester or the beginning of the third semester of study in order to continuein the program. An extension of one semester will be allowed to part-time students.

C. Foreign Language
A reading knowledge of French, German or Italian. Students planning to advance to doctoral work will be encouraged to master two of these three languages.

D. Teaching Requirement
All graduate students will be expected to assist in teaching a minimum of one semester. The course in which the student will assist shall be an introductory course on the history of art, either in ancient and medieval art, or in Renaissance, Baroque and modern art. Competency in teaching will be judged through teacher evaluation questionnaires and classroom visits by the course's faculty supervisor. Students must also present a public lecture in the department's Topics in Art series.

E. Thesis
After the completion of all other degree requirements, the student, together with his or her directing committee which shall consist of the student's advisor and at least two other faculty members, will jointly agree on a thesis topic. The departmental graduate studies committee will appoint the directing committee and will designate its chairperson, who shall not be the student's advisor. The committee may include a maximum of one faculty member from outside the Department of Art when the thesis includes a significant component of interdisciplinary work. The thesis must specify the student's primary area of specialization and will be in the form of one or more essays relevant to the examination of art history, criticism and theory. The student must submit a prospectus outlining the nature and aims of the thesis prior to its inception. The thesis shall be a significant original work.

Faculty

Bogart, Michele, Assistant Professor. Ph.D., University of Chicago: 19th century American and European art and cultural history.

Guilmain, Jacques, Professor. Ph.D., Columbia University: Medieval art; modern architecture and design; theory of style.

Jonaitis, Aldona, Associate Professor and Chairperson. Ph.D., Columbia University: Primitive and Pre-Columbian art and structural anthropology.

Joyce, Hetty, Assistant Professor. Ph.D., Harvard University. Greek and Roman art and architecture.

Kuspit, Donald B., Professor of Art and Philosophy. Ph.D., University of Michigan; D. Phil., University of Frankfurt: Art criticism, aesthetics, 20th century and Northern Renaissance art.

Mallory, Nina M., Associate Professor. Ph.D., Columbia University: Renaissance, Baroque and 18th century art, architecture and connoisseurship.

Moskowitz, Anita, Assistant Professor. Ph.D., New York University: Medieval and Renaissance art and connoisseurship.

Polcari, Stephen, Assistant Professor. Ph.D., University of California at Santa Barbara: 20th century art and intellectual history.

Rubin, James H., Associate Professor and Graduate Program Director. Ph.D., Harvard University: 18th and 19th century art; art and politics.

Courses

ARH 501 History of Renaissance and Baroque Art Criticism and Theory
An examination of theoretical treatises and other writings on art during the Renaissance and Baroque periods. The influence of theory on practice—and vice versa—will be explored through close examination of selected monuments. Changing concepts of the artist's place in society will also be studied as reflected in contemporary critical and expository writing.
Fall, 3 credits

ARH 502 History of 19th Century Art Criticism and Theory
A study of European art criticism and theory of the 19th century stressing relationships between art and the history of ideas. Readings will concentrate on primary sources, including reviews of art exhibitions (Diderot, Stendhal, Zola), artists' letters (Constable, Delacroix, the Impressionists), and treatises relating to art (Winkelmann, Proudhon, Ruskin). Special emphasis will be given to Baudelaire. Comparisons will be made between ways of seeing art as well as between critical and theoretical attitudes to artists' intentions.
Fall, 3 credits

ARH 503 History of 20th Century Art Criticism and Theory
The literature of art has expanded enormously in the 20th century—far beyond attempts to organize it developmentally or conceptually. An attempt will be made to define types of criticism both in relation to the critics and their relation to the support system for the arts of which they are part.
Spring, 3 credits

ARH 540 Methodologies of Art History
This course will focus primarily on three approaches to the history of art: (1) style and connoisseurship; (2) structuralism, semiology and related symbolic theories; and (3) social history. Under (1), various methods of stylistic analysis—such as cyclical schema, period and regional schema—will be examined both in relation to general theory and to particular kinds of art. Connoisseurship will be considered as another aspect of the methodology of style. Under (2), there will be a discussion of a variety of methods for investigating the nature of signs and symbols in art. In addition to structural-semiotic approaches, iconography and psychoanalytic methods will be included in this section. Under (3), there will be discussion of methods that treat the work of art and the artist as part of a larger social and political context. Consideration will be given to both Marxist critiques of establishment history and practice, and to other non-Marxist approaches.
Annual, 3 credits

ARH 541 Topics in Ancient Art
This course will deal with a variety of topics relating to ancient art and its influence on later European art and artistic theory. Areas to be explored will include: ancient art history, aesthetics and comparative criticism; Roman uses of Greek art; pagan imagery in early Christian and medieval art; antique art and the Renaissance (use of prototypes); collecting antiquities (from the Medici to Getty); archaeological exploration and publication in the 18th and 19th centuries; French neoclassicism; and the calligraphy of Greek vases (Hamilton, Blake, Flaxman, Ingres, Picasso).
Course offered once every two years, 3 credits

ARH 542 Topics in Medieval Art
A topic in medieval art or architecture, such as early medieval manuscript illumination, the medieval decorated letter, or the Gothic Cathedral, is selected and explored during the semester in lectures, discussions, student reports or papers.
Course offered once every two years, 3 credits

ARH 543 Topics in Renaissance Art
This course, usually a seminar, will deal with one or several of the following aspects of Renaissance art: iconographic problems, style and connoisseurship (including the study of individual works at the Metropolitan Museum or the Frick), patronage and its effect on the form and content of a work, the exchange of artistic ideas between northern and southern Europe, and Renaissance sources in antiquity and the Middle Ages.
Course offered once every two years, 3 credits

ARH 544 Topics in Baroque Art
Specific areas within 17th century art will be studied through lectures and seminar reports. Possible topics are: manners and mores in 17th century Dutch painting—the evolution of genre painting from its roots in the religious and moralizing images of the 16th century to scenes of Dutch social life, often didactic or satirical, in the 17th century; the iconography of 17th century religious art—a study of the direct impact of the Council of Trent on religious art in the 17th century, and of transformations in Christian iconography after the Counter Reformation.
Course offered once every two years, 3 credits

ARH 545 Topics in 19th Century Art
Selected topics in 19th century art with an emphasis on interdisciplinary approaches to interpretation. Possible topics include Politics and Art during the French Revolution; English Landscape Painting and the Theory of the Picturesque; or French Realism and mid-19th century Social Thought.
Course offered once every two years, 3 credits

ARH 546 Topics in 20th Century Art
Twentieth century art considered as an international movement, European and American, though national groups may be studied. Emphasis will vary with topics ranging over stylistic analysis, iconographical interpretations and theoretical studies. Students are expected to undertake original research and interpretation.
Course offered once every two years, 3 credits

ARH 547 Topics in Primitive Art
Study of the various theoretical approaches to the interpretation of primitive art. Topics will include: structural analysis of art, socio-economic structure and art, and symbolism and art.
Course offered once every two years, 3 credits

ARH 591 Practicum in the Writing of Art Criticism
This course is designed as a practicum in the writing of art criticism under the supervision of the faculty.
Fall and spring, 3 credits

ARH 592 Practicum in Teaching
Instruction in the department under the supervision of the faculty. (This course may not be included in the courses taken in fulfillment of the 36 credit hour requirement.)
Fall and spring, 3 credits

ARH 595 Directed Readings in Art History, Criticism and Theory
This course is an independent reading course to be arranged with a particular faculty member. Normally this course is reserved for advanced students who have fulfilled most of their course requirements and for whom the proposed program of study cannot be organized within other existing course structures.
Fall and spring, 1-3 credits, variable and repetitive

ARH 598 Thesis
Prerequisite: completion of all degree requirements.
Fall and spring, 1-12 credits, variable and repetitive

Comparative Literature (CLG)

Chairperson: Harvey Gross
Frank Melville, Jr. Memorial Library N 3009 (516) 246-6059

The Department of English offers Graduate Studies in Comparative Literature leading to the M.A. and Ph.D. degrees in English.

Admission

Admission to the M.A. Program, Graduate Studies in Comparative Literature

Applicants to Graduate Studies in Comparative Literature are required to fulfill the minimum admission requirements of the Graduate School. In addition, applicants 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, theatre, 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.

Admission to the Ph.D. Program, Graduate Studies in Comparative Literature

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, in addition to the minimum requirements of the Graduate School:

A. A B.A. or M.A. degree from a recognized institution and in a suitable area of study (see course requirements for the master's level in Comparative Literature).

B. Letters of recommendation.

C. Graduate Record Examination General Test Scores.

D. The applicant may also be asked, at the request of the graduate program committee, to take the M.A. examination in comparative literature to demonstrate professional competence in English and at least two foreign languages.

Degree Requirements

Requirements for the M.A. Degree, Graduate Studies in Comparative Literature

In addition to the minimum requirements of the Graduate School, the following are required:

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 (History of Literary Theory I and II), CLT 502 (Theory and Practice of Translation), CLT 510 (Comparative Literature Methodology) and at least one interdisciplinary seminar (CLT 508 or CLT 602). The remaining courses may be distributed among graduate courses in Comparative Literature, English, foreign languages, philosophy, history, art criticism, theatre and music.

B. Foreign Language Requirement

Entering students are expected to have a good command of one and preferably two foreign languages. They will ultimately need proficiency in two foreign languages in order to obtain the M.A. degree. One of the student's languages should be French or German, both of which are practical necessities for students of Comparative Literature. Native speakers of a foreign language may offer English as one of their languages. Foreign language proficiency may be proved in any one of several ways: by attaining a grade of B or better in a graduate literature course taught in the language at Stony Brook; by attaining a grade of B or better in a graduate translation course taught at Stony Brook; by attaining a score of 600 or better on the ETS language proficiency examination; by passing an examination, administered by the department, in which the student translates a passage dealing with an area of his or her special interest.

C. M.A. Examination

The student will take a written Master's Examination in the first or second year of graduate study. The exam consists of three parts measuring the student's knowledge and mastery of literary theory and its history; familiarity with the major texts of world literature; ability to write a competent *explication de texte.*

Requirements for the Ph.D. Degree, Graduate Studies in Comparative Literature

In addition to the minimum requirements of the Graduate School the following are required:

A. Course Requirements

1. CLT 500 and CLT 501 (Literary Theory I and II)
2. CLT 502 (Theory and Practice of Translation)
3. CLT 510 (Comparative Literature Methodology)
4. At least seven seminars on the 500- or 600-level, including one interdisciplinary seminar (CLT 510 or CLT 602). For students without an M.A. degree in Comparative Literature or a related discipline, the course requirement is 51 credits.

B. Foreign Language Requirement

A reading knowledge of three foreign languages is required for the Ph.D. Proficiency in a language may be established by the same means listed in the requirements for the M.A. degree.

C. Comprehensive Examination

The student should meet with the Chairperson and the Graduate Director to establish a committee for the oral comprehensive examination to be taken no later than one year after completion of all coursework. The committee will consist of five faculty members who regularly participate in Graduate Studies in Comparative Literature. The members of the committee shall be chosen to test the student in the following areas: literary theory and its history; a literary genre chosen by the student (drama, novel, lyric or epic); a period of literary history chosen by the student (Ancient, Medieval, Renaissance, Baroque and Neo-classical, 18th Century, or 20th Century); a special area of a comparative nature closely related to the student's plans for the dissertation.

D. Dissertation

The dissertation represents the culmination of the student's degree program and should also be a contribution to scholarship. The Stony Brook program encourages studies that are critical as well as scholarly: a group of related essays focusing on a single literary problem; a substantial translation prefaced by a critical and theoretical introduction; studies involving literature and other disciplines. Candidates choose their dissertation director and the dissertation committee in consultation with the Chairperson and the Graduate Director. A Ph.D. dissertation proposal should be presented to the dissertation director within three months after completion of the comprehensive examination. Early involvement of all members of the committee in the ongoing research and writing is strongly recommended. The student's formal defense of the dissertation is open to all members of the university community.

E. Teaching Assistantships

All students are asked to acquire some experience in teaching. Guidelines permit graduate students to be supported as teaching assistants (T.A.) for a maximum of four years. However, in exceptional cases, the Graduate School may grant permission for accomplished T.A.s who work in areas of department need to be considered for support after four years in the department. Graduate students in Comparative Literature have the opportunity to teach a wide variety of courses: traditionally they have taught foreign language courses, English composition, interdisciplinary courses offered in the undergraduate humanities program and sections of the entry level Comparative Literature courses.

F. Additional Information

A Handbook for Graduate Studies in Comparative Literature includes more extensive information on Comparative Literature at Stony Brook. A copy can be picked up at the Comparative Literature office or requested by mail.

Faculty

Aronoff, Mark, Associate Professor. Ph.D., 1974, Massachusetts Institute of Technolgy: Theoretical linguistics; linguistics as a tool for the understanding of literature: metrics, phonology, syntax.

Bieber, Konrad, Professor. Ph.D., 1953, Yale University: 18th- and 20th-century French Literature with particular emphasis on Franco-German cultural relations; translation theory.

Czerwinski, Edward, Professor. Ph.D., 1965, University of Wisconsin: Comparative theatre and drama; comparative Slavic literatures; Dostoevsky and Conrad; 20th-century literature.

De la Campa, Roman, Associate Professor. Ph.D., 1978, University of Minnesota: Spanish-American theatre; applied linguistics, Caribbean culture, ideology in literature, bilingual-bicultural studies; contemporary criticism.

Fry, Donald, Professor. Ph.D., 1966, University of California, Berkeley: Old and Middle English literature, especially *Beowulf* and Chaucer; medieval and classical literature and culture, including archaeology.

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

Gabbard, Krin, Assistant Professor. Ph.D., 1979, Indiana University: The arts and their interrelations; film studies; ancient Greek literature; comparative literature methodology; drama, especially modern; literary theory.

Gross, Harvey, Professor and Chairperson. Ph.D., 1955, University of Michigan: Literary and cultural modernism; literary theory and criticism; modern poetry; prosody; Thomas Mann and T.S. Eliot; literature and music.

Hathorn, Richmond, Professor. Ph.D., 1950, Columbia University: Homer; classical mythology through the ages; classical literature; theory of literature: classical Renaissance, neo-classical.

Kerth, Thomas, Assistant Professor. Ph.D., 1977, Yale University: Medieval literature; Tristan cycle, Parzival; late Middle Ages, especially in Germany; paleography and general *Handschriftenkunde;* poetry of Courtly Love.

Kott, Jan, Emeritus Professor. Ph.D., 1947, Lodz University, Poland: Shakespeare; drama; Polish literature; literary theory and criticism.

Miller, Ruth, Professor. Ph.D., 1965, New York University: Methods of literary criticism: application and evaluation; genre study; American literature; Poe, Whitman and Dickinson; sources and influences of American literature.

Petrey, D. Sandy, Professor. Ph.D., 1966, Yale University: Realistic fiction: Zola, Dreiser, Hugo; contemporary criticism.

Rawlinson, Mary C., Assistant Professor. Ph.D., 1978, Northwestern University: Literature and psychoanalysis; literature and medicine; literature and continental philosophy; phenomenology.

Rivers, Elias, Professor. Ph.D., 1952, Yale University: Spanish literature of the 16th and 17th centuries; the classical and Italian traditions in Spanish poetry of the 16th century; translation theory.

Rosen, Charles, Professor. Ph.D., 1951, Princeton University: Music, art and literature of 18th and 19th centuries; contemporary criticism in music, art and literature.

Scheps, Walter, Professor. Ph.D., 1966, University of Oregon: Chaucer; medieval English poetry; medieval lyric (Latin, Provencal, Old French, Italian, German, English); medieval heroic narrative; Old French; Old Norse; oral poetry.

Silverman, Hugh, Professor. Ph.D., 1973, Stanford University: Contemporary literary theory; autobiography and self-portraiture; philosophy and literature; the philosophical essay; history of ideas.

Simpson, Louis, Professor. Ph.D., 1959, Columbia University: Romantic movement in Europe and Britain; realism, naturalism and symbolism; modern American, British and European literature; literary theory and criticism.

Sjoberg, Leif, Professor. Ph.D., 1954, Uppsala University, Sweden: Scandinavian drama: Ibsen, Strindberg, Lagerkvist, Ingmar Bergman; modern Scandinavian poetry: Symbolist poets, Ekelof, Lagerkvist, Martinson, Transtromer; poetry and visual arts.

Sridhar, S.N., Assistant Professor. Ph.D., 1980, University of Illinois: Indian literature in English; linguistic analysis of literary style; syntax; literature as linguistic evidence; applied linguistics; Dravidian linguistics; bilingualism.

Tejera, Victorino, Professor. Ph.D., 1956, Columbia University: Ancient Greek life and thought; philosophy of art and aesthetics; philosophy of history; communication theory in arts, sciences and humanities; philosophy of myth.

Vasvari, Louise O., Associate Professor. Ph.D., 1969, University of California, Berkeley: Romance philology; medieval Spanish literature; theory of translation; medieval and Renaissance literature; Romance languages and literature.

Zimmermann, Eleonore, Professor. Ph.D., 1956, Yale University: French Symbolism; French 17th-century theory; Proust; Romanticism; Goethe; Holderlin; lyric poetry; contemporary French theatre.

Number of teaching, graduate and research assistantships, fall 1983: 17

Courses

CLT 500 History of Literary Theory I: Plato to Kant
An examination of the basic texts in literary criticism from Plato to Kant. Stress will be placed on the predominantly ethical and mimetic approach of classical theory, its transformation in the Renaissance and the Neo-classical periods, and its reformulation in subsequent theory.
Fall, 3 credits

CLT 501 History of Literary Theory II: Romanticism to the Present
A survey of the important developments in literary theory in the 19th and 20th centuries. Attention will be given to the important movements and to the influence of other disciplines such as important movements and to the influence of other disciplines such as psychology and linguistics; theorists considered include Coleridge, Hegel, Nietzche, Richards, Eliot, Auerbach, Frye and others.
Spring, 3 credits

CLT 502 Theory and Practice of Translation
After a brief overview of the history of translation theory, students will acquaint themselves with recent theory. Students will gain familiarity with the existing translations of works in their period of specialization and gain a critical attitude toward them.
Spring, 3 credits

CLT 503 Comparative Studies in Literary History
Changing topics in the study of literary periods and styles.
Fall and spring, 3 credits each semester, repetitive

CLT 504 Comparative Studies in Genre
Changing topics in the study of the history and theory of literary genres.
Fall and spring, 3 credits each semester, repetitive

CLT 508 Interdisciplinary Seminar
Specific problems in the relations between literature and other disciplines.
Fall and spring, 3 credits each semester, repetitive

CLT 510 Comparative Literature Methodology
An introduction to the discipline of Comparative Literature. Stress will be given to the history of the discipline as well as to the various methodologies essential to it, e.g., thematology, periodization, influence and genre studies, literary relations between countries, interdisciplinary studies, etc.
Fall, 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 600 Seminar in Style and Structure
Changing topics in the study of stylistic and structural elements of the literary text.
Fall and spring, 3 credits each semester, repetitive

CLT 601 Seminar in Literary Theory
Changing topics in the specialized examinations of recent or historical trends such as semiotics, Marxism, reader-response, psychoanalysis, hermeneutics, etc.
Fall and spring, 3 credits each semester, repetitive

CLT 602 Interdisciplinary Seminar
Specific problems in the relations between literature and other disciplines.
Fall and spring, 3 credits each semester, repetitive

CLT 690 Dissertation Research
Fall ans 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

English (EGL)

Chairperson: Richard Levine
Humanities Building 255 (516) 246-5083

Graduate Program Director: Paul Newlin
Humanities Building 194 (516) 246-5094, 6

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

Admission to the M.A. Program in English

Applicants for entrance to the M.A. program at mid-year should submit all their materials by October 1; 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, in addition to the minimum Graduate School requirements, 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 General Test, required by the Graduate School of all students.

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.

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.

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, in addition to the minimum Graduate School requirements, 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 General 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.

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.

Degree Requirements

Requirements for the M.A. Degree in English

In addition to the minimum requirements of the Graduate School, the following are required:

A. Course Requirements

In broad outline, a master's degree in English requires ten three-credit graduate courses, competence in one foreign language, and passing the Master's Examination. Of these ten courses, one must be a course in Shakespeare, another a course in Chaucer *or* Milton and one in the history and structure of the English language, although courses previously taken on the undergraduate level and passed with a grade of B or better may be accepted as fulfilling this requirement. The required ten courses must be distributed among at least four of the following six areas (at least one course must be in American literature):

1. Old Middle English
2. Renaissance (1500-1660)
3. Restoration and Eighteenth Century
4. Nineteenth-Century British
5. American literature to 1900
6. Twentieth-Century British and American

B. Independent Studies

Only one course numbered EGL 599, Independent Studies, will 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 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.

C. Foreign Language Requirement

Competence in one foreign language may be satisfied by having completed the second year of a foreign language at the undergraduate level within the past five years with a grade of B or better, or by examination arranged by the English department. The following languages are automatically accepted for fulfilling this requirement: Greek, Latin, Hebrew, French, German, Italian, Russian and Spanish. Other languages relevant to a student's graduate program may be approved upon petition to the graduate program committee.

D. Master's Examination

The master's examination is based on a reading list of about a dozen texts announced at the beginning of each academic year. This three-hour written examination will be in two parts: an explication of a passage from one of the texts on the list, and an essay that requires comparing and contrasting two or more texts on the list. Students must pass both sections of the examination. The examination may be re-taken only once. Copies of previous examinations may be consulted in the Graduate English Office.

E. The Graduate English Colloquium

Each student in the master's program is encouraged to participate in the Graduate English Colloquium, a series of lecture-discussions by members of the English faculty on texts included in that year's master's examination reading list. The lecture-discussions are not intended as materials on which students will be examined but as provocations to engagement with the texts on the list. The meetings of the colloquium, held in the late afternoon or evening, include a lecture and discussion period and informal opportunities to meet faculty and fellow students.

Requirements for the M.A. Degree, Graduate Studies in Creative Writing

In addition to the minimum requirements of the Graduate School the following are required:

A. Course Requirements

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.

B. Master's Project

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 the second year.

Transfer Credit and Standards of Performance in English 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.

Requirements for the Ph.D. Degree in English

In addition to the minimum requirements of the Graduate School, the following are required:

A. Course Requirements

The minimum course requirement for students in the doctoral program is eleven courses, including at least seven 600-level seminars. No course with a grade below B– may be used to satisfy course requirements. An average grade of B or better in all course work must be maintained at all times, and no more than two grades below B minus will be permitted. No transfer credit is accepted at the seminar level.

Among the seven seminars the student must satisfactorily complete EGL 600 and 611 (Backgrounds for the Study of English Literature). These seminars are designed to provide students with the classical, cultural and critical backgrounds they will need in all later study, and must therefore be taken in the student's first year in the program.

Students must have one course in the history and structure of the English language, one course in Shakespeare and one course in Chaucer or Milton. Courses previously passed with a grade of B or better at the undergraduate or M.A. level may be accepted as fulfilling this requirement.

Finally, each student must take at least one course in four of the following six areas:

1. Old and Middle English
2. Renaissance (1500-1660)
3. Restoration and 18th Century
4. Nineteenth-Century British
5. American literature to 1900
6. Twentieth-Century British and American

Students with teaching assistantships also take the Teaching Practicum.

B. Foreign Language Requirements

Students must complete one of 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.

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) knowledge 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 should consult the Director of Graduate Studies about setting up such examination. The passing of the reading and/or comprehensive examination at the M.A. level shall not be sufficient evidence that the student has met Option II.

The following languages are automatically accepted for fulfilling the language requirement: Greek, Latin, Hebrew, French, German, Italian, Russian, and Spanish. Other languages relevant to a student's graduate program may be approved upon petition to the Graduate Program Director.

Students will not be permitted to take the special field examination without first satisfying the foreign language requirement. Students choosing Option I must satisfy one language requirement before taking the three area examinations and the second before taking the special field examination.

C. The Area Written Examinations

The area examinations are three four-hour written examinations on three of the six literary periods listed above, or on two of those areas and one of the following modes of study: History and Theory of Criticism, Rhetoric and Composition, Bibliography and Textual Criticism, Practice and Theory of Creative Writing, Women's Studies. The area examinations will be based on reading lists for each area available in the Graduate English Office. The examinations will be offered twice a year (in the week preceding the beginning of the fall and spring semesters). Students must take the examinations before beginning the fifth semester in the program. Students must pass all three areas; those who fail one or more areas may re-take those sections one time only.

D. The Special Field Oral Examination

This oral examination will be based on a written rationale and a reading list prepared by the student with the advice and approval of the student's chosen major professor, and approved by the Director of Graduate Studies at least one month before the date of the examination. The examination will usually be focused on a major author, a literary genre and a literary period and will include both primary and secondary texts. The examining committee will be chaired by the student's chosen major professor and will include two other members of the faculty selected by the Graduate Program Director in consultation with the committee chair.

Students are encouraged, but not required, to include a dissertation proposal as part of this examination. The special field examination may be re-taken one time only.

ALL THE DOCTORAL REQUIREMENTS DESCRIBED ABOVE MUST BE COMPLETED, BEFORE A STUDENT IS ALLOWED TO TAKE THE SPECIAL FIELD EXAMINATION.

E. Advancement to Candidacy

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

F. Dissertation Seminar

This required seminar is designed to help students prepare their dissertation proposals and get their dissertations underway. Students should take this seminar during the semester they take the special field examination or in the semester immediately after passing that exam.

In the seminar, students will present for discussion work in progress on dissertation proposals and dissertations, and essays being prepared for publication. Admission to the seminar is by permission of the faculty coordinator whose role will be to organize the seminar, see that relevant texts are made available and contribute to the discussion of student work. To pass the seminar, students must attend regularly, present their work and complete a dissertation proposal by the end of the semester.

The dissertation seminar may also be the forum for the dissertation colloquium, when students who have completed their dissertations make a public presentation of their research to interested faculty and graduate students.

G. 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 Director 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.

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

H. Teaching Program

Training in teaching is stressed by the department and every student is expected to do some teaching as part of the doctoral program. Teaching assistants instruct in a variety of courses including composition, introductions to poetry, fiction and drama, tutoring in the Writing Center and assisting in large lecture courses. An important part of the teaching experience is the Practicum in Teaching (EGL 697 and 698) required of all teaching assistants.

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

I. Residency Requirement

The Graduate School requires at least two consecutive semesters of full-time graduate study beyond the baccalaureate. 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 special field oral examination; (2) are holding no position other than that required under the teaching program; (3) are registered for EGL 690, Dissertation 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.

J. The Graduate English Colloquium

Doctoral students are encouraged to participate in the Graduate English Colloquium, a series of lecture-discussions by members of the English faculty on works included in that year's master's examination reading list. The meetings of the colloquium, held in the late afternoon or evening, include lecture-discussions intended to provoke engagement with important literary texts and provide informal opportunities to meet faculty and fellow students.

K. Review of Student's Progress

Each incoming student will meet with the Director of Graduate Studies in English before the start of classes to plan in some detail the first year's coursework. Each spring semester, when departmental course offerings for the following year have been announced, the student must compose a tentative program for the following year's study and bring it to the advisor for discussion. These plans, along with the record of student's work to date and faculty evaluations, will be reviewed by the graduate program committee. This committee will determine whether the candidate may proceed with doctoral studies, may continue if certain requirements are met or may not continue in the doctoral program because of unsatisfactory work.

Matters Pertaining to All Advanced Degrees in English (including Graduate Studies in Comparative Literature and Creative Writing)

A. Extension 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. 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."

Advisement

There are a number of problems that 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.

Students are encouraged to raise individual questions about the graduate program with the Director of Graduate Studies in English.

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.

Belanoff, Patricia, Lecturer. Ph.D., 1982, New York University: The teaching of composition and literature; rhetoric.

Bialostosky, Don, Associate Professor. Ph.D., 1977, University of Chicago: British romantic literature.

Cooper, Helen, Assistant Professor. Ph.D., 1982, Rutgers University: Victorian literature; creative writing; women's studies.

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

Elbow, Peter, Associate Professor and Director of Writing Programs. Ph.D., 1969, Brandeis University: The teaching of composition and literature; rhetoric.

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

Fiess, Edward, Associate Professor, Ph.D., 1951, Yale University: American literature; 20th-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; 20th-century British and American literature; 19th-century American literature.

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

Goldberg, Homer, Professor.[2] Ph.D., 1960, University of Chicago: The Restoration and the 18th 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; 19th-century American literature.

Harvey, James, Assistant Professor. A.M., University of Michigan: The novel; drama; film.

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 Emeritus.[1] Ph.D., 1947, Lodz University, Poland: Shakespeare; drama; literary criticism.

Kranidas, Thomas, Professor. Ph.D., 1962, University of Washington: Prose and poetry of the 17th century; Milton; rhetoric and revolution.

Laurence, David, Assistant Professor. Ph.D., 1976, Yale University: Colonial and 19th-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 20th century; Joyce; Yeats.

Maresca, Thomas E., Professor. Ph.D., 1963, The Johns Hopkins University: Restoration and 18th-century literature; the epic; satire.

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

Munich, Adrienne, Assistant Professor. Ph.D., 1976, City University of New York: Victorian literature.

Newlin, Paul, Associate Professor and Graduate Program Director. Ph.D., 1967, University of California, Los Angeles: 19th-century American literature; black American literature.

Olster, Stacey, Assistant Professor. Ph.D., 1981, University of Michigan: 20th-century British and American literature; the novel.

Pequigney, Joseph, Associate Professor. Ph.D., 1959, Harvard University: The 17th century; Shakespeare.

Rogers, Thomas, Associate Professor. Ph.D., 1955, University of Pennsylvania: The Restoration and the 18th century; rhetoric; the teaching of composition 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.

Sheehan, David, Associate Professor. Ph.D., 1974, University of Wisconsin, Madison: The Restoration and the 18th century.

Simpson, Louis, Professor.[1] Ph.D., 1959, Columbia University: 19th- and 20th-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.

Sprinker, Michael, Associate Professor. Ph.D., 1975, Princeton University: Literary theory.

Squier, Susan, Assistant Professor. Ph.D., 1977, Stanford University: 19th- and 20th-century British literature; women's studies.

Stampfer, Judah L., Professor. Ph.D., 1959, Harvard University: The Renaissance and the 17th century; Shakespeare; literature and psychology.

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.[3] Ph.D., 1960, Yale University; The Restoration and the 18th-century; the Renaissance; the modern drama.

Number of teaching, graduate and research assistants, fall 1983: 56

[1] *Joint appointment, Comparative Literature.*

[2] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1972-73.*

[3] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1980-81.*

Courses

All courses are for 3 credits, except where noted * and content varies each semester.

EGL 501 **Studies in Chaucer**
EGL 502 **Studies in Shakespeare**
EGL 503 **Studies in Milton**
EGL 505 **Studies in Genre**
EGL 506 **Studies in Literary Theory**
EGL 509 **Studies in Language and Linguistics**
EGL 510 **Old English Language and Literature**
EGL 515 **Middle English Language and Literature**
EGL 520 **Studies in the Renaissance**
EGL 525 **17th-Century Literature**
EGL 530 **Studies in the Age of Dryden**
EGL 535 **Studies in Neoclassicism**
EGL 540 **Studies in Romanticism**
EGL 545 **Studies in Victorian Literature**
EGL 547 **Late 19th-Century British Literature**
EGL 550 **20th-Century British Literature**
EGL 555 **Studies in Irish Literature**
EGL 560 **Studies in Early American Literature**
EGL 565 **19th-Century American Literature**
EGL 570 **20th-Century American Literature**
EGL 575 **British and American Literature**
EGL 580 **Poetry Workshop**
EGL 581 **Fiction Workshop**
EGL 582 **Drama Workshop**
EGL 583 **Non-Fiction Workshop**
EGL 585 **Creative Writing Project**
EGL 592 **Problems in Teaching Writing or Composition**
EGL 593 **Problems in Teaching Literature**
EGL 594 **Contexts of Literary Study**
***EGL 597** **Practicum in Methods of Research**
EGL 599 **Independent Study**
EGL 600 **Pro-Seminar I**
EGL 601 **Problems in History and Structure of the English Language**
EGL 602 **Problems in Bibliography, Editing, and Textual Criticism**
EGL 603 **Problems in Literary Theory and Criticism**
EGL 604 **Problems in Literary Analysis**
EGL 605 **Problems in Convention and Genre**
EGL 606 **Period and Tradition**
EGL 607 **Individual Authors**
EGL 608 **Problems in the Relationship of Literature to Other Disciplines**
EGL 611 **Pro-Seminar II**
***EGL 690** **Dissertation Research**
EGL 695 **Methods of Teaching English**
EGL 697 **Practicum in Teaching English Literature**
EGL 698 **Teaching Practicum**
***EGL 699** **Directed Reading**

* *Variable and repetitive credit.*

French and Italian (FRN, ITL, DLF, DLI)

Chairperson: Joseph A. Tursi
Frank Melville, Jr. Memorial Library, 4005 (516) 246-8676

Graduate Program Director: Mario B. Mignone
Frank Melville, Jr. Memorial Library, 4003 (516) 246-5687

The Department of French and Italian 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. or the Doctor of Arts. 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.

M.A. Curriculum

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 toward 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.

Interdepartmental M.A. Curriculum

The Department of French and Italian and the Department of Hispanic Languages and Literature offer a M.A. in Romance Languages with concentrations in French and Spanish, Italian and Spanish, and French and Italian.

This interdepartmental graduate curriculum includes a possible concentration in either French, Italian, or Spanish literature and language, according to individual preparation, interests, and skills. It is a flexible program which will suit students who wish to go on to doctoral work and those who wish to terminate their studies with the master's degree.

Doctor of Arts Program

The program leading to the Doctor of Arts degree in Foreign Language Instruction 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.

A more detailed description of the graduate program is available from the departmental office. This includes specific distribution requirements, fields of specialization and information on the preliminary and qualifying examinations. Interested students should request information and application forms as early as possible, especially if they plan to apply for financial aid.

Facilities

The Department of French and Italian has available for its students a highly functional language laboratory as well as audio-visual equipment used in all its language, culture and literature courses: overhead projector, tape recorders, record players, video cassette recorders, 16-mm projectors, film strip and slide projectors. The Library holdings in both languages are quite extensive and continuously updated.

Admission

Admission to the M.A. Program in Romance Languages

For admission to Graduate Studies in French or Italian, the following, in addition to the minimum requirements of the Graduate School, are normally required:

A. A bachelor's degree or its equivalent from a reputable scholarly institution.

B. Three letters of recommendation written by persons qualified to assess the candidate's preparation.

C. Results of the Graduate Record Examination General Test.

D. A transcript of undergraduate grades.

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

F. Provisional admission for those students not meeting the above requirements.

It is also highly recommended that one or two sample papers be submitted. These papers are required of applicants transferring from graduate programs in other universities. While it is expected that the applicant demonstrate superior preparation in French or Italian language and literature, an undergraduate major in French or Italian is not required.

Foreign students must furnish as much information as possible about their training abroad (official certification degrees, lists of courses taken and papers submitted, whenever possible), together with letters of recommendation. Each application will be judged individually and transfer credit awarded as circumstances warrant—within the parameters set by the State of New York, and accepted by the Graduate School of this University.

Admission to the M.A. Program in Romance Languages, Interdepartmental Curriculum

For admission to graduate study in the interdepartmental M.A. degree in Romance Languages, the following, in addition to the minimum graduate school requirements, are normally required:

A. A Bachelor's Degree or its equivalent with a major in either French, Italian, or Spanish and at least 18 credits in the second language (French, Italian, or Spanish).

B. Good command of both oral and written skills of the languages.

C. An official transcript of undergraduate record.

D. Letters of recommendation from three previous instructors.

E. Results of the Graduate Record Examination General Test.

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

Admission to the Doctor of Arts Program, Graduate Studies in French and/or Italian

For admission to graduate study in French and/or Italian, the following, in addition to the requirements of the Graduate School, are normally required:

A. At least a B.A. degree and all credits for a M.A.

B. Three letters of recommendation written by persons qualified to assess the candidate's preparation.

C. Results of the Graduate Record Examination General Test.

D. A transcript of undergraduate and graduate grades.

Degree Requirements

Requirements for the M.A. Degree, Graduate Studies in French

A standard course of study in French is offered for candidates intending to teach at the secondary school level and for pre-Ph.D. candidates. In addition to the minimum Graduate School requirements, the following are required:

A. Course Requirements	*Credits*
1. Six courses in Literature:	18
FRN 507 Advanced Stylistics	3
FRN 508 *Explication de Texte*	3
2. Electives: Two courses of which one FRN 501, Contemporary French Culture and Civilization, is highly recommended	6
Total	30

B. Performance
Average of B or better for all courses listed under *A* is required.

C. Comprehensive Examination
At the completion of all coursework, candidates will take an oral and written comprehensive examination.

Requirements for the M.A. Degree, Graduate Studies in Italian

The Department offers two tracks for concentration in Italian. In addition to the minimum requirements of the Graduate School the following are required:

Track I—Italian with a Concentration in Literature:	Credits
A. Course Requirements	
1. Six courses in Literature:	18
ITL 501 Culture or one course in Romance Philolology or Linguistics	3
ITL 508 Stylistics (Syntax and Composition)	3
ITL 511 History of the Italian Language	3
2. Elective	3
Total	30

Special permission may be granted to replace two of the literature courses (6 credits) with a thesis.

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

C. Comprehensive Examination
At the completion of all coursework, candidates will take an oral and written comprehensive examination.

Track II—Italian with a Concentration in Language:

A. Course Requirements	Credits
1. ITL 501, ITL 502 Civilization and Culture	6
ITL 505 Methods and Materials or any Romance Philology or Linguistics course	3
ITL 507, ITL 508 Stylistics	6
ITL 511 History of the Italian Language	3
Three courses in literature	9
2. Elective	3
Total	30

B. Performance
Average of B or better for all courses listed under *A* is required.

C. Comprehensive Examination
At the completion of all coursework, candidates will take an oral and written comprehensive examination.

Requirements for the M.A. Degree in Romance Languages, Concentrations in French and Italian, French and Spanish or Italian and Spanish

Candidates will choose one language as a major, one as a minor, and must be able to do graduate work in both. To qualify for the degree, the M.A. candidate in French and Italian or French and Spanish or Italian and Spanish will normally complete 36 credit hours (12 courses). The distribution of these courses will vary according to whether the student chooses track I, with a concentra-

tion in literature, or track II, concentration in language.

In addition to the minimum requirements of the Graduate School, the following are required:

French/Italian—Track I M.A. with Concentration in Literature

A. Course Requirements

Major in French*	Major in Italian*
1. FRN 501 Civilization FRN 507 Advanced Stylistics FRN 508 *Explication de texte*	1. ITL 501 or 502 (Civilization and Culture ITL 508 Advanced Grammar and Stylistics ITL 511 History of the language or one course in stylistics
2. At least 15 credits in literature with concentration in two fields.	2. At least 15 credits in literature with concentration in two fields
Minor in Italian**	**Minor in French****
3. ITL 501, ITL 508	3. FRN 501 or 508, FRN 507
4. Two literature courses to be chosen with permission of advisor	4. Two literature courses to be chosen with permission of advisor

B. Performance

Average grade of B or better for all courses listed under 1 is required.

C. Final Examination

The final examination will cover two areas of specialization in each field, one from group 1 and one from group 2 (e.g., Modern French and Italian Literature, and Medieval/Renaissance French and Italian Literature.

French/Italian—Track II M.A. with Concentration in Language

A. Course Requirements

Major in French*	Major in Italian*
1. FRN 501 Civilization FRN 507 Advanced Stylistics FRN 508 *Explication de Texte* DLM 503 or DLM 504 or DLM 505 Methods or Applied Linguistics or Philology	1. ITL 501 Civilization ITL 501 Civilization and Culture ITL 508 Advanced Stylistics DLM 503 or DLM 504 or DLM 505 Methods or Applied Linguistics or Philology
2. At least 9 credits (three courses) in literature in one area of concentration (groups 1 and 2 in Literature and one elective.	2. At least 9 credits (three courses) in literature in one area of concentration (groups 1 and 2 in Literature track) and one elective.
Minor in Italian**	**Minor in French****
3. ITL 510 ITL 508	3. FRN 501 FRN 507
4. Two literature courses in the area of concentration	4. Two literature courses in the area of concentration

*Total of 24 major credits.
**Total of 12 minor credits.
Total credits required: 36

B. Performance

Average grade of B or better for all courses listed under 1 is required.

C. Comprehensive Examination

At the completion of all coursework, candidates will take an oral and written comprehensive examination.

French/Spanish

A. Course Requirements

French	Credits
1. FRN 501 Contemporary French Culture and Institutions	3
FRN 507	3
FRN 508 *Explication de texte*	3
Spanish	
SPN 501 Spanish Linguistics	3
SPN 510 The Hispanic Culture	3
SPN 515 Spanish Composition and Stylistics	3
DLM 503, or DLM 504, or DLM 505 (Methods, or Applied Linguistics, or Philology)	3
Total	21

2. At least 12 credits (4 courses) in literature in two areas of concentration with 6 credits (2 courses) in each of them, 3 in French and 3 in Spanish. One area will be chosen among group a, and the other from group b.

a	b	
1. 20th Century 2. 19th Century 3. Theatre 4. Prose Fiction or 5. Lyrics (6 credits)	1. French Baroque, Classical Theatre, and Spanish Golden Age, or 2. Medieval (6 credits)	12
3. Elective		
	Total	36

B. Performance

Average of B or better for all courses listed under *A* is required.

C. Comprehensive Examination

At the completion of all coursework, candidates will take an oral and written comprehensive examination.

Italian/Spanish

A. Course Requirements

Italian	Credits
1. ITL 501 Contemporary Italy	3
ITL 508 Stylistics—Syntax and Composition	3
ITL 511 History of the Italian Language or Linguistics course	3
DLM 503, DLM 504, or DLM 505 (Methods, or Applied Linguistics, or Philology)	3
Spanish	
SPN 501 Spanish Linguistics	3
SPN 510 Hispanic Culture	3
SPN 515 Spanish Composition and Stylistics	3
Total	21

2. At least 12 credits (4 courses) in literature in two areas of concentration (6 credits). The student will select two areas of concentration and will take 6 credits (2 courses) in each of them, 3 in Italian and 3 in Spanish. One area will be chosen among group a, and the other from group b.

a	b	
1. 20th Century	1. Italian Renaissance, Baroque and Spanish Golden Age, or	
2. 19th Century		
3. Theater		
4. Prose Fiction, or	2. Medieval (6 credits)	12
5. Lyrics (6 credits)		3
	Total	36

B. Performance
Average of B or better for all courses listed under *A* is required.

C. Comprehensive Examination
At the completion of all coursework, candidates will take an oral and written comprehensive examination.

Requirements for the Doctor of Arts Degree in Foreign Language Instruction, Graduate Studies in French and/or Italian

The following are required in addition to the regular Graduate School requirements:

A. Course Requirements
1. Major field: Candidates are expected to take a minimum of 15 credits, distributed evenly among the following areas: literature, advanced language, culture.
2. Minor field: In the minor (Spanish, French, Italian 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.

B. Teaching Experience
All candidates are required to fulfill the following teaching assignments during the program:
1. Practicum: The student is given charge of a three-hour section in a beginning or intermediate course in the area of language instruction. The practicum is to be assigned after the student has successfully completed a course in language instruction. This experience includes objectives, grading, and testing.
2. Internship: The student is apprenticed to a professor in charge of an appropriate literature, linguistics and/or culture course for at least one semester. The internship may not precede the practicum.
3. Externship: The student will be required to teach at the undergraduate or secondary level in the local area, when feasible. The student will normally be given three courses, e.g.: a beginning course in the major field, a beginning course in the second competence, and an introductory literature course in the major field.

C. Final Evaluation
The final evaluation will 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. This final examination will be scheduled twice yearly: November and April.

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 the major area and in language instruction and methodology. All candidates will be furnished a basic reading list. However, it will be the responsibility of the candidates to prepare, with their major and minor advisors, the optional part of the reading list to cover their individual specialties.

D. Dissertation
After the comprehensive examination, the candidates, in consultation with their dissertation director, should submit a dissertation proposal which will be reviewed by the D.A. Committee.

For further information and application forms, write to:
Dr. Joseph A. Tursi
Department of French and Italian
State University of New York at Stony Brook
Stony Brook, NY 11794-3359

Faculty

Allentuch, Harriet, Professor. Ph.D., 1962, Columbia University: 17th-century French literature.

Bieber, Konrad, Professor. Ph.D., 1953, Yale University: Contemporary French literatue; 18th-century French thought; history of ideas.

Blum, Carol, Associate Professor. Ph.D., 1966, Columbia University: 18th-century French literature.

Brown, Frederick, Professor. Ph.D., 1960, Yale University: 19th- and 20th-century literature in relation to social history and the history of ideas.

Brugmans, Linette, Professor Emeritus. Ph.D., 1951, New York University: 19th- and 20th-century French literature.

Carpetto, George, Assistant Professor. Ph.D., 1973, Rutgers University: 15th-century Italian humanism; romanticism.

Fontanella, Luigi, Assistant Professor. Ph.D., 1981, Harvard University: 19th- and 20th-century Italian literature.

Franco, Charles, Associate 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: 18th- and 19th-century French comparative literature

Kapuscinki, Gisele, Assistant Professor. Ph.D., 1982, Columbia University: Linguistics; French theater.

Laidlaw, C. Norman, Professor Emeritus. Ph.D., 1950, Columbia University: 18th- and 20th-century French literature; literature and science.

Mignone, Mario, Professor. Ph.D., 1972, Rutgers University: 20th-century Italian literature and contemporary theater.

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

Morgan, Leslie Zarker, Assistant Professor. Ph.D., 1983, Yale University: Italian and Romance philology and linguistics.

Petrey, D. Sandy, Professor. Ph.D., 1966, Yale University: 19th-century literature; contemporary criticism.

Riggs, Elizabeth P., Assistant Professor.[1] 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: 19th- and 20th-century literature.

Tursi, Joseph A., Professor and Chairperson.[1] Ph.D., 1965, New York University: 18th-century Italian literature; methodology and language.

Whitney, Mark S., Professor. Ph.D., 1962, University of Pennsylvania: 16th-century French literature.

Zimmerman, Eleanore M., Professor. Ph.D., 1956, Yale University: 17th-century French drama; 19th-century literature, especially lyricism; 20th-century drama.

Number of teaching, graduate, and research assistants, fall 1983: 9.

[1]*Recipient of the State University Chanellor's Award for Excellence in Teaching, 1974-75.*

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 or fall, 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.
Spring or 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 idionatic turns of phrase and correct structuring, compositions in the French language, and advanced wok in major discrepancies between French and English syntax.
Spring or fall, 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.
Spring or fall, 3 credits

FRN 510 Graduate French Phonetics and Diction
A course designed to perfect the mastery of the spoken language through the use of body language, psycholinguistics, analysis of intonation, rhythm, and accent. It will include practical corrective techniques and methods of self-correction. At least one hour of laboratory weekly will be required.
Spring or fall, 3 credits

FRN 521 Literature of the French Renaissance
A study of the major literary and cultural developments characteristic of the civilization of the Renaissance in France. The works of such writers as Rabelais and Montaigne will serve as both focus and starting point for broader inquiry into the artistic, social, and cultural movements accompanying the rebirth of art and letters in France.
Spring or fall, 3 credits

FRN 531 Studies in the Classical Theatre
Analysis of classical dramaturgy and some of the major themes of 17th-century tragedy and comedy. Careful reading of Corneille, Racine and Moliere.
Spring, fall, 3 credits

FRN 551 Studies in Romanticism
Reading and research in the background and manifestation of Romanticism in French literature.
Spring or fall, 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 or fall, 3 credits

FRN 561 Seminar in 20th-Century French Literature
Investigations of special topics and movements in 20th-century French prose, poetry, and theater based on the study of the works of such authors as Claudel, Cocteau, Sartre, Beckett, Ionesco, Louis Guilloux, Romain Rolland, Camus, Valery Larbaud, Gide, and Malraux.
Spring or fall, 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.
Spring or 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 or fall, 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 or fall, 3 credits

ITL 505 Strategies for Teaching Italian
A workshop for teachers of Italian on all levels. Teaching strategies will be discussed and demonstrated. Materials will be developed by the participants. Guest lecturers and workshop leaders from various levels of instruction will assist with several aspects of the course. Topics will include communicative skills, use of realia, testing, visuals, teaching culture.
Spring or fall, 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 or fall, 3 credits

ITL 516-517 Seminar of Dante
The *Vita Nuova*, the *Opere Minori* and the *Divine Comedy* will be studied based on the historical, social, and moral contexts of 13-14th century Italy.
Spring or fall, 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.
Spring or fall, 3 credits

ITL 522 Seminar in Italian Humanism and Renaissance Literature
Analysis of the works of such writers as Petrarch, Boccaccio, Ariosto, Machiavelli, Castiglion, Aretino, Tasso, and Michelangelo. Study of the relation of the individual works of these writers to broader historical, cultural, and intellectual developments of the period. This course may be repeated for credit when topic changes.
Fall or spring, 3 credits

ITL 541 Studies in 18th-Century Italian Literature
Study of the Enlightenment in Italy and its repercussions throughout the 18th century. Extensive reading of such authors as Metastasio, Goldoni, Parini, and Vico. The topics will vary from semester to semester depending on the authors selected.
Fall or spring, 3 credits

ITL 551 Studies in Italian Romanticism
Italian Romanticism is unique and it will be compared with the movement as it took place in other countries, such as England, Germany and France. The works of Foscolo, Leopardi and Manzoni will be studied in the philosophical and sociological context of the period.
Spring or fall, 3 credits

ITL 552 Studies in the Modern Novel
A study of the development of the Italian novel from Verga to the latest trends. Stess will be placed on the major shift in sensibility occurring at the beginning of the 19th century and after World War II. This course may be repeated when the topic changes.
Spring or 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 that 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, Compana and Pasolini.
Spring or 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

D.A. Courses

The following courses are available only to candidates in the Doctor of Arts Program:

DLF 601, DLI 601 Internship in Foreign Languages: French and Italian
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, DLI 602 Externship in Foreign Languages: French and Italian
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, 1-3 credits

DLF 699, DLI 699 Doctoral Research in Foreign Languages: French and Italian
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

Germanic and Slavic Languages and Literatures (GER, DLG, DLR)

Chairperson: John R. Russell
Frank Melville Jr. Memorial Library N3005 (516) 246-6830/31

Graduate Program Director: Samuel Berr
Frank Melville Jr. Memorial Library N3044 (516) 246-6069

The Department of Germanic and Slavic Languages and Literatures offers programs leading to the Master of Arts and the Doctor of Arts. Part-time study is permitted; some graduate courses are offered during the late afternoon. Interested students should request information and application forms as early as possible, especially if they plan to apply for financial aid.

Admission

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 General 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, at the outset of the first semester of study a written and oral examination testing command may be required. If judged insufficiently prepared, the student may be required to enroll in GER 321 and perhaps GER 322 in addition to the other 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.

Admission to 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. In addition to the minimum requirements of the Graduate School, the following are required:

A. Entering students must have a M.A. in German or Russian.

B. Official transcripts of all previous college work.

C. Three letters of recommendation.

D. Language proficiency.

E. Results of the Graduate Record Examination General Test.

All applicants for admission to the program will be reviewed by the Doctor of Arts Committee, and where necessary, candidates will be interviewed personally.

Degree Requirements

Requirements for the M.A. Degree
Option 1:

A. Course Requirements

	Credits
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* is required.

C. Language Examination

The student must pass an examination testing the 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 is required.

Option II:

A. Course Requirements
No thesis required—all 30 credits can be fulfilled by coursework as follows:

	Credits
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* is required.

C. Language Examination
The student must pass an examination testing the 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 professional 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 indepdendent 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.

*Requirements for the Ph.D. Degree in Germanic and Slavic Languages and Literatures**

In addition to the minimum requirements, the following are required:

A. Course Requirements
In addition to those listed under the master's degree students must take the following courses:

	Credits
1. In preparation for the independent research involved in the dissertation, students must take at least two advanced tutorials	
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
	24

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.

B. 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.

C. 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.

D. Dissertation Subject
A candidate must present a proposal for doctoral dissertation that is supported by that member of the department who has agreed to sponsor the dissertation.

E. Residence Requirement
A minimum of two consecutive semesters of full-time study is required.

Requirements for the Doctor of Arts Degree in Foreign Language Instruction

In addition to the minimum requirements of the Graduate School, the following is required:

A. Course Requirements
1. Major field: Candidates are expected to take a minimum of 15 credits, distributed evenly among the following areas: literature, advanced language, culture.
2. Minor field: In the minor (Spanish, French, Italian 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.

B. Performance
An average grade of B must be maintained in all coursework.

C. Teaching Experience
1. Practicum: Teaching an elementary or intermediate course in the major.
2. Internship: Team-teaching a course of literature, advanced language or culture for one semester.
3. Externship: Full-time teaching for one semester, three courses at the secondary or college level.

D. Comprehensive Examination
Both a written and oral comprehensive examination are required.

E. Dissertation
The total number of credits for the Doctor of Arts degree in foreign language instruction normally ranges from 45 to 51. 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.

**The doctoral program is currently not accepting new students.*

Faculty

Berr, Samuel, Associate Professor and Graduate Program Director.[2] Ph.D., 1968, New York University: Historical linguistics, Old Saxon; Yiddish language and literature.

Bethin, Christina Y., Assistant Professor.[3] 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.

Czerwinski, Edward J., Professor.[2] Ph.D., 1965, University of Wisconsin: Russian literature; comparative literature; Dostoevsky.

Elling, Barbara E., Professor.[1] Ph.D., 1971, New York University: Romanticism; literature and sociology; methods of language teaching.

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

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

Mielke, Andreas, Assistant Professor. Ph.D., 1981, Yale University: Enlightenment; age of Goethe; German novella; modern German drama; European Nihilism.

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

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

Rzhevsky, Nicholas, Assistant Professor. Ph.D., 1972, Princeton University: 19th- and 20th-century Russian culture; ideology and semiotics.

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

Vogel, Lucy, Associate Professor. Ph.D., 1968, New York University: 19th-century and early 20th-century Russian culture; symbolist poetry.

Number of teaching, graduate and research assistants, fall 1983: 13

[1] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1972-73.*

[2] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1973-74.*

[3] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1982-83.*

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 505 Minor Germanic Languages
German loan words in Scandinavian: Intensive study of Swedish, Dutch or Danish, as indicated and their relation to English and German.
Fall, 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 and Schiller. The major figures considered as poets, philosophers and theoreticians of the arts and literature.
Spring, 3 credits

GER 542 Literature of the Romantic Period
Selections from representative prose works, drama and poetry from the period 1795-1830 are examined from various perspectives, including the sociology of literature.
Fall or spring, 3 credits

GER 545 20th-Century Prose and Poetry
A survey of 20th-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
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 551 Baroque
A survey of the literature of the period.
Spring, 3 credits

GER 553 Realism
Selections from representative prose works, drama and poetry from the period 1835 to 1895 are examined from various perspectives, including the sociology of literature.
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 556 Bibliography and Methodology
Introduction to the bibliographical aspects of literary study, including an examination of various research techniques; introduction to the leading methods of modern literary criticism.
Fall or spring (as feasible), 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 561 Goethezeit
A study of the cultural changes in Germany during Goethe's lifetime 1749-1832.
Fall or spring (as feasible), 3 credits

GER 562 Gothic and Indo-European
An introduction to the principles of historical linguistics, with the applications of these principles applied to the tracing of Gothic from Indo-European. The bulk of the course will be devoted to the Gothic language per se, with readings from the Ulfilas translation of the Bible.
Fall or spring (as feasible), 3 credits

GER 563 Old High German
An introduction to the literary form of German of the ninth century. The language will be approached as a foreign language. The bulk of the course, however, will be directed toward a discussion of the genres of the period, the Heroic Epic, charms and incantations, glossaries, homilies, sermons and exerpts from the Bible.
Fall or spring (as feasible), 3 credits

GER 565 Middle High German Literature
Spring, 3 credits

GER 571 Comparative Germanic Linguistics
Descriptive analysis of English, New High German, Swedish, Dutch and Yiddish.
Fall or 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.
Variable and repetitive credit

Russian and Slavic 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

RUS 502 Problems of Literary Translation
The course will address theoretical and practical problems. The student will become acquainted with translation theory. Comparative and contrastive analyses will be done on masterpieces of Slavic literature that have several critically recognized translations, e.g., Pushkin's *Eugenij Onegin* as translated by W. Arndt, V. Nabokov and most recently by Charles Johnston, or the many translations of other works. The student will discuss strengths and weaknesses of a given translation with regard to language and content. The course will include practical training. As a final paper, the student will be expected to submit a translation of publishable quality of a previously untranslated literary selection.
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 507 Gogol and the Grotesque
Gogol's style and language as an expression of his philosophy that the universe is fundamentally absurd. We will trace the enormous influence of Gogol's style in Russian literature down to the present day.
Spring, 3 credits

RUS 509 Dostoevsky and the West
Cross-listed 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 514 Russian Literature since 1917
A seminar in Soviet post-Revolutionary and emigree prose. The course will deal with Russian prose fiction—such as prose genres, literary movements, major authors and selected topics.
Fall, 3 credits

RUS 517 History of the Russian Literary Language
This course will discuss the development of the Russian literary language from the 10th to the 19th centuries. Although its emphasis is primarily on the historical development of the language, the course will include readings from the early East Slavic chronicles, the *Tale of Igor's Campaign, The Life of Avvakum,* etc., as well as discussions of genre and style.
Fall, 3 credits

RUS 518 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 538 Structure of Russian
The course will investigate the phonetics, phonology and morphology of Contemporary Standard Russian. Special emphasis will be placed on an analysis of Russian that can be adapted for pedagogical purposes.
Every other 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 540 Techniques of Class Instruction
Teacher supervision, visitation and evaluation as well as help in development of lesson plans. To be taken in conjunction with a teaching assignment.
Spring, 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

RUS 602 Literature and Theater
The relationships of literature and theater with particular examples taken from Russian cultural history. The stage adaptations of prose by Stanislavsky, Meyerhold, and contemporary directors will be studied as forms of aesthetic conjunction and response to social-ideological context.
Spring, 3 credits

SLV 501 Special Topics in Slavic Literature
Special topics in Slavic literature investigating a specified author, period, genre, or theoretical issue. Designed to provide a forum for advanced research in critical methodology and bibliography.
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

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

D.A. Courses

The following courses are available only to candidates in the Doctor of Arts Program:

DLG 601, DLR 601 Internship in Foreign Languages: German and Russian
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

DLG 602, DLR 602 Externship in Foreign Languages: German and Russian
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

DLG 699, DLR 699 Doctoral Research in Foreign Languages: German and Russian
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

Hispanic Languages and Literature (SPN, DLS)

Chairperson: Georgina Sabat-Rivers
Frank Melville, Jr. Memorial Library N3022-3023 (516) 246-5685/91

Graduate Program Director: Jaime A. Giordano
Frank Melville, Jr. Memorial Library N3029 (516) 246-7736

The Department of Hispanic Languages and Literature offers graduate programs leading to the degrees of Master of Arts, Doctor of Arts and 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 university, or possibly for other careers in humanistic study, research and writing. The D.A. degree is primarily an advanced degree for continuing a career in teaching at the high school, junior college or undergraduate level. An Interdepartmental Romance Languages curriculum is also offered. This curriculum may be combined with the D.A. or the Ph.D. program.

More detailed information regarding the graduate program is available from the departmental office. This includes specific distribution requirements, fields of specialization and information regarding qualifying and Ph.D. examinations. Interested students should request information and applications forms as early as possible, especially if they plan to apply for a teaching assistantship and/or financial aid. Part-time study is permitted; some graduate courses are offered during the late afternoon and in the summer sessions.

Admission

Admission to the M.A. Program

In addition to the minimum requirements of the Graduate School, the following are required:

A. A completed application form (available from the department) including three letters of academic and personal reference.

B. A sample of written work (an essay or term paper) to be submitted at the time of application.

C. A copy of previous college transcripts, including proof that the student has completed a baccalaureate degree with a major in Spanish.

D. A copy of the Graduate Record Examination General Test (GRE) scores. [Foreign applicants must also present a TOEFL English test score of at least 550 and must show proof that they have the necessary funds to finance their education (living expenses plus tuition).]

E. The department will provisionally admit an applicant who has not fulfilled one of the above admission requirements on a part-time basis as a Graduate Special Student (GSP) through the Center for Continuing Education.

Admission to the Doctor of Arts Degree in Foreign Language Instruction

In addition to the minimum requirements of the Graduate School, the following are required:

A. A completed application form (available from the department) including three letters of academic and personal reference.

B. A sample of written work (an essay or term paper) to be submitted at the time of application.

C. A copy of previous college transcripts, including proof that the student has completed a baccalaureate degree or Master of Arts degree in language or related studies.

D. A copy of the Graduate Record Examination General Test (GRE) scores. [Foreign applicants must also present a TOEFL English test score of at least 550, and must show proof that they have the necessary funds to finance their education (living expenses plus tuition).]

E. The department will provisionally admit an applicant who has not fulfilled one of the above admission requirements on a part-time basis as a Graduate Special Student (GSP) through the Center for Continuing Education.

Admission to the Doctor of Philosophy Program in Hispanic Languages and Literature

In addition to the minimum requirements of the Graduate School, the following are required:

A. A completed application form (available from the department) including three letters of academic and personal reference.

B. A sample of written work (an essay or term paper) to be submitted at the time of application.

C. A copy of previous college transcripts, including proof that the student has completed a baccalaureate degree with a major in Spanish.

D. A copy of the Graduate Record Examination General Test (GRE) scores. [Foreign applicants must also present a TOEFL English test score of at least 550, and must show proof that they have the necessary funds to finance their education (living expenses plus tuition).]

E. The department will provisionally admit an applicant who has not fulfilled one of the above admission requirements on a part-time basis as a Graduate Special Student (GSP) through the Center for Continuing Education.

F. The entering graduate student who is considering the possibility of working for a Ph.D. should consult immediately with the Chairperson and/or Director of Graduate Studies in order to plan a broad program of reading and coursework in all areas offered by the department.

Requirements for the M.A. Degree

In addition to the minimum requirements of the Graduate School, the following are required:

A. Student must demonstrate proficiency in both Spanish and English.

B. 36 graduate credit hours are required, of which as many as six credits may be earned by completing a special project, thesis and/or examination.

C. At least one course should be taken in each of the following areas: teaching methods (a practicum), Spanish literature, and Spanish-American literature. Courses in linguistics, advvanced language and problems in bilingual education are recommended.

D. After completion of the 36 graduate-credit hours requirement, the student will either complete an independent project (thesis) or take a basic comprehensive examination adapted to the needs and interests of the individual student.

E. Students wishing to continue studies in the doctoral program are required to take the minimum of 36 hours normally including the 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 of all predoctoral M.A. students. This examination is normally scheduled early in November or early in April. Predoctoral M.A. students are also required to demonstrate a reading knowledge of French.

F. Studentss working on a part-time basis should complete all requirements for the M.A. within four years after their first regular graduate registration.

Requirements for the M.A. Degree, Concentration in Romance Languages

In addition to the minimum requirements of the Graduate School, the following are required:

A. A student must complete 36 graduate credit hours of specified coursework in two different languages (Spanish/French, Spanish/Italian). Student should arrange an appropriate course of study in conjunction with the Interdepartmental Romance Language M.A. advisors from both departments.

B. After completion of the 36 graduate-credit hours, the student must pass a comprehensive examination based on a special reading list.

C. A student must demonstrate proficiency in English and in both the language of the Interdepartmental degree.

Requirements for the Doctor of Arts Degree

In addition to the minimum requirements of the Graduate School, the following are required:

A. In the Spanish major 15 credits (depending on previous preparation) are to be distributed evenly among literature, advanced language and culture courses.

B. In the minor (French, German, Italian, Slavic or linguistics) 12 credits are required.

C. Additional requirements are: one course in advanced composition, one course in general linguistics and three education courses (including one in testing).

D. The total number of credits required ranges normally from 45 to 51.

E. The requirements of a practicum, an internship and an externship vary in individual cases.

F. Practical experience in teaching is required.

G. A B average in coursework must be maintained.

H. After completion of the course work, students must pass a comprehensive examination (written and oral) and fulfill a doctoral project.

Requirements for the Ph.D. Degree

In addition to the minimum requirements of the Graduate School, the following are required:

A. Course Requirements

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 501 (Historical Linguistics I).

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 one practicum is require and may be counted as part of the student's full-time study. Undegraduate 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 Study and work out an approved combination of courses.

B. 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 six literary works, and serves to indicate preparation and aptitude for doctoral work in Spanish. It consists of a written part (3½ hours) and an oral part (one-half hour). This examination may not be repeated.

C. 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.

D. Comprehensive (Preliminary) Examination

Having completed the department's standard reading list for a general coverage of topics in Spanish and Spanish-American literature, the student 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. 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.

E. Dissertation

After advancement to candidacy, the student 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 at least one faculty member from outside the department who has 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 Professor. 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: 18th- and 19th-century Peninsular literature; recent articles on Galdos, Clarin and Alarcon.

Giordano, Jaime A., Associate Professor and Director of Graduate Program. 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.

Klein-Andreu, Flora, Assistant Professor. Ph.D., 1972 Columbia University: Semantics, sociolinguistics and language change. Discourse perspectives on syntax: articles on Spanish semantics and language change.

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.

McKenna, James B., Associate Professor. Ph.D., 1965, Harvard University: 20th-century Spanish culture and literature (on Administrative leave).

Montoro, Adrian, Associate Professor. Doctor en Filosotia 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.

Pato, Hilda, Assistant Professor. Ph.D., 1983, University of Pennsylvania: Contemporary Peninsular poetry and theory.

Rivers, Elias L., Professor. Ph.D., 1952, Yale University: 16th- and 17th-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 and Chairperson. Ph.D., 1969, Johns Hopkins University: Spanish literature; *Sor Juana Ines de la Cruz: Obras selectas; El Sueno de Sor Juana Ines de la Cruz: Tradiciones literarias y originalidad.*

Vasvari, Louise, O., Associate Professor.[1] 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-dugue.*

Number of teaching graduate and research assistants, fall 1983: 14.

[1] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1975-76.*

Courses

SPN 501 Historical Linguistics I
Universals of linguistic change, as well as with the evolution of Latin and creation of Romance languages. Emphasis on development of Spanish, with a strong secondary focus on French and Italian.
Prerequisite: B.A. Degree or permission of instructor
Fall or spring, every 2 years or more, 3 credits

SPN 502 Historical Linguistics II
After a brief descriptive introduction to morphological terminology, the course will be divided into two parts: the nominal systems of Latin and modern Spanish, and conservation versus innovations in the verbal system.
Prerequisite: B.A. Degree or permission of instructor
Fall or spring, every 3 years or more, 3 credits

SPN 509 Literary Theory
A study of outstanding methods of analysis and literary research, and a survey of major works pertaining to the study of literature as a science. A required course for Ph.D. candidates in Spanish.
Prerequisite: B.A. Degree
Fall or spring, every 2 years or more, 3 credits

SPN 510 The Hispanic Culture
An introduction to the essential aspects of Peninsular and/or Latin American cultures and civilizations, designed to provide incoming graduate students with enough background to undertake the advanced study of the Hispanic language and literature.
Prerequisite: B.A. Degree
Fall or spring, every 2 years or more, 3 ccredits, repetitive

SPN 512 Medieval Literature
Major literary works within the Medieval period will be read and discussed in depth, and their interrelation with the cultural context analyzed. Topics may vary.
Prerequisite: B.A. Degree
Fall or spring, 3 credits, repetitive

SPN 515 Graduate Spanish Composition and Stylistics
Theory and practice of problems in composition and in translation with revision of difficult points in advanced Spanish grammar. Classroom analysis and discussion. Required course for Doctor of Arts students (DLS); also useful for M.A. and Ph.D. students.
Prerequisite: B.A. Degree
Fall or spring, 3 credits

SPN 523 Golden Age Literature
Major literary works within the Renaissance and/or Baroque periods, read and analyzed in depth, and their interrelation with the cultural context discussed. Topics may vary.
Prerequiste: B.A. Degree
Fall or spring, 3 credits, repetitive

SPN 528 Cervantes
Miguel de Cervantes' works will be read, analyzed and discussed in depth. A required course for Ph.D. students (when not offered as a seminar). Advanced Doctor of Arts (DLS), and M.A. students will be accepted.
Prerequisite: M.A. Degree or permission of instructor.
Fall or spring, 3 credits, repetitive

SPN 531 Spanish Enlightenment and Romanticism
A course devoted to the Spanish literature of the enlightenment and the Romantic period, with particular attention to the significance of the ideas prevalent at the time in literary theory and the historical and social concept.
Prerequisite: B.A. Degree
Fall or spring, 3 credits, repetitive

SPN 541 19th-Century Spanish Literature until the Generation of 1898
Major literary works within the period will be read and analyzed in depth, and their interrelation with the cultural context will be discussed.
Prerequisite: B.A. Degree
Fall or spring, 3 credits, repetitive

SPN 543 20th-Century Spanish Literature
Major literary works within the period will be read, analyzed and discussed in depth, and their interrelation with the cultural context will be discussed.
Prerequisite: B.A. Degree
Fall or spring, 3 credits, repetitive

SPN 552 Colonial Spanish-American Literature
Major authors and literary works of the period. Readings will be analyzed and discussed in depth, and their interrelation with the cultural context.
Prerequisite: B.A. Degree
Fall or spring, 3 credits, repetitive

SPN 562 19th-Century Spanish-American Literature
Major authors and literary works of the period. Readings will be analyzed and discussed in depth and their interrelation with the cultural context will be discussed.
Prerequisite: B.A. Degree
Fall or spring, 3 credits, repetitive

SPN 569 Spanish-American Modernism
Major authors and literary works of the Modernistic period (1880-1916) in Spanish America. Readings will be analyzed in depth and their interrelation with the cultural context discussed. A required course for Ph.D. students (when not offered as a seminar course).
Prerequisite: M.A. and advanced Doctor of Arts (DLS) students
Fall or spring, 3 credits, may be repetitive

SPN 571 20th-Century Spanish-American Literature
A course devoted to major authors and literary works of the period. Readings will be analyzed and discussed in depth, and their interrelation with the cultural context discussed.
Prerequisite: B.A. Degree
Fall or spring, 3 credits, repetitive

SPN 582 Hispanic Tradition in the United States
A general historical analysis of the influence of hispanic culture in the United States as a consequence of the continuous interaction between Spanish and English-speaking people. Special attention is given to cultural manifestation in a bicultural setting.
Prerequisite: B.A. Degree
Fall or spring, 3 credits

SPN 583 Spanish-English Contrastive Phonology
A contrastive analysis of the sound system of English and Spanish entailing a phonetic and phonological description of both languages with major emphasis on Spanish; discussion of problem areas in both languages which create linguistic interference among both bilinguals and second language learners; overview of phonetic dialectology throughout the Hispanic world. Course will be in English and/or Spanish.
Prerequisite: B.A. Degree
Fall or spring, 3 credits

SPN 584 Contrastive Spanish-English Morpho Syntax
The grammatical structures of English and Spanish are studied in relation to each other in order to gain insights into their similarities and their points of conflict. Contrastive analysis and its tools are important branches of applied linguistics and of great usage for potential foreign language and bilingual teachers, Teachers of English as a Second Language, and for advanced language and linguistics students. English and/or Spanish.
Prerequisite: B.A. Degree
Fall or spring, 3 credits

SPN 585 Caribbean Literature
A course devoted to major writers and works of the Caribbean area. Readings will be analyzed and discussed in depth, and in their interrelation with the cultural context. Topics may vary.
Prerequisite: B.A. Degree
Fall or spring, 3 credits, repetitive

SPN 588, 589 Directed Master's Research
For Masters' thesis only. This course is for students with a terminal Masters' thesis option. Letter grades.
Prerequisite: Permission of Director of Graduate Studies or Instructor
Fall and spring, 1 to 6 credits, repetitive

SPN 595, 596 Directed Independent Individual Studies
For M.A. and Ph.D. candidates. Requires a written proposal signed by the faculty member involved, prior to registration, and a term paper for the course. A copy of the paper presented will be kept in the departmental files. Limited to specific and justified cases. Requires the approval of the Director of Graduate Studies and the Departmental Chair. No more than a total of nine credits may be applied for graduate work.
1-6 credits, variable

SPN 612 Topics Seminars
A seminar course designed primarily for advanced doctoral candidates. The topic will be chosen by the professor from among those topic courses required of all Ph.D. students. A minimum of four 600 level seminars are required of all Ph.D. students.
Prerequisite: Advanced doctoral candidates and/or permission of instructor
Fall and spring, 3 credits, repetitive

SPN 681 Directed Readings
For the student who has completed all course requirements but has not yet taken the Comprehensive Exams. Students in this category will not be permitted to take the Directed Doctoral Research course in the same semester that this course is being taken.
Prerequisite: Course work must be completed except for Comprehensive Exams.
Fall and spring, 1-9 credits, non-repetitive

SPN 691 Practicum in the Teaching of Spanish Language
Theory and practice of language. Applied methodolgy and linguistics to classroom situations. A required course for Teaching Assistants.
Prerequisite: Permission of Director of Graduate Studies
Fall, 3 credits, non-repetitive

SPN 695, 696 Directed Doctoral Research
For students who have completed their Ph.D. course requirements and need to devote their time for preparation of their thesis.
Prerequisite: Comprehensive Exams completed. Permission of Instructor.
Fall and spring, 1-9 credits, repetitive

SPN 695, 696 Directed Doctoral Research
For students who have completed their Ph.D. course requirements and need to devote their time for preparation of their thesis.
Prerequisite: Comprehensive Exams completed. Permission of Instructor.
Fall and spring, 1-9 credits, repetitive

D.A. Courses

The following courses are available only to candidates in the Doctor of Arts Program;

DLS 601 Internship in Foreign Languages: 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

DLS 602 Externship in Foreign Languages: 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.
Fall and spring, 3-6 credits.

DLS 699 Doctoral Research in Foreign Languages: 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.

Music (MUS)

Chairperson: Billy Jim Layton
Fine Arts Center 3310 (516) 246-5672/3

Graduate Program Director: Richard Kramer
Fine Arts Center 3310 (516) 246-5672/3

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 20th century reflects one aspect of the department's philosophy. The department encourages the development of professional competence in more than one area of musical study. Opportunity for advanced 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 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. A fully equipped Electronic Music Studio complex provides advanced facilities for electronic music composition. The Music Library contains an extensive research collection of books, periodicals, scores, microfilms and recordings and includes an excellent listening facility.

Admission

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, in addition to the Graduate School Requirements.

A. A baccalaureate degree from a recognized institution.

B. Official transcripts of undergraduate records.

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

D. At least three letters of recommendation from persons familiar with the applicant's work.

E. 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, musical scores and tapes.

F. Scores of the Graduate Record Examination General Test.

G. 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 16-century or 18-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 these areas will be required to take appropriate undergraduate or graduate courses to remedy the deficiencies. The entrance examinations must be passed before the comprehensive examinations are attempted.

Admission to the M.M. Program

The following are required for admission to the M.M. program in performance, in addition to the requirement sof the Graduate School:

A. A baccalaureate degree from a recognized institution.

B. Official transcripts of undergraduate records.

C. An audition in the major field of performance. Students residing at a distance may gain provisional acceptance by sending a taped audition. Audition dates, usually designated for February, are announced by the department each fall. Applicants should contact their prospective major teachers regarding suitable repertory for auditions.

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

E. Scores of the Graduate Record Examination General Test.

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

Admission to the Doctor of Musical Arts Program

See Admission to the M.M. Program above. In addition, a master's degree, usually in the pertinent area of performance, is required. Applicants must audition in person before a faculty committee. Current audition schedules are available on request from the department.

Students who do not posses a Master of Music degree from Stony Brook must pass the entrance examination in ear training and demonstrate preparation in music history and theory commensurate with the M.M. requirements.

Applicants who plan to include a secondary area of specialization in composition, history, or theory within their D.M.A. program must submit examples of work in the proposed secondary area and must demonstrate to the pertinent faculty competence commensurate with a master's degree at a distinguished level in that area. Students who are accepted in a secondary area of specialization must pass 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.

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 Graduate Program Director by February 1 for fall admission. The application should be accompanied by letters of recommendation and examples of work where pertinent. A personal audition is required.

Admission to the Ph.D. Program

See *Admission to the M.A. Program,* above. In addition, a master's degree, usually in the pertinent area of competence, is required. As evidence of ability to carry on doctoral work in the area of specialization, applicants should submit examples of recent work as follows:

1. For composition, musical scores and tapes
2. For history, essays in music research, analysis or criticism
3. For theory, essays in music analysis or theory, examples of composition in traditional styles.

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 Graduate Program Director by February 1 for fall admission. The application should be accompanied by examples of work and letters of recommendation.

Students who do not posses the Master of Arts degree in music from Stony Brook will be asked to demonstrate achievement commensurate with that degree by the end of the first year of study by taking the relevant master's comprehensive examination.

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

Degree Requirements

Requirements for the M.A. Degree, Graduate Studies in Music History

A. Course Requirements
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 20th 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 toward the degree, approval by the Graduate Studies Committee must be obtained.

B. Foreign Languages
A reading knowledge of French and German is required. The German 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 is required. The paper should be submitted no later than the third week of the semester in which the student expects to receive the degree.

Requirements for the M.A. Degree, Graduate Studies in Music Theory

A. Course Requirements
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: three courses from the group MUS 531-534.
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 is required. The German 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 examination in the history of music theory and week-long projects involving problems in analysis and theory are required.

D. Research Paper
A substantial essay, normally one which the student has written as a part of the course work is required. The paper should be submitted no later than the third week of the semester in which the student expects to receive the degree.

Requirements for the M.A. Degree, Graduate Studies in Composition

A. Coures Requirements
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 is required. 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 is required.

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.

Requirements for the M.M. Degree

A. Course Requirements
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 one course in music history (MUS 503 or MUS 507) and one course in music theory (MUS 502, 504, or 508). Students who can demonstrate adequate preparation may take more advanced courses to fulfill this requirement.

MUS 565 Graduate Orchestra is required of all students who play orchestral instruments during each semester of residence. Participation in the Accompaniment Pool is required of all pianists during each semester of full-time residence. All students except those in the conducting programs must be enrolled in MUS 571 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. Ear-Training
Satisfactory performance on the entrance examination in ear-training is required. Deficiencies in this area should be remedied within the first year of study.

C. 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 D, below) is given.

D. A Public Recital.

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. The committee may include additional faculty members from within or outside the department if 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, essays and examinations. The term of the contract should normally be completed after two yeras of full-time residence.

A. Work in the Student's Area of Specializaation
Progress during residence in the program will be demonstrated to the directing committee through the presentation of four recitals, not including the Doctoral Degree Recital, showing mastery of a broad 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, are required. 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-Centrury Music
Either a substantial portion of one of the recitals, described above in section *A*, or the lecture-recital, section *B*, must be devoted to twentieth-century music.

E. Foreign Language
A reading knowledge of French, German or Italian is required. 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 is required.

G. Orchestra/Accompaniment
Students who play orchestral instruments are required to participate in the Graduate Orchestra during each semester of full-time residency as needed. Pianists are required to participate in the Accompaniment Pool during each semester of full-time residency.

H. Secondary Area of Specialization
Students who propose to do advanced 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.
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.

I. Doctoral Jury Examinations
One jury will be played at the end of the first full year of residency. A second, thirty-minute jury examination will be taken at the end

of the period of residency covered under the contract toward candidacy. Both juries must be passed as a condition for Advancement to Candidacy.

J. Advancement to Candidacy
Upon completion of the above requirements (*A-I*), the student may be advanced to candidacy. Advancement to candidacy is granted by the Graduate School upon recommendation from the departmental Director of Graduate Studies.

K. Doctoral Degree Recital Examination
After being advanced to candidacy, the student must:

1. Submit a program of the proposed doctoral degree recital to the Graduate Studies Committee. The program must not include works previously performed to satisfy other graduate degree requirements.
2. Submit written notes on the program that focus on significant features and interpretative aspects of the works to be performed.
3. Appear before an examining committee to demonstrate mastery of the doctoral degree recital program and of areas pertinent to the works to be performed.
   The doctoral degree recital examination normally takes place within one year after Advancement to Candidacy.

L. Doctoral Degree Recital
The doctoral degree recital may be performed after the degree recital examination has been passed. It must demonstrate a distinguished, professional level of performance. A recording of this recital, along with program and notes, is to be deposited in the University Library.

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 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. Successful completion of relevant master's requirements is assumed for the Ph.D. degree; see *Admission to the Ph.D. Program,* above.

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 mastery of a broad 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. n 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
Reading knowledge of German and French for students in history or theory is required; reading knowledge of French, German or Italian for composition students is required. (See pertinent M.A. language requirements, above). 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 is required. 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.

E. 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.

F. 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. Approval of the dissertation in composition rests with the dissertation committee. The composer will present a public colloquim on the dissertation work(s).

Faculty

Addison, Adele, Performing Artist in Residence. B. Mus., 1946, Westminister Choir College, New England Conservatory of Music: Voice; vocal pedagogy.

Anderson, Ronald, Performing Artist in Residence. M.S., 1958, Juilliard School of Music; Ed.D. 1969, Columbia University: Trumpet; Renaissance and Baroque brass performance practice; 20-century brass repertory.

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; 20-century wind repertory.

Bonvalot, E. Anthony, Associate Professor. Ph.D., 1966, Harvard University: Renaissance music.

Borror, Ronald, Performing Artist in Residence. D.M.A., 1978, Yale University: Trombone; brass ensemble.

Brooks, Marguerite L., Assistant professor and Director of Choral Music. M.Mus., 1975 Temple University: Choral conducting.

Canin, Martin, Performing Artist in Residence. M.S., 1956, Juilliard School of Music: Piano; piano repertory.

Cherlin, Michael, Assistant Professor. Ph.D., 1983, Yale University: Theory, 20-century music, analysis.

DesRoches, Raymond, Performing Artist in Residence. M.Mus., 1961, Manhattan School of Music: Percussion; percussion ensemble.

Eddy, Timothy, Performing Artist in Residence. M.Mus., 1970, Manhattan School of Music, Cello: Chamber music; 20-century string repertory.

Fuller, Sarah, Associate Professor. Ph.D., 1969, University of California, Berkeley: Medieval and Renaissance music; history of music theory.

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.

Gosman, Lazar, Professor. Diploma, 1949, Moskow State Conservatory U.S.S.R.; pupil of David Oistrakh: violin; orchestral conducting.

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, Professor. B.A., 1956, Columbia University: Piano; chamber music; 20-century piano repertory.

Kramer, Richard, Associate Professor and Graduate Program Director. Ph.D., 1974, Princeton University: 18-century theory; Beethoven and Schubert; sketch studies.

Kreiselman, Jack, Performing Artist in Residence and Director of the University Wind Ensemble. Manhattan School of Music; pupil of Simeon Bellison and Simon Kovar: Clarinet; wind ensemble; 20-century wind repertory.

Lawton, David, Associate Professor and Director of the Orchestra. Ph.D., 1973, University of California, Berkeley: Orchestral and opera conducting; 19th-century studies.

Layton, Billy Jim, Professor and Chairperson. Ph.D., 1960, Harvard University: Composition; analysis.

Lessard, John, Professor. Diploma, 1940, Ecole Normale; Diploma, 1941, Longy School of Music: Composition; tonal counterpoint and fugue.

Levine, Julius, Performing Artist in Residence and Director of Chamber Music. B.S., 1946, Juilliard School of Music: String Bass; chamber music.

Linfield, Eva, Assistant Professor and Director of the Collegium Musicum. Ph.D., 1984, Brandeis University. 17-century music; J.S. Bach; performance of early music.

McCalla, James, Assistant Professor. Ph.D., 1976, University of California, Berkeley: 20-century music; aesthetics and criticism.

Purvis, William, Performing Artist in Residence. B.A., 1971, Haverford College; pupil of Forrest Standley and James Chambers: Horn; chamber music.

Roseman, Ronald, Performing Artist in Residence. B.A., 1955, Queens College: Oboe; chamber music; 20-century wind performance.

Rosen, Charles, Professor. Ph.D., 1961, Princeton University; D. Mus., H.C., 1976, Trinity College, Dublin; D. Mus, H.S., 1977, University of Leeds: Classical and Romantic music; music of the 20-century; criticism in art, music and literature; piano.

Semegen, Daria, Associate Professor and Associate Director of the Electronic Music Studio. M. Mus., 1971, Yale University; Composition; electronic music.

Silver, Sheila, Assistant Professor. Ph.D., 1976, Brandeis University: Composition; analysis.

Treitler, Leo, Professor. Ph.D., 1966, Princeton University: Medieval and early Renaissance music; 20-century music; history of music theory; historiography; music criticism.

Weisberg, Arthur, Performing Artist in Residence and Conductor of the Orchestra. Juilliard School of Music; pupil of Simon Kovar: Bassoon; orchestral conducting; 20-century ensemble.

Willard, Jerry, Performing Artist in Residence. Pupil of Sophocles Papas: guitar, lute.

Winkler, Peter, Associate Professor.[1] M.F.A., 1967, Princeton University: Composition; theory and history of popular music.

Number of teaching, graduate and research assistants, fall 1983: 85

[1]*Recipient of the State University Chancellor's Award for Excellence in Teaching, 1976-77.*

Courses

MUS 500 Introduction to Music Research
Music bibliography, research techniques, and editorial procedures. Students will write several short papers covering a broad spectrum of historical periods and repertories.
3 credits

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 structure 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, 3 credits, each semester
(See note below MUS 509)

MUS 508 Studies in Composition and Theory
Study of contemporary compositional techniques or of traditional writing styles, including both analysis and exercises in writing. Various specific topics offered each semester.
Fall and spring, 1-3 credits, variable
(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.M./D.M.A. students. The course is not open to M. M.M/D.M.A. students, except for conducting students who can demonstrate graduate-level ability in an instrument or voice.
Fall and spring, 2-3 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 these 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

MUS 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 560 Score Reading
Intensive drill in score reading. Singing, composing and playing in open score with movable clefs. Students must have basic proficiency at the keyboard. Limited to eight students. Priority given to students in the conducting program.
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. Open only to students in the graduate conducting programs.
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 semester in score study, will recive 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, 3-6 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 567 Master Class in Orchestral Repertory
Study of orchestral parts for sections (brass, strings, woodwinds) or for individual instruments. The course will emphasize overall ensemble skills and audition preparation. Different sections directed toward specific groups. See the Course Listing for offerings in any particular semester.
2 credits

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, Cater, 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
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, 2-6 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. Enrollment by groups only.
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 , 2-4 credits, variable

MUS 581 20th-Century Repertory for Instrumnt 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 secton 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 Semester on the Teaching of Music
Discussion of fundamental problems in teaching music. Topics may include the explanation of musical processes, communication to nonprofessionals, 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 insructor. 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 annd 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.
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 annd spring, 1-12 credits each semester, repetitive

Philosophy (PHI)

Chairperson: Edwad S. Casey
Old Physics Building 209 (516) 246-8432

Doctoral Program Director: Robert Sternfeld
Old Physics Building 203 (516) 246-3344

Master's Program Director: Sidney Gellber
Old Physics Building 217 (516) 246-3344

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 Philsophy. The two programs differ in content and purpose.

Graduate Studies in Philosophical Perspectives (master's level) emphasizes current moral, social and political problems and involves an exploration of important issues in education, law, medicine, art, religion and human relationships. Throughout we stress the development of critical and analytic abilities and concentrate on the self-understanding of changing people in a changing world. It is a program in philosophical *perspectives* not only because of interdisciplinary emphasis but because of the importance placed on understanding different approaches possible to many-sided issues. The program complements practice in the variety of professions, as well as serving to promote an intellectual focus for the academic disciplines in the sciences and liberal arts.

Courses are taught by the faculty of the Department of Philosophy and organized under the themes of Moral and Ethical Perspectives; Public Issues; Individual Self and Human Development; Inquiry, Method and the Sciences; Philosophic Traditions and History; and Art and Literature. Some of the offerings relate to such areas as Ethics in the Profesions, Feminism, Parents and Children, Technology, Commnication, Oriental Philosophy and Religion, Existentialism, Marxism and Communism, Guilt and Responsibility and Life Histories.

The curriculum is designed with principally two kinds of students in mind: (a) those currently enrolled in Stony Brook's MA/LS program: (b) those who received their baccaluareate degree some years ago and who are desirous of returning to school to broaden or continue their education in this area.. The program is open to both full- and part-time students. All courses are scheduled for late afternoons, evenings or Saturdays. Those able to take three courses per semester can complete course requirements in about three semesters and (depending on one's pace) the master's paper a short time thereafter. Some financial aid is available.

Admission

Admission to Graduate Studies in Philosophical Perspectives (Master's Level)

For admission to Graduate Studies in Philosophical Perspectives, the following are normally 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 General 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 enrolll in philosophy courses in the MA/LS program prior to consideration of his or her application.

Admission to the Ph.D. Program in Philosophy

There are three general aims of the doctoral program:

1. To cultivate and make explicit the rational values of the principal contemporary styles of philosophical reasoning;

2. To investigate the areas between philosophy and other disciplines which involve communication and reason;

3. To provide an understanding of the history, major figures and diverse problems of philosophy.

For admission to the doctoral program in philosophy, the following are normally required:

A. A bachelor's degree with a major in philosophy.

B. Some knowledge of the history of philosophy and of contemporary modes of thought is highly desirable. Deficiencies in these areas may require that special work be undertaken.

C. An official transcript of undergraduate record and of any work completed at the graduate level.

D. Letters of recommendation from three previous or current instructors; submission of a philosophical essay (which may be a paper written for a previous course).

E. Graduate Record Examination General Test scores.

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

Degree Requirements

Requirements for the M.A. Degree, Graduate Studies in Philosophical Perspectives (MA/PP)

In addition to the minimum Graduate School requirements, the following are required.

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, as listed below:

1. Two 3-credit courses (PHI 510-511) in Resources in the History of Philosophy
2. Two 3-credit courses (PHI 515-516) Resources in Contemporary Philosophy
3. One 3-credit course (PHI 518-519) in the detailed examination of the work of a single philosopher
4. Five 3-credit courses in the MA/PP offerings

Reading knowledge of a foreign language, while desirable, is neither required nor presumed.

B. The M.A. Essay

The essay is a research paper in which the student exhibits an ability to locate, comprehend and articulate a concept or theme that bears upon one or another contemporary problem. The paper is usually begun under the direction of the instructor in one of the MA/PP offerings and will eventually be presented to that instructor and one other faculty member upon completion.

Other options, in satisfying this degree requirement, are available to students, upon approval by the MA/PP program committee:

1. *The M.A. Practicum*
   The Practicum is for those students who are teaching in high school and who can obtain permission to introduce a philosophy course into the curriculum, under the direction of a faculty member in the Department of Philosophy. The student will be required to present course plans, bibliographies and other evidence of his/her academic readiness prior to the teaching of the course, to the faculty advisor and to the MA/PP program committee for their approval. 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 and upon submission of a report written by the student.
2. *Fieldwork*
   A student, with the direction of two faculty members (as advisors), chooses a problem related to the perspectives on moral and ethical issues, or public issues and perspectives that he or she wishes to investigate by going into the community (e.g. hospitals, government agencies, schools, etc.). A written plan of the project will be submitted for review and approval by the advisors and the MA/PP program committee. Overall evaluation will take place at the conclusion of the study and upon submission of a written report by the student.

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 twelve credits of C grades will be dropped from the program.

D. Transfer Credits

A maximum of six hours of post-baccalaureate credit in philosophy from other institutions *may* be transferred toward the M.A. in Philosophy (Philosophical Perspectives). The transference of credit will not be automatic, but will depend upon the suitability of the courses to the goals of MA/PP and upon the grades received in the courses. A maximum of six credits of CED courses in philosophy earned in Stony Brook's MA/LS program are transferrable, subject only to the performance and distribution regulations mentioned above.

Requirements for the Ph.D. Degree in Philosophy

The doctoral program is designed to be completed in four years of full-time work. The Graduate School regulations prescribe a minimum of two semesters of full-time enrollment. In addition to the minimum degree requirements of the Graduate School, the following are required:

A. Seminars

1. Two seminars in the history of philosophy from among courses concentrating upon the thought of an individual thinker (Plato, Aristotle, Kant) or of a period (19th-Century Thought) or an identifiable movement (Rationalists or Empiricists).
2. Two seminars on problems or areas: one from each of the following groups:
   Group a:
   PHI 630 Philosophy of Science and Logic
   PHI 631 Metaphysics
   PHI 632 Epistemology
   PHI 633 Philosophy of Mind
   Group b:
   PHI 634 Ethics
   PHI 635 Social and Political Philosophy
   PHI 637 Aesthetics and Rhetoric
3. Three Style Seminars, one in each of the three contemporary modes of philosophizing: Analytic, Continental and Systematic Proseminars (PHI 650, 651, and 652) will explore the methods, presuppositions and operational modes of the style involved. Advanced Style Seminars and an Interstyle Seminar will be offered regularly, one of which is strongly recommended.
4. Two Interface Seminars in interdisciplinary areas between philosophy and another discipline: Natural Science, Social Science, Humanities. These seminars are usually team-taught by philosophy faculty members knowledgeable about fields outside philosophy along with faculty members from the relevant disciplines.
5. A practicum in the teaching of philosophy, Supervised Teaching, along with additional teaching experience in the undergraduate program.
6. Two additional elected seminars

An overall average grade of B or better is required, with no more than six credits of C counting toward the degree.

B. General

1. To pass an exam in the History of Philosophy.
2. To have accepted a Philosophical Style Essay
3. To have accepted an Interface Essay

The Director of Graduate Studies will guide students in planning their program of studies.

C. Ph.D. Candidacy

Official Ph.D. candidacy is attained when, in addition to the requirements listed above, a student fulfills the additional competency requirements:

1. Competence in symbolic logic. This means sufficient knowledge of concepts and notations of first-order logic for understanding and applying to problems in philosophy. A grade of B or better in an undergraduate symbolic logic course is normally adequate evidence of competence.
2. Competence in a foreign language. This is shown by translating a previsously untranslated philosophical article (or the equivalent) *or* by writing a research paper including a translation of substantial philosophical passages.
3. Competence to undertake dissertation project. This is shown (a) by a paper (10-15 pages) outlining projected study, expected findings, relevant arguments and evidence (e.g. bibliography), and (b) by a development of the projected study before a faculty examining committee.

Upon the recommendation of the graduate faculty that the dissertation project be initiated, the student becomes a candidate for the Ph.D.

M.A. Degree Requirement

Doctoral students may be awarded an M.A. degree upon completion of 30 graduate credits of graded coursework and two of the three projects listed above, Section B, as general requirements. (This M.A. degree is quite distinct from the Master of Arts, Graduate Studies in Philosophical Perspectives described above.)

Faculty

Allison, David B., Associate Professor. Ph.D., 1974, Pennsylvania State University: Phenomenology; structuralism.

Athay, Patricia, Lecturer. B.A., 1974, Reed College: History of 17th- and 18th-century philosophy; Kant; philosophy of science; philosophy of the social sciences.

Buchler, Justus, Distinguished Professor Emeritus. Ph.D., 1938, Columbia Univesity: 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 and Master's Program Director. 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; philosophy of language.

Heelan, Patrick, Professor. Ph.D., 1952, St. Louis University; 1964, University of Louvain, Belgium: Philosophy of science.

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, Federal Republic of Germany; 1971, University of Michigan: Art criticism; 20th-century art; northern Renaissance art.

Martin, Christopher, Lecturer. M.A., 1976, Susex (England): Philosophy and history of logic; medieval philosophy; logic.

Miller, Clyde Lee, Associate Professor.[6] 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., Professor.[4] Ph.D., 1973, Stanford University: Continental philosophy; history of ideas; literary theory.

Simon, Michael A., Associate Professor. Ph.D., 1967, Harvard University: Philosophy of mind; philosophy of biology; philosophy of social science.

Spector, Marshall, Professor. Ph.D., 1963, John Hopkins University: Philosophy of science; modern philosophy.

Sternfeld, Robert, Professor and Doctoral Program Director. 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, Assistant Professor. Ph.D., 1973, Southern Illinois University: Phenomenology and social philosophy.

Williams, Peter, Assistant Professor.[3,5] Ph.D., 1973, Harvard University: Philosophy of law; ethics.

Zyskind, Harold, Professor. Ph.D., 1964, University of Chicago: Philosophic rhetoric; history of philosophy.

Number of taching, graduate and research assistants, fall 1983: 36.

[1] *Joint appointment, Department of Art*
[2] *Dean of Humanities annd Fine Arts*
[3] *Joint appointment, Community and Preventive Medicine*
[4] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1976-77.*
[5] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1977-78.*
[6] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1979-80.*

Courses

MASTER'S PROGRAM IN PHILOSOPHICAL PERSPECTIVES

All courses are for 3 credits unless otherwise noted.

PHI 510, 511 Resources in the History of Philosophy I & II

PHI 515, 516 Resources in Contemporary Philosophy I & II

PHI 518, 519 Individual Thinkers in the History of Philosophy

I. MORAL AND ETHICAL PERSPECTIVES

PHI 521 Contemporary Moral Issues

PHI 522 Ethical Issues

PHI 523 Moral Theories of the Modern World

PHI 524 Guilt and Responsibility

II. PUBLIC ISSUES AND PERSPECTIVES

PHI 532 Freedom, Consent and Values

PHI 533 Community

PHI 534 Philosophy of Law

PHI 535 Political Philosophy

PHI 536 Marxism and Communism

PHI 537 Philosophy of Technology

PHI 538 Philosophy of Medicine

PHI 539 Perspectives on Feminism

PHI 540 Perspectives on the Environment

III. PERSPECTIVES ON INDIVIDUAL SELF AND HUMAN DEVELOPMENT

PHI 551 Life Histories

PHI 552 Parents and Children

PHI 553 Philosophy of Education

PHI 554 Perspectives on Death and Dying

IV. PERSPECTIVES ON INQUIRY, METHOD AND THE SCIENCES

PHI 561 Structure of Inquiry

PHI 562 Logic

PHI 563 Philosopohy of Language

PHI 564 Perspectives on Communication

V. PERSPECTIVES ON PHILOSOPHIC TRADITIONS AND HISTORICAL THEMES

PHI 571 American Philosophy

PHI 572 Oriental Philosophy

PHI 573 Philosophies of History

PHI 574 Myth

PHI 575 Philosophy of Religion

VI. PERSPECTIVES ON ART

PHI 581 Philosophy of Literature

PHI 582 Philosophy of Art

PHI 590, 591 Directed Readings
(Variable credit)

PHI 595, 596 Directed Research
(Variable credit)

DOCTORAL PROGRAM IN PHILOSOPHY

All courses are for 3 credits unless otherwise noted.

I. AREA COURSES

PHI 600 Ancient Philosophy

PHI 601 Medieval Philosophy

PHI 602 Modern Philosophy

PHI 630 Philosophy of Science and Logic

PHI 631 Metaphysics and Systematic Philosophy

PHI 632 Epistemology

PHI 633 Philosophy of Mind

PHI 634 Ethics

PHI 635 Social and Political Philosophy

PHI 637 Aesthetics and Rhetoric

PHI 638 Oriental Philosophy

II. PROSEMINARS

PHI 650 Analytic Philosophies

PHI 651 Phenomenological-Existential Philosophies

PHI 652 Contemporary Systematic Philosophies

III. STYLE SEMINARS

PHI 660 Style Seminar: Analysis

PHI 661 Style Seminar: Phenomenology and Existentialism

PHI 662 Style Seminar: Systematic Philosophies

IV. 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

THEATRE ARTS (THR, DRM)

Chairperson: William J. Bruehl
Fine Arts Center 3045 (516) 246-5670

Graduate Programs Director: Carol Rosen
Fine Arts Center 3017 (516) 246-5674 or 246-5670

The Department of Theatre Arts offers two graduate programs: a three-year (72 credit) M.F.A. in Dramaturgy, and, parallel with the first year of the M.F.A., a one-year (30 credit) M.A. program in the theory and practice of theatre. Both programs offer opportunities for interdisciplinary study. Among the faculty are practicing dramaturgs, critics and scholars, directors, designers, playwrights and translators. Highly distinguished specialists from the University's Foreign Language, English and Comparative Literature Departments contribute significantly to the training as well. Graduate students are encouraged to take elective courses in related disciplines—studies of culture, society, history and literary genres—to help develop a breadth, as well as depth, of knowledge about the place of theatre in society.

The goals of the M.A. program are (1) to study the dramatic tradition and the history of the performing arts; (2) to develop an understanding of the vital relationship between theatre theory and onstage practice; and (3) to prepare students qualified to matriculate in programs of study at the M.F.A. or Ph.D. level. This M.A. program does not set out to train dramaturgs. It is intended for students seeking to become directors in educational, community or professional theatre; drama critics; producers; playwrights; or translators of dramatic texts. It is also suitable for teachers interested in theatre, whose first degree has been in a purely literary discipline.

The M.F.A. program of the Department of Theatre Arts focuses on the work of the *Dramaturg,* sometimes called the Literary Manager, of the theatre. In the United States and throughout the world, the dramaturg takes a vital part in the direction of professional theatre. He or she is responsible for advising on choice of repertoire, for choosing or commissioning translations of foreign plays, collaborating with directors and dramatists in research of many kinds and making public statements about policy and productions. The dramaturg must be well informed in historical, critical and comparative studies, and also sensitive to every aspect of theatre practice. In a three-year M.F.A. professional training program, our graduate students work in close contact with our faculty and with professional theatres both on and off campus, notably with Stony Brook's Highlight Theatre, under the artistic direction of John Russell Brown, Associate of the National Theatre of Great Britain. Training in dramaturgy is useful even to students who later decide to pursue other careers in the theatre or other media, or teaching at the university level, for, in fact, professional dramaturgs do often become directors, producers, administrators, drama critics, teachers or playwrights; many combine two or three different careers. Therefore, the Stony Brook program offers natural opportunities for students with a wide range of interests in theatre practice and dramatic criticism, and in the last three semmesters growing emphasis is placed upon individual development. As this progam is built on the bond between theory and practice that we believe must lie at the heart of dramaturgical training, the culmination of the program is the professional internship and the M.F.A. project.

More detailed descriptions of these graduate programs are available from the departmental office. These descriptions include specific requirements, areas of concentration, and information on independent projects, theses and general examinations. Interested students should request information and application forms as early as possible, especially if they plan to apply for financial aid.

Facilities

The Theatre Arts Department is located in Stony Brook's Fine Arts Center, which houses an 1106 seat proscenium stage, three black box theatres, a scene shop, a costume shop, a design studio, a dance studio, dressing rooms and green rooms. Two additional theatre spaces, another scene shop, and storage space are also available on campus. The campus has electronic media facilities including a large and small TV studio equipped for sound and film technology.

The Unviersity library is immediatelly adjacent and holds in excess of 27,000 volumes related to the study of theatre arts. Special collections of play texts, including translations, and of theatre archives are held and are being developed continually. Manhattan is an easy commute by train, bus or car, and its many theatres, exhibitions, archives and libraries (most notably the New York Public Library of the Performing Arts at Lincoln Center) are also accessible to our students.

Admission

Admission to the M.A. Program in Theatre Arts

For admission to the M.A. program in Theatre Arts, the following, in addition to the minimum Graduate School requirements, are normally required:

A. A baccalaureate degree from an accredited college or university.

B. Advanced undergraduate courses in theatre history, dramatic literature, and/or theatre practice.

C. Undergraduate grade-point average of at least 3.0.

D. Three letters of recommendation.

E. Graduate Record Examination General Test scores.

F. Supporting materials such as scripts, essays, publications, or a portflio, etc. (For the return of this sample of his or her work, the

applicant must include a stamped, self-addressed envelope with the completed application.)

G. Acceptance both by the Department of Theatre Arts and by the Graduate School.

H. If a student not meeting all the above requirements is admitted provisionally, he or she must complete the missing requirements within the first semester of graduate study.

I. If a student accepted into the M.A. progam wishes to offer, either for credit toward the degree or for exemption from enrollment in courses required by Stony Brook, analogous courses taken at another university, he or she must present transcripts and other supporting materials for consideration by the Director of Graduate Studies before the end of his or her first semester in the program.

Admission to the M.F.A. Program in Dramaturgy

This M.F.A. program is intensive and admission to it is highly selective. For admission, the following, in addition to the minimum Graduate School requirements, are normally required:

A. A baccalaureate degree from an accredited college or university.

B. Advancd undergraduate courses in theatre history, dramatic literature, and/or theatre practice.

C. Undergraduate grade point average of at least 3.0.

D. Three letters of recommendation.

E. Graduate Record Examination General Test scores.

F. Supporting materials such as scripts, essays, publications or a portfolio, etc. (For the return of this work sample, the applicant must include a stamped, self-addressed envelope with the completed application.)

G. Acceptance both by the Department of Theatre Arts and by the Graduate School.

H. If a student not meeting all the above requirements is admitted provisionally, he or she must complete the missing requirements within the first semester of graduate study.

I. Applicants who already hold an M.A. in Theatre Arts from another institution may be admitted provisionally to the second year of the M.F.A. program. Such students are required to fulfill M.F.A. first-year course requirements not taken as part of their M.A. training elsewhere.

J. If a student accepted into the M.F.A. program wishes to offer, either for credit toward the degre or for exemption from enrollment in courses required by Stony Brook, analogous courses taken at another university, transcripts and other supporting material must be presented for consideration by the Director of Graduate Studies before the end of the student's first semester in the program.

K. If so indicated on the application, an applicant for the M.F.A. program in Dramaturgy can also be considered for admission to the one-year (30- credit) M.A. program in Theatre Arts, which runs parallel to the first year of the M.F.A. If such an applicant is admitted instead to the M.A. program, he or she may then be considered, upon successful completion of the M.A., for admission to the second year of the M.F.A. program.

L. If a student applying for admission to the M.F.A. program wishes to earn an M.A. degree upon successful completion of his or her first year of full-time study, he or she must indicate this at the time of application, and when in residence, he or she must fulfill all requirements for the 30-credit M.A. degree (see below).

M. Students in the M.F.A. program are evaluated at the end of each year of study before permission is granted to continue. If a student completing his or her fist year of study is not given permission to continue, he or she may instead be redesignated as a candidate for an M.A. degree. He or she must then fulfill all requirements for that 30-credit degree (see above).

Degree Requirements

Requirements for the M.A. Degree in Theatre Arts

In addition to the minimum Graduate School requirements, the following are required:

A. Course Requirements

All courses are 3 credits.

THR 500 Research, Bibliography, and Critical Writing
THR 501 Theatre History
THR 502 The History, Theory, and Practice of Acting
THR 503 Dramatic Literature: Theory, Criticism, and History
THR 504 Playwriting: Tradition and Practice
THR 505 The Organization and Development of Contemporary Theatre
THR 550 Teaching Seminar and Practicum (see *D* below)

B. Final General Examination

A final general examination in essay form assaying the student's knowledge of theatrical history, theory and criticism must be passed with a grade of B or better.

C. Foreign language

Proficiency in a foreign language must be demonstrated. This requirement may be fulfilled either: (1) by successfully completing with a grade of B or better a foreign language course offered for this purpose, or (2) by passing with a grade of B or better a language proficiency examination given by the department.

D. Teaching Experience

Teaching for a least one semester at the university level is required of all graduate students. This requirement is normally fulfilled in the Teaching Seminar and Practicum (THR 550, 3 credits).

E. The Master's Thesis

The master's thesis (THR 506, 3 credits) must be successfully completed with a grade of B or better under the direction of a faculty advisor.

F. Residency Requirement

This 30 credit program is normally completed in one to two years of full-time residency. A full-time student may register, with permission of the Director of Graduate Studies, for from a minimum of 12 credits to a maximum of 18 credits per semester. Students may also be enrolled in the M.A. program part-time.

Requirements for the M.F.A. Degree in Dramaturgy

In addition to the minimum Graduate School requirements, the following ared required:

A. Course Requirements.

All these courses are 3 credits.

1. First year:
   THR 500 Research, Bibliography, and Critical Writing
   THR 501 Theatre History
   THR 502 The History, Theory, and Practice of Acting
   THR 503 Dramatic Literature: Theory, Criticism, and History
   THR 504 Playwriting: Tradition and Practice
   THR 505 The Organization and Development of Contemporary Theatre
   THR 550 Teaching Seminar and Practicum (see *E* below)
2. Second year:
   THR 600 Theatre History II
   THR 601 The Director: Tradition and Techniques
   THR 602 Translations and Adaptations
   THR 603 Theatre Architecture and Stage Design
   THR 604 Concept and Execution
3. Third year:
   THR 650 The Profession of the Dramatist
   THR 651 Shakespeare's Theatre
   THR 652 Theatre and the Media

B. Required Independent Projects under Faculty Supervision

1. First year:
   THR 506 A Theatre's History (3 credits)
2. Second year:
   THR 605 Scripting (3 credits)
3. Third year:
   THR 653 Dramaturg's Practicum (3 credits)
   THR 654 Professional Internship (6 credits)
   THR 655 Third year M.F.A. Projects: "Notes for a 655 Theatre's Artistic Director" (6 credits)

C. Examinations

1. First year:
   At the end of the first year, a general examination in essay form assaying the student's knowledge of theatrical history, theory, and criticism must be passed with a grade of B or better.
2. Third year:
   At the end of the third year, a final comprehensive oral examination before a minimum of three participating faculty must be passed with a grade of B or better.
   These examinations may be taken no more than twice.

D. Foreign Language

Proficiency in a foreign language must be demonstrated before a student may begin the second year of the M.F.A. program. This requirement may be satisfied either: (1) by successfuly completing with a grade of B or better a foreign language course offered for this purpose, or (2) by passing with a grade of B or better a language proficiency examination given by the department.

E. Teaching Experience

Teaching for at least one semester at the university level is required of all graduate students. This requirement is normally fulfilled in the Teaching Seminar and Practicum (THR 550 3 credits).

F. Residence Requirement

This 72-credit program is normally completed in three years of full-time residency. The last semester, during which the student completes the Professional Internship (THR 654) and Third-Year M.F.A. Project (THR 655), is spent in residence either: (1) as a dramaturg with a theatre in the United States or abroad, or (2) as a critic with a newspaper or journal in the United Stated or abroad.

G. Time Limitation

The M.F.A. program is normally completed in 3 years. The time limit for completion of the M.F.A. program, given unusual circumstances, is 6 years.

Faculty

Alpaugh, Robert, Assistant Professor. M.F.A., 1972, University of North Carolina: Directing acting; producing; dance and theatre management.

Auerbach, Leonard, Associate Professor. 1937, City College of New York: Stage management; directing, acting.

Bharucha, Rustom, Assistant Professor. D.F.A., 1981, Yale University: Theatre history; dramaturgy; directing.

Brown, John Russell, Professor. B. Litt., 1952, Oxon; Ph.D., 1960, Birmingham University, England: Directing, theatre practice; dramaturgy; history and criticism; Shakespearean drama.

Bruehl, William J., Professor and Department Chairperson. Ph.D., 1966, University of Pennsylvania: Directing; modern drama; improvisation; acting.

Dickerson, Glenda, Assistant Professor. M.A., 1969, Adelphi University: Black theatre; oral interpretation; directing.

Hartzell, Richard, Associate Professor. M.Ed., 1949, Pennsylvania State University: Documentary film; filmmaking; television.

Heller, Robert, Assistant Professor. M.F.A. 1978, Yale University: Lighting and sound design; theatre technology.

Insull, Sigrid, Associate Professor. M.A., 1966, Indiana University: Costume design.

Levy, Jonathan, Associate Professor. Ph.D., 1966, Columbia University: Playwriting; theatre for children; dramatic criticism; Italian Renaissance drama.

Lusardi, Lewis, Assistant Professor[1]. B.A., University of London: Television production and programming.

Mercier, George, W., Assistant Professor. M.F.A., 1983 Yale University: Set and costume design.

Neumiller, Thomas G., Professor. M.F.A., 1965, Yale University School of Drama: Directing; acting; mime.

Peterson, Louis, Associate Professor. M.A., 1947, New York University: Playwriting; writing for film; acting.

Prusslin, Norman L., WUSB Director. B.A., 1973, State University of New York at Stony Brook: Broadcast management.

Rosen, Carol, Associate Professor and Graduate Program Director. Ph.D., 1975, Columbia University: Dramatic theory and criticism; dramaturgy; comparative modern drama.

Wood, Susan, Lecturer, M.F.A., 1983, University of Michigan: Costume design.

Faculty members from other participating departments include:

Allentuch, Harriet R., Professor[3]. Ph.D., 1962, Columbia University: Seventeenth century French prose and classical theatre; Corneille.

Czerwinski, Edward J., Professor[5]. Ph.D., 1965, University of Wisconsin: Avant-garde theatre of Eastern Europe; Russian literature; comparative literature, Dostoevsky.

Kott, Jan, Professor[2,4] and Critic-in-Residence. Ph.D., 1947, Lodz University, Poland: Dramatic theory and criticism; Shakespearean drama; literary criticism.

Levin, Richard, Professor[2]. Ph.D., 1957, University of Chicago: English Renaissance drama; literary criticism.

Sjoberg, Leif, Professor.[5] Ph.D., 1954, Uppsala University, Sweden: Scandinavian drama and prose; Ibsen, Strindberg, Lagerkvist. Ingmar Bergman, and Aspen Strom.

Zimbardo, Rose. Associate Professor.[2] Ph.D., 1960, Yale University: Restoration and 18-century satiric drama; modern drama; the Renaissance.

Zimmermann, Eleonore M., Professor.[3] Ph.D., 1956, Yale University: 17th-century French theatre; Racine; French romantic and early 20-century theatre; 19-century literature, especially lyricism.

[1] *Adjunct*
[2] *Department of English*
[3] *Department of French*
[4] *Department of Comparative Literature*
[5] *Department of Germanic and Slavic Languages and Literatures*

Courses

THR 500 Research, Bibliography and Critical Writing
An introduction to the methodology of research and bibliography. Students will use the resources of theatre collections and archives to document the lives of theatre companies. Students will have considerable practice in the art of writing criticism.
Prerequisites: Admission to the M.A. or first year of the M.F.A. program or permission of the Director of Graduate Studies
Fall, 3 credits

THR 501 Theatre History
An intensive study of selected periods chosen so that they raise a variety of issues and focus on a range of countries and centuries (e.g., 17th-century France, England in the 16th century, early 20th-century Russia) to supplement rather than repeat areas of study already undertaken by the student. Emphasis will be on production and performance.
Prerequisites: Admission to the M.A. program or first year of the M.F.A. program or permission of the Director of Graduate Studies.
Fall, 3 credits

THR 502 The History, Theory and Practice of Acting
An examination of the principles of acting, with special attention to its history and the work of leading actors and theorists. Seminar work is supplemented by a practicum, where students are engaged in various aspects of the craft. Students will observe the work of skilled professional actors in rehearsals, workshops, and performances.
Prerequisites: Admission to the M.A program or first year of the M.F.A. program or permission of the Director of Graduate Studies.
Fall, 3 credits

THR 503 Dramatic Literature: Theory, Criticism and History
Major dramatic texts will be chosen for detailed study with emphasis on the playwright's style and on the playwright's relation to the dramatic tradition and to the public. These major texts will then be considered in the light of a range of approaches to theatre criticism to illuminate their place in their own time, in our time and in a historical context. This course complements the fall semester course in Theatre History.
Prerequisites: Admission to the M.A. program or first year of the M.F.A. program or permission of Director of Graduate Studies.
Spring, 3 credits

THR 504 Playwriting: Tradition and Practice
A seminar devoted to a study of the tradition and practice of playwriting. The dynamics of dramatic construction — including narrative argument, formal structure, dialogue, and documentary and fictional source material — will be explored. The presentation of students' own plays in readings and workshop productions will enable them to study drama as a dynamic art rather than as one that exists only on paper.
Prerequisites: Admission to the M.A. program or the first year of the M.F.A. program or permission of Director of Graduate Studies.
Spring, 3 credits

THR 505 The Organization and Development of Contemporary Theatre
A study of contemporary theatre and drama in the U.S. and abroad with special reference to the composition of companies, methods of production, styles of performance and varieties of produced works. The aim of this course is to illustrate the range of theatre and dramatic form — from off-off Broadway to fringe theatre to regional theatre to the West End — viable today.
Prerequisites: Admission to the M.A. program or the first year of the M.F.A. program or permission of Director of Graduate Studies
Spring, 3 credits

THR 506 Master's Thesis: Independent Project
Under the direction of the project advisor, the student uses both primary and secondary sources to examine the life of a particular theatre company or artistic movement.
Prerequisites: The successful completion with grade of B or better of at least 12 credits of Theatre Arts Department 500-level courses and approval of the Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 520 Script Preparation and Stage Management
A practical and theoretical approach to the contributions of the dramaturg and stage manager to the production process. This course includes both a seminar and a practicum where work on actual on-campus productions will take place.
Prerequisites: Admission to M.A. program or M.F.A. program or permission of the Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 521 Lighting and Sound Design and Control
A practical introduction to the tradition and craft of lighting and sound design. The course has both a seminar component and a practicum where work on actual campus productions will take place.
Prerequisites: Admission to the M.A. or M.F.A. program or permission of the Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 522 Costumes, Manners and Properties: Tradition and Style
An examination of costume design and stage properties in the context of theatre history and contemporary methods. Techniques to be considered include masks, disguises and transformations. Theoretical approaches studied will be tested in the practicum.
Prerequisites: Admission to the M.A. or M.F.A. program or permission of the Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 550 Teaching Seminar
Supervised student teaching of undergraduate courses accompanied by a seminar in methods and strategies of teaching theatre arts at the university level.
Prerequisites: Admission to the M.A. or M.F.A. program
Fall or spring, 3 credits

THR 551 Practicum in Acting
Independent supervised tutorial with practical work. Requirements include the submission of final report and reading list. Students applying for these practica must submit a study plan in advance.
Prerequisites: Admission to the M.A. or M.F.A. programs or permission of the Director of Graduate Studies
Fall or spring, 3 credits

THR Practicum in Directing
Independent supervised tutorial with practical work. Requirements include the submission of final report and reading list. Students applying for these practica must submit a study plan in advance.
Prerequisites: Admission to the graduate programs or permission of Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 553 Practicum in Stage Design
Independent supervised tutorial with practical work. Requirements include the submission of final report and reading list. Students applying for these practica must submit a study plan in advance.
Prerequisites: Admission to the M.A. or M.F.A. program or permission of the Director of Graduate Studies
Fall or spring, 3 credits

THR 554 Practicum in Lighting and Sound Design
Independent supervised tutorial with practical work. Requirements include the submission of final report and reading list. Students applying for these practica must submit a study plan in advance.
Prerequisites: Admission to the M.A. or M.F.A. program or permission of the Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 555 Practicum in Playwriting or Adaptation
Independent supervised tutorial with, optimally, a finished script at the end. Students applying for these practica must submit a study plan in advance. Requirements include the submission of final report and reading list.
Prerequisites: Admission to the M.A. or the M.F.A. program or permission of the Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 556 Practicum in Dramatic Criticism
Independent supervised tutorial with practical work. Requirements include the submission of final report and reading list. Students applying for these practica must submit a study plan in advance.
Prerequisites: Admission to the M.A. or M.F.A. program or permission of the Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 557 Practicum in Theatre Technology
Independent supervised tutorial with practical work. Requirements include the submission of final report and reading list. Students applying for these practica must submit a study plan in advance.
Prerequisites: Admission to the M.A. or M.F.A. program or permission of the Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 558 Practicum in Children's Theatre
Independent supervised tutorial with practical work. Requirements include the submission of final report and reading list. Students applying for these practica must submit a study plan in advance.
Prerequisites: Admission to the M.A. or M.F.A. program or permission of the Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 559 Practicum in Producing
Independent supervised tutorial with practical work. Requirements include the submission of final report and reading list. Students applying for these practica must submit a study plan in advance.
Prerequisites: Admission to the M.A. or M.F.A. program or permission of the Director of Graduate Studies
Fall, spring, or summer, 3 credits

THR 560 Film and Video
Independent supervised tutorial with practical work. Requirements include the submission of final report and reading list. Students must apply for these practica in advance.
Prerequisites: Admission to the M.A. or M.F.A. program or permission of the Director of Graduate Studies
Fall, spring, or summer, 3 credits,

THR 600 Theatre History II
This course is devoted to the study of a specific theatre and its history. The study includes research into specific productions of a company and analysis of the company's actors, dramatists, directors, designers, audiences, and finances. The focus of the course is on how the structure and organization of a theatre influences the art it produces in a cultural context.
Prerequisites: Admission to the second year of the M.F.A. program or permission of the Director of Graduate Studies
Fall, 3 credits

THR 601 The Director: Tradition and Techniques
A close study of the tradition and techniques of directing. In the seminar the students will consider the director's role in the development of modern drama and styles of presentation. In the practicum the students will work as assistants to directors of on-campus productions of Highlight Theatre.
Prerequisites: Admission to second year of the M.F.A. program or permission of the Director of Graduate Studies
Fall, 3 credits

THR 602 Translations and Adaptations
The course combines studies of existing versions of texts with experiments toward new translations and adaptations. As students learn how to criticize various versions of a single script, they move toward a theory of translation and toward an ability to hold an entire play in their imagination, as does a playwright, during the scripting process.
Prerequisites: Admission to second year of the M.F.A. program or permission of the Dirctor of Graduate Studies
Fall, 3 credits

THR 603 Theatre Architecture and Design
Students will examine the structure, orientation and major functions of a range of different kinds of theatre buildings and sets, large-scale and small, ancient and modern. Among the topics covered are key artists in the tradition, the physical buildings, auditoria and how backstage facilities influence onstage presentations.
Prerequisites: Admission to the second year of the M.F.A. program or permission of the Director of Graduate Studies
Spring, 3 credits

THR 604 Concept and Execution
For each of several major works examined, study focuses on a different aspect of production: casting, design, programming, stage management, directing, producing, technology. The students devise a production plan, organize imaginary productions and submit a written critical evaluation of the envisioned productions: a producer's report.
Prerequisites: Admission to the second year of the M.F.A. program or permission of the Director of Graduate Studies
Spring, 3 credits

THR 605 Independent Projects: Scripting
Under the direction of the project advisor, the student develops skills in translation or adapation by preparing a dramatic script for production. The dramatic work may derive either from documentary materials or from a literary source. The focus of the project is on revivifying the spirit, sense and structure of the original work in the translation or adaptation.
Prerequisites: Permission of the Director of Graduate Studies and successful completion of all second-year M.F.A. fall coursework
Spring, 3 credits

THR 620 Music and Theatre
Students explore the importance of music to theatrical presentations of different periods and kinds. Topics may include masques, the supporting role of music in classical theatre, the use of music for theatrical effect, music in the interval, opera and musical comedy.
Prerequisites: Admission to the second year of the M.F.A. program or permission of the Director of Graduate Studies
Fall, 3 credits

THR 622 Finance, Audience Development and Management
A study of the ways and means of producing and financing theatre and developing an audience. Various theatre organizations will be studied as models. Students will work as interns in association with various levels of theatre presentation.
Prerequisites: Admission to the second year of the M.F.A. program or permission of the Director of Graduate Studies
Spring, 3 credits

THR 650 The Profession of the Dramatist
A close examination of selected dramatists of different nationalities, styles and periods considered in terms of critical theory, technique, form and the theatrical tradition. The career and the canon of each of these dramatists will be considered in depth. In one semester, for example, the works of Aeschylus, Moliere, Shaw and O'Neill might be considered.
Prerequisites: Admission to the third year of the M.F.A. program or permission of the Director of Graduate Studies
Fall, 3 credits

THR 651 Shakespeare's Theatre
Advanced study of the Elizabethan Theatre and Shakespeare's plays then and now. In addition to a critical reading of texts and criticism, the course will consider how Shakespeare's plays echo the concerns of various periods in which they have been produced. A special emphasis will be placed on actors' choices in the text.
Prerequisites: Admission to the third year of the M.F.A. program or permission of the Director of Graduate Studies
Fall, 3 credits

THR 652 Theatre and the Media
A study of the electronic media and their present and potential relationship to the theatre. Special attention will be given to the methods of adapting stage work for other media. Both research in theory and practical work in adaptation will be required.
Prerequisite: Admission to the third year of the M.F.A. program or permission of the Director of Graduate Studies
Fall, 3 credits

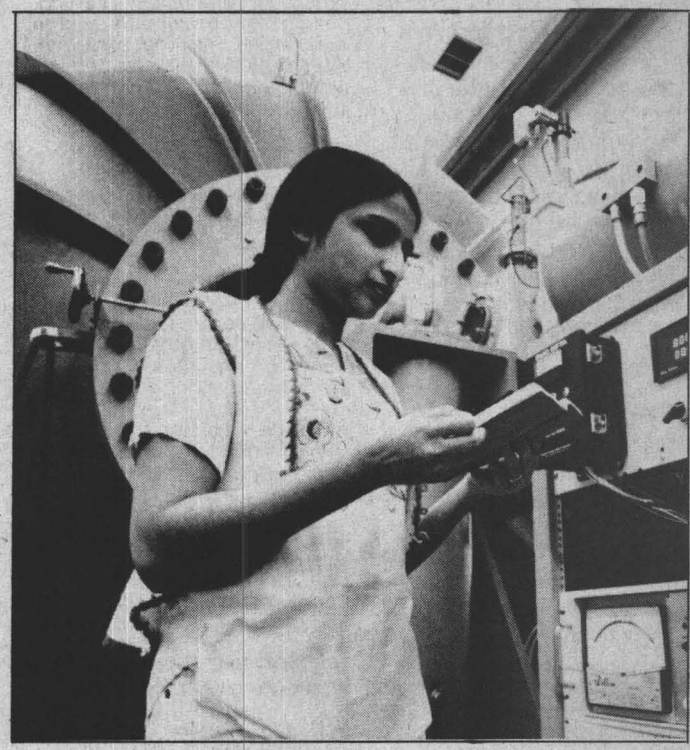
THR 653 Dramaturg's Practicum
Advanced students in the program will function as dramaturgs for campus productions, particularly for Highlight Theatre, the department's professional production program. Their functions will include work with the director, research, programs, questions of casting, post-performance discussions and possibly translation or adaptation of texts.
Prerequisites: Successful completion of the first two years of M.F.A. coursework, or permission of the Director of Graduate Studies
Fall, spring, 3 credits

THR 654 Professional Internship
The M.F.A. third-year internship is normally either (1) as a dramaturg with a professional theatre in the U.S. or abroad, or (2) as a critic with a performing arts publication. The internship includes a critical journal that records, analyzes, and evaluates the work on production or criticism done during the internship. Internship proposals must include a detailed study project with an on-site supervisor and a campus mentor, and must be approved by the graduate committee.
Prerequisites: Successful completion of all coursework leading to the M.F.A. and permission of the Director of Graduate Studies,
Spring, 6 credits

THR 655 Third-Year M.F.A. Project
The student will submit "Notes for a Theatre's Artistic Director" for a season of plays for a specific theatre and budget. Preparation for this includes research of many kinds into repertoire, production values, and the community in which this company exists. All proposals for independent study must be submitted in writing and be approved by the faculty supervisor, graduate director and graduate committee.
Prerequisites: Successful completion of all coursework for the M.F.A. or permission of the Director of Graduate Studies
Spring, summer, 6 credits

DIVISION OF PHYSICAL SCIENCES AND MATHEMATICS

The Departments of Chemistry, Earth and Space Sciences, Physics and Mathematics, respectively, comprise the Division of Physical Sciences and Mathematics. With a faculty of about 140, full-time graduate students numbering 340, postdoctoral research associates numbering about 60, numerous scientific visitors, and external research fund expenditures of about nine million dollars per year, the Division has a wide range of vigorous research programs. In addition to the formal course offerings described in the following departmental sections, there are a multitude of seminars and talks by distinguished visitors. Detailed information about special research programs and facilities are described in the following sections.



Chemistry (CHE)

Chairperson: Ben Chu
Chemistry Building 104 (516) 246-5050

Graduate Program Director: F. W. Fowler
Chemistry Building 104 (516) 246-5050

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.

Facilities

The 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 portion of the instrumentation of 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 maintaining 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 nonteaching professionals in the electronic, glass and machine shops.

Admission

Admission to Graduate Study

The following, in addition to the minimum Graduate School requirements, 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 General 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.

Degree Requirements

Requirements for the M.S. Degree in Chemistry

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 in Chemistry

A. 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 is required. 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.

B. Language

Reading proficiency in German, Frennch or Russian is required.

C. 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) examiation. This examination, normallly 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.

D. Presentation of a Department Seminar

E. Research, Dissertation, Dissertation Defense and Departmental Colloquium

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 inquiries 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.

F. Residence
A one-year residence is required.

Requirements for the Ph.D Degree, Concentration in Chemical Physics

A field of concentration in chemical physics is 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:

A. Courses
In addition to CHE 532 and two semesters of CHE 610, a minimum of nine formal graduate courses is required, including the following:

1. CHE 523 Chemical Thermodynamics
2. PHY 503 Mathematical Physics
3. Two courses from among CHE 521, 522 Quantum Chemistry I, II and PHY 511, 512 Quantum Mechanics I, II
4. CHE 528 or PHY 540 Statistical Mechanics
5. PHY 501 Classical Mechanics
6. PHY 505 Classical Electrodynamics
7. One course in chemistry from among CHE 501, 502, 503, 511 and 512

B. Advancement-to-Candidacy (preliminary) Examination
In some cases a hybrid of the chemistry and physics requirements may be used.

Requirements for the Ph.D. Degree, 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:

A. 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.

Faculty

Alexander, John M., Professor. Ph.D., 1956, Massachusetts Institute of Technology: Reactions between complex nuclei; nuclear potentials; nuclear entropies.

Anderson, Scott., Assistant Professor. Ph.D., 1981, University of California, Berkeley: Dynamics of chemical reactions; spectroscopy and reactions of metal cluster ions; state-to-state reaction dynamics.

Bates, H.A., Assistant Professor. Ph.D., 1977, University of California, Berkeley: Synthesis annd structure determination of biologically significant natural products.

Bigeleisen, J., Professor. Ph.D., 1943, University of California, Berkeley: Equilibrium and kinetic isotope effects corrrelated 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.

Burrows, Cynthia J., Assistant Professor. Ph.D., 1982, Cornell University: Design, synthesis and properties of new organic molecules for ion complexation, selection oxidation and DNA intercalation.

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 noncrystalline media; liquid crystals.

Fowler, Frank W., Associate Professor and Graduate Program Director. 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.[4] 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.[5] 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.

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.

Ojima, Iwao, Associate Professor. Ph.D., 1973, University of Tokyo, Japan: Development of new and effective methodologies for the syntheses of physiologically active compounds based on organic and organometallic chemistry.

Okaya, Yoshi, Professor. Ph.D., 1956, Osaka University, Japan: Crystallography: development of on-line computer-controlled systems for automatic collection of X-ray diffraction data, crystal structure and absolute configuration determination.

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. 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.

Number of teaching, graduate and research assistants, fall 1983: 91

[1] *Joint appointment, Department of Pharmacology.*
[2] *Joint appointment, Department of Materials Science.*
[3] *Joint appointment, Department of Mechanical Engineering.*
[4] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1978-79.*
[5] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1980-81.*

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 experimental 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 organic 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 is emphasized.
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 collison 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; artifically 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, flourescence, magnetic resonance spectra), and the thermodynamics and kinetics of interaction with small molecules and ions. Theory of conformation changes and phases transitions.
3 credits

CHE 530 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, hard torch and bench torch. Safety with glass. Open to graduate students in the sciences.
Fall, 1-2 credits

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
The subject matter varies depending on interests of students and faculty. Possible topics could include asymmetric synthesis, and natural product syntheses. 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 could include asymmetric synthesis, and natural product synthesis.
1-2 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 include 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

Earth and Space Sciences (ESS)

Chairperson: Gilbert N. Hanson
Earth and Space Sciences Building (516) 246-6541

Graduate Program Director: Charles T. Prewitt
Earth and Space Sciences Building (516) 246-4046

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. Included under Astronomical Sciences are concentrations in astronomy, astrophysics and planetary sciences; included under Geological 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 that 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 that 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.

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 for Astronomical Sciences

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 Observatory at Quabbin, Massachusetts, the 45-foot millimeter radio antenna is partially equipped with instrumentation provided by Stony Brook, thereby guaranteeing access to this instrument. 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. The student 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 advisor 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 power 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

Geophysical research at Stony Brook is focused on the investigation of the mechanical properties of earth materials and the mechanical behavior of the Earth's crust and mantle. The principal research topics within this broad area are laboratory studies of elastic, anelastic and brittle behavior of geologic materials, and local, regional and global investigations of the structure of the Earth's crust and mantle. Related course offerings include solid-state geophysics, mechanics of geologic materials, introductory and advanced seismology, inverse theory, earthquake mechanics and regional and global tectonics.

Mineral Physics

The focus of the mineral physics concentration is the determination of the physical properties of minerals likely to be present within the earth's interior. Both experimental and theoretical tools are used. In particular, for sample synthesis there are several high-temperature facilities. Acoustic velocities can be determined using ultrasonic techniques or Brillouin spectroscopy. In addition, crystal structure and volume as a function of pressure and temperature can be determined using the X-ray facility.

Rock Physics

The rock physics concentration focuses on the study of thermomechanical properties of crystal rocks, brittle fracture, frictional instability and earthquake mechanics. Facilities for high-pressure triaxial deformation, ultrasonic velocity measurement, ion-milling and electron microscopy are available.

Seismology

Our growing seismology concentration spans a broad range of research topics, from a local to a global scale. We participate in the Northeastern U.S. Seismic Network and contribute research on regional seismicity, crystal structure and tectonics. A three-station digital portable seismic network is available for field and aftershock studies in addition to our two permanent stations on Long Island. Other areas of research include the investigation of the internal structure and dynamics of volcanoes and the study of associated volcanic earthquakes, the study of seismicity and crystal structure along the San Andreas fault in central California and the analysis of tsunami-generating earthquakes. Finally, we are involved in efforts to explore the global three-dimensional structure of the Earth's mantle using seismic tomography. A substantial collection of IDA, ISC and WWSSN data is available for this and other global seismological studies.

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.

Admission

Admission to Graduate Study

For admission to graduate study in earth and space sciences, the following, in addition to the Graduate School requirements, 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 General 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.

Degree Requirements

Requirements for the M.S. Degree

A. Formal Coursework

For the M.S. degree, it is necessary to successfully complete, with a B average, 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 that 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.

B. 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.

C. Language

There is no language requirement for the M.S. degree.

D. 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.

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. examin-

ing 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.

2. *M.S. without thesis:* Passage of an oral examination on material covered in the approved course of study.

E. 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.

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. Residence

There is no residence requirement.

H. 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.

Requirements for the Ph.D. Degree

In addition to the minimum Graduate School requirements, the following are required:

A. Formal Coursework

Successful completion of an approved course of study is required. The number of credit hours required is unspecified and will be set according to the student's background and interests.

B. Qualifying Examination

Acceptable performance on the written Ph.D. qualifying examination is required. (Applicable to astronomy only.)

C. Preliminary Examination

Successful defense of one to three research proposals is required.

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 potentiall 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.

D. Language
There is no language requirement for the Ph.D. degree.

E. Advancement to Candidacy
Upon successful completion of the preliminary examination, including any associate 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 PhD. degree, except the dissertation.

F. 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.

G. 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.

H. Residence
Two consecutive semesters of full-time graduate study are required.

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., Associate 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, Associate Professor. Ph.D., 1971, University of Wisconsin: Theoretical studies of planetary atmospheres, particularly the giant planets and Titan; space astronomy; infrared observations.

Comer, Robert P., Assistant Professor. Ph.D., 1982, Massachusetts Institute of Technology: Seismology, planetary geophysics.

Dodd, Robert T., Professor. Ph.D., 1962, Princeton University: Chondritic meteorites; metamorphic history of the Precambrian rocks in southeastern New York.

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 and Chairperson. 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, Federal Republic of 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., Associate 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.

Meyers, William J., Associate Professor. Ph.D., 1973, Rice University: Carbonate diagenesis; geochemistry; sedimentology.

Owen, Tobias C., Professor Ph.D., 1965, University of Arizona: Solar system studies; spectroscopy of planets, satellites and comets, origins of planetary atmospheres, exploration of the solar system with deep space missions.

Peterson, Deane M., Associate Professor. Ph.D., 1968, Harvard University: Stellar atmospheres; radiative transfer; Bp stars; lunar and asteroid occultations high time resolution photometry.

Prewitt, Charles T., Professor and Graduate Program Director. 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.

Sharp, Warren D., Assistant Professor. Ph.D., 1983, University of California, Berkeley: Structural geology and tectonics; development of continental crust as revealed by field study and isotopic dating.

Simon, Michal, Professor. Ph.D., 1967, Cornell University: Infrared astronomy; physics of the interstellar medium; star formation; solar astronomy.

Solomon, Philip, 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; theoretical geophysics.

Weidner, Donald J., 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.

Wong, Teng-fong, Assistant Professor. Ph.D. 1980, Massachusetts Institute of Technology: Experimental rock physics, fault mechanics.

Yahil, Amos, Professor. Ph.D., 1970, California Institute of Technology: Galaxies, clusters of galaxies; physical cosmology; accretion processes; stellar collapse; supernovae; nuclear astrophysics.

Number of teaching, graduate and research assistants, fall, 1983: 62

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.
Prerequisite: 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 history 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 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 528 Carbonate Geochemistry
Examination of the mineralogical and chemical characteristics of the rock-forming carbonates with emphasis on stabilities in the geological environments. Includes study of phase relations, trace and minor element chemistries, and mechanisms of growth, dissolution and replacement. Use of current research techniques as applied to carbonate minerals.
Fall, 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 535 Regional Structure and Tectonics
Formation and development of continental crust in Phanerozoic mountain belts. The structure and origin of ocean crust, magmatic arcs, and continental margin sequences are studied using geophysical, geochemical and geologic data from ancient and modern examples.
Fall, alternate years, 3 credits

ESS 542 Inverse Theory
Introduction to the basic concepts of inverse theory and its application to the study of the internal structure of the earth and related problems.
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 545 Coastal Sedimentary Environments
Survey of depositional environments from the nearshore continental shelf through the backbarrier estuarine complex. Emphasis will be placed on depositional processes and products within such varied environments as tidal deltas, barrier islands, tidal flats and salt marshes, point bars and river deltas.
Prerequisites: Introductory course in stratigraphy and sedimentation, geological oceanography or permission of the instructor.
Fall, 3 credits

ESS 548 Cosmochemistry
The chemical composition of parts of the galaxy, the cosmic rays, stars, the sun, the solor 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. First 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. Second 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 fall (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 563 Sedimentary Petrology
Sedimentary petrology of tertigenous carbonate, and chemical rocks. Subjects will include origin of major rock suites from each of these three groups in terms of both their deposition and diagenesis. The laboratory will focus on thin section and SEM identification of genetically important grain types, textures and diagenetic fabrics.
Prerequisite: Undergraduate course in optical mineralogy, or permission of instructor.
Fall, alternate years, 4 credits

ESS 570 Earthquake Mechanics
A survey of fundamental mechanics aspects of earthquake rupture; reviews concepts of fracture mechanics, elastodynamics and experimental rock mechanics. Topics will include state of stress in the lithosphere, theoretical models of earthquake instability, energetics of faulting, representation of dynamic elastic field generated by earthquakes and relation of seismic signals to the kinematics and dynamics of seismic source.
Prerequisites: ESS 552 or permission of instructor
Spring, alternate years, 3 credits

ESS 571 Mechanics of Geologic Materials
Elastic, thermal and anelastic properties of geological materials. The course emphasizes a thermodynamic characterization of these properties including irreversible thermodynamics and nonhydrostatic thermodynamics. Specific applications to the earth's environment are discussed.
Prerequisites: ESS 551, 552 or permission of instructor
Fall, alternate years, 3 credits

ESS 572 Advanced Seismology
Course is intended to expose the student to topics that are at the forefront of current seismological research. Examples include wave propagation in heterogeneous media, earthquake source studies, tsunami generation, and seismic network data analysis.
Prerequisite: ESS 552
Fall, alternate years, 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.
Spring, even 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-a-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, nonthermal 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. The elements of cosmology will be introduced. 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, 1-3 credits

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-a-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

MATHEMATICS (MAT)

Chairperson: Irwin Kra
Mathematics Building 5-116 (516)246-3345

Graduate Program Director: Detlef Gromoll
Mathematics Building 5-115 (516)246-4062

The Department of Mathematics offers programs leading to the degrees of Master of Arts and Doctor of Philosophy. The master's 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. There is also a 5-year B.S./M.A. program (Secondary Teacher Option). For details of the 5-year program, see the Undergraduate Bulletin.

The doctoral 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

Admission to the M.A. 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 in addition to the requirements of the Graduate School, that evidence will include:

A. Records of prior training in mathematics.

B. 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.

C. All applicants must submit Graduate Record Examination General Test scores.

D. Each foreign applicant must also submit a TOEFL score of 550 or above.

E. For admission, a student must be accepted by both the Department of Mathematics and the Graduate School.

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.

Admission to the Ph.D. 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. Students must also satisfy the admission requirements of the Graduate School.

Degree Requirements

Requirements for the M.A. Degree

In addition to the requirements of the Graduate School, the following are required:

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: MAT 511, Fundamental Concepts of Mathematics; MAT 512, Algebra for Teachers; MAT 513-514, Analysis for Teachers I-II; MAT 515, Geometry for Teachers; MAT 516, Probability and Statistics for Teachers; MAT 518, Seminar in the Uses of Mathematics; MAT 519, Seminar in Mathematics Teaching; CEN 560 or CEN 561, Introduction to Computing; and a three-credit elective. The comprehensive examination consists of the final examinations in MAT 512, 513, 514 and 515. The minor requirement is met by the three courses, MAT 516, MAT 518 and either CEN 560 or CEN 561.

For students in the Professional Option, the courses that satisfy the 30-credit requirement are worked out individually with each student but ordinarily include MAT 530-531, Topology/Geometry I-II; MAT 534-535, Algebra I-II; MAT 542, Complex Analysis I; MAT 544, Analysis; MAT 550, Real Analysis I; and MAT 598, Teaching Practicum. Students preparing for the doctoral program ordinarily take, in addition, MAT 590, Problem Seminar. The comprehensive examination consists of the final examinations in MAT 530, 531, 534, 535, 542, 544 and 550, or the equivalent. Well-prepared students may substitute the passing of equivalent examinations that 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.

Requirements for the Ph.D. Degree

In addition to the requirements of the Graduate School, the following are required:

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. Advancement to candidacy.
E. Writing an acceptable dissertation.
F. Two consecutive semesters of full-time study.

The Doctoral Comprehensive Examination
The 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, Alfred, Professor. Ph.D., 1956, University of California, Los Angeles: Differential geometry and mathematical economics.

Barcus, William, Professor. Ph.D., 1955, University of Oxford, England: Algebraic topology.

Cheeger, Jeff, Professor. Ph.D., 1967, Princeton University: Differential geometry.

Doss, Raouf, Professor. Ph.D., 1944, University of Cairo, Egypt: Harmonic analysis.

Douglas, Ronald G., Professor. Ph.D., 1962, Louisiana State University: Operator theory; functional analysis.

Ebin, David, Professor. Ph.D., 1967, Massachusetts Institute of Technology: Global analysis.

Fox, William, Associate Professor. Ph.D., 1967, University of Michigan: Complex analysis.

Geller, Daryl, Associate Professor. Ph.D., 1977, Princeton University: Analysis.

Gromoll, Detlef, Professor and Graduate Program Director. Ph.D., 1964, University of Bonn, Federal Republic of Germany: Differential geometry.

Hawkins, Jane, Assistant Professor. Ph.D., 1981, University of Warwick, England: Ergodic theory and operator theory.

Hill, C. Denson, Professor. Ph.D., 1966, New York University. Partial differential equations; several complex variables.

Jablow, Eric, Assistant Professor. Ph.D., 1983, Princeton University: Complex analysis.

Jones, Lowell, Associate Professor. Ph.D., 1970, Yale University: Topology.

Kra, Irwin, Professor and Chairperson. Ph.D., 1966, Columbia University: Complex analysis, Kleinian groups.

Kuga, Michio, Professor. Ph.D., 1961, University of Tokyo, Japan: Complex manifolds; algebraic groups.

Kumpel, Paul, Associate Professor. Ph.D., 1964, Brown University: Algebraic topology.

Laufer, Henry, Professor. Ph.D., 1966, Princeton University: Several complex variables.

Lawson, H. Blaine, Professor. Ph.D., 1968, Stanford University: Differential geometry, topology.

LeBrun, Claude, Assistant Professor. Ph.D., 1980, University of Oxford, England: Complex analysis; mathematical physics.

Lister, William, Professor. Ph.D., 1951, Yale University: Algebra.

Maskit, Bernard, Professor. Ph.D., 1964, New York University: Complex analysis, Kleinian groups.

McDuff, Dusa, Professor. Ph.D., 1971, University of Cambridge, England: Operator theory; topology.

Michelsohn, Marie-Louise, Associate Professor, Ph.D., 1974, University of Chicago: Topology; differential geometry.

Nisnevich, Yevsey, Assistant Professor. Ph.D., 1982, Harvard University: Algebra and number theory.

Phillips, Anthony V., Professor. Ph.D., 1966, Princeton University: Differential topology.

Pincus, Joel, Professor. Ph.D., 1959, New York University: Operator theory and integral equations.

Sah, Chih-Han, Professor. Ph.D., 1959, Princeton University: Group theory and its applications.

Spatzier, Ralf Jurgen, Assistant Professor. Ph.D., 1983, University of Warwick, England: Ergodic theory.

Spencer, Joel, Professor. Ph.D., 1970, Harvard University: Combinatorics.

Strasser, Elvira, Professor Emeritus. Ph.D., 1956, New York University: Combinatorial group theory.

Szusz, Peter, Professor. Ph.D., 1951, University of Budapest, Hungary: Analytic number theory.

Taylor, Michael, Professor. Ph.D., 1970, University of California, Berkeley: Partial differential equations.

Teleman, Nicolae, Associate Professor. Ph.D., 1977, Massachusetts Institute of Technology: Differential geometry.

Thorpe, John, Professor.[1] Ph.D., 1963, Columbia University: Differential geometry.

Tso, Kai-sing, Assistant Professor. Ph.D., 1983, Courant Institute, New York University: Nonlinear partial differential equations.

Zaustinsky, Eugene, Associate Professor. Ph.D., 1957, University of Southern California: Differential geometry.

Number of teaching, graduate, and research assistants, fall 1983: 47

[1] *Recipient of the State University Chancellor's Award for Excellence in Teaching 1972-73.*

Courses

CORE COURSES FOR TEACHER OPTION

MAT 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

MAT 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

MAT 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

MAT 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

MAT 515 Geometry for Teachers
A re-examination of elementary geometry using concepts from analysis and algebra.
Fall, spring or summer, 3 credits

MAT 515 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.

MAT 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.

MAT 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

MAT 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

MAT 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

MAT 534 Algebra I
Linear algebra: fields, vector spaces, dimension, bases, matrices, linear maps, determinants, canonical forms. Multilinear algebra: bilinear forms, Hermitian forms, spectral theorem, symmetric and tensor products, exterior products.
Fall, 3 credits

MAT 535 Algebra II
Groups: normal subgroups, Jordan-Holder theorem, fundamental theorem of Abelian groups. Rings: ideals and homomorphisms, Euclidean rings, polynomial rings, unique factorization. Fields: transcendence, algebraic extensions, primitive elements, fundamental theorem of Galois theory, applications.
Fall, 3 credits

MAT 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.
Spring, 3 credits

MAT 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

MAT 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

MAT 544 Analysis
An introduction to the theory of ordinary and partial differential equations. Existence and uniqueness of solutions. Matrix methods. Power series methods. Fourier series and the Fourier transform. The heat equation. Laplace's equation, and the wave equation. Harmonic functions.
Fall, 3 credits.

MAT 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

MAT 550 Real Analysis I
Lebesque measure and integration. Radon-Nikodym theorem, Lebesque-Stieltjes measures, Fubini and Tonelli theorems, classical Banach spaces.
Spring, 3 credits

MAT 551 Real Analysis II
Banach space, Hilbert space, Hahn-Banach and uniform boundedness theorems, topics in topological vector spaces, distribution theory.
Fall, 3 credits

MAT 566 Differential Topology
Vector bundles, transversality and characteristic classes. Further topics such as imbeddings and immersions, intersection theory, surgery and foliations.
Prerequisite: MAT 531
Fall, 3 credits

MAT 568, 569 Differential Geometry
Connections, curvature, geodesics, parallelism and completeness. Riemannian manifolds, geometry of sub-manifolds; 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: MAT 531
Fall and spring, 3 credits each semester.

MAT 590 Problem Seminar
Analyze problems and explore supplementary topics related to the core courses in the Professional M.A. Option. Focus preparation for the Doctoral Comprehensive Examination.
Fall and spring, 3 credits each semester, repetitive

MAT 598 Teaching Practicum
Seminar and workshop for new teaching assistants.
Fall, 3 credits

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.

MAT 602, 603 Topics in Algebra
Typical topics will be drawn from group theory, ring thoery, representation theory of groups and algebras, fields and commutative algebra, homological algebra.
Fall and spring, 3 credits each semester, repetitive

MAT 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 credit each semester, repetitive

MAT 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

MAT 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

MAT 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

MAT 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 operations, nonlinear equations.
Fall and spring, 3 credits each semester, repetitive

MAT 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

MAT 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 connectioon 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.

MAT 662, 663 Advanced Topics in Algebra

MAT 666, 667 Advanced Topics in Algebraic Topology

MAT 670, 671 Advanced Topics in Complex Analysis

MAT 674, 675 Advanced Topics in Differential Equations

MAT 678, 679 Advanced Topics in Real Analysis

MAT 682, 683 Advanced Topics in Differential Geometry

OTHER COURSES

MAT 696 Mathematics Seminar

MAT 697 Mathematics Colloquium

MAT 698 Independent Study

MAT 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

PHYSICS (PHY)

Chairperson: Peter B. Kahn
Physics Building P-110 (516) 246-6580

Graduate Program Director: David Fox
Physics Building P-106 (516) 246-6106

The Department of Physics offers courses of study leading to the degrees of Master of Arts for students seeking an education at an advanced level in physics, physics teaching or in instrumentation, and of Doctor of Philosophy for those preparing for careers in which research is a central activity. A student in the Ph.D. program may choose from a number of curricula described below.

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 synchroton 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-electorn 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 X-ray absorption spectroscopy, properties of superlattices, impurity effects in semiconductors, phase transitions in two-dimensional solids, electronic structure of alloys, the Josephson effects and related phenomena, liquid helium superfluids and ^{3}He-^{4}He mixtures. The current experimental focus includes macroscopic quantum tunnelling using Josephson junction devices; properties of quantum fluids including ^{3}He-^{4}He mixtures and highly polarized ^{3}He; and X-ray and synchrotron radiation studies of materials and surfaces. Other areas of study include electronic structure of metals and semimetals, the Josephson effects, properties and superconducting thin films, fluctuation effects

in superconductors, and physical properties of amorphous systems.

The experiments at Stony Brook make use of a wide variety of techniques, such as extended X-ray absorption fine structure, X-ray diffraction, quantum oscillations in a 10-tesla magnetic field, microwave absorption and cyclotron resonance, superconducting quantum interference, high-frequency (400 MHz) nuclear magnetic resonance, measurement of the velocity and attenuation of ultrasound and X-ray spectroscopy. Ultralow temperatures are produced by dilution refrigeration and adiabatic demagnetization. Thin film microstructures are fabricated by means of electron be... lithography using a scanning electron microscope. Several projects involving synchrotron radiation are underway at the National Synchrotron Light Source at Brookhaven National Laboratory and at the Cornell High-Energy Synchrotron Source.

Atmospheric Physics

A novel technique developed over the past several years by Stony Brook scientists from Physics and Radio Astronomy is being used to make quantitative ground-based measurements of stratospheric trace gases at concentrations of a part-per-billion or less, in connection with studies of stratospheric chemistry and man's influence on the atmospheric environment. These studies are part of interdepartmental activities involving planetary atmospheres (Earth and Space Sciences Department) and other aspects of atmospheric sciences (Mechanical and Thermal Engineering), and are leading to new information about anthropogenic influences on the earth's stratosphere and climate.

X-Ray, Ultraviolet and Surface Physics

The National Synchrotron Light Source at nearby Brookhaven National Laboratory provides unparalleled opportunities for research with X-rays and vacuum ultraviolet radiation. In addition, two high-power rotating-anode X-ray generators are available in the department. Work in progress includes the study of phase transitions in lower dimensional systems by X-ray scattering, the development of X-ray microscopy and holography, X-ray absorption spectroscopy of alloys and liquids and the study of multiple excited atomic and molecular species.

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 interactions. 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 (and the translation of this force into an effective interaction valid for nuclear matter and nuclei) to the interpretation of the observed complexities of nuclear structure with the aid of appropriate models. Topics of current interest include the derivation of the properties of baryons and their low-energy interactions from quantum chromodynamics and studies of a variety of infinite Fermi systems including neutron stars. In anticipation of significant experimental advances in relativistic heavy ion physics, a number of problems regarding nuclear matter at high densities and temperatures are being considered.

Solid-State Theory and Statistical Mechanics

Research in theoretical solid-state physics includes studies of properties of superconductors, electron-phonon interactions, disordered solids, critical phenomena, macroscopic quantum effects, and quasi-one-dimensional conductors.

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.

Admission

Admission to Graduate Study

For admission to graduate study in physics, the following, in addition to the minimum Graduate School requirements, are required:

A. A baccalaureate degree in physics from an accredited instituion.

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 General 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 admission, the student will be informed of the requirements that must be satisfied for termination of provisional status.

Retention of students in subsequent years will depend on satisfactory academic progress.

Degree Requirements

Requirements for the M.A. Degree in Physics

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. Minimum grade-point average of 3.0 in all graduate courses taken at Stony Brook.

C. Passing of the master's examination..

Requirements for the M.A. Degree, Graduate Studies in Teaching Physics

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 credits with a minimum grade-point average of 3.0

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 M.A. Degree, Graduate Studies in Scientific Instrumentation

A candidate for the master's degree with concentration in instrumentation will be required to demonstrate a certain level of knowledge of physics (by written and/or oral examination), to spend at least one semester as a teaching assistant in an undergraduate laboratory, to take certain required and elective courses, and to complete both a major and minor project. The curriculum is designed to meet the needs of students learning about the design, construction, and testing of sophisticated instrument systems. The degree holder will not be a super technician but a professional scientist trained in both physics and measurement techniques.

A. A student shall demonstrate proficiency in undergraduate physics at the level of the present courses PHY 335, 405, 431 and 472. This can be done 1) by acceptance by the Master's in Scientific Instrumentation Committee of courses taken as an undergraduate, 2) by written examination or 3) by passing the courses appropriate to a student's deficiencies.

B. Thirty credits (minimum) of graduate courses (500 level or above), including a minor project and a master's thesis. This thesis must describe a major piece of work in scientific instrumentation, and must be in a form acceptable to the graduate school. It need not be original research in the same sense as a Ph.D. thesis, but it should be the result of an effort consistent with a full year of full-time work. The thesis should present an improvement of the state of the art in some area, the development of a sophisiticated and/or automated apparatus, or some other significant laboratory project. It should be defended before a committee of the faculty.

C. Teaching assistant in undergraduate laboratory for at least one semester.

D. Students shall acquire those technical skills deemed necessary by their thesis supervisors. These must include, but are not limited to, machining capability and computer literacy.

Each student will be assigned an advisor and a committee of two additional faculty members, and will be required to meet frequently with them. It is expected that very frequent communication among all the faculty and students involved will foster spirit, expose problems, and generally contribute to success.

Requirements for the Ph.D. Degree

A. Satisfactory completion of an approved program of courses, with a minimum cumulative grade-point average of 3.0.

B. Completion of required courses: Each of the courses listed below must be passed with a grade of A or B.
1. Two semesters of PHY 599 (Graduate Seminars). This course is normally taken during the first year of graduate study, with each student registering in Section 1 during one of the semesters and in Section 2 during the other.
2. PHY 515 (Methods of Experimental Research). This course, given every semester, must be taken not later than the fourth semester of residence.
3. Two advanced courses, each in an area outside that of the student's thesis research, chosen from a list of courses approved for this purpose.

C. 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 the beginning of the fourth semester of graduate study. The oral examination must be passed before the end of the second academic year.

D. Advancement to candidacy for the Ph.D.: The department's recommendation to the Graduate School for advancement to candidacy is based on the satisfactory completion of all requirements listed above.

E. Research, dissertation and passing of the dissertation examination.

F. Teaching experience at least equivalent to that obtained in a one-year appointment as a teaching assistant.

G. One year of residence.

Faculty

Allen, Philip B., Professor. Ph.D., 1969, University of California, Berkeley: Theoretical sold-state physics.

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.

Braun-Munzinger, Peter, Professor. Ph.D., 1972, University of Heidelberg, Federal Republic of Germany: Experimental nuclear physics.

Brown, Gerald E., Professor[1] 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)[1]. Ph.D., 1943, University of Rochester: Theoretical physics; high-energy accelerator design.

deZafra, Robert L., Professor. Ph.D., 1958. University of Maryland: Experimental atomic physics, optical pumping and double resonance; quantum electronics.

Dresden, Max, Professor[2]. Ph.D., 1946, University of Michigan: Theoretical physics; field theory; statistical mechanics; particle physics.

Eisenbud, Leonard, Professor Emeritus. Ph.D., 1943, Princeton University: Theoretical physics; nuclear theory; foundations of quantum theory.

Engelmann, Roderich, Professor. Ph.D., 1966, University of Heidelberg, Federal Republic of 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 Graduate Program Director. Ph.D., 1952, University of California, Berkeley: Theoretical physics; solid-state theory; properties of molecular crystals.

Goldhaber, Alfred S., Professor[1] 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 B., 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; energy physics; X-ray optics.

Kivelson, Steven A., Assistant Professor. Ph.D. 1979, Harvard University: Theoretical solid-state physics.

Koch, Peter M., Associate 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 D.B., 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., Associate 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., Professor[1], Ph.D., 1967, Harvard University: Theoretical physics, statistical mechanics.

McGrath, Robert L., Professor. Ph.D., 1965, University of Iowa: Experimental physics; nuclear structure.

Metcalf, Harold J., Professor[3]. 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[5]. Ph.D., 1951, Princeton University: Experimental nuclear physics; neutron physics.

Nathans, Robert, Professor and Director, Institute for Energy Research. 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[1] Ph.D., 1966, Harvard University: Theoretical physics; elementary particles.

Paul, Peter, Professor. Ph.D., 1959, University of Freiburg, Federal Republic of Germany: Experimental nuclear physics.

Perk, Jacques, Assistant Professor[1] 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.

Rocek, Martin, Assistant Professor[1] Ph.D., 1979, Harvard University: Theoretical physics: supersymmetry and supergravity.

Shrock, Robert, Associate Professor[1] 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[1] Ph.D., 1963, University of Edinburgh, Scotland: Theoretical physics; elementary particle physics.

Spouse, 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, Associate Professor[1] Ph.D., 1974, University of Maryland: Theoretical physics.

Strassenburg, Arnold A., Professor. 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[1] Ph.D., 1971, University of Utrecht, The Netherlands: Theoretical physics; quantum field theory.

Weisberger, William I., Professor[1] 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.[1] Ph.D., 1948, University of Chicago: Theoretical physics; field theory; statistical mechanics; particle physics.

Number of teaching graduate and research assistants, fall 1983: 110

[1]*Member, Institute for Theoretical Physics.*

[2]*Executive Officer and Member, Institute for Theoretical Physics*

[3]*Recipient of the State University Chancellor's Award for Excellence in Teaching, 1973-74.*

[4]*Recipient of the State University Chancellor's Award for Excellence in Teaching, 1975-76.*

[5]*Recipient of the State University Chancellor's Award for Excellence in Teaching, 1977-78.*

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, multiple 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, 516 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 each semester

PHY 525 Current Research Instruments
In a series of distinct units, various members of the experimental research faculty will describe the nature of their work, explain the major principles of their laboratory instruments, discuss how these instrument systems function and conduct tours of their laboratories showing the apparatus in action. The student will become familiar with most of the experimental research instrumentation in the department.
Fall, 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 electronphonon 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.
Spring, 3 credits

PHY 585 Special Study
Reading course in selected topics.
Each semester, variable and repetitive credit

PHY 595 Master's Degree Thesis Research
Independent research for master's degree students. Open only to those approved by individual faculty for thesis work.
Each semester, 1-12 credits, variable and repetitive

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 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

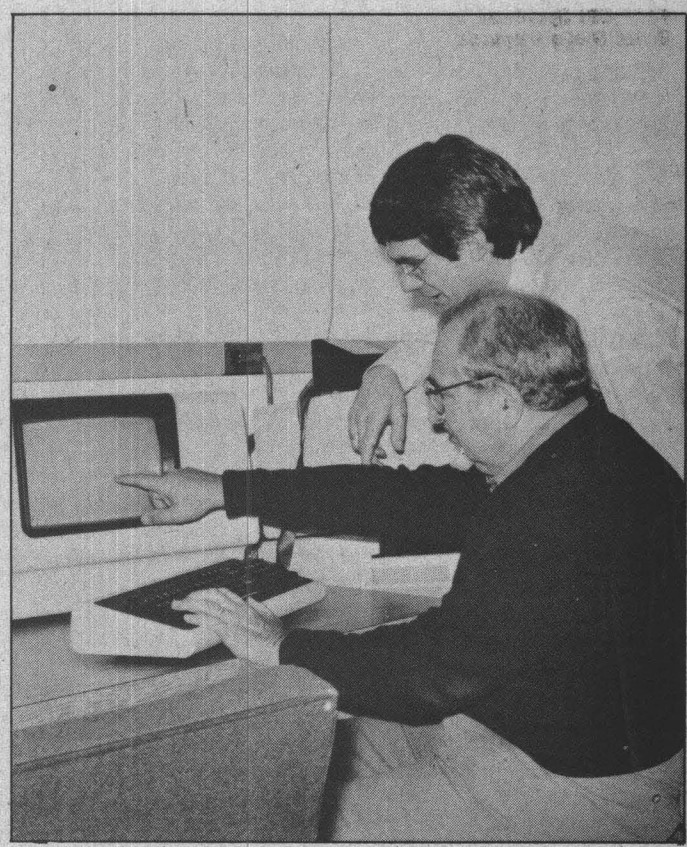
PHY 690 Special Topics in Quantum Electronics

PHY 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

DIVISION OF SOCIAL AND BEHAVIORAL SCIENCES

The Departments of Anthropology, Economics, History, Political Science, Psychology and Sociology and the Programs in Linguistics, Labor/Management Studies, Social Science Interdisciplinary and Special Education constitute the Division of Social and Behavioral Sciences. The six departments all have high quality Ph.D. programs, described in the following sections, and several departments and programs have M.A. programs and/or offer graduate courses through the Center for Continuing Education. The Division has a faculty of about 175 professors, many of them with national and international distinction, full-time Ph.D. students from all over the world numbering 340, and a number of visiting faculty from leading universities in many countries. Several departments in the Division have been ranked very highly by national surveys of departmental quality and all of them have exciting and broad-ranging research programs involving graduate students. Each department has a large number of professional colloquia, talks by distinguished visitors and opportunities for independent study by graduate students.



Anthropology (ANT)

Chairperson: Philip C. Weigand
Social and Behavioral Sciences Building, S-501 (516) 246-6748

Graduate Program Director: Paula Brown Glick
Social and Behavioral Sciences Building S-511 (516) 246-6749

Co-Director: John Fleagle
Doctoral Program in Anthropological Sciences
Health Sciences Center, T 8-023 (516) 444-3121

The Department of Anthropology offers a full graduate program leading to the M.A. and the Ph.D. degrees. With the M.A. program, candidates may study toward a master's in anthropology or choose to study toward a master's in anthropology with a concentration in Applied Anthropology. Admission and degree requirements are the same, but the course of study differs. Students who complete their graduate studies with the M.A. degree are well prepared to enter a variety of fields. The doctoral program in Anthropological Sciences is an interdepartmental program that offers a broader training and graduates often go on to university or college teaching.

Facilities and Research Opportunities

The Department of Anthropology has ample laboratory space, as well as desk and office space for all graduate students. The archaeological and physical anthropological labs housed in the department provide facilities for the analysis of artifact collections, mapping, serial photograph analysis, and for the analysis of primate or human remains. Housed in the department are ethnographic collections from areas such as Oceania and Central America and archaeological collections from Mesoamerica and the Near East. Darkroom facilities are available for use by all qualified graduate students.

Outside of the Anthropology Department proper, interested students have access to the research facilities for comparative primate morphology, human anatomy and human and primate evolution housed in the Department of Anatomical Sciences facilities that are at present unparalleled at any other institution. The collections include primate fossils ranging from the Cretaceous to the Plio-Pleistocene, primate osteological material from Africa, Asia and South America, and living non-human primates, including chimpanzees, gibbons, New and Old World monkeys and a variety of prosimians.

Also in the Department of Anatomy is a gait lab that includes equipment and facilities for force plate analysis, high-speed cinematography, telemetered electromyography and cineradiography. Scanning and transmission electron microscope facilities are available elsewhere on campus.

The Department of Anthropology also has excellent contacts with other research institutions in the area. The Art and Archaeology Project of Brookhaven National Laboratory will consider training qualified students in nuclear activation analysis and other advanced analytical techniques. Students have access to good libraries, collections and the Computing Center.

For students interested in anthropological research in the New York/Long Island area, there is a research room containing an expanding collection of documentary material. The Long Island Archaeological Project manages cultural resource survey and environmental impact statements for the area and provides equipment for survey, excavation and data analysis for use by any interested students. Students may also be be invited to participate in the ongoing archaeological projects on Long Island, Mesoamerica and the Near East.

Students and faculty conduct ethnographic field research in many areas: North and South America, Africa, Europe, the Middle East, Asia, Melanesia, Indonesia, the Philippines, Mesoamerica. New York and Long Island area studies are concerned with ethnic relations, community, work and industry, ecology and land use and social change.

The Department of Anthropology has language laboratory facilities, tape recorders, and play-back equipment used in field methods courses. This equipment is available to students for language recording and practice.

A more detailed description of the graduate program is available from the departmental office. This includes specific distribution requirements, fields of specialization, and information on the preliminary and qualifying examinations. Interested students should request information and application forms as early as possible, especially if they plan to apply for financial aid.

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 obtain the M.A. as a mark of progress toward 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.

M.A. in Anthropology with Concentration in Applied Anthropology

This program 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.

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.

Doctoral Program in Anthropological Sciences

The goal of the doctoral program in Anthropological Sciences is to prepare scholars for teaching and research in Social and Cultural Anthropology and Ethnography, Cultural History and Archaeology, Physical Anthropology and Linguistics. The first-year program is directed toward a foundation in anthropological theory and the four fields of general anthropology.

Admission

Admission to the M.A. and Ph.D Programs

In addition to the admission requirements of the Graduate School, the Anthropology Department requires:

A. A baccalaureate degree from an accredited college. A minimum grade point average of 3.0 (B) in all undergraduate course work, and 3.25 (where 3.0 = B) in the major field of concentration.

B. Results of the Graduate Record Examination General Test.

C. Test of English as a Foreign Language for international students. Minimum score: 550.

D. Acceptance by the Department of Anthropology and the Graduate School.

Degree Requirements

Requirements for the M.A. in Anthropology and M.A. in Anthropology with Concentration in Applied Anthropology

In addition to the requirements of the Graduate School, the following are required:

A. Completion of a minimum of 30 graduate credits, maintaining a 3.0 average.

B. A course of study planned and carried out with the approval of the student's M.A. guidance committee. This may require examinations, 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.

C. One-year minimum residence.

The Anthropology Department also participates in the Interdisciplinary Social and Behavioral Sciences M.A. program.

Requirements for the Ph.D. Degree in Anthropological Sciences

A. Completion of a minimum of 48 graduate credits, maintaining a minimum of 3.0 average.

B. The qualifying examination taken after one year of study, and passed at an appropriate level.

C. A course of study planned and carried out under the direction of the student's guidance committee. This may require courses in methods, other subjects, library research, essays, fieldwork, and laboratory study.

D. Pass foreign language requirement, statistics and computer competence.

E. Teaching requirement for all students.

F. Preparation of dissertation research proposal.

G. Pass preliminary examination, and advance to candidacy (may be awarded M.A. at this point).

H. Fieldwork or other dissertation research.

I. Written dissertation and defense.

J. Time limit: The candidate must satisfy all requirements for the Ph.D. degree within seven years after completing 24 credit hours of graduate courses at the State University of New York at Stony Brook department or program in which the candidate is to receive his or her degree.

First Year Program

A. Every year the following introductory courses are offered:

Fall	Spring
ANT 501: Development of Anthropological Theory	ANT 502: Development of Anthropological Theory
ANT 540: Readings Ethnog./ Ethnol.	ANT 520: Princ. Soc/Cult. Anthro.
ANT 515: Theory/Meth. Arch.	ANT : (Elective Arch./ Culture History)
ANT 530: Physical Anthro.	ANT: : (Electives Phys. Anthro.)
ANT 560: Readings Descrip. Ling.	ANT 578: Lang. Cult. Context

B. From these courses all students will take:

1. The full-year sequence in theory (ANT 501–502)
2. One semester of each of the four fields of anthropology as follows:

Physical Anthropology	ANT 530
Arch/Cult. History	ANT 515
Soc/Cult. Anthro./Ethno.	ANT 540 or ANT 520
Linguistics	ANT 560 or ANT 578

3. One additional three-credit course from each of two of the four fields from available electives or courses.

When a student has completed this first-year program, an oral qualifying examination is given by a faculty committee. After successfully completing this, a student begins an individual course of study under the direction of a guidance committee. This includes participation in seminars and independent study courses, specialization in one or more subdisciplines and preparation for dissertation research. The second-year program includes studies in methods and techniques appropriate to the student's field of interest. The guidance committee plans a course of study that may include computer competence, statistics, research methods, languages and other fields as appropriate. Under guidance committee direction, students prepare essays in two or more subjects and areas and prepare a dissertation research proposal. An oral Ph.D. preliminary examination is required for advancement to candidacy. When this is successfully passed, the student may be awarded an M.A. degree and proceed to dissertation research. Dissertation writing and examination are supervised by a faculty committee which includes one member outside of the doctoral program in Anthropological Sciences faculty.

Faculty

Anshen, Frank, Associate Professor.[2,4] Ph.D., 1968, New York University: Sociolinguistics.

Arens, W., Associate Professor.[4] Ph.D., 1970, University of Virginia: Social anthropology; complex societies; social change; Africa.

Aronoff, Mark, Associate Professor.[2,4] Ph.D., 1974, Massachusetts Institute of Technology: Phonology; morphology.

Bonvillain, Nancy, Associate Professor.[4] Ph.D., 1972, Columbia University: Social organization; culture change; North American Indian ethnography and acculturation; language and culture; linguistics.

Carrasco, Pedro, Professor.[4] Ph.D., 1952, Columbia University: Theory, economics, preindustrial civilizations; ethnohistory; Mesoamerica, Tibet.

Creel, Norman, Associate Professor.[1,4] Ph.D., 1967, Eberhardt Carls University, Federal Republic of Germany: Systematics; biometrics; primate and human behavior.

Faron, Louis C., Professor.[4] Ph.D., 1954, Columbia University: Kinship and marriage systems, ecology, religious systems, complex societies; Chile, Peru, Panama, Mexico.

Fleagle, John, Associate Professor.[1,4] Ph.D., 1975, Harvard University: Primate and human evolution; primate behavior; functional morphology; growth and development.

Gilmore, David, Associate Professor.[4] Ph.D., 1975, University of Pennsylvania: Complex societies, stratification, peasant culture; Europe, Mediterranean.

Glick, Paula Brown, Professor[4] and Graduate Program Director. Ph.D., 1950, University of London, Great Britain: Social anthropology, ecology and economy; politics, urbanization and social change; Oceania, North America.

Grine, Frederick Edward, Assistant Professor.[4] MsC, 1976, University of the Witwatersrand, Johannesburg, S. Africa: Mammalian and hominid evolution; functional morphology of the masticatory apparatus; diet reconstruction.

Harbottle, Garman, Adjunct Professor.[4,5] Ph.D., 1949, Columbia University: Radiochemistry; application of nuclear techniques to archaeology and art.

Hicks, David, Professor.[4] D. Phil., 1972, Oxford University, Great Britain: Symbolism; Indonesia.

Inke, Gabor, Professor.[1,4] M.D., 1944, Pazmany Peter University, Budapest, Hungary; Ph.D., 1961, Martin Luther University, Federal Republic of Germany: Multivariate correlation of skull, jaws, and teeth.

Newton, Dolores, Assistant Professor.[6] Ph.D., 1972, Harvard University: The relation of material culture to social organization, special interest in teaching museum training and techniques; Brazil, North America.

Starr, June, Associate Professor.[4] Ph.D., 1970, University of California, Berkeley: Political anthropology of law, social change, culture and personality, women in culture; Middle East, North Africa.

Stern, Jack T., Jr., Professor.[1,4] Ph.D., 1969, University of Chicago: Functional morphology of primates; biomechanics of muscle.

Stevenson, Robert F., Associate Professor. Ph.D., 1965, Columbia University: Theory, political systems, age organization, ecology, cultural evolution; Africa.

Stone, Elizabeth C., Assistant Professor.[4] Ph.D., 1979, University of Chicago: Old World archaeology, state formation, ancient economy and society; Near East.

Susman, Randall L., Associate Professor.[1,4] Ph.D., 1976, University of Chicago: Hominid evolution; functional morphology.

Weigand, Phil C., Professor[4] and Chairperson. Ph.D., 1970, Southern Illinois University: Early civilizations and urbanization, culture history and ethnography, culture change and theory; Near East, Mexico, Southwest.

Wheeler, Margaret C., Associate Professor. Ph.D., 1957, Yale University: Urban anthropology, Jewish culture, complex societies, physical anthropology; Canada, U.S.A.

Number of teaching, graduate and research assistants, fall 1983: 25

[1] *Anatomical Sciences*
[2] *Linguistics*
[3] *Art History*
[4] *Doctoral Program in Anthropological Sciences*
[5] *Brookhaven National Laboratory*
[6] *Anthropology Museum*

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 19th Century to the present. There is a major emphasis on materialist, and historical and evolutionary 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 that examines the scientific foundations of anthropology, explanation, methods of research, analysis of data, and the preparation of research proposals. Fieldwork techniques include observation, recording, interviewing, texts, life histories, genealogies, census. *Prerequisite:* One year of graduate study
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 512 Comparative Civilizations
A comparative study of the processes of sociocultural evolution from the beginnings of sedentary life to the achievement of early civilization in the Near East, Egypt, the Indus Valley, China, Mesoamerica 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 515 Theory and Method in Archaeology
Theoretical and methodological approaches employed in archaeology. The goals of the course are: to provide a historical perspective on the growth of theory and method in archaeology, and to examine in detail some of the pertinent research topics being studied today.
3 credits

ANT 520 Principles of Social and Cultural Anthropology
Concepts and principles of social and cultural anthropology; historical background, structure and function, social processes, transactions, culture and communication, continuity and change, topics and problems of contemporary interest.
3 credits

ANT 522 Male–Female Roles in Cross-cultural Perspective
Theory concerning how gender differences and the subordination of women emerged in simple and complex societies. Women in the development process, and women's changing work and position in contemporary societies.
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 evaluations 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 include food collecting, hunting, agricultural, pastoral and mixed economies.
3 credits

ANT 530 Physical Anthropology
A course in the fundamentals of physical anthropology that will be an introduction to the subject and a basis for advanced and specialized work.
3 credits

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 547 Topics in Primitive Art
Study of the various theoretical approaches to the interpretation of primitive art. Topics will include: structural analysis of art, socioeconomic structure and art, and symbolism and art.
3 credits

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 The Anthropology of Law
The study of law and conflict resolution in technologically simple and advanced societies. Village social control methods, as well as law courts in Africa, Middle East, and Asian societies are contrasted with U.S. law systems.
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 559 Urban Anthropology
Processes and methods in urbanization of contemporary complex societies from a cross-cultural perspective, with emphasis on organizational structure of groups, social institutions, communities and other aspects of urban life. Forces causing change in the make-up of rural, suburban, and city areas will be examined.
3 credits

ANT 560 Descriptive Linguistics
Focuses on the series, techniques and methods of linguistic analysis. In this course, students learn how to do linguistic analysis, working through problems in a wide variety of the world's languages. It covers the topics of phonology, morphology, syntax, and semantics.
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 565 Human Evolution
A survey of the fossil record of hominid evolution through the Pliocene and Pleistocene with emphasis on the morphological structure and function of locomotor, masticatory and neutral systems. Includes utilization of comparative anatomical material and extensive cast and slide collections.
4 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 LIN 521.
3 credits

ANT 572 Phonetics
Articulatory, acoustic and physiological phonetics with some attention paid to speech perception. Crosslisted with LIN 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 LIN 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 LIN 526.
3 credits

ANT 577 Selected Topics In Linguistics
Crosslisted with LIN 532.
3 credits

ANT 578 Language and Cultural Context
Language and its use in cultural context. Topics include: structure of languages, origin and development of human language, relationship of language and culture (ethnolinguistics, sociolinguistics) linguistic and cultural change, language and mind, language acquisition.
3 credits

ANT 600 Practicum in Teaching
Variable and repetitive credit

ANT 602 Research Seminar in Anthropological Theory
Variable and repetitive credit

ANT 610 Individual Research
Research supervised by faculty. Students must have permission of instructor and enroll in appropriate section.
Variable and repetitive credit.

ANT 611 Research Seminar In Old World Archaeology
This course will present an in-depth analysis of some of the major 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 614 Research Seminar 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 Mesoamerica 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 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

ECONOMICS (ECO)

Chairperson: Estelle James
Social and Behavioral Sciences Building, N–625 (516) 246–7928

Graduate Program Director: R. Bryce Hool
Social and Behavioral Sciences Building. S—621 (516) 246-6547

Admission

The Department of Economics admits only students who intend to complete the Ph.D. degree program. There is no M.A. program but students are eligible to receive the M.A. degree if they have met requirements listed below (see Degree Requirements).

Requirements for admission to the Ph.D. program in addition to the minimum Graduate School requirements, are as follows:

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.

C. Letters of recommendation from three instructors or academic advisors.

D. Submission of results of the Graduate Record Examination General Test (verbal, quantitative and analytical parts).

E. Submission of results of the TOEFL examination, with a minimum score of 550. (Foreign students only.)

F. Acceptance by the Department of Economics and by the Graduate School.

Students who do not meet all these requirements may apply if they think that their circumstances warrant special consideration. Application for admission in the academic year starting in September should ordinarily be submited before the preceding March 1.

Degree Requirements

Requirements for the M.A. Degree in Economics

In addition to the minimum Graduate School requirements, the department has its specific degree requirements. The M.A. degree requires a minimum of 30 resident graduate course credits (500 level or above, not including ECO 598 or ECO 698) in which a grade of B or better has been received.

Requirements for the Ph.D. Degree in Economics

The Ph.D. program emphasizes rigorous training in economic theory and quantitative methods, and their creative application. The goal is to develop the capability of each student to conduct independent research and analysis. To this end the program has three phases: (1) a general foundation in economic theory and quantitative methods; (2) specialization in two or more fields of theoretical or applied economics; and (3) independent research culminating in the doctoral dissertation. These are not totally distinct phases but indicate the natural order of progression. Coursework is supplemented by independent study and research seminars. Throughout the program students have advisors to consult in developing a study plan that best meets their needs.

The Ph.D. degree requirements are as follows:

A. Course Requirements

A minimum of 14 courses in economics (including core courses) must be completed, with a grade of B or better in each elective course. Included in the elective courses must be at least two in each of two or more fields (listed below). However, the Ph.D. committee may approve (i) the inclusion of up to two elective courses taken in another department, (ii) a waiver of part of the 14-course requirement in the case of students with graduate work elsewhere.

1. *Core Courses*
   Those courses which provide the foundation in economic theory (micro and macro) and quantitative analysis (mathematical methods, statistics and econometrics) are referred to as core courses.
2. *Comprehensive Examinations*
   Comprehensive examinations are taken in microeconomics, macroeconomics and quantitative methods, normally beginning at the end of the first year of study and to be completed by the end of the fifth semester. Comprehensive examinations are written but may be supplemented by oral examinations at the discretion of the examining committee.
3. *Elective Courses and Fields of Specialization*
   In addition to core courses, students choose elective courses from the variety of fields offered in theoretical and applied economics. It is through these courses that breadth of economic knowledge is gained and students are therefore encouraged to take as many courses as is consistent with the time needed for dissertation research. Normally, at least seven elective courses must be taken, with groupings in at least two fields. It is usual but not necessary that a dissertation topic be chosen from one of these fields of specialization.

Fields currently offered by the department are advanced micro theory, advanced macro theory, advanced econometrics, labor economics, economic demography, international economics, industrial organization, urban economics, public sector economics, comparative economic systems, economic history and economic development.

B. Seminars and Workshops
Participation in departmental seminars and research workshops is considered an essential part of a student's progress toward the doctorate. Seminars in economic theory and applied economics are presented on a regular basis by faculty, visitors and graduate students. Workshops oriented toward thesis research are conducted by faculty and students working in related areas.

C. Advancement to Candidacy
Advancement to candidacy for the Ph.D. is achieved by completion of the comprehensive examinations in all three core fields and completion of required coursework. Advancement to candidacy normally must be achieved by the end of the fifth semester.

D. Dissertation
A doctoral dissertation must be completed. A dissertation prospectus must receive approval of the thesis advisor and members of the thesis committee. Final approval of the dissertation 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.

Preliminary research on a dissertation topic is normally begun in the third year of study and most of the fourth is spent in developing and refining this research. Throughout this phase, students interact closely with faculty members who constitute their dissertation committee, one of whom will be principally involved as the thesis supervisor. At the same time, student research workshops provide the opportunity to present and receive feedback on research at any stage of development.

E. Teaching
The department is committed to achieving a high quality of teaching and encourages all graduate students to acquire teaching experience during their graduate studies. The department operates a training program to prepare teaching assistants for classroom presentation.

F. Time Limit
If the degree requirements have not been met within five years of entry into the program, departmental approval is required for continuation in the program.

Faculty

Ames, Edward, Professor. Ph.D., 1952, Harvard University: Economic theory; comparative systems; economic history.

Anton, James, Assistant Professor. Ph.D., 1983, Stanford University: Macroeconomic theory; game theory.

Dawes, William, Assistant Professor. Ph.D., 1972, Purdue University: Econometrics; economic history.

Denci, Michael S., Adjunct Assistant Professor. M.S., 1961, Columbia University.

Dusansky, Richard, Professor. Ph.D., 1969, Brown University: Public sector economics; microeconomic theory; health economics.

Entine, Alan D., Adjunct Associate Professor. Ph.D., 1963, Columbia University.

Gertler, Paul, Lecturer. Ph.D. expected 1984, University of Wisconsin, Madison: Applied microeconomics; regulation and health economics.

Hause, John C., Professor. Ph.D., 1962, University of Chicago: Industrial organization; microeconomics; econometrics.

Hendricks, Kenneth, Assistant Professor. Ph.D., 1982, University of Wisconsin, Madison: Microeconomic theory; natural resources.

Hool, R. Bryce, Associate Professor and Graduate Program Director. Ph.D., 1974, 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 and Chairperson. Ph.D., 1961, Massachusetts Institute of Technology: Welfare economics; economics of education.

Kristein, Marvin M., Associate Professor. Ph.D., 1955, New School for Social Research: Managerial economics; health economics.

Locay, Luis, Assistant Professor. Ph.D., 1982, University of Chicago: Microeconomics; economics of the family; economic demography.

Muench, Thomas J., Professor. Ph.D., 1965, Purdue University: Mathematical economics; econometrics; urban economics.

Nairay, Alain, Assistant Professor. Ph.D., 1981, Yale University: Microeconomic theory; international economics; econometrics.

Neuberger, Egon, Professor. Ph.D., 1958, Harvard University: Comparative systems; Soviet and East European economics.

Novales, Alfonso, Assistant Professor. Ph.D., 1983, University of Minnesota: Macroeconomics; econometrics.

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: History of economic thought; international economics.

Walker, Mark, Associate Professor. Ph.D., 1970, Purdue University: Economic theory; mathematical economics; theory of economic systems.

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.

Zschock, Dieter K., Associate Professor. Ph.D., 1967, Tufts University: Economic development, labor economics.

Zweig, Michael, Associate Professor. Ph.D., 1967, University of Michigan: Political economy; labor economics.

Number of teaching, graduate and research assistants fall 1983: 57

Courses

ECO 500 Microeconomics I
The first semester of a one-year course in microeconomic theory. Deals with decision-making of economic agents in different choice environments using the analytical approach of duality theory. Topics include theory of the consumer, theory of the firm, decision-making under risk and uncertainty, intertemporal choice, aggregation and capital theory.
Fall, 4 credits

ECO 501 Microeconomics II
A continuation of ECO 500, focusing on theories of equilibrium and market structure. Topics include general competitive equilibrium, imperfect competition and game theory, imperfect information, theory of public goods and social choice.
Spring, 4 credits

ECO 502 Applied Microeconomic Problem Solving
Development and use of frameworks for applied microeconomic analysis. Specific applications to problems dealt with generally in ECO 500–501.
Prerequisites: ECO 500, ECO 501
Fall, 2 credits

ECO 510 Macroeconomics I
The first semester of a one-year course in macroeconomic theory. Deals with theories and determinants of income, employment and inflation. Topics include static equilibrium models, theories of money demand and monetary phenomena, theories of the labor market and unemployment, rational expectations and stabilization policy, consumption and investment.

ECO 511 Macroeconomics II
A continuation of ECO 510, focusing on dynamic models. Topics include models of economic growth, optimal growth and efficiency, overlapping-generations models, rational expectations and optimal policy.
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; univariate and multivariate distributions; limiting distributions; point and interval estimation; hypothesis testing.
Spring, 4 credits

ECO 521 Econometrics
A continuation of ECO 520. The application of mathematical and statistical methods of economic theory, including the concept of an explanatory economic model; multiple regression; hypothesis testing; simultaneous equations models and estimating techniques.
Fall, 3 credits

ECO 522 Applied Econometrics
A continuation of ECO 521. The application and extension of econometric techniques developed in ECO 521. Emphasis on relationship between economic theory, econometric modeling and estimation, and empirical inference. Computer usage for calculation of estimators. Critical examination of econometric studies in current journals.
Prerequisite: ECO 521
Spring, 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 complex 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. Nonlinear 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
A one-semester course dealing with mathematical concepts and techniques relevant to economic theory. Topics in set theory, topology, linear algebra and optimization theory. Applications to economic theory developed as time permits.
Fall, 4 credits

ECO 598 Economic Fundamentals
Directed work for individuals or groups, on topics in which students are inadequately prepared at time of admission to program. Typical focus is mathematical methods as background for ECO 590. Course credits may not be counted toward degree requirement.
Variable and repetitive credit

ECO 599 Research in Special Topics
Variable and repetitive credit

ECO 600 Advanced Microeconomic Theory I
Topics in mathematical economic theory, including general equilibrium and welfare theory, stability theory, economic dynamics, game theory, imperfect information, allocation and incentive mechanisms. Mathematical concepts developed as needed.
Prerequisites: ECO 501, ECO 590 or equivalent
Corequisites: MAT 550 or MAT 321
2 credits

ECO 601 Advanced Microeconomic Theory II
Continuation of ECO 600.
2 credits

ECO 607 Production and Technology
Economic aspects of reserch, 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, repetitive

ECO 610 Advanced Macroeconomic Theory I
Topics in macroeconomic theory, including microfoundations of macroeconomics, temporary general equilibrium and disequilibrium, monetary theory, equilibrium theory of business cycles, implicit contracts, rational expectations and econometric implications.
Prerequisites: ECO 501, 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
Analysis of modern theories of the business cycle and the use of alternative stabilization policies. 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, nonlinear 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 modern cross-section econometric methods with emphasis on methods used in labor economics. Although the discussion will take place in the context of specific empirical applications, the goal is the understanding of the theoretical properties of the estimation methods. Topics include: qualitative and limited dependent variables, maximum likelihood, nonlinear regression, random coefficient models, panel data and Bayesian estimation. An interest in labor economics is desirable but not necessary.
Prerequisite: ECO 521 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
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
Analytical 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 636 Industrial Organization I
Public policy toward industry. Regulation and deregulation. The design of optimal regulation and the effectiveness of current regulation. A combination of general analysis and case studies.
Prerequisite: ECO 502
2 credits

ECO 637 Industrial Organization II
Application of microeconomic theory to the determinants of market structure; relationships between market structure, firm behavior and allocational efficiency; economic estimation and testing of some hypotheses suggested by the theory; and an introduction to antitrust policy (if time permits).
Prerequisites: ECO 502, ECO 521
2 credits

ECO 640 Advanced Labor Economic Theory I
This is primarily a course in advanced labor economics theory. There will, however, be some attention to empirical work. Topics will include 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 ECO 640. There will, however, be more emphasis on empirical application. Topics to be covered are labor contracts, unemployment and job turnover, labor demand, unionism, and signaling and screening.
Prerequisite: ECO 640
2 credits

ECO 642 Demographic Economics I
This course deals with the economics of the family. It utilizes recently developed techniques in economics and in demography to deal with questions concerning marriage, divorce, fertility, contraception, the intrafamily distribution of resources and the intergenerational distribution of resources. Students will do original theoretical and empirical research under the professor's supervision.
Prerequisites; ECO 500, ECO 501, or equivalent
2 credits

ECO 643 Demographic Economics II
This course is a continuation of ECO 642. It will deal with the same questions and tools as ECO 642, but will emphasize primitive and developing economies. The connections between population growth and development will be stressed.
Prerequisites: ECO 500, ECO 501
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 647 Selected Topics in U.S. Economic History I
This course applies advanced economic theory to issues concerning the contribution of institutional arrangements to the development of the U.S. economy from colonial times to the present. Among the topics to be studied are implications of the demise of the Second National Bank of the U.S.; slavery and economic development; efficiency and equity of the National Banking System; economic institutions and business cycles; and the role of the Federal Reserve System in the Great Depression.
2 credits

ECO 648 Selected Topics in U.S. Economic History II
This course applies advanced economic theory to issues related to the growth of the U.S. economy from colonial times to the present. Among the issues to be studied are the character of modern economic growth in America; savings and growth; technical change; the interaction between growth and U.S. international economic relations; and the relation between population and economic growth.
2 credits

ECO 650 International Trade
A modern and thorough presentation of international trade theory including the classical theory (Ricardo), the neoclassical theory (Heckscher-Ohlin-Samuelson) and extensions, welfare aspects, trade and growth, the theory of tariffs and applications.
2 credits

ECO 651 International Finance
Theories of balance of payments adjustment and exchange rate determination, including monetarist, Keynesian and elasticity theories; disequilibrium macro models; policy analysis; international liquidity and capital flows.
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. 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 ECO 654 are applied to specific urban problems such as poverty, housing, slums and urban renewal, urban transportation, financing local government and environmental quality. Emphasis is also placed on methodology. ECO 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 motivtion. A conceptual framework is developed for analyzing market, centrally planned and planned market models; the model and the reality of Soviet-type centrally planned economies and the reforms in these economies; the model and reality of worker management; and measurement of quality of system performance.
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.
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.
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.
1–6 credits

ECO 695 Research Workshops
Designed to direct students to the selection of dissertation topics. Oral and written presentation of student papers with active faculty participation. Several sections may be offered each semester in areas of broad research interest.
Prerequisites: Three semesters of coursework in the Ph.D. program
1–6 credits, repetitive

ECO 698 Practicum in Teaching
1–6 credits

ECO 699 Dissertation Research
1–9 credits

History (HIS)

Chairperson: Herman Lebovics
Social and Behavioral Sciences Building, N-309 (516) 246-8323

Graduate Program Director: Fred Weinstein
Social and Behavioral Sciences Building, N-323 (516) 246-6146

The History Department's faculty and full- and part-time graduate students concentrate in three major fields: United States, Modern Europe and Latin America. Additional fields include expansion of Europe (colonialism and imperialism), history of science, technology and medicine, and on the M.A. level only, medieval European and Asian history. The department's outstanding strengths in both research and teaching include the fields of cultural history, labor history, the history of science, technology and medicine, Latin American history and the uses of social theory and method in history.

A more detailed description of the graduate program is available from the departmental office. This includes specific distribution requirements, fields of specialization, and information on the preliminary and qualifying examinations. Interested students should request information and application forms as early as possible, especially if they plan to apply for financial aid.

Admission

For admission to graduate study in history, the following, in addition to the minimum Graduate School requirements, are required:

A. A baccalaureate degree in history or its equivalent.

B. An official transcript of undergraduate record.

C. A minimum grade point average of 2.75 (B–) in all undergraduate course work, and 3.00 (B) in history courses.

D. Letters of recommendation from three previous instructors.

E. Results of the Graduate Record Examination General Test.

F. Acceptance by the Department of History and the Graduate School.

In special cases, students not meeting requirements A and C 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.

Degree Requirements

Requirements for the M.A. Degree

In addition to the minimum Graduate School requirements, the following are required:

A. 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.

B. 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 provided training in research and writing skills. To achieve these goals, the M.A. curriculum consists of required courses that full-time students can complete in one academic year. These courses are as follows:

1. HIS 500: Introduction to Historiography
2. HIS 501–502, 521–522, 545–546: 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 that 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.

C. Examination

A committee of three faculty members, chosen by the student in consultation with an M.A. advisor will assess the work accomplished by the student, and the knowledge acquired, in an oral examination. This examination will be taken in the student's final semester of M.A. work.

Requirements for the Ph.D. 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, to guide the student through the Ph.D. qualifying examinations and

direct the dissertation. The Ph.D. program, which is organized differently from the M.A. program, is supervised by a Ph.D. preparation committee made up of members of the graduate faculty in fields in which the student has an interest. The preparation committee will prescribe the content of the student's program. A foreign language requirement 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 field 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 on 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 that 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.

In addition to the minimum Graduate School requirements, the following are required:

A. Coursework

The program should be planned in consultation with the student's 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.

B. Ph.D.-Level Seminars

There are three types of doctoral-level seminars: 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.

C. Thesis Workshop

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, a statement of hypothesis and an outline of both the research sources and the methods that the student expects to employ. The prospectus must be aceptable to both the instructor of the thesis workshop and 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.

D. 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.

E. 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.

F. 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 careers.

G. 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.

H. 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 the 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.

I. 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[2] Ph.D., 1953, University of California, Berkeley: Modern Europe; German; political and labor history; Jews in modern Germany.

Barnhart, Michael, Assistant Professor. Ph.D., 1980, Harvard University: U.S. foreign policy; 20th-century U.S.; modern Japan.

Bottigheimer, Karl S., Associate Professor. Ph.D., 1965, University of California, Berkeley: Tudor-Stuart England and Ireland; early modern Europe; modern Ireland.

Burner, David, Professor. Ph.D., 1965, Columbia University: 20th-century U.S., political and social history.

Chinchilla-Aguilar, Ernesto, Professor. Ph.D., 1957, Escuela Nacional de Antropologia de Mexico: Central America and the Caribbean; colonial history; archival training and diplomacy.

Cleland, Hugh, Associate Professor[3] Ph.D., 1957, Case-Western Reserve University: U.S. labor and socialism: immigration; history of photography.

Cowan, Ruth S., Associate Professor. Ph.D., 1969, Johns Hopkins University: History of science, biology and technology; women in modern history.

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: Social and intellectual history of science; 19th- and 20th-century physics; European intellectual and social history.

Kuisel, Richard F., Professor. Ph.D., 1963, University of California, Berkeley: Modern Europe, France; political economy; business and public administration.

Lampard, Eric E., Professor. Ph.D., 1954, University of Wisconsin: Economic history; urban history; U.S., modern European cities.

Landsman, Ned, Assistant Professor. Ph.D., 1979, University of Pennsylvania: U.S. colonial; local history; Anglo-American world.

Larson, Brooke, Assistant Professor. Ph.D., 1978, Columbia University: Colonial Latin America; Andean rural history; peasant societies and women in Latin America.

Lebovics, Herman, Associate Professor and Chairperson. 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; Manchurian borders and cultural contacts.

Lemay, Helen R., Associate Professor. Ph.D., 1972, Columbia University: Medieval and Renaissance intellectual history; paleography; history of science and medicine; women's history.

Lida, Clara, Associate Professor. Ph.D., 1969, Princeton University: Spain; comparative labor; 19th century Spanish America.

Marker, Gary A., Assistant Professor. Ph.D., 1977, University of California, Berkeley: Russian social and intellectual history; history of printing; European labor history.

Miller, Wilbur R., Associate Professor. Ph.D., 1973, Columbia University: 19th-century U.S. social and urban history; police and criminal justice; Civil War and Reconstruction.

Owens, Leslie H., Associate Professor[1] 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 political history; New York State 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.

Taylor, William R., Professor. Ph.D., 1956, Harvard University: 19th- and 20th-century U.S. history; cultural and intellectual history.

Tomes, Nancy J., Assistant Professor. 1978, University of Pennsylvania: 19th-century U.S. social; medicine, nursing and psychiatry; women and family.

Weinstein, Barbara, Assistant Professor. Ph.D., 1980, Yale University: Brazil; modern Latin America; slave societies.

Weinstein, Fred, Professor and Graduate Program Director. 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 R., Associate Professor. Ph.D., 1963, University of Wisconsin: British Empire; Africa; the Commonwealth; expansion of Europe.

Number of teaching, graduate and research assistants, fall 1983: 28

[1]*Joint appointment, Africana Studies Program*
[2]*Recipient of the State University Chancellor's Award for Excellence in Teaching, 1974–75.*
[3]*Recipient of the State University Chancellor's Award for Excellence in Teaching, 1978–79.*

Courses

HIS 500 Historiography
Introduction to historiography through reading and writing about interpretations 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 interprettions from the French Revolution through the Second World War. Required for M.A. students in European 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 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 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 545 Introduction to Colonial Latin American History
Field seminar in colonial Latin American history. Survey major historical problems and debates from the colonial period through the wars for independence. Required for M.A. in Latin American history.
3 credits

HIS 546 Introduction to Modern Latin American History
Field seminar in modern Latin American history. Surveys major historical problems and debates from the post-independence period to the present. Required for M.A. in Latin American history.
3 credits

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 Social Theory 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 Europe 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 Seminars 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 for 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.
3 credits

HIS 699 Research for Ph.D. Candidates
Dissertation research under direction of advisor.
Variable and repetitive credit

Linguistics (LIN, DLT)

Chairperson: Mark Aronoff
Social and Behavioral Sciences Building, N-509 (516) 246-3431

Graduate Program Director: Frank Anshen
Social and Behavioral Sciences Building, N-513 (516) 246-3452

The program in Linquistics offers a course of studies leading to the degrees of Master of Arts in Teaching English to Speakers of Other Languages (TESOL), Master of Arts in Applied Linguistics and Doctor of Arts in Foreign Language Instruction with a concentration in TESOL. The graduate program in linguistics combines sophisticated instruction in theoretical linguistics with extensive practical training in the area of teaching English to foreign students, as well as other areas of applied linguistics. The M.A. in TESOL is designed to equip students to become qualified teachers, teacher trainers and curriculum specialists, and includes supervised teaching experience in the University's classes in English for foreign students. Graduates of the TESOL M.A. program generally go on to teach English as a foreign language abroad or in schools, colleges and universities in the United States. The M.A. in Applied Linguistics also includes training in the teaching of English as a foreign language and is designed as well to prepare students to carry out research in various areas of applied linguistics, such as psycholinguistics, sociolinguistics, stylistics, bilingualism and second language acquisition and is especially suitable for students who may wish to pursue their studies beyond the M.A. level. The quirements of the M.A. program satisfy a substantial portion of the requirements for New York State certification in TESOL, and students may arrange to complete the requirements for state certification in conjunction with pursuit of the M.A. The D.A. degree is primarily an advanced degree for continuing a career in teaching at the secondary school, junior college or undergraduate level.

A detailed description of the graduate program is available from the departmental office. Interested students should request information and application forms as early as possible, especially if they plan to apply for financial aid.

Facilities

The Linguistics program maintains a phonetics laboratory and a language laboratory with facilities for computer-assisted instruction.

Admission

Admission to the M.A. Program

For admission to the graduate program in linguistics, the following, in addition to the minimum Graduate School requirements, are normally required:

A. A bachelor's degree from a recognized institution with a minimum grade point of 3.0 or its foreign equivalent.

B. An official transcript of the undergraduate record.

C. Letters of recommendation from three previous instructors.

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

E. Graduate Record Examination General Test scores.

F. Students whose native language is not English must have obtained a score of at least 600 on the Test of English as a Foreign Language (TOEFL). This requirement may be waived in the case of exceptionally qualified students.

G. Students who do not meet the above requirements may be admitted provisionally. Their status will be reviewed after their first semester of graduate study.

H. Acceptance by the Department of Linguistics and the Graduate School.

Admission to the D.A. Program

For admision to the Doctor of Arts Program, the following, in addition to the minimum Graduate School requirements, are normally required:

A. A master's degree in Linguistics or TESOL from a recognized institution.

B. An official transcript of the undergraduate record.

C. Letters of recommendation from three previous instructors.

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

E. Graduate Record Examination General Test scores.

F. Students whose native language is not English must have obtained a score of at least 600 on the Test of English as a Foreign Language (TOEFL). This requirement may be waived in the case of exceptionally qualified students.

G. Students who do not meet the above requirements may be admitted provisionally. Their status will be reviewed after their first semester of graduate study.

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

Degree Requirements

Requirements for the M.A. Degree

In addition to the minimum Graduate School requirements, the following are required:

A. Formal Course Requirements	*Credits*
1. LIN 521 Syntax	3
LIN 522 Phonetics	3
LIN 524 Methods of TESOL	3
LIN 527 The Structure of English	3
LIN 571 Practicum in TESOL I	3
LIN 572 Practicum in TESOL, II	3
2. One of the following:	
LIN 525 Contrastive Analysis	3
LIN 526 Analysis of an Uncommonly Taught Language	3
3. Two of the following:	
LIN 531 Language Testing	3
LIN 532 Second Language Acquisition	3
LIN 534 Applied Linguistics	3
4. One elective course approved by the department.	

B. Comprehensive Examination
Successful completion of a comprehensive examination is required. Exceptional students may be invited to write a thesis in place of the comprehensive examination. The thesis will be written under the supervision of a thesis committee and must be approved by that committee.

C. Performance
The student must achieve a grade point average of B or better and a grade of Satisfactory in LIN 571 and 572 in order to be graduated from the program.

D. Course Waivers
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.

Requirements for the D.A. in Foreign Language Instruction with a Concentration in TESOL

In addition to the minimum Graduate School requirements, the following are required.

A. Formal Course Requirements	*Credits*
1. Major Field: TESOL	15
2. Minor Field: Foreign Language/Comp.Lit./Psychology/other areas related to TESOL	9
3. Literature: English Lit./Comp.Lit.	6
4. Professional Courses: Language Testing and Teaching Methodology	6
5. Practicum	3
6. Internship	3
7. Externship	3
8. Dissertation	6
Minimum Total	51

Courses in the minor field must be approved by the departmental advisor. A maximum of 6 transfer credits may be recognized for non-SUNY candidates and 9 for SUNY candidates. 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.

B. Language Requirement
Demonstration of proficiency in speaking, understanding, reading, and writing a language other than the candidate's native tongue.

C. Comprehensive Examination
Successful completion of a comprehensive examination consisting of both an oral and a written examination is required.

D. Dissertation
A dissertation must be submitted and approved by the doctoral committee.

Faculty

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

Anshen, Frank, Associate Professor and Graduate Program Director. Ph.D., 1968, New York University: Sociolinguistics.

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

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

Bonvillain, Nancy L., Associate Professor. Ph.D., 1972 Columbia University: Language and culture; linguistic field methods; language and sex; North American Indian languages.

Broselow, Ellen, Associate Professor. Ph.D., 1976, University of Massachusetts, Amherst: Phonology; phonetics; second language acquisition.

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

Hoberman, Robert, Assistant Professor. Ph.D., 1983, University of Chicago: Semitic linguistics.

Sridhar, S. N., Assistant Professor. Ph.D., 1980, University of Illinois: Syntax; psycholinguistics; bilingualism; applied linguistics.

Vasvari, Louise O., Associate Professor, Ph.D., 1969, University of California, Berkeley: Romance philology; historical linguistics; contrastive analysis; translation theory.

Number of teaching, graduate and research assistants, fall 1983: 15.

Courses

LIN 521 Syntax
A study of the fundamental notion of a grammar as a formal device which generates (describes) all and only the well formed sentences of a language. The general methodology of modern syntax is applied to a wide range of problems in a variety of languages, providing students with the tools for independent analysis. Crosslisted with ANT 571.
Spring, 3 credits

LIN 522 Phonetics
A study of articulatory phonetics and the international phonetic alphabet, with intensive practice in phonetic transcription from a wide variety of languages. Acoustic phonetics, speech perception, and the applications of phonetics to foreign language teaching. Crosslisted with ANT 572.
Fall, 3 credits

LIN 523 Phonology and Morphology
An introduction to the formal study of sound patterns and the internal structure of words. Although English will be central, a wide variety of languages will be analyzed.
3 credits.

LIN 524 Methods and Materials of TESOL
Theoretical bases of foreign language pedagogy: inputs from linguistics, psychology and education; overview of methods; syllabus design; lesson plans; teaching aids; techniques for teaching grammar, vocabulary, pronunciation, reading and writing; teaching communicative competence; evaluating and creating textbooks and supplementary materials.
Fall, 3 credits

LIN 525 Contrastive Analysis
A survey of linguistic typology and a comparison of various languages as a basis for understanding the errors made by language learners and devising strategies for teaching a foreign language. Crosslisted with ANT 575.
Spring, 3 credits

LIN 526 Analysis of an Uncommonly Taught Language
Working from primary and secondary sources, students construct an outline of the phonology, morphology and syntax of a language previously unknown to them. Crosslisted with ANT 576.
3 credits

LIN 527 Structure of English
A description of the major sentence elements, subsystems and productive grammatical processes of English. The justification of grammatical categories, interaction between systems and processes, notions of standard and correctness are discussed with a view to their application in the ESL classroom.
Fall, 3 credits

LIN 530 Introduction to General Linguistics
An introduction to modern theoretical and applied linguistics, including phonology, morphology, syntax, language acquisition, historical linguistics, and sociolinguistics.
3 credits

LIN 531 Language Testing
The application of the principles of measurement to the assessment of linguistic functioning. The relation of test strategies to validity and reliability. The role of testing in research, schools, and society. Examination of specific language tests.
Spring, 3 credits

LIN 532 Second Language Acquisition
Study of the acquisition of a second language by children and adults. The focus is on data (the systematicity of the learners' errors, the ease of acquisition in childhood, etc.,), the adequacy of theories (e.g., interlanguage processes, the monitor model, the critical period) to explain data, and the reliability of methods of obtaining data. Students conduct an empirical study testing a current hypothesis.
3 credits

LIN 534 Applied Linguistics
A survey of the potential and actual applications of linguistic principles and findings to a variety of human concerns. The implications of linguistics for theories of language learning, syllabus design, error prediction and correction, literary analysis, non-standard and non-native varieties of language, language teaching for specific functions, and bilingual functioning.
Fall, 3 credits

LIN 535 Historical Linguistics
A study of linguistic change. Some general topics to be dicussed are: the genetic classification of languages; language families, language and prehistory; reconstruction; types of sound change; types of semantic change; borrowing.
Spring, 3 credits

LIN 550 Selected Topics in Linguistics
Topics will be announced each semester. The course may be repeated if topic differs.
Fall and spring, 3 credits each semester

LIN 571 Practicum in TESOL I
Under the supervision of a member of the Linguistics Program each student will have primary responsibility for teaching a section of English as a Second Language.
Fall and spring, 3 credits each semester

LIN 578 Language and Cultural Context
Language and its use in cultural context. Topics include: structure of languages, origin and development of human language, relationship of language and culture (ethnolinguistics, sociolinguistics), language and cultural change, language and mind, language acquisition. Crosslisted with ANT 578.
Spring, 3 credits

LIN 591 Directed Readings in Applied Linguistics
Students conduct research on a topic of special academic interest or professional relevance to them under the direction of a faculty member.
Fall and spring, 3 credits each semester

LIN 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

DLT 601 Internship in TESOL
Students in the Doctor of Arts Program will assist an instructor as an aid in a language course on the undergraduate level.
Fall and spring, 1-3 credits

DLT 602 Externship in TESOL
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, 1-3 credits

DLT 699 Doctoral Research in TESOL
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

POLITICAL SCIENCE (POL)

Chairperson: Frank Myers
Social and Behavioral Sciences Building, S-711 (516) 246-6550

Ph.D. Program Director: Helmut Norpoth
Social and Behavioral Sciences Building, N-731 (516) 246-8288

M.A. Program Director: Mark Schneider
Social and Behavioral Sciences Building, N-725 (516) 246-8268

Master's Program in Political Science

Objectives: Graduate studies in Public Affairs is a distinct program 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.

Ph.D. Program in Political Science

The Department of Political Science offers Ph.D. training in three areas of concentration: (1) political psychology/behavior, (2) public policy and (3) American politics.

Political Psychology/Behavior

The political psychology/behavior 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, psychophysical, 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, cognitive processes and decision making.

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.

American Politics

The doctoral concentration in American politics focuses on national political institutions and processes. Areas of special interest include elections, political parties and the legislative process in Congress. Members of the faculty in American politics are currently conducting research on the role of party activitists in presidential nominations, applications of spatial theories of voting to presidential elections, congressional decision-making, and voting in congressional elections. Students are encouraged to work closely with faculty members on these research projects.

Admission

Admission to the M.A. Program

In addition to the minimum requirements of the Graduate School, the following are required:

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. These may come from present or past employers and from professional colleagues as well as from faculty.

D. The Graduate Record Examination General Test scores are required by the end of the first semester enrolled.

E. Acceptance by both the Department of Political Science and the Graduate School.

Admission to the Ph.D. Program

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 the Graduate Record Examination General Test Scores.

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.

Requirements for the M.A. Degree

In addition to the minimum requirements of the Graduate School, the following are required:

A. All candidates must have completed 24 credits of formal graduate coursework and six credits of internship in a public sector agency.

B. Students may substitute a master's thesis for the internship requirement where appropriate.

C. 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.

Requirements for the Ph.D. Degree in Political Science

Candidates must meet the general requirements for the Ph.D. degree set by the Graduate School. Departmental requirements are as follows:

A. Coursework

1. All Ph.D. students, regardless of area of concentration, are required to take the following seminars:
   POL 550 Foundations: American Politics
   POL 551 Foundations: Political Psychology/Behavior
   POL 552 Foundations: Public Policy
   POL 553 Foundations: Comparative Politics/ International Relations
   POL 603 Applied Data Analysis I
   POL 604 Applied Data Analysis II
   POL 605 Philosophy and Social Science
   Students should enroll in these courses during the first three semesters.
2. Four advanced seminars must be taken in one's area of concentration; for students specializing in Political Psychology/Behavior, POL 560 and POL 561 (Political Psychology I and II) constitute two of these four courses. In addition, at least one advanced seminar outside one's area of concentration is required.
3. For advanced training in quantitative methods, each student must enroll in two methods courses outside the Political Science Department. Students in Public Policy, for example, may satisfy this requirement by taking Economics 320 and Economics 321. Students are encouraged to check also with the departments of Psychology, Sociology and Applied Mathematics for appropriate courses.
4. During the fourth semester each student is required to conduct a research project, the result of which should be a paper of high quality, i.e., one that may be presentable at a professional conference or, even better, may be publishable in a journal. For the purposes of conducting the requisite research, the student is to enroll in POL 680 (Independent Study) during the fourth semester. The topic of research should be chosen in close consultation with a faculty member who will supervise the project.
5. During the fifth or sixth semester, each student is to enroll in POL 680 (Independent Study) for the purpose of designing a dissertation proposal. This should be done in close consultation with the faculty member whom the student intends to choose as dissertation advisor.

In all, the Political Science Department requires 16 courses to be completed before a student is allowed to take preliminary examinations for the Ph.D.

B. First-Year Evaluation

Each student's progress is formally evaluated near the end of the second semester by the department's Ph.D. program committee. The committee meets with each first-year student to review the student's performance. Based on this evaluation, the committee decides whether or not a first-year student will be allowed to continue graduate study toward the Ph.D. degree. In the event of a negative decision, the committee may recommend that the student be allowed to work toward an M.A. degree. The first-year evaluation also serves as a basis for the decision on whether the student is to receive financial support during the subsequent semesters of graduate work.

C. Preliminary Examinations for the Ph.D.

Students should anticipate taking preliminary examinations at the end of the third year of coursework. These are written examinations in four fields of political science and an oral examination. Each student is examined in the field of Research Methods, but is free to choose the other three fields from the following list: American Politics, Political Psychology/Behavior, Public Policy, or Comparative/International Politics. A student, however, has the option of submitting his or her dissertation proposal in lieu of one field examination. Moreover, another field examination might be waived if the student has presented a paper of high quality at a professional conference or has published such a paper in a scholarly journal; it is up to the student's dissertation committee to grant or refuse the waiver.

The written examinations are followed in due time by an oral examination. The main purpose of the oral examination is to evaluate the student's dissertation proposal, although questions relating to the answers on the written examinations may also be asked. The board for the oral examination consists of the members of the student's dissertation committee and the Ph.D. director. Based on the student's performance on the written and oral examination, a decision is made whether or not the student has passed the preliminary examinations and thus will be admitted to candidacy for the Ph.D. degree. Students failing preliminary examinations may be permitted to retake them once. Failure on the second try means dismissal from the Ph.D. program.

D. Dissertation
The dissertation is a substantial and significant piece of original work that conclusively demonstrates the student's ability to contribute to scientific knowledge about politics. At the beginning of the third year of graduate study each student should ask one faculty member of the Political Science Department to serve as advisor of the prospective doctoral dissertation. The department, in turn, appoints for each student, and in consultation with him or her, a "doctoral committee" consisting of the dissertation advisor chosen by the student, two other members of the Political Science Department and one member of another department. This committee should be set up some time in January of the year in which the student intends to take preliminary examinations. The responsibility of the doctoral committee is fivefold: (1) to certify the student's dissertation proposal; (2) together with the Ph.D. Director to evaluate the student's performance on the preliminary examinations; (3) to supervise the work on the dissertation; (4) to administer a dissertation colloquium, open to interested faculty members and students, in which the student defends his or her doctoral dissertation; and (5) to decide whether or not to accept the finished dissertation. Acceptance of the dissertation after the colloquium constitutes the final departmental requirement for the award of the Ph.D. degree.

E. Performance as Teaching/Research Assistant
Students in the Ph.D. program are assigned either as teaching assistants or as research assistants. The department considers both kinds of activity to be an integral part of graduate work, providing students with experiences both in the classroom and on faculty research projects. 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.

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 procession; the Presidency.

Baumann, Philip R., Assistant Professor. Ph.D., 1983, Michigan State University: International and comparative politics; research methods.

Cover, Albert D., Assistant Professor. Ph.D., 1976, Yale University: American politics and institutions; legislative politics; congressional elections and functions.

Enelow, James M. Professor. Ph.D., 1977, University of Rochester: Formal political theory; models of decision making.

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.

Iyengar, Shanto, Associate Professor. Ph.D., 1972, University of Iowa: Political psychology; mass media.

Javits, Jacob K., Adjunct Professor. New York University, 1926.

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., Professor and Chairperson. Ph.D., 1965, Columbia University: Comparative politics; political theory.

Norpoth, Helmut, Associate Professor and Ph.D. Program Director. Ph.D., 1974, University of Michigan: Electoral behavior; quantitative methods; comparative politics.

Petrick, Richard, Lecturer. Ph.D., expected 1984 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 and M.A. Program Director. 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., 1983, 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, Masssachusetts Institute of Technology: Political psychology; psychophysiology; scaling.

Williams, Jay C., Jr., Professor Emeritus. Ph.D., 1955, University of Chicago: Political theory; political propaganda.

Number of teaching, graduate and research assistants, fall 1983: 27

[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.

REQUIRED CORE COURSES

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 are 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.
3 credits

POL 511 Research Methods for Public Policy Analysis
A follow-up to the Statistical Methods course in which students engage in actual problem-solving research. The course emphasizes the application of quantitative and qualitative methods to the analysis of public sector problems.
Prerequisite: POL 510
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 or policy.
3 credits

POL 535 Public Policy Analysis and Evaluation
This course concentrates on the strategies and methods of public policy analysis and evaluation. Skills stressed in the course include developing a research strategy and design, choosing measures, analyzing data and communicating results. Students develop a program evaluation of their own and partially conduct their research during the semester.
Prerequisite: POL 533 or permission of M.A. Program Director
3 credits

ELECTIVES

POL 529 Policy Tactics: The Practical Side of Politics
An examination of the relationship between the constitutional and statutory structure and function of government, on one hand, and the operations, compromises and bargaining of the practical side of administration, on the other.
3 credits

POL 530 Topics in Public Affairs
Specially organized seminars are offered on topics of particular importance to students of public affairs. These courses are led by distinguished experts in those policy areas.
3 credits

POL 531 Topics in Public Affairs: Planning
This course addresses the planning process as a decision-making tool in the implementation of public policy in housing, land-use, transportation and environmental management. The course also investigates intergovernmental relations and the impact of citizen participation on policy changes.
3 credits

POL 534 Intergovernmental Relations and Policy Delivery
The examination of the formulation, implementation and impact of intergovernmental policy. Several policies are 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 systems are examined.
3 credits

POL 536 Introduction to Budgeting
The examination of the United States federal, state and local government budgeting procedures. Special emphasis is placed on the current federal practices and on 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 compares alternative explanations for the success and failure of various regulatory agencies, and examines 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. Specific policy areas, such as education, finance and police are considered. Political phenomena, including parties and ethnic groups, are also 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 focuses on the legal responsibilities and obligations of administrators.
3 credits

POL 540 Accounting for the Public Sector
Students in this course learn the basic principles of preparing public sector agency budgets and reviewing budgets prepared by others. Concepts of fiscal control, accountability, and responsibility are discussd, as are ways of using the budget as a means of program control. Students are exposed to relevant practices with regard to both operating and capital budgets.
3 credits

POL 543 Environmental Politics and Policy
Federal environmental policies, such as the National Environmental Policy Act, the Coastal Zone Management Act and the Federal Pure Waters Management Act, are examined. The policies, politics and administrative activities of federal, state and local levels are considered. Finally the interaction of the public sector, the private sector and citizen groups in the implementation of environmental policy is 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

POL 598 Thesis Registration
1 credit, repetitive

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.
1-6 credits, variable and repetitive

DOCTORAL PROGRAM IN POLITICAL SCIENCE

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 American political institutions,.

POL 551 Foundations: Political Psychology/ 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, electoral behavior, elite vs. mass politics, decision-making, personality and politics, political conformity and protest.

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.

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

POL 557 Seminar on Political and Administrative Design-Making
Exploration of approaches to the study of political choice. Topics dealt with include: decision theory, bargaining and negotiation, rationality, the political context of decisions, decision tools, the empirical study of decision-making, social criticism and decisionist perspective.

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.

POL 561 Political Psychology II
Continuation of POL 560, with emphasis on the psychophysical, psychophysiological and behavioral measurement of political variables.
Prerequisite: POL 560

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. In addition, each student will design and conduct a series of laboratory experiments which will illustrate the capabilities and problems of computer experimentation.

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 preparation of lecture material and the construction of exams.
Prerequisites: POL 550, 551

POL 602 Teaching Methods and Practicum
A continuation of POL 601.
Prerequisite: POL 601

POL 603 Applied Data Analysis I
The application of statistical and mathematical models to the analysis of political data: introduction to the research process, including philosophy of science, research designs, measurement, basic descriptive and inferential statistics.

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: correlation; analysis of variance; simple and multiple regression.
Prerequisite: POL 603

POL 605 Philosophy and Social Science
Survey and critical evaluation of the major philosophical perspectives on the nature of "science" in political science. Course will offer an in-depth introduction to the three major contending methodological and epistemological approaches to the study of politics: positive, hermeneutic and critical theory. Other topics include the growth and development of science, and the sociology and politics of knowledge.

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 research project and be required to prepare a research report on one aspect of the project.

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.

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

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

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

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

POL 638 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 638.

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.

POL 660 Advanced Topics in Political Psychology/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.
Prerequisite: POL 550, 551, 552, 553

POL 661 Advanced Topics in Political Psychology/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.
Prerequisite: POL 550, 551, 552, 553.

POL 662 Group Decision Model
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.

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.

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.

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

POL 666 Advanced Topics in Political Analysis
A continuation of POL 665.
Prerequisite: POL 665

POL 667 Dimensional Analysis
The course provides training—in both theory and applications—in the several statistical methods collectively labeled dimensional analysis. These include unfolding, Guttman scaling, factor analysis and multidimensional scaling. Particular emphasis will be on the 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

POL 670 Advanced Topics in Public Policy Analysis I
An intensive examination of major substantive and methodological concerns involved in the investigation of the public policy process. Programs evaluation methodologies will be investigated as well as political milieu within which these evaluations must be utilized.
Prerequisite: POL 552

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

POL 672 Urban and Suburban Growth Policy
The processes of urban and suburban community growth are the central concerns 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

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 bureacracy.
Prerequisite: POL 550

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

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

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

POL 667 Political Elites
Critical review of established and new theoretical approaches and methodological orientations to the study of political elites.

POL 680 Independent Study
Prerequisite: POL 611
Variable credit

POL 681 Independent Study
Prerequisite: POL 611
Variable credit

POL 669 Doctoral Dissertation Research
Prerequisite: POL 611
Variable credit

PSYCHOLOGY (PSY)

Chairperson: John Stamm
Psychology B 175 (516) 246-6185

Graduate Program Director: H. William Morrison
Psychology B 154 (516) 246-6180

As the first behavioral clinical curriculum in the country, Stony Brook has served as a model for a number of other behaviorally oriented clinical programs and continues to be a leader in that field. In Developmental Psychology the focus has been on early processes, but some emphasis is now also placed on life-span issues. Research at Stony Brook in the experimental area has always included both human and animal learning and now extends to cognitive processes more generally, sensation and perception, and psychophysics. Psychobiology offers two major areas of concentration, animal-comparative and physiological-neuropsychology. Social Psychology focuses on the study of human relations within the context of current and historical social issues. A more detailed description of the graduate program, including requirements for students in each area of graduate studies, is available from the departmental graduate office.

In all areas the primary emphasis is on research training, through research advisement and apprenticeship. Students are encouraged to become involved in ongoing research immediately, and to engage in independent research when sufficient skills and knowledge permit, with the goal of becoming active and original contributors. By the end of the first year at the latest, a student should make arrangements with a selected faculty member to serve as research advisor; this need not be the student's initial advisor and may be a faculty member outside the student's area of studies.

Clinical Psychology

Training is based on the premise that clinical psychology is an integral part of the science of psychology and has as its goal the preparation of behavioral scientists who are capable clinical practitioners. A behavioral orientation provides the framework for studies, and behavior modification is the method of choice for clinical interventions. Behavior therapy, defined as an empirical approach to psychological problems, entails continuous evaluation, objectively anchored terms and measurable procedures. An open-ended, self-correcting and constantly changing field of endeavor, behavior therapy is not synonymous with any specific technique or theory, nor can it be identified with any single figure or school. Clinical 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. However, psychodynamics, nondirective, Gestalt or humanistic orientations are not represented at Stony Brook. Stony Brook's specialization in clinical psychology is approved by the American Psychological Association.

*Developmental Psychology**

Developmental faculty represent a variety of theoretical perspectives and research interests. A major area of research is 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 is better served in the clinical area.

*Experimental Psychology**

The student is trained in both 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: Animal-Comparative and Physiological-Neuropsychology**

Research facilities for *Animal-Comparative Psychology* are available for experimental and semi-naturalistic behavioral studies of invertebrates, fish, birds, rodents and small primates; a greenhouse provides the habitat for a marmoset colony. There are also opportunities for field research in a local zoo. Within the *Physiological-Neuropsychology* subarea are options in animal physiological psychology, experimental neuropsychology, and psychophysiology, with advanced courses in each option. Among the research interests and activities are: electrophysiological recordings of unit - and macropotentials in behaving animals; human cortical-evoked potentials as correlates of perceptual and cognitive processes and as indices of brain dysfunction in developmentally disabled children and various adult clinical groups; cortical slow-potential shifts in relation to attention, learning and memory; biofeedback of autonomic and central nervous system responses and neuropsychological assessment. The Anatomy, Biology, and Physiology Departments also offer relevant courses.

*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.

*Social Psychology**

Located in the intersection of all 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 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 either a Ph.D. or a terminal M.A. in general psychology. Students unable to complete their doctoral studies in one of the fields of graduate studies above may be permitted to transfer to general psychology to complete the M.A. or Ph.D. requirements, and doctoral students may receive an M.A. in the course of their training as described below. For a terminal M.A., degree, students may apply to Interdisciplinary Graduate Studies in Social and Behavioral Sciences, permitting a concentration in psychology.

Transfer between Areas

Transfer between areas of graduate studies requires approval of a formal application.

Inter-Area Concentrations

All students must matriculate in one of the areas of graduate study above, but may also be able to choose courses within a concentration which represent a "minor." The department is organizing such concentrations in Applied Child and Family Studies, Health Psychology/Behavioral Medicine, and possibly Quantitative Methods. To date all students in the multi-program Political Psychology area have chosen to matriculate in Political Science's Doctoral Program, ordinarily taking some of their courses in the Psychology Department.

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, research 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. The *University Preschool* sponsored by the department enrolls children from 18 months to 5 years of age, permitting both research and observation. The *University 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. A branch of *Suffolk Child Development Center,* a private school for young autistic, retarded, aphasic and developmentally delayed children is located on campus. Affiliations have been established with the *University Health Sciences Center,* local public schools, an agency for the mentally retarded, and a nearby VA hospital, in addition to the *Suffolk Child Development Center,* for clinical neuropsychology. Additional information about some of these facilities is given below.

There are currently PDP-8 and PDP-12 computers in the department's laboratories, as well as microcomputers being used for sponsored research and undergraduate laboratory courses. In the Political Science Department there are MINC-11 and 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* are 12 additional terminals and two printers for use with campus computers.

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.

Admission

The requirements for admission, in addition to the minimum Graduate School requirements, ordinarily include:

A. A baccalaureate degree with a major in psychology, or in 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 (3.0) 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 General 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. Not all areas within the department consider the GRE to be an important screening criterion, and no arbitrary minimum score is required for consideration. The deadline for receipt of applications and supporting materials for fall admission is early in February, although the Graduate Office continues to process material received after that date to the extent possible. Applicants whose materials arrive too late can be considered for late admission if there are still openings. There is no fixed deadline for applications for spring admission, but to receive fullest consideration applications and supporting materials should be received by November 15 (October 20 for foreign nationals).

Degree Requirements

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 the Graduate School's degree requirements, students must satisy the following requirements (as well as requirements of their area of studies):

*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.

A. Course Requirements
A student must successfully complete an approved program of study with a grade of at least 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); first semester of 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), and a practicum in statistical computer applications are required. Following admission students with graduate training elsewhere can petition to satisfy course requirements on the basis of their previous graduate work.

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 courses (below) and a second year review/research paper suitable for submission to a refereed journal. This second year paper requirement must be satisfied prior to the Specialty Examination. The form of the *Specialty Examination* depends upon the student's area of graduate studies, but all areas require its completion before the end of the third year.

C. Advancement to Candidacy
Upon successful completion of the preliminary examination and requirements of the student's area of studies, a majority vote of the faculty of the student's area is required to recommend advancement to candidacy for the Ph.D.

D. Research and Teaching
Supervised teaching and research experience from admission through the fourth year is required. The program requires both research and instructional experience during each semester, rather than having students serve *either* as teaching assistant *or* as research assistant. This requirement can be waived or modified for students holding fellowships, serving as full-time interns or as graduate instructors, or being supported for grant research.

Two semesters of substantial direct instruction in classroom or laboratory is required. During these semesters, graduate students must receive teaching evaluations by their students.

E. 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.

F. Dissertation
The approval of the dissertation proposal and successful oral defense of the completed thesis are required. Petitions to waive requirements above, or to satisfy them on the basis of previous graduate work, should be directed to the Psychology Graduate Committee, which includes a faculty member from each area of specialized study and two student representatives and is chaired by the Graduate Program Director. Petitions to waive PSY 504 must be submitted before the end of the add/drop period of the student's first semester. Petitions concerning area requirements should be addressed to the student's area director.

While these and the requirements of the student's area certainly guide graduate students activities, graduate student experience at Stony Brook depends as much on the system of advisement as on the formal requirements. Each student is involved in at least ten hours/week research activities, under the supervision or guidance of a research advisor (see *D.* above). Unless the research advisor is outside the student's area, this faculty member is ordinarily also the student's academic advisor. At the same time, most students have instructional responsibilities (see *D.* above) ordinarily involving at least five to eight hours/week serving as a teaching assistant, but the nature of this activity varies a great deal, from leading discussion sections or teaching a course to purely administrative responsibilities which involve no classroom contact. After the first semester in the program, students' preferences are taken into account to the extent possible in arranging such TA positions.

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.

Faculty

Baars, Bernard, Assistant Professor. Ph.D. 1977, University of California, Los Angeles. Cognitive psychology, including psychology of language, artificial intelligence approaches to psychological theory and testability of these theories.

Birns, Beverly, Professor.[1] Ph.D., 1963, Columbia University: Cognitive development; sex differences in development; history of childhood; women and mental health; children and social policy; health policy.

Bramel, Dana, Professor. Ph.D., 1960, Stanford University: Interpersonal perception and attitudes, with emphasis on racism, social class; psychoanlaytic approaches.

Carr, Edward G., Associate Professor. Ph.D., 1973, University of California, San Diego: Experimental child psychopathology; developmental disabilities; language acquisition process; student preparation for academic research careers.

Cohen, David, Professor. Ph.D., 1963, University of California, Berkeley: Research on cellular mechanisms of conditioning and neural control of the heart.

Collins, R. Lorraine, Assistant Profesor. Ph.D., 1980, Rutgers University: Cognitive and behavioral approaches to the conceptualization and treatment of addictive behaviors with emphasis on alcohol use and obesity; commonalities across addictive behaviors.

Cross, David, Associate Professor. Ph.D., 1965, University of Michigan: Psychological scaling and psychophysics; measurement theory; mathematical models in psychology; multivariate statistical techniques; causal modelling.

Dix, Theodore, Assistant Professor. Ph.D., 1980, Northwestern University: Development of children's understanding of persons and behavior; processes involved in parents' assessment of children's behavior and the effects those processes have on socialization practices.

Dube, Ernest Fred, Assistant Professor. [3] Ph.D., 1976, Cornell University: Cross-cultural studies of cognition as well as research on attitudes and racism, and politics of race.

Dwyer, James, Assistant Professor. Ph.D., University of California, Santa Cruz: Health effects of herbicides on Vietnam veterans and the Vietnamese; structural equation models; causal inference from longitudinal designs; health psychology.

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; assessment measures of social problem-solving skills; evaluaton of a problem-solving approach to stress management.

Emmerich, David S., Associate Professor and Director of Resources. Ph.D., 1967, Indiana University: Sensory psychology and perception including psychoacoustics, reaction time studies, signal detection theory, and generally how we perceive the world.

Emmerich, Helen Jones, Part-time Lecturer. Ph.D., 1972, University of Illinois: Memory development; visual memory; motivational factors in children's learning, memory and reading.

Finke, Ronald, Assistant Professor. Ph.D., 1979, Massachusetts Institute of Technology: Mental imagery and visual attention; information-processing constraints on perception and cognition; representation of spatial relationships, constraints on visual acuity, dissociations in visual processes, visual control of bodily orientation and visual-motor coordination and adaptation.

Friend, Ronald, Associate Professor. Ph.D., 1969, University of Toronto: Interpersonal processes, prejudice, work and health, health psychology; political uses of social psychology.

Gagnon, John, 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, and sex as a model for the study of emotion.

Glass, David, Professor. Ph.D., 1959, New York University: Psychological stress and coping; physiological correlates of behavior; behavioral factors in cardiovascular disease.

Goldfried, Marvin, Professor. Ph.D., 1961, State University of New York at Buffalo: Cognitive behavior therapy; the delineation of common therapeutic principles across theoretical orientations.

Green, Richard, Professor. [5] M.D., 1961, Johns Hopkins University School of Medicine: Human sexuality and gender identity.

Hay, Dale F., Associate 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. 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; also 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 environmental psychology informal education, architecture annd social planning/networking); also a behavioral approach to the study of values and ethical belief systems of scientists.

Levine, Frederic 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; also psychological systems, especially a comparison of oriental and western views of human nature.

Liebert, Robert M., Professor Ph.D., 1966, Stanford University: Delivery systems for behavioral intervention, stereopsis, nuclear safety.

Logue, Alexandra W., Assistant Professor. Ph.D., 1978, Harvard University: Learning and motivation, particularly self-control; quantitative analysis of choice; history of behaviorism; implications of illness-induced food aversion learning for learning theory and for treatment and prevention of feeding disorders.

Loney, J., Professor[5] Ph.D., 1961, University of Illinois: Assessment of hyperactivity; long-term follow-up studies of hyperactive children and long-term effect of medication on them.

LoPiccolo, Joseph, Professor. [5] 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 group processes, communication, and learning.

Morrison, H. William, Associate Professor and Graduate Program Director. Ph.D., 1962, University of Michigan: Psychological measurement, human judgment and decision processes, display and visualization of multivariate relations, distribution-free statistics, and computer-assisted instruction.

Neale, John M., Professor. Ph.D., 1969, Vanderbilt University: Research on schizophrenia and life stress.

Newman, Richard, Assistant Professor. Ph.D., 1982, University of Michigan: Development of children's mathematical skills, metacognition, memory development, learned helplessness and learning disabilities.

O'Leary, K. Daniel, Professor. Ph.D., 1967, University of Illinois: Etiology and treatment of marital discord, spouse abuse, and hyperactivity; also the effects of marital discord on childhood problems.

O'Leary, Susan G., Part-time Associate Professor. 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 and punishment with children.

Peterson, Mary A., Assistant Professor, Ph.D., 1983, Columbia University: Object perception, attention, mental structures.

Pomeranz, David, Associate Professor. Ph.D., 1963, University of Rochester: Environmental psychology, group treatment approaches for agoraphobia, and 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. Also selective attention and its relationship to learning disabilities, as well as ethical, professional, and organization issues in psychology.

Springer, Sally, Associate Professor. Ph.D., 1971, Stanford University: Cognitive psychology and neuropsychology, particulary brain mechanisms underlying cognitive functions such as speech and language, and hempispheric 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; developmental neuropsychology.

Stamm, John, Professor and Chairperson. Ph.D, 1950, University of Southern California: Human steady potentials; experimental neuropsychology. Adjunct staff, Division of Neurology, Nassau County Medical Center, NY.

Tursky, Bernard, Professor.[6] Diploma, 1954, Lowell Institute School, Massachusetts Institute of Technology: Psychophysiology, behavioral medicine, biofeedback, and pain perception; laboratory instrumentation and methodology, and 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 individual processes.

Waters, Everett, Associate Professor. Ph.D., 1977, University of Minnesota: Human infancy as well as personality and social development; also longitudinal studies of social competence, psychometric methods, and ethological perspectives on human development.

Waters, Harriet Salatas, Associate Professor. Ph.D., 1976, University of Minnesota: Cognitive development, particularly the development of learning and memory strategies, encoding and retrieval processes in memory; and comprehension and production of prose; problem-solving and computers.

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; identification of child and family factors in children's successful adjustment to diabetes.

Whitehurst, Grover, Professor. Ph.D., 1970, University of Illinois: Learning processes in the acquisition of language and other complex skills, the analysis of communications skills in childhood, and delayed language development.

Wyers, Everett, Professor. Ph.D., 1955, University of California, Berkeley: Comparative psychology, primarily the evolution of behavior and animal learning.

Number of teaching, graduate and research assistants, fall 1983: 128

[1] *Joint appointment with Interdisiplinary Social Sciences Program*
[2] *Joint appointment with Department of Neurobiology and Behavior*
[3] *Joint appointment with Africana Studies Program*
[4] *Joint appointment with Department of Sociology*
[5] *Joint appointment with Department of Psychiatry*
[6] *Joint appointment with 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 or spring, 3 credits

PSY 501 Analysis of Variance and Experimental Design
The design and analysis of factorial experiments having a single dependent variable. Topics include between - and within-subjects designs, mixed factor designs, interactions, trend analysis, planned comparisons, and analysis of covariance. Emphasis on applications in psychological research. Required of all Ph.D. students in psychology.
Prerequisite: Undergraduate statistics
Fall, 3 credits

PSY 502 Correlation and Regression
Correlation, regression, multiple correlation, multiple regression, partial correlation, and introductions to some of the following topics: factor analysis, canonical correlation, structural equation modelling, relation of regression to analysis of variance, or general linear model. Required of all Ph.D. students in psychology.
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, hierarchial, 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 or spring, 3 credits

PSY 504 First Year Lectures
Presentation and discussion of current research progress and interests. Required of all first year Ph.D. students.
Fall and spring, 0 credits

PSY 505 Structural Equation Modeling
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 are compared with "classical" methods.
Fall or spring, biennially, 3 credits

PSY 509 Practicum in Computer Applications
Workshops and practical experience in computer applications. Provides computer access for courses which do not have their own accounts and for student projects to satisfy other degree requirements.
Prerequisite: Psychology doctoral student not advanced to candidacy; for Section 2 (statistical applications), PSY 502 as a pre- or corequisite.
Section I: fall and spring, 0 credits, repetitive; Section 2: spring, 1 credit

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.
Fall or 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 review 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. Required of all second year experimental students.
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, biennially, 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 the complex human processes such as language, memory and growth of logical thinking.
Fall or spring, biennially, 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, biennially, 3 credits

PSY 533 Principles of Therapeutic Intervention
A critical review of various therapeutic 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.
Prerequisite: Clinical doctoral student
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.
Prerequisites: PSY 533, Clinical doctoral student
Corequisite: PSY 601
Spring, 3 credits

PSY 537 Methods of Intervention: Child and Adolescent
Strategies, methods and techniques used in a broadly construed behavioral approach to working with children and adolescents in clinic, home, school, institutional and community settings
Prerequisites: PSY 538, Clinical doctoral student
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.
Prerequisites: PSY 534, Clinical doctoral student
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
Cover areas relevant to growth and physiology as they relate structurally to psychological functioning during development. Among the topics considered are: behavioral genetics, developmental sensory physiology, psychological aspects of infancy, early neurological characteristics and infant assessments of normal and abnormal functioning.
Fall or spring, biennially, 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 topics with stress on behavioral theories and presentation of biological and psychodynamic points of view.
Fall, 3 credits

PSY 546 Measurement and Scaling
An historical introduction to the measurement of psychological variables and survey of contemporary scaling methods with an emphasis on psychophysical scaling and experimental applications.
Fall or spring, biennially, 3 credits

PSY 550, 551 Topics in Social Psychology
Content varies as a function of staff and student interests. Recent topics include environmental psychology, society and health, aggression, politics of social psychology, research methods, attitude change and social inequality.
Fall and spring, variable and repetitive credit

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 556 Social Psychology Research Seminar
Required research seminar for all social psychology students who have not yet completed their speciality examination. Weekly research presentations and specialty oral examinations are given in this seminar. Social psychology students only.
Fall and spring, 3 credits, repetitive

PSY 560 Neuropsychology
The functions of the normal and pathological primate brain in bahavior. 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 567 Advanced Physiological Psychology
An in-depth critical review of the experimental literature concerning brain and behavior. Topics include: cellular neurophysiology, motor control, sensory processing, and the neural basis of complex physiological processes.
Fall or spring, biennially, 3 credits

PSY 568 Human Electrophysiology
Techniques for recording the electrophysiological activity of the human brain will be presented. Sensory and cognitive event-related potentials are discussed, as well as the application of these techniques to clinical questions. Individual reports on selected topics based on library research is required.
Fall, 3 credits

PSY 569 Human Electrophysiology Lab
Experience in a variety of human electrophysiological techniques, with the emphasis on recording evoked potentials in auditory, visual and somatosensory modalities. Individuals are responsible for conducting experiments on selected topics and submitting report.
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 are 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 is placed on social organization, communication, development and learning, especially under naturalistic conditions; but beyond this, topics are selected to reflect the most 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, 0-3 credits each semester, repetitive

PSY 583, 584 Experimental Psychology Colloquium
Seminars on current research problems directed by students, staff and invited scientists. Required of all experimental students.
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 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 103, 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.
Corequisite: PSY 533 or 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 or PSY 538
Fall and spring, 1 credit each semester

PSY 603 Advanced Clinical Practicum
Supervised experience in clinical practice for advanced clinical students.
Fall and spring, variable and repetitive credit

PSY 604 Clinical Psychology Internship
Qualified clinical students carry supervised clinical responsibilities in settings approved by the faculty.
Fall and spring, varialbe 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 credits

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 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, use 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, permission of instructor
Fall or spring, 3 credits, repetitive

PSY 638 Psychophysiological Methods
Covers organization of the human nervous systems 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 POL 630.
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 669 Doctoral Research
Prerequisite: Advancement to candidacy
Variable and repetitive credit

SOCIOLOGY (SOC)

Chairperson: Norman Goodman
Social and Behavioral Sciences Building, S-409 (516) 246-6722

Graduate Program Director: Andrea Tyree
Social and Behavioral Sciences Buidling, S-457 (516) 246-7730

The Department of Sociology offers a graduate program leading to the Ph.D. degree. It also grants an M.A. degree as a sign of progress toward the doctorate but does not maintain a separate M.A. program and does not encourage applicants who seek to pursue an M.A. in Sociology as a terminal degree. The department does offer, in conjunction with other departments in the Division, an Interdisciplinary M.A. Program in Social Sciences in which students may choose a major concentration in Sociology.

The Sociology program has been granting doctorates to eight to twelve students per year. Most of these have gone on to university or college teaching positions or postdoctoral programs at other universities. A few have entered government service or business.

Facilities

The Sociology Department has a Microsociology Laboratory for research and education in such areas as child development, group processes, social interaction and communications. It also has a Sociology Reading Room, including computer terminals linked to the University's mainframe. This supplements the Social Science Data Lab also in the building for the use of graduate students.

Admission

Admission to the Ph.D. Program in Sociology

For admission to graduate study in Sociology, the following, in addition to the minimum Graduate School Requirements are normally required:

A. A baccalaureate degree or its equivalent, as attested to by transcripts of previous academic work.

B. Undergraduate statistics course required.

C. Undergraduate grade point average of 3.0 or above.

D. Satisfactory results on Graduate Record Examinations. International students, in addition to taking the Graduate Record Exams, must also take the TOEFL exam and receive a score of 550 or better to be considered for admission.

E. Satisfactory recommendations from former instructors.

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

Degree Requirements

Requirements for the Ph.D. Degree in Sociology

In addition to the minimum Graduate School requirements, the following are required:

A. Residence

Minimum residence is 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 for those students entering without prior graduate study or less than 24 graduate credit hours and 9 or more graduate credit hours per semester for those students entering with more than 24 graduate credit hours or with advanced standing provided by prior graduate work. Since a graduate traineeship is considered part of the academic program, credit hours will be given for teaching or research assistantships as well as supervised teaching. Credit hours may also be given for the individual research work outside formal courses but under the supervision of faculty members.

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 sociology 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, a teaching assistantship under the supervision of a faculty member.

C. M.A. Degree

A student is awarded the M.A. degree as a sign of progress toward the Ph.D. To receive the M.A. a student must complete:

1. To consecutive semesters of full-time study, achieving a 3.0 grade point average for 30 hours of graduate work.
2. One of the three papers required by writing option (Section D, Option 2) for the Ph.D. program.

D. Optional Programs

Continuing doctoral students have two options for completing the first half of the doctoral program before moving on to work in a special field and on their dissertation.

Option 1 Comprehensive Examination and M.A. Research Report: In this rather traditional 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 semester and the beginning of the sixth semester of graduate study, must be passed at the standard set by the department for doctoral-level work. A student who fails to pass this examination at the required level, but whose perfromance is satisfactory in all aspects, may be permitted to take a terminal M.A. by completing 30 credits of graduate coursework and submitting an acceptance 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 sucessful completion of all of the above requirements, along with completion of minimum of 30 hours of graduate credit, the department will recommend to the Vice Provost for Research and Graduate Studies that the student will 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.

Option 2 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 students 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 for 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 that outlines a field for use in teaching a graduate seminar.

Upon successful completion of all the above requirements, along with completion of 30 hours of graduate credit, the student may proceed to the advanced stage of his or her doctoral work.

E. Teaching Requirement
Graduate training includes supervised teaching experience. After completing *D* above, students enroll in a teaching practicum to prepare them to teach their own course, under supervision, the following semester, Ordinarily, this requirement should be fulfilled during the third year of graduate study.

F. Requirements Outside 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 by passing with a B average three courses at the graduate level in applied mathematics or statistics, 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 Graduate Program Director

G. 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 depth of knowledge in the broad area from within which the student has selected a dissertation topic. 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.

H. 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.

I. Doctoral Dissertation
This 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 evaluated 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 the 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 in the department, the student's Ph.D. candidacy will lapse. 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 to five years from the start of graduate work.

Students who arrive 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, Assistant Professor. Ph.D., 1978, University of Chicago: Comparative; historical; political.

Attewell, Paul, Assistant Professor. Ph.D., 1978, University of California, San Diego: Economic; political; classical and contempory sociological theory.

Barthel, Diane, Assistant Professor. Ph.D., 1977, Harvard University; Urban; community; race; sex roles; policy and evaluation research.

Chase, Ivan, Assistánt Professor. Ph.D. 1972, Harvard University; Social inequality; comparative; stratification.

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.

Coser, Rose L., Professor.[2] Ph.D., 1957, Columbia University: Family; women's roles, medical.

Dunham, H. Warren, Visiting Professor. Ph.D., 1941, University of Chicago: Medical; social psychology; mental illiness; health; psychiatry.

Dwyer, James H., Adjunct Assistant Professor. Ph.D., 1975, University of California, Santa Cruz: Social stratification; structural equation modeling; psychology.

Feld, Scott, Associate Professor. Ph.D., 1975, Johns Hopkins University: Methodology; political; research analysis.

Feldman, Kenneth, Professor Ph.D., 1965, University of Michigan: Social psychology; higher education; theory.

Gagnon, John H., Professor.[3] Ph.D., 1969, University of Chicago: Deviance; family simulations; sexual conduct; social change.

Goode, Erich, Professor Ph.D., 1969, Columbia University: Deviance; religion; criminology.

Goodman, Norman, Professor and Chairperson Ph.D., 1963, New York University: Social psychology; family; socialization.

Granovetter, Mark, Associate Professor Ph.D., 1970, Harvard University: Theory; political; economic.

Hallowell, Lyle, Assistant Profressor Ph.D., 1980, University of Minnesota: Criminology; deviance; law; social problems.

Hare, Bruce R., Assistant Professor Ph.D., 1975, University of Chicago: Education; social psychology; life cycles.

Howard, Richard C., Adjunct Professor Ph.D., 1970, University of Texas-Austin: Philisophy of social sciences;' history and development of sociological theory; philosophy.

Lang, Gladys, Professor. Ph.D., 1954, University of Chicago: Mass communications; social movements; collective behavior.

Lang, Kurt, Professor. Ph.D., 1953, University of Chicago: Collective behavior; military; mass communications.

Polsky, Ned, Associate Professor[4]. University of Wisconsin: Criminology; deviance; arts.

Roos, Patricia, Assistant Professor. Ph.D., 1981, University of California, Los Angeles: Social stratification; demography; labor force; women's roles.

Rule, James B., Professor. Ph.D., 1969, Harvard University: Theory; political; social control.

Schwartz, Michael, Associate Professor. Ph.D., 1971, Harvard University: Mathematical models; historical; political.

Selvin, Hanan, Professor. Ph.D., 1956, Columbia University: Methodology; higher education; statistics.

Spanier, Graham B., Professor[5]. Ph.D., 1973, Northwestern University: Marriage and the family; life-span development; social policy and application of family research; research methodology.

Tanur, Judith, Associate Professor. Ph.D., 1972, State University of New York at Stony Brook: Statistics; methodology; social psychology.

Tyree, Andrea, Associate Professor and Graduate Program Director. Ph.D., 1968, University of Chicago: Demography; social stratification; occupations.

Weinstein, Eugene Professor[6]. Ph.D., 1954, Northwestern University: Experiemental social psychology; family; methodology.

Williams, Richard, Assistant Professor. Ph.D., 1981, State University of New York at Binghamton: Race; ethnic development; media.

Yago, Glenn, Assistant Professor. Ph.D., 1980, University of Wisconsin, Madison: Urban; community; political; economic.

Number of teaching, graduate and research assistants, fall 1983: 51

[1] *On sabbatical, fall 1984 semester*
[2] *Joint Appointment, Department of Community and Preventive Medicine*
[3] *Joint Appointment, Department of Psychology*
[4] *On leave, academic year 1984-85*
[5] *Joint Appointment, Department of Psychiatry*
[6] *On leave, academic year 1984-85*
[7] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1975-76*

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, reliablity 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 relationship 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 illiness; 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 chioce.
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. The following topics have been covered: Microsociology; Advanced Topics in Marxist Theory; Sociology of Emotions; Historical Methods; War and Military; Ethnic Relations; Biosociology; Comparative Stratification; Max Weber.
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 Quanlitative 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 for Teaching and Graduate Assistants
Individualized supervision of initial (first two semesters) teaching assistance. Discussion, examination construction, student consultation, and grading. Register for section of supervising instructor.
3 credits each semester

SOC 692 Practicum in the Teaching of Sociology
The exploration of teaching goals, processes, and outcomes. Practice lectures, videotaped and discussed; classroom visits; planning, outlining, selections of course material; writing of syllabus for Introductory Sociology section to be taught as SOC 693 in following semester.
Prerequisite: SOC 691
Fall, 3 credits

SOC 693 Practicum for Graduate Teaching Interns
Supervised teaching of a section of Sociology 103 using the outlines, materials, and techniques developed in SOC 692. Includes weekly meetings of all persons registered for SOC. 693 and observation of classes by both faculty and fellow graduate students.
Prerequisite: SOC 691 and 692
Spring, 3 credits

SOC 698 Dissertation Research
Variable and repetitive credit

Interdisciplinary Graduate Studies in Social and Behavioral Sciences

Director: H. William Morrison
Psychology B, 154 (516) 246-6180

The Division of Social and Behavioral Sciences invites applications for graduate studies in Interdisciplinary Social and Behavioral Sciences leading to a Master of Arts degree in either Anthropology, Economics, History, Political Science, Psychology or Sociology. Jointly sponsored by the Anthropology, Economics, History, Political Science, Psychology and Sociology Programs, this curriculum is intended for students whose interests span more than one discipline. Students with more focused interests might prefer more specialized curricula such as Anthropology, Applied Anthropology, History, History Teaching, Public Affaris, and Applied Sociology, offered by the various departments at the M.A. level.

Interdisciplinary graduate studies may prove especially usefull for teachers, staff members of state and local agencies and individuals who are considering reentering the labor market or continuing their education after an interruption of several years, as well as recent graduates dissatisfied with the breadth and depth of their undergraduate training in these areas. Both full-time and part-time students are welcome.

Applicants should recognize that an M.A. in a Social or Behavioral Science may enchance an individual's credentials for a position for which the person is otherwise qualified but by itself does *not* ordinarily qualify the student for any particular position. Students seeking professional or career training should therefore attempt to enter a Ph.D. program or more specialized M.A. studies. Superior performance at the M.A. level may strengthen a student's subsequent application to a Ph.D. program, however.

For further information contact the Director, Interdisciplinary Graduate Studies in Social and Behavioral Sciences, c/o Department of Psychology.

Admission

Admission, in addition to the minimum Graduate School requirements ordinarily requires the following:

A. Baccalaureate degree, and two official transcripts from all post-secondary institutions attended, with certified English translation of any transcripts in a foreign language.

B. Letters of recommendation from instructors or academic advisors (ordinarily three).

C. Results from verbal, quantitative and analytic Graduate Record Examination (if deferred, such results must be provided before the student can register for a second semester).

D. Foreign nationals must provide the International Student Financial Affidavit, and (unless their native language is English or they attended college where English was the language of instruction) TOEFL scores.

E. Acceptance by the Program and the Graduate School.

Students who do not meet these requirements may also apply if they feel special circumstances should be considered.

Degree Requirements

In addition to requirements of the Graduate School, the following are required:

A. The M.A. degree is awarded upon completion of 30 graduate credit hours in an approved course of study, with at least a B (3.0) average in all courses taken.

B. The student chooses Anthropology, History, Political Science, Psychology or Sociology as the department of concentration in which a minimum of 12 and a maximum of 18 credit hours (including any CE courses taught by faculty of that department is taken). The M.A. is awarded through the department of concentration.

C. In addition, an approved three-credit course in quantitative or research methods, such as PSY 501 or SOC 514, is required. This course in not counted within the 12-18 concentration hours.

D. The course of study should be chosen according to the interests and needs of the individual, in consultation with a faculty advisor, from a list of courses approved for this purpose by the participating departments.

E. Although the Graduate School's requirements to register during each semester and to complete degree requirements within a specified time period apply, there is no residence requirement. While the program is flexible in order to accommodate a variety of interests and purposes, certain limitations apply to credit hours counted toward the 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 the History Department)
3. No more than 6 credit hours from Continuing Education courses or courses cross-listed with CE, whether these courses are within or outside the department of concentration
4. No more than 6 approved graduate credits from another institution, and no more than 12 credits earned prior to admission

A master's thesis may be submitted upon making necessary arrangements with a faculty sponsor, a second reader and the department of concentration but is not required. The department of concentration may require a comprehensive examination. No practicum in teaching is required.

Petitions to substitute or waive requirements should be submitted to the Director of Interdisciplinary Graduate Studies in Social and Behavioral Sciences. Students who accumulate 12 credit hours of C, F or U grades will ordinarily be dismissed from the program.

Courses

A variety of daytime and occasionally evening and summer courses is available. A list of courses approved for Interdisciplinary Social and Behavioral Sciences students, some of which require the instructor's or department's permission, is available. Other courses offered by the participating departments may be taken with approval of the advisor and permission of the course instructor. Students may also request permission to count graduate courses from Applied Mathematics, the Biological Sciences, Computer Science, Industrial Management, Philosophy, Technology and Society, Urban and Policy Sciences or other fields toward degree requirements.

College of Engineering and Applied Sciences

COLLEGE OF ENGINEERING AND APPLIED SCIENCES

The College of Engineering and Applied Sciences consists of six academic departments: Applied Mathematics and Statistics, Computer Science, Electrical Engineering, Materials Science and Engineering, Mechanical Engineering and Technology and Society. The latter offers a program leading to the Master of Science in Technological Systems; each of the other five departments offers programs leading to the Master of Science and Doctor of Philosophy degrees.

Each of the departments has its own laboratories for teaching and research; in addition, collaborative research programs are carried out utilizing the facilities in the School of Basic Health Sciences, Marine Sciences Research Center, Brookhaven National Laboratory and other off-campus national and industrial laboratories. The graduate programs in the College of Engineering and Applied Sciences are designed to train both academically oriented students and students with professional goals in industrial and governmental occupations requiring an advanced degree.

Each of the academic departments evaluates candidates for admission to its programs. The material that follows describes these programs and their supporting facilities in detail. Prospective applicants should address inquiries directly to the Graduate Program Director of the appropriate department.

Applied Mathematics and Statistics (AMS)

Chairperson (Acting): Alan Tucker
Mathematics Building, P-130 (516) 246-6773

Graduate Program Director: Ram P. Srivastav
Mathematics Building, P-137 (516) 246-6773

The graduate program of the 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 that 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.

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.

A more detailed description of the graduate program is available from the departmental office. This includes specific distribution requirements, fields of specialization and information on the preliminary and qualifying examinations. Interested students should request information and application forms as early as possible, especially if they plan to apply for financial aid.

Admission

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 General Test.

D. Acceptance by both the Department of Applied Mathematics and Statistics and the Graduate School.

E. Three letters of reference and all transcripts of undergraduate study completed.

F. Students admitted provisionally must satisfy designated course and grade point average requirements during the first year of graduate study before being admitted to full degree candidacy.

Combined B.S./M.S. Degree

Undergraduate Applied Mathematics majors with strong academic credentials (minimum of 3.0 in the Applied Mathematics major) may apply for admission to the special Bachelor of Science-Master of Science program in Applied Mathematics and Statistics at the end of the junior year. During the subsequent two years, a student will complete the requirements for the baccalaureate and master's degrees and will receive both degrees upon satisfactory completion of the five-year program. Further information about the combined program may be obtained from either the departmental Graduate Program Director, the Director of Undergraduate Studies or the Assistant to the Chairperson.

Degree Requirements

Requirements for the M.S. Degree

In addition to the minimum Graduate School requirements, the following are required:

A. Course Requirements

The M.S. degree in the Department of Applied Mathematics and Statistics requires the satisfactory completion of a minimum of 30 graduate credits.

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.

Core Requirements for the M.S. Degree

1. *Applied Mathematics*
   AMS 500 Mathematical Modeling
   AMS 501 Differential Equations and Boundary Value Problems
   AMS 503 Applications of Complex Analysis
   AMS 504 Foundations of Applied Mathematics
   AMS 505 Applied Algebra I
   AMS 526 Numerical Analysis I
2. *Operations Research*
   AMS 505 Applied Algebra I
   AMS 530 Linear Programming
   AMS 535 Stochastic Processes
   AMS 540 Modeling Laboratory
   AMS 536 Queuing Theory or
   AMS 529/CSE 530 Simulation and Modeling or
   AMS 542/CSE 548 Analysis of Algorithms
   One course in statistics
3. *Statistics*
   AMS 505 Applied Algebra I
   AMS 569 Probability Theory I
   AMS 570 Mathematical Statistics I
   AMS 572 Exploratory Data Analysis I
   AMS 575 Data Analysis Laboratory
   AMS 578 Regression Theory
   AMS 582 Design of Experiments

Elective Requirements for the M.S. Degree

1. *Applied Mathematics and Operations Research*
   Any graduate-level AMS 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:
   AMS 504 Foundations of Applied Mathematics
   AMS 535 Stochastic Processes
   AMS 571 Mathematical Statistics II: Hypothesis Testing
   AMS 573 Exploratory Data Analysis II
   AMS 581 Analysis of Variance
   AMS 584 Sequential Analysis
   AMS 585 Sampling Techniques
   AMS 587 Nonparamagnetic Statistics
   AMS 586 Time Series
   AMS 588 Biostatistics
   AMS 605 Probability Theory II
   AMS 691 Topics in Applied Mathematics
   ECO 620, 621 Advanced Econometrics I, II
   BEE 553 Multivariate Analysis in Biology
   BEE 557 Numerical Taxonomy
   AMS 1529/CSE 529 Simulation and Modeling
   Other graduate-level courses with prior approval of advisor.

B. 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.

C. 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. Course Requirements
The course of study prescribed for the M.S. degree provides basic guidelines for doctoral study in consultation with the graduate advisor. Separate qualifying examinations are administered for each program of study: Applied MAthematics, Operations Research and Statistics.

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. 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.

F. 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.

G. 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.

H. Dissertation Defense
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.

I. Minimum Residence
At least two consecutive semesters of full-time study is required.

J. 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.

Part-Time Graduate Studies

In addition to the 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 a part-time program on campus. The part-time program is governed by regulations governing the resident full-time program with the exception that students in the part-time program have greater flexibility in choosing the time for the qualifying examination if they are contemplating pursuing the Ph.D.

The purpose of this part-time 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, statistics, and operations research. Applicants who hold a bachelor's degree in applied mathematics, mathematics, engineering, physical sciences, life sciences, or social sciences, 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.

Additional information may be obtained from the Assistant to the Chairperson, Esther Weitzman, at the Department of Applied Mathematics and Statistics, State University of New York at Stony Brook, Stony Brook, NY 11794-3600.

Graduate Studies in Industrial Management

Graduate Studies in Industrial Management, formerly administered by the Department of Applied Mathematics and Statistics, is now under the aegis of the Department of Technology and Society. Individuals interested in this area of graduate study should contact Mr. Arthur Gilmore, Department of Technology and Society, SUNY at Stony Brook, Stony Brook, NY 11794-2250.

Faculty

Balinski, Michel, Professor. Ph.D, 1959, Princeton University: Operations research.

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. 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.

Ginzburg, Lev, Associate Professor[1]. Ph.D., 1970, Agrophysical Institute, Leningrad, U.S.S.R.: Evolutionary theory; mathematical population genetics.

Grimson, Roger, Associate Professor[6]. Ph.D., 1969, University of North Carolina, Chapel Hill: Biostatistics, combinatorics, epidemiologic methods; nonparametric methods, mathematical modelling.

Heckman, Nancy, Assistant Professor. Ph.D. 1982, University of Michigan: Sequential analysis; nonlinear renewal theory.

Jensen, David, Assistant Professor. Ph.D., 1983, Cornell University: Operations research.

Johnson, Ellis, Visiting Professor. Ph.D., 1965, University of California, Berkeley: Operations research, integer programming networks.

Katehakis, Michael, Assistant Professor. Ph.D., 1980, Columbia University: Operations research; Markov decision theory.

Kim, Woo Jong, Associate Professor. 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.

Kuo, Lynn, Assistant Professor. Ph.D, 1980, University of California, Los Angeles: Statistics, decision theory; survey sampling.

Mendell, Nancy, Assistant Professor. Ph.D., 1972, University of North Carolina, Chapel Hill: Biostatistics.

Muench, Thomas, Professor[4]. Ph.D., 1965, Purdue University; Mathematical economics; econometrics.

Robbins, Herbert, Professor. Ph.D., 1938, Harvard University: Sequential analysis; stochastic approximation; Bayesian models and tests of power.

Rohlf, F. James, Professor[7]. Ph.D, 1962, University of Kansas: Multivariate data analysis techniques applied to problems in taxonomy and ecology; mathematical population genetics.

Sexton, Thomas, Assistant Professor[5]. Ph.D., 1979, State University of New York at Stony Brook: Operations research, transportation problem analysis.

Sokal, Robert R., Professor[7]. Ph.D., 1952, University of Chicago: Numerical taxonomy; theory of systematics; geographic variation; spatial models in ecology and evolution.

Spencer, Joel, Professor[2]. Ph.D., 1970, Harvard University: Combinatorics.

Sprivastav, Ram P., Professor and Graduate Program Director. 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.

Tanur, Judith, Associate Professor[8]. Ph.D., 1972, State University of New York at Stony Brook: Application of statistics in social sciences; survey methodology.

Tewarson, Reginald P., Ph.D., 1961, Boston University: Numerical analysis and computational methods; sparse matrices; generalized inverses and large nonlinear systems; mathematical models of diffusion problems in biology and medicine.

Tucker, Alan, Professor and Chairperson[9]. Ph.D., 1969, Stanford University: Graph theory; combinatorial algorithms.

Varma, Andre A., Professor[6], M.D., 1950, School of Medicine of Paramaribo, Surinam; M.Sc., 1960, Columbia University: Biostatistics.

Walker, Mark, Assistant Professor[4]. Ph.D., 1970, Purdue University: Economic theory; decision theory.

Young, Dennis R., Professor and Director, Institute for Urban Science Research[5]. Ph.D., 1969, Stanford University: Operations research; public service organization, evaluation and analysis.

Zemanian, Armen H., Professor[3], Eng. Sc.D., 1953, New York University: Network theory; food system modelling.

[1] *Department of Ecology and Evolution*
[2] *Department of Mathematics*
[3] *Joint appointment with Department of Electrical Engineering*
[4] *Department of Economics*
[5] *W. Averell Harriman College for Policy Analysis and Public Management*
[6] *Department of Community and Preventive Medicine*
[7] *Joint appointment with Department of Ecology and Evolution*
[8] *Department of Sociology*
[9] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1973-74.*

Courses

AMS 500 Mathematical Modeling
The course will consist of about eight generally unrelated case studies. Problems selected for both the physical and social sciences will be employed to illustrate the process of model formulation and solution. Mathematical ideas and techniques will be developed as needed to deal with the problems being studied. Realistic data and situations will be employed whenever possible.
Fall, 3 credits

AMS 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. Sturm-Liouville theory and eigenfunction function expansion. Green's functions.
Prerequisite: AMS 505
Recommended prerequisite: AMS 504
Spring, 3 credits

AMS 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 induction, vibrations, aerodynamics. Transform techniques; separation of variables, conformal mapping and approximation.
Prerequisite: AMS 501
3 credits

AMS 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.
Spring, 3 credits

AMS 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 theory and integration.
Spring, 3 credits

AMS 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

AMS 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

AMS 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

AMS 511 Methods in Applied Mathematics for Engineers and Scientists
This course is concerned with basic mathematical questions relating 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

AMS 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, semigroups, groups and ring theory.
Prerequisite: AMS 505
3 credits

AMS 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 initial value problems.
3 credits

AMS 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 problems, the Green's function method and eigenvalue problems.
3 credits

AMS 518/519 Workshop in Finite Mathematical Structures for Teachers I, II
An introduction to the principles of combinational 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

AMS 520 Mathematical Modeling 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

AMS 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

AMS 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 approximation by rational functions, orthogonal functions. Hilbert space methods, general aspects of approximation in normed linear spaces.
3 credits

AMS 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

AMS 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. AMS 527 may be taken whether or not the student has completed AMS 526.)
3 credits

AMS 529 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. Crosslisted with CSE 529 Simulation and Modeling.
Prerequisite: CSE 201 or equivalent
Spring, 3 credits

AMS 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 nonlinear programming.
Corequisite: Linear algebra course
Fall, 3 credits

AMS 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

AMS 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

AMS 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: 530
Fall, odd years, 3 credits

AMS 534 Nonlinear Programming
Necessary and sufficient conditions for unconstrained and constrained optima. The geometric background is developed using tangents and cones in finite dimensional spaces. Computational methods, including interior (penalty function), boundary (gradient projection), and exterior (cutting plane) approaches.
Prerequisite: AMS 530 or permission of instructor
Spring, 3 credits

AMS 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: AMS 507 or equivalent
Spring, 3 credits

AMS 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: AMS 507
Fall, even years, 3 credits

AMS 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: AMS 507
Fall, odd years, 3 credits

AMS 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: AMS 507 or equivalent
3 credits

AMS 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: AMS 530 or permission of instructor
Spring, even years, 3 credits

AMS 540 Modeling 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

AMS 541 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: AMS 535
3 credits

AMS 542 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: CSE 521
Recommended: AMS 506
Spring, 3 credits

AMS 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

AMS 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 multilife situations. Introduction to populations theory. Solution of sample problems for each topic.
Prerequisite: Actuarial Science I or equivalent
3 credits

AMS 545 Graph Theory and Applications
Basic structure of undirected and directed vector space analysis of graphs, applications.
3 credits

AMS 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

AMS 548 Models for Water Resource Management I
Introduction to cost benefit analysis and linear and integer programming techniques. Optimal sitting applied to water supply and treatment. Multidimensional regional optimization.
Spring, 3 credits

AMS 549 Models for Water Resource Management II
Advanced topics in water resource management modeling. 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 AMS 548 or their equivalents
3 credits

AMS 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

AMS 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: AMS 530
3 credits

AMS 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: AMS 501
3 credits

AMS 557/558 Elasticity I and II
These courses are identical with ESC 541, 542.
3 credits

AMS 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

AMS 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 homogeneous and in anisotropic media. Green's function for boundary value problems.
3 credits

AMS 569 Probability Theory I
Intermediate-level probability. Random variables, distribution functions, moments, generating functions, properties of random variables, limit theorems, conditional expectation, combinatorial identities.
Prerequisite: AMS 504 or equivalent
3 credits

AMS 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: AMS 312 or equivalent
3 credits

AMS 571 Mathematical Statistics II: Hypothesis Testing
Decision problems, Neyman-Pearson lemma, likelihood ratio tests, uniformly most powerful tests, unbiased tests, invariant tests, sequential tests, nonparametric tests. Introduction to tests on contingency tables and multvariate data. Bayesian approaches and introduction to current research problems.
Prerequisite: AMS 570 or equivalent
3 credits

AMS 572, Data Analysis I
Introduction to basic statistical procedures. Survey of elementary statistical procedures such as the t-test and chi-square test. Procedures to verify that assumption are satisfied. Extensions of simple procedures to more complex situations and introduction to one way analysis of variance. Basic exploratory data analysis procedures such as stem and leaf plots, straightening regression lines, and techniques to establish equal variance.
Prerequisite: AMS 312 or permission of instructor
Fall, 3 credits

AMS 573 Design and Analysis of Categorical Data
Measuring the strength of association between pairs of categorical variables. Methods for evaluating classification procedures and interrater agreement. Analysis of the associations between three or more categorical variables using log linear models. Logistic regression.
Prerequisite: AMS 572
Spring, 3 credits

AMS 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

AMS 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: AMS 310 or permission of instructor
3 credits

AMS 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.
Prerequisite: AMS 572 or equivalent
3 credits

AMS 580 Reliability Theory
Monotone failure rates; renewal theory; availability theory; classes of life distributions; coherent structures and systems; general stochastic models for failure; maintenance policies; redundancy optimization.
Prerequisite: AMS 535 or equivalent
3 credits

AMS 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.
Prerequiste: AMS 570 or equivalent
3 credits

AMS 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.
Prerequiste: AMS 572 or equivalent
3 credits

AMS 584 Sequential Methods
Sequential decision problems in statistics. Two two-armed bandit, selection by relative rank and other examples. Optimal stopping and sequential analysis. Empirical Bayes and compound decision problems. Fixed-width confidence intervals, confidence sequences, and tests of power, one. Adaptive least squares and stochastic approximation.
Prerequisite: AMS 570
3 credits

AMS 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: AMS 312 or equivalent
Fall, 3 credits

AMS 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: AMS 507 and AMS 570
3 credits

AMS 587 Nonparametric Statistics
This course will cover the applied nonparametric statistical procedures—one-sample Wilcoxon tests, two-sample Wilcoxon tests, runs test, Krushal-Wallis test, Kendall'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 nonparametric inference will be made.
Prerequisites: AMS 312 and AMS 572 or equivalents
Fall, 3 credits

AMS 588 Biostatistics
Statistical techniques for planning and analyzing medical studies. Planning and conducting clinical trials and retrospective and prospective 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: AMS 572 or permission of instructor
Fall, 3 credits

AMS 599 Research
Variable and repetitive credit

AMS 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: AMS 569 or instructor's permission
3 credits

AMS 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: AMS 502
3 credits

AMS 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: AMS 501
3 credits

AMS 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: AMS 537 or equivalent
3 credits

AMS 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 intergration; equivalence of finite element and finite difference methods.
Prerequisite: AMS 502 or equivalent
3 credits

AMS 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: AMS 504 and AMS 505
3 credits

AMS 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 distributions and passive linear systems and to the solution of nonlinear equations.
3 credits

AMS 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 projection for nonlinear least square methods, with applications.
3 credits

AMS 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.

Stochastic Modelling

Control 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

AMS 698 Practicum in Teaching
3 credits, repetitive

AMS 699 Dissertation Research
Variable and repetitive credit

Computer Science (CSE)

Chairperson: Jack Heller
Lab Office Building 1400 (516) 246-7647

Graduate Program Director: Peter Henderson
Lab Office Building 1400 (516) 246-7647

Full-time graduate programs leading to the M.S. and Ph.D. degrees are offered by the Department of Computer Science. The M.S. program is designed primarily to train students with professional goals in business, industry or government requiring advanced knowledge of computer science concepts and applications. The Ph.D. program is for students interested in obtaining academic or research positions in colleges and universities, or government and private research laboratories. The department offers a limited part-time master's program for students who can attend daytime classes. There are no part-time evening programs.

The primary areas of departmental research interests include among others: operating systems, computer networks, databases, VLSI, artificial intelligence, natural language understanding, graphics, software engineering, algorithms, theory of computation, programming languages and computer architecture.

The professional M.S. degree program concentrates on applied computer science. Software development, computer systems and applications are emphasized in the coursework. In addition, each student is given the experience of grappling with a large-scale software or hardware development project. This is accomplished through either M.S. thesis work or workshop-type course activities.

The Ph.D. program gives students a rigorous and thorough knowledge in a broad range of theoretical and practical subject areas and develops the ability to recognize and pursue significant research in computer science. The first two years of graduate study are devoted to the first goal through coursework. By the end of the second year the research phase of the student's graduate career should be underway with participation in advanced study and preliminary research work. The final two to three years of graduate study are devoted to dissertation research.

More detailed information regarding the M.S. and Ph.D. programs in computer science may be obtained by contacting the Graduate Program Director, Department of Computer Science.

Facilities

The Computer Science Laboratory contains a VAX 11/780, seven VAX 11/750s and a PDP 11/60 computer, all of which run the Berkeley UNIX operating system. These systems are equipped with an approximate total of 3,000 megabytes of disk storage and are linked with ethernet. The VAXs are used primarily for departmental research. Supporting peripherals and equipment include, among others, two laser printers and a color printer, four high-definition color graphics systems and numerous terminals and line printers. The PDP 11/60 is used primarily for research in operating systems and computer networks. In addition, six high-resolution bit-mapped workstations (SUN, BBN, etc.) are available for research. The department will be dramatically increasing the number of such workstations in the near future. Numerous microcomputers and micro-based hardware are also available for experimentation. For VLSI research the department has access to facilities for designing, fabricating and testing 3-micron CMOS and other technology chips. The department's laboratory facilities provide direct access to the CSNET and the ARPANET. The University Computing Center operates a dual-processor Univac 1100/82 system with approximately 200 terminals available to students.

Admission and Degree Requirements

The Department of Computer Science is currently revising the admission and degree requirements for both the M.S. and Ph.D. degrees. At press time, these revisions were not available. For specific requirements, beyond the minimum ones of the Graduate School, please contact the department.

Faculty

Badr, Hussein G., Assistant Professor. Ph.D., 1980, Pennsylvania State University: Operating systems; computer systems performance evalution.

Bernstein, Arthur, Professor. Ph.D. 1962, Columbia University: Operating systems; concurrent programming; computer networks.

Buckley, Gael, Assistant Professor. Ph.D., 1984, University of Texas at Austin: Distributed algorithms, database concurrency control.

Duffrin, Nancy, Lecturer. M.S. , 1981, State University of New York at Stony Brook: Undergraduate education.

Gelernter, Herbert, Professor. Ph.D. 1956, University of Rochester: Artificial intelligence; knowledge-based heuristics; scientific applications.

Henderson, Peter, Associate Professor and Graduate Program Director. Ph.D., 1975, Princeton University: Software engineering; programming environments.

Heller, Jack, Professor and Chairperson. Ph.D., 1950, Polytechnic Institute of Brooklyn: Database systems; office automation.

Hsiang, Jieh, Assistant Professor. Ph.D., 1982, University of Illinois, Urbana-Champaign: Theory of computation; program verification; programming language semantics.

Kedem, Zvi, Professor. D.Sc., 1974, Technion-Israel Institute of Technology: VLSI theory; graphics; database systems.

Kifer, Michael, Assistant Professor. Ph.D., 1984, Hebrew University of Jerusalem: Database design theory, inferential databases, database concurrency control.

Mishra, Prateek, Assistant Professor. Ph.D., 1984, University of Utah: Compiler construction, programming languages.

Sciore, Edward, Assistant Professor. Ph.D., 1980, Princeton University: Database systems; date semantics; programming languages.

Smith, David, Professor. Ph.D., 1961, University of Wisconsin: VLSI; computer architecture; digital systems.

Smolka, Scott, Assistant Professor. Ph.D., 1984, Brown University: Distributed languages; operating systems; concurrent computation.

Srivas, M.K., Assistant Professor. Ph.D., 1983, Massachusetts Institute of Technology: Programming languages; software specification.

Stark, Eugene, Assistant Professor. Ph.D., 1984, Massachusetts Institute of Technology: Programming language semantics, formal specifications, verification, distributed algorithms.

Warren, David, Associate Professor. Ph.D., 1979, University of Michigan: Database systems; artificial intelligence; natural language and logic.

Wittie, Larry, Associate Professor. Ph.D., 1973, University of Wisconsin: Computer networks; operating systems; architecture.

Zorat, Alessandro, Associate Professor. Ph.D., 1979, University of Southern California: VLSI theory; algorithm analysis; computer architecture.

Number of teaching, graduate and research assistants for fall, 1983. 53.

Courses

CSE 502 Computer Architecture
Register transfer language, arithmetic algorithms for integer and floating point formats. Control unit design, hardwired and microprogrammed control, instruction set design. Memory devices: organization and management. I/O processing, program controlled I/O interrupts, direct memory access I/O. Performance measurement. Multiprocessor systems, parallel processing, computer networks. Students will perform design exercises using a high-level computer simulation language.
Prerequisite: ESE 318
4 credits

CSE 503 VLSI Design
The course covers the Mead-Conway method for the design of large-scale integrated silicon chips and is supported by a suite of software design tools available in Berkeley UNIX. These cover symbolic layout, design rule check, cell libraries, and logic simulation. The students team up in pairs in the second half of the semester to generate IC designs which, if pursued through successful simulation, are then submitted for fabrication.
Prerequisites: CSE 502 and ESE 318
4 credits

CSE 504 Bit Microprocessor Applications
The course covers 16-bit microprocessor hardware, architecture, I/O devices, programming and applications. It is supported by a coordinated laboratory meeting three hours per week throughout the semester. The students use design modules based on the MC 68000 processsor and its peripheral chips. First they perform six set "EXPERIMENTS" illustrating cross software, resident monitor, down loading, I/O devices and handlers. Then they divide up and work on projects. The fact that object modules can be downloaded from a host and manipulated by a local executive program means that programmed applications of some sophistication can be run.
Prerequisite: ESE 318
4 credits

CSE 513 Advanced VLSI Design
The purpose of the course is to follow up the introductory design course (CSE 503) by providing the interested students from that course the opportunity to continue with a significant VLSI design project. The first part of the course would be devoted to the exploration of possible projects. Interaction with other research groups in the department will be encouraged, for example, by offering some guest lectures. This would culminate in the selection of one or possibly two large projects on which the group would collaborate. By approximately one month into the course, it is normally expected that the chips fabricated from the previous semester would arrive. These will be divided up among the seminar students for testing, using the simulation command files from the previous semester. The remainder of the semester will then be devoted to completing the new designs, through high-level simulation, layout and low-level simulation.
Prerequisite: CSE 503
3 credits

CSE 520 Techniques of 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.
Prerequisite: CSE 201 or equivalent
4 credits

CSE 522 Advanced Topics in Compiler Design
Advanced topics in the design and implementation of compilers and interpreters. Topics drawn from: intermediate code languages, code generation for advanced language constructs, global program improvement techniques requiring flow analysis, such as constant propagation and dead code elimination, loop optimization, local program improvement techniques such as peephole optimization, tail recursion elimination, table-driven final code generation techniques, runtime environments, and register allocation. Non-Algol-like languages may also be covered, including database query languages and functional; applicative, object-oriented and logic programming languages; also compilers for interactive program development systems.
Prerequisite: CSE 304 or equivalent
3 credits

CSE 523 Laboratory in Computer Science I
A significant programming problem or digital system design will be undertaken. The laboratory project will extend over two consecutive semesters and will be completed in CSE 524.
Prerequisite: CSE graduate student status or permission of instructor
2 credits

CSE 524 Laboratory in Computer Science II
Solutions to the programming problem or digital system design, which was undertaken in CSE 523, are to include all aspects of large-scale problem-solving including cost analysis, design, testing and documentation. A final report documenting requirements, design, implementation and testing details is required, and when appropriate a user's manual must be written.
Prerequisite: CSE 523
3 credits

CSE 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.
Prerequisites: CSE 120 and CSE 201 or equivalents
4 credits

CSE 526 Principles of Programming Languages
Analysis of concepts in programming language concepts and design, with emphasis on abstraction mechanisms. Topics studied include: denotational semantics, imperative and functional languages, object-oriented programming, procedure call and parameter passing mechanisms, generic and polymorphic definitions, abstract data types, concurrent and distributed programming primitives and efficiency issues. Several representative languages (such as ALGOL 60, Pascal, ALGOL 68, Euclid, CLU, SMALLTALK, LISP, FP, ADA) studied in detail with emphasis given to design issues and interactions of features. Background in compiler construction and programming experience in a high-level language required.
Prerequisite: CSE 304
3 credits

CSE 528 Computer Graphics
This course emphasizes a hands-on approach to the use of computer graphics. The topics covered include: models, picture description, and interaction; windowing, clipping, panning and zooming; geometrical transformations in 2D and 3D; algorithms for raster displays (scan-line conversion, polygon fill, polygon clipping, etc.); hidden line and hidden surface removal, shading models; user interaction. The students will implement a substantial application program for one of the graphic terminals available in the department.
Prerequisite: Undergraduate course in Data Structures
3 credits

CSE/AMS 529 Simulation and Modeling
An introductory course to the tools and methodology of performance evaluation. Topics will include: Markov chains and renewal processes; queueing models, parameter estimation, introduction to queueing networks; applications to computer systems; discrete-event simulation, pseudo-random number and variate generation, simulator design, simulation techniques, model design, model control using statistical inference, variance reduction techniques.
Prerequisite: AMS 310 or AMS 507 (or equiv.), or consent of instructor
3 credits

CSE 530 Analysis of Computer Systems
This course is devoted to the performance evaluation of computer systems and will include topics from: queueing networks and operations analysis, statistical data analysis; modeling single and multiple-resource systems, program behavior, memory management, scheduling and resource allocation; modeling concurrent processes, computer networks and distributed processing; work-load characterization, system monitoring, calibration and fine-tuning.
Prerequisite: CSE/AMS 529 or consent of instructor
3 credits

CSE 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. The emphasis is on more theoretical aspects of the topic.
Prerequisite: Undergraduate course in data structures or permission of the instructor
4 credits

CSE 533 Computer Network Communication Protocols
This is a survey of network communication software and hardware techniques, especially the ISO reference model of layered protocols. Topics include connectivity and delay analysis, data transmission techniques, pipelined window protocols, virtual circuits and datagrams, routing, congestion control, local area network access, process to process message transport, internetwork gateways, encryption, and distributed application protocols.
Prerequisite: Prior course in Operating Systems or permission of the instructor
3 credits

CSE 534 Advanced Operating Systems
This is a survey of modern operating system techniques, especially those needed for distributed operating systems. Topics include network topologies, interprocess communication, failure detection and system recovery, local kernel functions, global network services, location transparency, large network constraints, distributed control algorithms (synchronization, configuration, deadlock detection and searches) and existing distributed operating systems.
Prerequisite: Undergraduate course in Operating Systems or permission of the instructor
3 credits

CSE 535 Asynchronous Systems
Discusses asynchronous systems, their description using concurrent and distributed programming language and their verification. Topics include monitors and message passing, formal semantics of communication, locking and commit protocols, distributed synchronization, Ada.
Prerequisite: Undergraduate course in Operating Systems
3 credits

CSE 537 Artificial Intelligence
A comprehensive introduction into the problems of artificial intelligence and the techniques for attacking them. Topics include: problem representation, problem solving methods, search, pattern recognition, natural language processing, learning, expert systems, AI programming languages and techniques. The course will emphasize both theoretical methods and practical implementations.
3 credits

CSE 538 Natural Language Processing
A survey of computational approaches to natural language processing issues in phonology, morphology, syntax, semantics and pragmatics. Topics to be discussed include natural language parsing algorithms, generation algorithms and knowledge representations. Models for speech recognition systems, story understanding systems and natural language front-ends to databases and other application programs will be investigated.
Prerequisite: CSE 537
3 credits

CSE 539 Expert Systems
Characteristics of some exisiting expert consultation and problem-solving systems. Techniques, tools, and languages for designing and building such systems. Knowledge representation. Problems of knowledge base construction and maintenance; extracting the "expertise" from the experts. Students will participate in a class project in which an expert knowledge-based consultation system for a specific problem domain will be specified and built.
Prequisite: CSE 537
3 credits

CSE 541 Theoretical Foundations of Computer Science
First order predicate calculus. Proof theory. Introduction to model theory. Application of logic to program verification (Hoare's axiomatic method, structural induction, fixed-point semantics). Nonclassical logic systems useful in computer applications (temporal logic, dynamic logic, many-sorted logic, intuitionistic logic).
Prerequisite: CSE 303 or permission of the instructor
3 credits

CSE 543 Computability and Undecidability
Automata theory (with more emphasis on Turing machines, less on regular and context-free languages) and the halting problem. Introduction to recursive function theory. Models of computation and associated time and space measures for complexity of algorithms in the various models.
Prerequisite: CSE 303 or permission of the instructor
3 credits

CSE/ESE 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.
3 credits

CSE 548 Analysis of Algorithms
Techniques for designing efficient algorithms, including choice of data structures, recursion, branch and bound, divide and conquer, and dynamic programming. Complexity analysis of searching, sorting, matrix multiplication and graph algorithms. Standard NP-complete problems and polynomial transformation techniques. Some computing will be required.
Prerequisite: Some familiarity with data structures
Recommended: AMS 506
3 credits

CSE 551 Program Semantics and Verification
Formal approaches to defining semantics of programming languages: denotational, operational, axiomatic, and transformational semantics. Formal systems for program verification. Logics of program, type theory, lambda calculus. Further topics selected from: Term rewriting approach to proving properties of data types, semantics and verification of languages with concurrent and parallel constructs.
Prerequisite: CSE 541
3 credits

CSE 587 Independent Study in Computer Science
A course that involves the student in an independent study course under the supervision of a faculty member. A prior permission of the graduate program director is required if the course is to be counted toward the fulfillment of the degree requirements.
1-4 credits, variable and repetitive

CSE 599 Research
Variable and repetitive credit

CSE 600 Topics in Modern Computer Science
A survey of current computer science research areas and issues. This course comprises lectures by faculty members and visitors, selected readings and introductory-level research problems. Possible topics include approximation algorithms for intractable problems, probabilistic algorithms, distributed systems, system design, expert systems, robotics, networks, VLSI and multiprocessor computers.
Prerequisite: Permission of the instructor
3 credits

CSE 621 Seminar in Programming Languages
3 credits, repetitive

CSE 622 Seminar in Operating Systems
3 credits, repetitive

CSE 630 Seminar in Artificial Intelligence
3 credits, repetitive

CSE 631 Seminar in Database Systems
3 credits, repetitive

CSE 645 Seminar in Theory of Computation
3 credits, repetitive

CSE 648 Seminar in Analysis of Algorithms
3 credits, repetitive

CSE 662 Mathematical Techniques for the Analysis of Algorithms
Course includes advanced topics in combinatorics, the analysis of sorting and hashing algorithms, an introduction to probabilistic analysis, asymptotic analysis and Mellin transforms. Also covered are techniques for solving recurrence equations and Greene's calculus on labeled formal languages.
Prerequisite: CSE 548
Recommended: Some skills in mathematical analysis
3 credits

CSE 663 Modern Developments in Algorithms and Complexity
Course covers probabilistic estimation techniques, the Hungarian method and approximation algorithms. Also covers probabilistic algorithms, including primality testing, the theory of pseudo-random number generation and an introduction to cryptography.
Prerequisite: CSE 548
Recommended: Some knowledge of probability and number theory
3 credits

CSE 681 Special Topics in Programming Languages
3 credits, repetitive

CSE 682 Special Topics in Computer System Design
3 credits, repetitive

CSE 683 Special Topics in Computer Applications
3 credits, repetitive

CSE 684 Special Topics in Computer Architecture
3 credits, repetitive

CSE 685 Special Topics in Artificial Intelligence
3 credits, repetitive

CSE 686 Special Topics in Theory of Computation
3 credits, repetitive

CSE 687 Special Topics in Computer Graphics
3 credits, repetitive

CSE 698 Practicum in Teaching
Variable and repetitive credit

CSE 699 Dissertation Research
Variable and repetitive credit

Electrical Engineering (ESE)

Chairperson: Steven D. Shapiro
Light Engineering Building 273 (516) 246-6757

Graduate Program Director: Stephen S. Rappaport
Light Engineering Building 201 (516) 246-7760

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.

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 these specific 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, systems and networks theory and computer-aided design, as well as the application of systems science to robotics distributed control, 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 530, 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: PAM 513, PAM 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 forseeable future. Data communications traffic between computers or from remote devices to a central facility is routine. Much of the world's communications is via satellite and new techniques that 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 communication networks, mobile radio and multiple-access systems, satellite channels and communications traffic, digital signal processing, coding for error control, new modulation and multiplexing techniques and adaptive array 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 even larger functions from sewing machine stitch controls to inventory control. Current research and training in the department concentrates on research in integrated circuit design, 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, ESE 554, CSE 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, particularly MSW and SAW in solids and gases, through a description of the mechanisms that 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 that 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, 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 modeling of active physiological membranes, 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.

Facilities

The Department of Electrical Engineering operates six laboratories for both teaching and research:

1. *The Computing Laboratory* in the Department of Electrical Engineering consists of a VAX 11/780 minicomputer with 4MB of RAM, 454 MB main disk storage with 206 MB removable disk storage magnetic tape storage, floating point accelerator and a 32-line multiplexer. An Image Laser printer is also part of the lab, as are two Ramtek color graphics terminals and a color graphics printer.

2. *The Digital Signal Processing Research Laboratory* is involved in digital signal processing architectures, hardware and software research. The laboratory is presently active in architecture development and hardware implementation of multiplierless digital filters.

3. *The Microcomputer Systems Design Laboratory* has equipment for teaching and research in microprocessor-based systems. Equipment includes state-of-the-art development systems, in circuit emulators, and logic analyzers.

4. *The Robotics Teaching and Research Laboratory* concentrates on teaching the fundamentals and current applications of robotics using an industrial robot arm. There are several research projects at the senior and at the graduate levels presently underway. These are concerned with the hardware design of the Stony Brook robot—MIKI—and its microprocessor-based peripherals as well as with advanced theoretical study of robotics technology.

5. *The Solid-State Laboratory* is equipped for experimental work in areas of integrated circuits, solid-state microwave electronics, magnetostatic wave (MSW) and surface acoustic wave (SAW) devices. It includes low-temperature electromagnet facilities, vacuum deposit equipment, photolithographic facilities, microwave equipments and network analyzer system. The laboratory is presently active in MSW and SAW devices research.

6. *The Telecommunication Laboratory* is equipped with the NASA Adaptive Multibeam Phased Array for research and teaching in advanced communications, systems both digital and analog, adaptive array systems and antenna systems.

Admission

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 General Test.

E. Acceptance by both the Department of Electrical Engineering and the Graduate School.

Degree Requirements

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. These requirements may be satisfied by either one of the two following options:

I. 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 six credits may be 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. At least three of these five regular courses must be selected from the following five choices: (a) ESE 502, (b) ESE 503, (c) ESE 511, (d) ESE 520, (e) either ESE 545 or ESE 580.

C. ESE 506, ESE 507, ESE 599, ESE 597, ESE 698 and ESE 699 are not counted as regular courses in (B). ESE 670 may not be counted more than twice (maximum of 6 credits) in (B).

D. Up to six transfer credits may be applied toward the degree with the approval of the program committee.

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 for 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 six (6) regular courses with at least 3.0 grade point average. At least four regular courses must be in the Department of Electrical Engineering. At least three of these four regular courses must be selected from the following five choices: (a) ESE 502, (b) ESE 503, (c) ESE 511, (d) ESE 520, (e) either ESE 545 or ESE 580.

C. ESE 506, ESE 507, ESE 599, ESE 597, ESE 698 and ESE 699 are not counted as regular courses in (B). ESE 670 may not be counted more than twice (maximum of 6 credits) in (B).

D. Up to six transfer credits may be applied toward the degree with the approval of the program committee.

E. Satisfactory completion of a thesis.

Requirements for the Ph.D. Degree

A. Qualifying Examination
A student must pass a written qualifying examination.

B. Course Requirements
1. A minimum of six regular courses above the M.S. degree, or fourteen regular courses above the baccalaureate degree. The choice must have the prior approval of the designated faculty academic advisor. The courses ESE 506, ESE 507, ESE 597, ESE 598, ESE 599, ESE 698 and ESE 699 are not counted as regular courses. Courses that are presented under the title ESE 670 may not be counted more than four times (maximum of 12 credits), in total, for all graduate degrees awarded by the Department of Electrical Engineering.
2. The student must satisfy the stipulations of a plan of study which must be filed with the Graduate Program Committee within six months after the student passes the qualifying examination. The study plan, which will include the six regular courses as required in Item I will be developed under the aegis of the designated faculty advisor (who may or may not be the eventual thesis advisor). Modification of the study plan may be made by the preliminary examination committee, and at any later time by the thesis advisor. An up-to-date plan must always be placed on file with the Graduate Program Committee each time a modification is made.

C. Preliminary Examination
A student must pass the preliminary examination within 36 months after passing the qualifying examination. Both a thesis topic and the thesis background area are emphasized.

D. 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.

E. 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.

F. Dissertation Defense
The student must defend the dissertation before an examining committee. On the basis of the recommendation of this committee, the Dean of Engineering and Applied Sciences 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.

G. Residency Requirement
A one-year residency is required.

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

Bajpai, Shyam N., Assistant Professor. Ph.D., 1980, Indian Institute of Technology, Delhi, India: Magnetostatic waves, transducers and magnetic materials.

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, Tsu Shuan, Assistant 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.

Lilly, John H., Assistant Professor. Ph.D., 1982, Rensselaer Polytechnic Institute: Controls and systems; robotics.

Marburger, John H., Professor and President, State University of New York at Stony Brook.[2] Ph.D., 1967, Stanford University: Theoretical laser physics.

Marsocci, Velio A., Professor[3]. Eng. Sc.D., 1964, New York University: Solid-state electronics, integrated electronics; biomedical engineering.

Parekh, Jayant P., 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, in signal processing.

Rappaport, Stephen S., Professor and Graduate Program Director. Ph.D., 1965, New York University: Communication theory; systems.

Robertazzi, Thomas G., Assistant Professor. Ph.D., 1981, Princeton University: Computer communications, statistics, combinational and numerical optimization.

Shapiro, Stephen D., Professor and Chairperson. Ph.D., 1967, Columbia University: Digital systems and picture processing.

Short, Kenneth L., Associate Professor. Ph.D., 1973, State University of New York at Stony Brook: Digital system design, instrumentation.

Smith, David R., Professor,[4] Ph.D., 1961, University of Wisconsin: Logic design, computer architecture.

Sussman-Fort, Stephen E., Associate Professor. Ph.D., 1978, University of California, Los Angeles: VLSI; computer-aided circuit design; microwave circuits, active and passive filters, classical network theory.

Truxal, John G., Distinguished Teaching Professor,[5] 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 New York: 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.

Yeh, Chien-Chung, Assistant Professor. Ph.D., 1983, University of Pennsylvania: Adaptive arrays and systems; bearing and spectral estimation.

Zemanian, Armen H., Professor. Eng. Sc.D., 1953, New York University: Network theory; food system modeling.

Number of teaching, graduate and research assistants, fall 1983: 48

[1] *Joint appointment, Department of Materials Science and Engineering*
[2] *Joint appointment, Department of Physics*
[3] *Clinical Professor of Health Science*
[4] *Joint appointment, Department of Computer Science*
[5] *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 propogation 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 densitities 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 Director
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 and amplification; CO_2 lasers; discharge lasers; semiconductor lasers.
3 credits

ESE 516, 517 Integrated Electronic Devices and Circuits I and 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 magnetostatics; 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 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: thin-film dielectric optical waveguides and modes, dielectric fibers, semiconductor planar 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-film 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. Kirchoff's laws, linear and nonlinear 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 signaling, comparison classes of signaling 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.
Prerequiste: ESE 531
3 credits

ESE 533 Satellite Communication Engineering
Historical perspective, economics, orbital mechanics, synchronous satellites, transponders, multiaccess earth terminals, frequency division multiple access, time division multiplexing, time division multiple acces, PSK, carrier-phase tracking, filter distortion, bit sync, timing systems, delay-lock tracking.
Prerequisite: ESE 503 or equivalent
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.
Prerequiste: ESE 502
3 credits

ESE 542 Stability Theory and Application
Definition and application of stability criteria in both linear and nonlinear 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 nonlinear control systems.
3 credits

ESE 543 Optimal Control
Topics include parameter optimization, La Grange multipliers, numerical techniques such as steepest descent. Newtown'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 nonlinear control problems. Control in restricted phase space.
3 credits

ESE 544 Optimal Filtering and Data 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 CSE 502 for credit.
Prerequisite: ESE 318
4 credits

ESE/CSE 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.
Prerequisite: CSE 101, 102, ESE 318 or equivalent
4 credits

ESE 554 Introduction 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 symbolic layout language and use of 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.
Prerequisites: B.S. in electrical engineering or computer science
3 credits

ESE 555 VLSI Circuit Design
As a continuation of ESE 554, this course provides students with the opportunity to design a VLSI chip in its entirety: from systems specification to detailed cell layout. Students will use advanced computer design automation tools. Layouts will be edited using colorgraphic computer terminals, designs will be submitted for fabrication and testing.
Prerequisite: ESE 554
3 credits

ESE 556 Nonlinear Discrete-Time Systems
Analysis of various classes of nonlinear discrete-time systems, theory and applications of nonlinear ordinary difference equations, closed-form solutions, fixed-points and limit cycles, asymptotic expansions, local and global stability, bifurcations, chaos, strange attractors, a selection of applications in electrical engineering, economics and biology.
3 credits

ESE [illegible]igital Signal Processing II: Design, Implementation and Applications
This course emphasizes the implementation aspect of digital signal processors and research in digital filters. Topics include the design of IIR and FIR digital filters, the architectural consideration for general-purpose digital signal processors, the implementation of some special-purpose processors. The study of new digital filter structures from journals is also emphasized.
Prerequisite: ESE 547 or permission of instructor
3 credits

ESE 558 Digital Image Processing I
The material in this offering will constitute a first course introduction to the field of digital image processing. Image generation, electroptical sensor characteristics, vision, color perception/matching will be discussed with respect to image processing requirements followed by image sampling techniques, 2D Nyquist Theorem, aliasing effects and scalar/vector quantization techniques. Linear image processing techniques will be treated from finite and infinite dimensional vector space approaches and will include Fourier, Haar, singular-value decomposition, Karhunan-Loeve transforms and their fast counterparts. Application of these techniques to image enhancement/restoration will follow and will include histogram equilivation, deblurring, weiner filtering, and pseudo-inverse restoration.
Prerequisite: Linear Systems/Problem Theory
3 credits

ESE 559 Digital Image Processing II
The course material will proceed directly from DIP-I starting with image reconstruction from projections. After the basic projection theorems are developed, computerized axial tomography techniques will be examined in detail including forward and inverse random transformations, convolution, back projection and Fourier reconstruction. Nuclear magnetic resonance imaging and positron emission tomography will be similarly covered. Surer resolution concepts will be developed and applied to a variety of remote sensing applications as well as digital image coding for efficient transmission of digital TV imagery.
Prerequisite: ESE 558
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 syntheses 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 563 Fundamental of Robotics I
This course covers: homogenous transformations of coordinates; kinematic and dynamic equations of robot with their associated solutions of any kind; control and programming of robots.
Prerequisite: Permission of instructor
3 credits

ESE 564 Fundamentals of Robotics II
This course advances ESE 563, with more emphasis on kinematic and dynamic equations, as well as advancing control strategy. In addition it covers the following topics: vision, sensory processing, collision-free robot languages.
Prerequisite: Permission of instructor
3 credits

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 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 580, 581 Microprocessor-Based Systems Engineering I and II
This course is a study of methodologies and techniques for the engineering design of microprocessor-based systems. Emphasis is placed on the design of reliable industrial quality systems. Diagnostic features are included in these designs. Steps in the design cycle are considered. Specifically, requirement definitions, systematic design implementation, testing, debugging, documentation and maintenance are covered. Laboratory demonstrations of design techniques are included in this course. The students also obtain laboratory experience in the use of microprocessors, the development of systems, circuit emulation and the use of signature and logic analyzers.
4 credits, each semester

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, grading S,U

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 present their thesis finding to the department as a whole.
1 credit, repetitive, grading S,U

ESE 698 Practicum in Teaching
Variable and repetitive credit, grading S, U

ESE 699 Dissertation Research
Variable and repetitive credit, grading S, U

Materials Science and Engineering (ESM)

Chairperson: Herbert Carleton
Engineering Building 314 (516) 246-6759

Graduate Program Director: Clive Clayton
Engineering Building 314 (516) 246-5945

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 that 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 coursework 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.

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, XPS, AES, corrosion and erosion, mechanical testing, ultrasonics and electron microscope techniques, and are used in both the teaching and research programs of the department. Dedicated high-speed computing facilities are available for the dynamic simulation and evaluation of materials, processes and devices.

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 U.S. The department invites applications from graduate students who wish to pursue their research interests in the field of synchrotron topography.

Admission

For admission to graduate study in Materials Science and Engineering, the minimum requirements, in addition to those of the Graduate School, 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 General 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

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. 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.

B. 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.

C. 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.

D. 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.

E. 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.

F. 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.

G. Residency
Two consecutive semesters of full-time study are required.

H. Time Limit
All requirements for the Ph.D. degree must be completed within seven years after completing 24 credit hours of graduate courses in the department, exclusive of research credit.

Faculty

Bilello, John C, Professor, Ph.D., 1965, University of Illinois; Mechanical properties; lattice defects; fracture; refractory metals; surface coatings; synchrotron topography.

Broughton, Jeremy Q., Assistant Professor. Ph.D., 1977, Cambridge University, England: Molecular dynamics; computer simulation; electronic materials.

Carleton, Herbert R., Professor and Chairperson.[1] Ph.D., 1964, Cornell University, Optical and ultrasonic properties; Brillouin scattering in crystals; surface acoustics.

Chu, Benjamin, Professor.[2] Ph.D., 1959, Cornell University: Laser scattering, small-angle X-ray scatterings, critical phenomena, molecular forces; configuration and dynamics of macromolecules; structure of noncrystalline media; liquid crystals.

Clayton, Clive R., Associate Professor and Graduate Program Director. Ph.D., 1976, Surrey University, England: Corrosion science; XPS; AES; RHEED; ion implantation.

Goland, Allen N., Adjunct Professor.[3] Ph.D., 1956, Northwestern University; Solid-state physics; defects; interaction of radiation with condensed matter.

Herley, Patrick J., Professor.[2] 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.

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.[3] Ph.D., 1969, University of California, Berkeley: Metallurgy of superconducting materials.

Vanderwalker, Diane M., Assistant Professor. Ph.D., 1981, Massachusetts Institute of Technology: Phase transformations; dislocations; electron microscopy.

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.[3] Ph.D., 1978, University of Florida: Analytical electron microscopy; X-ray fluorescence; semiconductor defects.

Welch, David O., Adjunct Professor.[3] 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.

Number of teaching, graduate and research assistants, fall 1983: 31

[1] *Joint appointment, Department of Electrical Engineering*
[2] *Adjunct, Brookhaven National Laboratory*
[3] *Joint appointment, Department of Chemistry*
[4] *Joint appointment, Department of Earth and Space Sciences*

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, 3 credits

ESM 504 Production Processes
Selected topics in manufacturing processes in modern industry: forming, joining, fabrication and finishing 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 studied using X-ray, neutron and electron diffraction techniques. Topics covered are: coherent and incoherent scattering of radiation, structure of crystalline and amorphous solids, sterographic 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 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 516 Mathematics Materials
Modern materials science requires a working knowledge of a number of quantitative methods of analysis. The following topics are developed in the context of material science applications: vector and tensor concepts, linear operators in quantum mechanics, eigenvalue problems, Fourier series, quantum statistics, and Green's functions. This is a problem-oriented course.
Fall, 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 607 Imperfections in Crystals
A unified treatment of crystal lattice defects encompassing point, line and planar defects; their geometric properties, energies, interactions and contributions to material properties.
Spring, 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 difusion 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 the mechanisms of nucleation and growth and martenistic transformations. Melting and solidification, precipitation from solid solution, polymorphic transformations, eutectic and eutectoid reactions, second-order transitions, recrystalization 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 facuity members and students presenting current research results.
1 credit, repetitive

ESM 698 Practicum in Teaching
0-3 credits, repetitive

ESM 699 Dissertation Research
Variable and repetitive credit

Mechanical Engineering (ESC)

Chairperson: Edward E. O'Brien
Light Engineering Building 113 (516) 246-6771

Graduate Program Director: Sultan Hameed
Light Engineering Building 169 (516) 246-7656

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 with concentrations in solid mechanics, fluid mechanics, energy transfer, computer-aided engineering design and atmospheric sciences.

A departmental brochure describing specific distribution requirements, areas of research, and a more detailed description of the graduate program is available upon request.

Facilities and Areas of Specialization

Solid Mechanics

Fracture of metal is studied with emphasis on elastic-plastic fracture and on temperature effects. Experimental program involves the development of various optical techniques of strain analysis including moire methods, laser and white-light speckle methods, holographic interferometry, photoelasticity and classical interferometry. A major part of the experimental program is the application of these methods to solid mechanics problems such as fracture, wave propagation, metal forming, flexure, vibration, etc. Shock waves are studied in crystalline solids. Discrete lattice theory is used with nonlinear force interactions to determine the structure of the shock as it evolves from classical continuum response to sequences of solitary wave pulses. Dislocation response to impact has been analyzed for dynamic yield stress at 0°K. Surface dynamics during impact is currently being studied for adhesion with pure surfaces and the influence of surface impurities. Generally, asymptotic methods of analysis are used together with computer studies.

Energy Systems and Fluid Mechanics

Four specific disciplines are included in this concentration: fluid mechanics, heat transfer, thermokinetics and statistical thermodynamics. Studies in this area of specialization are supported by experimental facilities such as a heated round jet, a water tunnel, a wind tunnel, a low-turbulence water channel, a laser-Doppler anemometer system and rheological apparatus. Sophisticated instrumentation and data acquisition systems are also available. Current theoretical investigations include studies of two-phase suspension flows, turbulent transport of chemically reactive species, chemical kinetics, theory of nucleation and soot formation. Statistical mechanical techniques are being used to study the relation between intermolecular forces and the thermodynamic, dielectric, optical and transport properties of fluids and fluid suspensions. The current research in heat transfer involves the development of techniques for determining rheological properties of fluids, the study of free convection effects in electrophoresis systems, heat transfer in noncircular ducts with rheological fluids and free convection in systems with rheological fluids.

Computer-Aided Design

The mechanical engineering master's degree with specialization in computer-aided design emphasizes interactive computer graphics techniques in the context of a curriculum based in solid mechanics, heat transfer and thermodynamics. A student in this program may choose to specialize in either structural design or fluid mechanics and heat transfer design. Satisfactory completion of an independent design project under the supervision of a faculty member is required in this program. Of the courses in the program, the required courses are ESC 525, ESC 526, ESC 539, PHY 503, and six (6) credits of ESC 596. In addition, a student who chooses the structural design option may take the following elective courses: ESC 532, ESC 534, ESC 552 and ESM 506. The fluid mechanics and heat transfer design option normally consists of the following electives: ESC 534 and three courses selected from ESC 501, ESC 502, ESC 511, ESC 512, ESC 513 and ESC 514.

ESC 525 and ESC 526 are taught by the staff of the Grumman Aerospace Corporation at their facilities in Bethpage and are restricted to U.S. citizens and permanent residents. The program is structured such that it may be completed in two years by full-time students.

Atmospheric Sciences

The Laboratory for Planetary Atmospheres Research (LPAR) coordinates an interdepartmental teaching and research concentration for students interested in the physics and chemistry of the atmospheres of the Earth and other planets. Theoretical modeling techniques are being used to study global and regional climate change, atmospheric radiation transfer; particulary, the greenhouse effect and aerosol scattering, tropospheric chemical balance and its perturbation by air pollution and structures of planetary atmospheres. Infrared measurements of molecules of atmospheric interest are performed in a spectroscopy laboratory equipped with grating spectrometers, a tunable diode laser spectrometer and low temperature data from the International Ultraviolet Explorer, the Infrared Telescope Facility, and NASA Jupiter Data Analysis and Earth Radiation Budget Experiment Programs.

Admission to the M.S. Program

For admission to the M.S. program in Mechanical Engineering, the following are normally required:

A. A baccalaureate degree in physical 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 General Test. Applicants are encouraged to submit test scores for the advanced examination as well.

D. Acceptance by both the Department of Mechanical Engineering and the Graduate School.

Admission to the Ph.D. Program

For admission to the Ph.D. program in Mechanical Engineering, the following are normally required:

A. A baccalaureate degree in physical 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 General Test. Applicants are encouraged to submit test scores for the advanced examination as well.

D. Acceptance by both the Department of Mechanical Engineering and the Graduate School.

Degree Requirements

Requirements for the M.S. Degree

A minimum of thirty (30) credits, exclusive of ESC 698 (Practicum in Teaching), is required for the M.S. degree.

A. Course Requirements

1. *M.S. with thesis:* Twenty-one approved graduate course credits with an accepted thesis registered as nine (9) credits of ESC 599. A limit of three (3) credits of ESC 696 prevails with a thesis option.
2. *M.S. without thesis:* Thirty (30) approved graduate credits. No credit for ESC 599 (Master's Thesis) is approved for fulfilling this requirement. No more than six (6) credits of ESC 696 may be applied toward the approved graduate course credit requirements.
3. Physics 503 (Methods of Mathematical Physics I) is a requirement for every student enrolled in the graduate program. The Graduate Program Director may waive this requirement if the student has taken an equivalent course elsewhere.
4. Enrollment in one semester of ESC 565 (Departmental Research Seminar) is mandatory for all first year graduate students except those in the Computer-Aided Design concentration.

B. Performance

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. Transfer Credits for Graduate Courses

A maximum of six (6) graduate credits from another institution can be transferred at the discretion of the department and with 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. The thesis must be approved by a departmental faculty committee of at least three members who may require the student to present a seminar on the topic of his or her thesis.

B.E./M.S. Program

B.E./M.S. students will have started their master's thesis in their senior year by registering for ESG 440. For the fifth year of the B.E./M.S. Program, students are required to register for twenty-four (24) credits, of which eighteen (18) are course credits and six (6) are ESC 599.

Requirements for the Ph.D. Degree

A. Advisor

Students must have an advisor for the duration of their enrollment as Ph.D. candidates.

B. Course Requirements

Fifteen (15) approved credits of formal courses beyond the M.S. degree requirement, excluding credit for ESC 699 and ESC 698 are required. Physics 503 (Mathematical Physics I) is a requirement unless the student has taken an equivalent course elsewhere, and the Graduate Program Director approves of the waiver. Enrollment in ESC 565 (Departmental Research Seminar) is mandatory for every first-year graduate student in the department. The advisor may impose additional course requirements.

C. Major and Minor Requirements

The student must specialize in one of three areas within the department:

1. Energy Systems and Fluid Mechanics
2. Solid Mechanics
3. Atmospheric Sciences

A minor from one of the following academic disciplines must also be selected:

1. Fluid Mechanics
2. Heat Transfer
3. Thermokinetics
4. Statistical Mechanics
5. Solid Mechanics
6. Atmospheric Sciences
7. Approved disciplines outside the department.

Three 3-credit courses with a grade of at least B in each satisfies the minor requirement. Material from these courses will not appear on the qualifying examination.

D. Transfer Credits for Graduate Courses

A student who has entered the Ph.D. program with an M.S. degree from another institution may transfer only twelve (12) credits toward the degree. A student with a master's degree from Stony Brook may transfer six (6) credits toward the Ph.D. degree. Requests for transfer credits will be submitted to the Graduate Program Director for his decision on their acceptability, upon the recommendation of a faculty member who is familiar with the given area.

E. Written Qualifying Examinations

Written examinations in each area of specialization are offered once every year in January. Students who enter the graduate program with a master's degree from another university must take the examination the first time it is offered following one year in residence.

Students enrolled in the master's/doctoral program at Stony Brook must take the qualifying examination within one year of completing thirty (30) graduate credits. Only under extraordinary conditions, and by a written petition to the Graduate Program Committee 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. Statisticall Mechanics
4. Thermokinetics

F. Preliminary Oral Examination

Within one year after passing the written qualifying examination, the student is required to submit a dissertation proposal and register for three (3) credits of ESC 699. The examination committee consists of three (3) department faculty members and one (1) member from outside the department. Three of four members of the examination committee must approve the student's performance in order for him/her to be admitted to candidacy for the Ph.D. degree.

A student who has completed a master's degree with thesis is not required to take the oral examination.

G. Advancement to Candidacy

A student will be advanced to candidacy for the Ph.D. degree when he or she has completed all formal course work and satisfied all the requirements listed under previous paragraphs. These requirements must be completed within one calendar year after passing the written qualifying examination.

H. Research and Dissertation

The dissertation will be examined by a committee of 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, selects the committee members.

The official recommendation for the appointment of the dissertation committee is made to the Vice Provost for Research and Graduate Studies when the candidate's dissertation is near completion. Dissertation defenses are open to both the dissertation examining committee and the faculty. The final decision is rendered by a majority vote of the dissertation committee.

Prior to the formal dissertation defense, presentation at a seminar scheduled by the advisor is encouraged. The dissertation is to be distributed to the committee members at least three (3) weeks before the dissertation defense. One (1) is to be kept in the departmental office for examination by the faculty.

Faculty

Berlad, Abraham L., Professor Emeritus. Ph.D., 1950, Ohio State University: Combustion, reactive media, stratospheric photochemistry, energy technology.

Cess, Robert D., Professor. Ph.D., 1959, University of Pittsburgh: Atmospheric sciences.

Chiang, Fu-Pen, Professor. Ph.D., 1966, University of Florida: Experimental mechanics, photoelasticity, moire and other optical methods for stress analysis.

Drubka, Robert, Assistant Professor. Ph.D., 1981, Illinois Institute of Technology: Experimental fluid mechanics.

Hameed, Sultan, Associate Profesor and Graduate Program Director. Ph.D., 1968, University of Manchester, England: Atmospheric sciences.

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 and Chairperson. Ph.D., 1960, Johns Hopkins University: Turbulent transport.

Rubinstein, 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, Professor. Ph.D., 1967, University of California, San Diego: Planetary spectroscopy; molecular physics.

Wang, Lin-Shu, Associate Professor. PhD., 1951, University of California, Berkeley: Dynamic meteorology; energy technology.

Yang, Ching H., Professor. Ph.D., 1951, Lehigh University: Thermokinetic systems.

Number of teaching, graduate and research assistantships, fall 1983: 35.

Courses

ESC 501 Convective Heat Transfer and Heat Exchange
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 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 descriptions. 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 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 526 Computer-Aided Design Laboratory
Implementation of interactive computer graphics equipment in the context of the engineering design case study (ESC 525) is undertaken. The intent is to provide the student with understanding of the power and the limitations of ICG technique and when to apply it in the design process.
Corequisite: ESC 525
3 credits

ESC 527 Analytical Methods in Solid Mechanics
An introduction to the mathematical foundations of continuum mechanics. Vectors and tensors, properties and basic differential operations. Curvilinear coordinates, kinematics of deformations, conservation laws. Stress, constitutive equations, linear material. Linear elasticity. Basic problems in plane elasticity and methods of analytic functions. Basic ideas of fracture mechanics.
Alternate years, 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 532 Structural Dynamics
The time-dependent response of engineering structures is studied for steady-state and transient conditions. Topics studied are single- and multiple-degree of freedom systems, elastic strings, rods, beams and nonlinear vibration. Methods of analysis include normal coordinates, Lagrangian dynamics and Laplace transform theory.
Alternate years, 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
Concepts of the engineering system. Topics will include the "need" analysis; cost/performance optimization; program planning; system verification; product assurance; human factors and system safety including fault tree analysis. The course material will be illustrated by case studies of recent engineering projects.
Spring, 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. Principal of virtual work. Formulation of stress-strain relations in elasticity, plasticity and visco-elasticity. 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 I: Measurement Techniques
Fundamental of measurements and instrumentation. Operating principles and performance characteristics of instruments for measurements of physical quantities such as velocity, pressure and temperature. Introduction to hot-wire anemometry and laser-doppler velocimetry along with current optical measuring techniques. Application of flow-visualization techniques to liquid and gas flows. Laboratory demonstrations.
3 credits

ESC 538 Experimental Fluid Mechanics II: Data Acquisition and Processing
Fundamentals and application of analog and digital data collection techniques. Fast-rate data acquisition systems and storage. Introduction to analysis of random variables with special applications to turbulent flows. Numerous examples of modern signal processing techniques as applied to various areas of fluid mechanics.
Every fall, 3 credits

ESC 539 Finite Element Methods in Structural Analyses
Finite element methods for solving structural analysis problems. Matrix force and displacement methods, direct stiffness method, basic equation of the theory of elasticity. General formulation using virtual work of bar, beams, membranes, shear general purpose analysis systems. Application to practical problems of interest to industry. How the methodology is used in integrated design analysis systems. Generalization to other areas, heat flow, fluid flow.
3 credits

EAS 541, 542 Elasticity I, II
Derivation of linear equations of elasticity. Stress equations of motion. Displacement and strain. Stress-strain relations for crystalline solids. Compatibility 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 credit 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. Blackbody 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 plants.
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 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 Composition of the Atmosphere
A survey of the current knowledge regarding the compositions of the troposphere and the stratosphere. Global distributions, sources, sinks and chemical reactions of trace gases such as carbon dioxide, carbon monoxide, methane, hydrogen, nitrogen oxides, ozone and chlorofluorocarbons will be discussed. Changes in atmosphereic composition arising from natural and anthropogenic causes will also be covered.
Prerequisite: Permission of instructor
Alternate years, 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 resource 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 course is concerned with the analysis of layered composite materials subject to mechanical loads. Cartesian tensor calculus is used. Homogeneous anisotropic media are studied first. The effect of layering is then analyzed. Applications to plates and shell are studied and analytical methods of solution are given. Numerical analysis of composite solids is also considered using finite-difference and finite-element methods.
Alternate years, 3 credits

ESC 565 Departmental Research Seminar
Meetings at which first-year graduate students learn about the research activities of the departmental faculty.
Prerequisite: First-year graduate student
0 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

ESC596 Mechanical Engineering Design Master's Project
Design project for master's students who are completing the program in Computer-Aided Engineering Design. Project should include the processes of preliminary design analysis and systems synthesis.
Prerequisites: ESC 525, ESC 526
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 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 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 621/622 Combustion Theory I and II
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, each semester

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 duct and boundary layers. Both purely viscous and visoelastic fluids will be considered. The measurement of rheological transport properties will be discussed.
Prerequisite: Permission of instructor
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 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

Technology and Society (EST)

Chairperson: Emil J. Piel
Engineering Building, E-210 (516) 246-8427

Graduate Program Director: Thomas T. Liao
Engineering Building, E-220 (516) 246-8648

M.S. Program in Technological Systems Management

Individuals increasingly depend upon modern technology which helps mold every facet of life. Governmental as well as individual decisions require public understanding of the characteristics, capabilities and limitations of modern technology. Industrial and government employees and teachers at all levels and in all disciplines increasingly find that a more than superficial knowledge of technology is of critical importance.

The master's degree in Technological Systems Management is designed to provide professionals in all fields with the expertise to use technological concepts and devices to enhance the performance and management of specific systems. Students can focus on one of three areas of concentration: Educational Computing, Systems Planning and Management, or Industrial Management. The five required courses (15 credits) for the first two areas of concentration are the same; Industrial Management has its own set of required courses. Both part-time and full-time students are accepted, with teaching or research assistantships availablle for full-time students who qualify.

Graduate Studies in Industrial Management

The Department of Technology and Society 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.

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, Arthur W. Gilmore, Director of Graduate Studies in Industrial Management.

Facilities

Besides having access to the University's mainframe computer, students also have access to three microcomputer laboratories. Our large 20-workstation microcomputer learning laboratory uses Commodore Pets with 32K of memory. The department also has a special laboratory with four disk-based Control Data 110 microcomputers. The third laboratory houses at lease one of most of the other microcomputers (e.g., two Apple II computers). An open laboratory is also available for students to study other types of technologies such as intelligent videodisks and analog computers. This laboratory and the microcomputer facilities are also used for educational technology projects.

Admission

For admission to the M.S. program in Technological Systems Management, the following are required:

A. A bachelor's degree in engineering, natural sciences, social sciences, mathematics or a closely related area from an accredited college or university.

B. A minimum grade average of at least B in courses of undergraduate major.

C. Work experience during or following attainment of the bachelor's degree.

D. Any deviation from the above requirements must be approved by the faculty committee on admissions to this program.

E. The Graduate Record Examination General Test scores.

F. Acceptance by the College of Engineering and Applied Sciences and the Graduate School.

Degree Requirements

In addition to the minimum Graduate School requirements, the following are required:

A. 5 required courses (3 credits each) (15 credits)
B. Elective Program (Electives are selected with the approval of the MS/TSM Faculty Advisor) (15 credits)
   1. Independent Study (up to 3 credits)
   2. Graduate Electives
C. 1. Computer language competency requirement (Part of Computer Literacy Course)
   2. Master's Project (Part of Project Seminar)

Faculty

Ferguson, D. L., Assistant Professor. Ph.D., 1980 University of California, Berkeley: Quantitative methods; computer applications (especially intelligent tutoring systems and decision support systems); mathematics, science, and engineering education.

Gilmore, A. W., Lecturer. M.S., 1957, University of Colorado: Aerospace engineering; engineering economics.

Leonhardt, N. A., Lecturer. M.S., 1978, State University of New York at Stony Brook: Decision-making; computer literacy, applications software, user education.

Liao, T. T., Associate Professor. Ed.D., 1971, Columbia University: Computers in education; technology assessment.

Paldy, L. G., Associate Professor. 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; human-machine systems.

Spanier, S. W., Lecturer. Ph.D., Pennsylvania State University, 1981: Communication skills for engineering and applied sciences; technology and the liberal arts.

Truxal, J. G., Distinguished Teaching Professor. Sc.D., 1950, Massachusetts Institute of Technology: Control systems; technology-society issues.

Visich, M., Jr., Professor. Ph.D., 1956, Polytechnic Institute of Brooklyn: Aerospace engineering; technology-society issues.

Required Courses

COMPUTERS IN EDUCATION AND PLANNING AND MANAGEMENT CONCENTRATIONS

CEN 580 Socio-Technological Problems
A series of case studies of current socio-technological problems encompassing such areas as health service delivery, water supply, population, emergency medical care, auto safety, noise pollution, and the energy crisis. The problem in each case is studied historically and alternatives are developed in the areas of education, legislation, and technology with consideration of the corresponding technological, economic and social consequences involved.
Fall, 3 credits

EST 581 Methods of Socio-Technological Decision-Making
Application of decision-making techniques to analyze problems involving technology, particularly its social impacts. Area of study includes decision-making under uncertainty; decision-making in a passive vs. active environment; sequential decisions; estimating payoffs; forecasting; and technology assessment. These systems-analysis techniques are used to formulate and solve a variety of socio-technological problems.
Prerequisites/Corequisites: CEN 580 or permission of instructor
Fall, 3 credits

EST 582 Systems Approach to Human-Machine Systems
Applications of systems 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 use of feedback; stability and instability of urban systems, transportation, epidemics and economics; machines and systems for men, including communication and prosthetics.
Prerequisite/Corequisite: CEN 580 or permission of instructor
Spring, 3 credits

EST 583 Computer Literacy
Students will develop a basic understanding of digital computers—how they work and their applications. Emphasis will be placed on applications and the social implications of the use of computers in education, business, artificial intelligence and robotics, medicine and government. Actual experience with the computer will include introduction to programming, algorithmic problem formulation, and running existing programs.
Spring and fall, 3 credits each semester

EST 590 Seminar for MS/TSM Students
A forum for the discussion of research methods, project ideas, and preparation of a proposal. A final product of this seminar is an approved master's project proposal. Each student also leads a discussion about an important technology-society problem or issue such as safety of nuclear power plants, impact of video games and the MX controversy. Each student will work with a faculty advisor on background research and preparation of the master's project proposal.
Fall, 3 credits

CORE REQUIREMENTS FOR INDUSTRIAL MANAGEMENT

EMP 504 Quantitative Management Methods and at least four of the six 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

EMP 517 Quality Management

Electives shall be selected with approval of faculty advisor from a board selection of programs. A maximum of 6 credits of graduate coursework under the continuing ducation program are transferrable to be counted toward the degree.

EMP 500 Management Policy and Planning by Case Study
This course provides the student with experience in analyzing complex, multifactor management problems in the context of realistic case studies. The cases cover areas such as marketing, finance, labor relations, strategic planning, design and administrative organization, corporate reponse to social change.
Prerequisite: EMP 502 or equivalent
Fall, 3 credits

EMP 501 Behavioral and Organizational Aspects of Management
This course provides an understanding of the management process by analyzing organizational behavior. Topics include: behavior in two-person situations, factors influencing attitudes and changes in organizational behavior, group influence on behavior, formal and informal organizational structures, conflict and conflict resolutions and the dynamics of planned change.
Fall, 3 credits

EMP 502 Management Accounting and Financial Decision Analysis
Fundamentals of managerial accounting with emphasis on cost accounting terms, concepts, ratio and break-even analysis, financial structure, cost analysis, opportunity costs and return calculations, replacement of assets, portfolio theory.
Spring, 3 credits

EMP 503 Legal and Regulatory Aspects of Management
This course provides a survey of business and regulatory law. Topics discussed include contracts, sales and forms of business organizations. An overview is provided of antitrust, environmental and civil rights legislation and their impact on business..
3 credits

EMP 504 Quantitative Methods in Management
A rapid introduction to the application of modern mathematical concepts and techniques in management science. Algebraic operations, mathematical functions and their graphical representation, and matrix operations are reviewed. Topics covered include the following: break-even analysis, mathematics of interest, annuity, and mortgage, traffic flow and other systems of linear equations, algebraic and simplex methods of linear programming, probability, statistics of acceptance testing, Markov chain modeling of market transitions, queuing models. Simple management oriented examples are used to introduce mathematical formulations and extensions to more general problems.
Prerequisite: 2 semesters of calculus or equivalent
Fall, 3 credits

EMP 509 Management Information Systems
The flow of data in industrial and governmental organizations. How information is stored, analyzed and disseminated for various management tasks. The physical and logical organization of computer data processing systems. Principles of file processing, data base management and information systems design.
Sprng, 3 credits

EMP 517 Quality Management
Quality is now being recognized as of strategic importance for manufacturing and service organizations. This course will provide opportunity for the students to explore numerous aspects of the Quality System approach to management, rather than statistical quality control techniques. Special attention will be given to the tailoring of the subject material to the actual situations existing in the students' organizations. Development of specific policies, objectives, and goals will take place, accompanied by the tools necessary to measure their accomplishment and impact.
Spring, 3 credits

COMPUTERS IN EDUCATION CLUSTER

EST 565 Personal Computers in Learning Environments
This course will provide exposure to and experience with several of the "personal" microcomputers. These new machines, with a cost range of $800 to $2,000 are appearing in schools and other learning environments. The intent of this course is to cover topics on basic specifications and characteristics of several machines, an introduction to the commercial programs that are available for these machines and how to use them in the classrooms. It is expected that at the end of the course the students will be able to develop a working program that could be used in a classroom.
Prerequisite: EST 583
Spring, 3 credits

EST 570 Design of Computer Courseware
The purpose of this course is to develop in the student the capability to develop computer courseware modules in the student's discipline. Existing courseware modules will be described to illustrate the structure requirements of such modules. After each exposure, each student will select topics for courseware development from her/his discipline and will concentrate on module development under the individual guidance of the instructor. Students will implement the programs in microcomputers in the Laboratory for Personal Computers in Education.
Prerequisite: EST 565
Spring, 3 credits

EST 571 Computer-Based Educational Technologies
This course emphasizes the design and evaluation of computer-based educational technology systems. The uses of personal computers, intelligent video disks, games and other devices in education are examined. Students will learn state-of-the-art technology, contemporary uses, strategies for matching these technologies to the needs and characteristics of learners, ways of introducing these systems into learning environments and the evaluation of their effectiveness.
Prerequisite: EST 565 or permission of instructor
Spring, 3 credits

EST 585 Technology in Learning Systems
This course is designed to provide educators with an overview of how technology is being used to improve instruction. Specific areas of study include a systems approach to the design of learning environments, use of technology in conventional classroom and for individualizing instruction, use of computers in instruction and evaluation of the performance of student learning. Future educational uses of technology as well as present applications will be discussed.
Fall, 3 credits

EST 591 Independent Study in Technology and Society
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/her master's project. Students should consult individually with faculty members on work load and credit(s).
Prerequisite: EST 590
Fall, spring, 1 to 3 credits

PLANNING AND MANAGEMENT ELECTIVES

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. These applications include communication systems, human auditory and visual systems, and societal systems involving feedback.
Prerequisite: EST 582
3 credits

EST 587 Today's Technology, Impact on Education and Economics
This course will involve the student in studies of the science, technology and economics of four selected areas: electronics, transportation, energy, and health sciences. Classroom time will be supplemented by visits to appropriate facilities in each area. Individuals and groups will also plan for the use of the information in their specific areas of responsibility. For example, teachers will have the responsibility for developing teaching strategies for use of the information in their classes and for student career advice and preparation. Others from commerce and industry will want to learn of the powerful influence of technological development on regional economics. This knowledge should prove helpful in carrying out strategic planning and forecasting within the student's organization.
Summer, 3 credits

EST/EMP 588 Technical Communication for Management and Engineering
The ability to communicate technical ideas clearly and effectively is critical to success in management and engineering. Personal hours and money are wasted when confused, distorted writing and speaking obscure the information they are intended to convey. This course will provide managers, engineers and other technical professionals with practical methods for making their memos, reports and correspondence clear, comprehensible and persuasive. They will learn strategies for communicating with both non-specialist and technical audiences, stating their purpose clearly, organizing points most effectively, and expressing ideas concisely and precisely. Special attention will be given to technical presentations, and communicating in meetings.
Spring, 3 credits

EST 589 Technology-Enhanced Decision Making
This course will examine the use of technological devices, especially computer, as aids in decision making. A treatment will be given of the cognitive science and artificial intellligence methods used in the structure and operation of some systems that support human decision making. Medical diagnosis systems, business and industrial planning systems, as well as computer-aided dispatch systems will be discussed. In addition, the application of high technology in air traffic control systems will be examined.
Prerequisite: EST 581
Corequisite: EST 582 or permission of instructor
Fall, 3 credits

INDUSTRIAL MANAGEMENT ELECTIVES

EMP 505 Investments and Portfolio Management
Provides an introduction to investments in stocks, bonds, options, commodities and the design of portfolios to realize optimal return on investment, at least risk. Topics include operations of the securities markets, evaluation of investments, trading strategies, timing, risk vs. return analysis, efficient market theory, capital market theory.
Prerequisite: EMP 502 or equivalent
3 credits

EMP 507 Research in Special Topics
Research in special topics on industrial management either individually or in a seminar setting.
Prerequisite: Completion of core program or 18 credits, whichever applies, and permission of program director and supervising faculty member.
3 credits

EMP 508 Case Studies in Organizational Behavior
Application of behavioral science principles and research to the solution of intraorganizational problems on three levels of behavior: interpersonal situations including superior subordinate as well as peer relationships, dynamics of work groups from viewpoints of both leadership and membership roles, problems of larger organizational self-systems and the organization as an entity. Relevant behavioral science theory and research will be studied through collateral readership and then applied through case studies to the solution of day-to-day problems as well as longer-range behavioral issues faced by organizations. These studies will be approached from various viewpoints such as discussions, analysis, and diagnosis, organizational simulation, role playing and experiential techniques.
3 credits

EMP 511 Environmental Law
The legal aspects of water supply and pollution; national, state and local laws and codes pertaining to water, air and water pollution and solid waste disposal. Compliance with these regulations: the statutory responsibilities of private and governmental organizations. Environmental impact statements, their preparations and assessment. The availability of and requirements for obtaining federal and state funding.
3 credits

EMP 513 Social Insurance
The problems involved with modern social insurance, public and private pension systems, unemployment insurance, disability benefits health insurance, etc., are examined as they affect the covered populations, management, labor, legislators, and government and private administrators of such programs. Included are such topics as cost estimate, solvency, and future trends in population, labor force, and the economy.,
3 credits

The Marine Sciences Research Center

The Marine Sciences Research Center

Dean: J.R. Schubel
Endeavour Hall (516) 246-6546

Graduate Program Director: J.R. Schubel

The Marine Sciences Research Center (MSRC) is the center for research, graduate education and public service in the marine sciences for the entire State University of New York system. It offers the only SUNY graduate degree programs in oceanography and marine environmental sciences. MSRC has programs of research in biological, chemical, geological and physical oceanography, in coastal zone management and in fishery management. MSRC scientists have a strong commitment to translate the results of research into forms readily usable for management, and when possible, solution of environmental problems of the coastal zone. Emphasis in the research, educational and public service programs is on the coastal ocean.

The Center is situated ideally for studies of a variety of coastal environments including estuaries, lagoons, salt marshes, barrier islands and continental shelf waters. Long Island has a greater diversity of coastal environments in a limited geographical range than any other comparable area in the United States. The proximity of New York City and the burgeoning population of Long Island and Connecticut make New York coastal waters an excellent laboratory for evaluating conventional methods of pollution abatement and coastal zone management. They also present an exciting and demanding challenge to the most imaginative and innovative scientists and planners to develop more effective ways of accommodating multiple and conflicting uses of these valuable natural resources with predictable and acceptable impacts.

The Marine Sciences Research Center offers a M.S. degree in Marine Environmental Sciences and a Ph.D. degree in Coastal Oceanography. The following pages describe the two programs in detail. Interested students should address inquiries to the Graduate Program Director.

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.

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 student, to formulate and attack coastal oceanographic problems. It builds on a flexible, interdisciplinary program and offers students the opportunity to extend their command of the tools of scholarship and to mature their judgement 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 profound knowledge of at least one basic science and a general understanding of the processes that characterize the coastal ocean.

Facilities

The main laboratories and offices of the Marine Sciences Research center (MSRC) are housed in a cluster of buildings with more than 7,969 square meters of usable floor space. Laboratories are well-equipped for most analyses, and students and faculty have access, with special arrangements, to nearby Brookhaven National Laboratory and Cold Spring Harbor Laboratory. Center and University computing facilities are excellent. The University Library has extensive holdings in oceanography and environmental sciences as well as in the basic sciences.

MSRC manages Flax Pond, a 0.6-square kilometer salt marsh located approximately seven kilometers from campus. Flax Pond is surrounded by large estates and has retained a relatively pristine character. Approximately three-fourths of the marsh has been set aside for research and education, and competing activities are prohibited. MSRC has a well-equipped laboratory with a continuous seawater system. Laboratory and sea-table space are available to MSRC faculty and students.

The Center operates an 18-meter research vessel, the *R/V ONRUST,* which was completed late in 1974. The *R/V ONRUST,* designed specifically for oceanographic research, is one of the finest vessels of its kind and is outfitted for virtually every kind of oceanographic sampling. MSRC also maintains a number of smaller boats.

Admission

Admission to the M.S. Program in Marine Environmental Sciences

For admission to graduate study in Marine Environmental Sciences, the following, in addition to the minimum Graduate School requirements, are normally required:

A. B.A. or B.S. degree.

B. Coursework in mathematics through calculus; physics; introductory courses in at least two of the following areas . chemistry, biology and earth sciences, with advanced work in at least one of these areas.

C. Cumulative grade point average of at least 3.0 (B).

D. Acceptable scores on the General Test of the GRE.

E. Acceptable scores (550) on the TOEFL Exam for international students.

F. Three letters of recommendation.

G. Official transcript(s).

H. Acceptance by the Marine Sciences Research Center and the Graduate School.

Admission to the Ph.D. Program in Coastal Oceanography

For admission to graduate study in Coastal Oceanography, the following, in addition to the minimum requirements of the Graduate School, are normally required:

A. For the most part, applicants 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. The M.S. degree need not be in oceanography or marine sciences. Requirement of an M.S. degree may be waived after the first year for students who have demonstrated exceptional capability in scholarship, motivation, diligence in the discharge of their duties and a clear sense of direction. Students who transfer either must demonstrate, by examination, mastery of the material in the MSRC core courses (MAR 501, 502, 503, and 506) or must take these courses.

B. Acceptable scores on the General Test of the Graduate Record Examination also required.

C. Acceptable scores (550) on TOEFL Exam for international students.

D. Three letters of recommendation.

E. Official transcript(s).

F. Acceptance by both the Marine Sciences Research Center and the Graduate School.

Degree Requirements

Requirements for the M.S. Degree in Marine Environmental Sciences

In addition to the minimum Graduate School requirements, the following are required:

A. Core courses (Biological, Chemical, Geological and Physical Oceanography) with a least a B average; or demonstration of proficiency to the satisfaction of the instructor.
   Students who do not achieve the B average must petition the Graduate Programs Committee for a decision concerning their status in the program. Any student who receives two C's that have not been offset by two A's will not be allowed to register for the following semester and may be asked to leave the program.

B. One management course.

C. Seminar MAR 580 (2 semesters).

D. An advisor by the end of the first year.

E. Master's research proposal due by end of first year, signed by advisor and two readers.

F. Written comprehensive exam.

G. Sea experience or appropriate field experience.

H. Oral defense of thesis work.

I. Submission of approved thesis.

Requirements for Ph.D. Degree in Coastal Oceanography

In addition to the minimum Graduate School requirements, the following are required:

If the student has done sufficiently well on the comprehensive exam and wishes to continue for a Ph.D. degree in Coastal Oceanography, he/she may apply for admission. If accepted, the additional requirements are:

J. Demonstrate proficiency in one, approved foreign language.

K. Ph.D. degree dissertation proposal approved by three MSRC faculty.

L. Practicum in teaching.

M. Oral qualifying examination.

N. Formal advancement to candidacy.

O. Oral defense of dissertation.

P. Submission of approved dissertation.

Q. Residency. Normally at least two consecutive semester of full-time study.

If a student enters with a M.A. or M.S. and aspires to the Ph.D. degree, the requirements are the same as the preceding requirements with the exclusion of the following:

1. The student will not have to take a management course (Step B).
2. The student will not have to prepare a Master's proposal (Step E).
3. The student will not have to prepare or defend a Master's thesis (Steps H and I).
4. The student will not have to meet the 30-credit requirement.

The student will be responsible for ALL other requirements, although the comprehensive examination may be waived by the Director of the MSRC Graduate Programs upon recommendation of the Graduate Programs Committee, if the student proves satisfactorily that he/she has already demonstrated comprehensive and integrative ability in the four disciplines (ie., physical, chemical, geological and biological oceanography) at a level comparable to that expected on the written comprehensive exam.

Faculty

Bokuniewicz, Henry J., Associate Professor. Ph.D., 1976, Yale University: Nearshore transport processes; coastal sedimentations; marine geophysics.

Bowman, M.J., Associate Professor, Ph.D., 1971, University of Saskatchewan, Canada: Oceanography of coastal waters; water quality modeling; microstructure and turbulence.

Brinkhuis, Boudewijn H., Assistant Professor. Ph.D., 1975, State University of New York at Stony Brook: Seaweed productivity, physiology and ecology.

Capone, Douglas G., Assistant Professor. Ph.D., 1978, University of Miami: Microbial ecology and biogeochemistry.

Capriulo, Gerard M., Adjunct Assistant Professor. Ph.D., 1982, State University of New York at Stony Brook: Microzooplankton ecology; marine food webs; marine protozoan ecology.

Carpenter, Edward J., 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.

Cochran, J. Kirk, Assistant Professor,[7] Ph.D., 1979. Yale University: Marine geochemistry; use of radionuclides as geochemical tracers; diagenesis of marine sediments.

Conover, David O., Assistant Professor. Ph.D., 1981, University of Massachusetts: Ecology of fishes; fisheries biology.

Cosper, Elizabeth M., Assistant Research Professor. Ph.D., 1981, City University of New York: Phytoplankton physiology and ecology; resistance of microalgae to pollutants.

Duguay, Linda E., Assistant Research Professor. Ph.D., 1979, University of Miami: Physiology and ecology of marine protozoans and zooplankton.

Fairbridge, Rhodes W., Adjunct Professor. D. Sc. 1944, University of Western Australia: geology; coastal geomorphology; sedimentology; ecology.

Falkowski, Paul G., Adjunct Assistant Professor,[2] Ph.D., 1975, University of British Columbia, Canada: Marine phytoplankton ecology; phytoplankton physiology.

Fuhrman, Jed A., Assistant Professor. Ph.D., 1981, Scripps institution of Oceanography: Marine microbial ecology; bacterioplankton production.

Gerard, Valrie A., Assistant Professor. Ph.D., 1976. University of California, Santa Curz: Marine macrophyte ecology and physiology; marine biomass as an energy.

Giese, Graham S., Associate Director and Adjunct Professor. Ph.D., 1966, University of Chicago: Coastal physical processes: beach and nearshore changes; sediment transport and wave dynamics, in particular coastal seiching.

Herman, Herbert, Professor. Ph.D., 1961, Northwestern Univervsity: Ocean engineering; undersea vehicles; marine materials.

Hopkins, Thomas S., Adjunct Associate Professor,[2] Ph.D., 1971, University of Washington: Coastal current structure: water mass analysis; air-sea interaction.

Horrigan, Sarah G., Assistant Professor. Ph.D., Scripps Institution of Oceanography Marine microbial ecology; nutrient cycling.

Kirby, James T., Assistant Professor. Ph.D., 1983, University of Delaware. Nearshore hydrodynamics; coastal engineering.

Koppelman, Lee E., Professor and Executive Director, Long Island Regional Planning Board. Ph.D., 1970, Cornell University: Coastal zone management; planning; policy studies.

Levine, Howard G., Post-Doctoral Fellow. Ph.D., 1983, University of Massachusetts: Phycology; environmental monitoring; aquaculture.

Like, Irving, Adjunct Professor,[4] LL.B., 1984, 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.

Mackin, James E., Assistant Professor. Ph.D., 1983, University of Chicago: Diagenesis of sediment.

Malouf, Robert E., Associate Professor. Ph.D., 1977, Oregon State University: Shellfish biology; aquaculture.

Manheim, Frank T., Adjunct Professor. Sc.D., 1974, University of Stockholm: Marine geochemistry; ocean policy.

Mayer, Garry F., Adjunct Assistant Professor,[5] Ph.D., 1972, Harvard University: Pollution effects; ichthyology systematics.

McHugh, John L., Professor Emeritus. Ph.D., 1950, University of California, Los Angeles: Fishery management; fishery oceanography; whales and whaling.

Meade, Robert H., Adjunct Professor,[6] Ph.D., 1960, Stanford University: Coastal and fluvial sedimentation; ground water.

Meyers, William J., Associate Professor. Ph.D., 1973, Rice University: Carbonates; sedimentology.

Najarian, Tavit O., Adjunct Assistant Professor,[8] Ph.D., 1975, Massachusetts Institute of Technology; Physical oceanography; water quality modeling.

O'Connor, Joel S., Adjunct Associate Professor,[5] Ph.D., 1966, University of Rhode Island: Estuarine and coastal ecology.

Okubo, Akira, Professor. Ph.D., 1963, Johns Hopkins University: Oceanic diffusion; animal dispersal; mathematical ecology.

Partch, Eric N., Assistant Research Professor. Ph.D., 1981, University of Washington: Estuarine dynamics and mixing processes; oceanic dispersion.

Peterson, William T., Assistant Professor. Ph.D., 1979, Oregon State University: Zooplankton population dynamcis; 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.

Roethel, Frank J., Lecturer. Ph.D., 1982, State University of New York at Stony Brook: Environmental chemistry; behavior of coal waste in the environment; solution chemistry.

Schubel, J.R., Dean, Marine Sciences Research Center and Professor. Ph.D., 1968. 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.

Siddall, Scott E., Assistant Professor. Ph.D., 1980, University of Miami: Physiological ecology, taxonomy and morphology of molluscan larvae; management of shallow-water resources.

Slobodkin, Lawrence B., Professor,[10] Ph.D., 1951, Yale University: Theoretical ecology; marine ecology.

Smith, Sharon L., Adjunct Assistant Professor,[2] Ph.D., 1975, Duke University: Plankton ecology; nutrient regeneration by zooplankton.

Squires, Donald F., Director, New York Sea Grant Institute and Professor. Ph.D., 1955, Cornell University: Marine affairs and science policy.

Stanford, Harold M., Adjunct Associate Professor,[5] M.S., 1970, Oregon State University: Marine pollution in estuarine and coastal waters; marine geochemistry.

Swanson, R. Lawrence, Adjunct Professor and Research Associate, National Sea Grant Program, NOAA. Ph.D., 1971, Oregon State University: Physical oceanography of coastal waters and estuaries; ocean dumping; coastal zone management.

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,[2] Ph.D., 1972' University of New Hampshire: Transport, fate and effects of viruses in the aquatic environment.

Vieira, Mario E.C., Assistant Research Professor: Ph.D., 1983, Johns Hopkins University. Estuarine and coastal waters circulation and dynamics.

Walsh, John J., Adjunct Professor and Head, Oceanographic Sciences Division, Brookhaven National Laboratory. Ph.D., 1969, University of Miami: Upwelling ecosystems; phytoplankton ecology; ecosystems modeling.

Wang, Franklin F.Y., Professor.[3] 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; paleoceanography.

Whitledge, Terry E., Adjunct Assistant Professor.[2] Ph.D., 1972, University of Washington: Nutrients; chemistry of seawater; ecosystem dynamics.

Williams, Susan L., Adjunct Assistant Professor. Ph.D., 1981, University of Maryland: Cycling of carbon and nitrogen in marine ecosystems.

Wilson, Robert E., Associate Professor. Ph.D., 1973, 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 cholorinated hydrocarbons on phytoplankton communites.

Young, David R., Associate Research Professor. Ph.D., 1970, Scripps Institution of Oceanography: Water quality; marine pollution.

Zarillo, Gary A., Assistant Professor, Ph.D., 1979, University of Georgia: Beach and nearshore processes; sediment dynamics.

Number of teaching, graduate and research assistants, fall 1983: 59

[1]*University of Concepcion, Chile*
[2]*Brookhaven National Laboratory*
[3]*Joint appointment, Department of Materials Science*
[4]*Reilly, Like and Schneider, Attorneys*
[5]*National Oceanic and Atmospheric Administration, Ocean Assessment Division*
[6]*U.S. Geological Survey*
[7]*Joint appointment, Department of Earth and Space Sciences*
[8]*Najarian & Associates, Inc.*
[9]*University of Alaska*
[10]*Joint appointment, Department of Ecology and Evolution*

Courses

MARINE ENVIRONMENTAL SCIENCES COURSES

MAR 501 Physical Oceanography
Part I — Course examines physics of ocean circulation and mixing on various scales with strong emphasis on profound effects of earth's rotation on motions and distribution of properties.
Part II — Introduction to physics of estuaries and other coastal water bodies.
Prerequisite: Concurrent enrollment MAR 555 or permission of instructor
Fall, 5 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 laboratory experience directed toward imparting analytical skills.
Prerequisite: MESP enrollment or permission of instructor
Spring, 4 credits

MAR 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.
Prerequisite: MESP enrollment or permission of instructor
Fall, 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.
Prerequisite: 1 yr. physics, 1 yr. calculus, and permission of instructor
Spring, 4 credits

MAR 515 Phytoplankton Ecology
Phytoplankton ecology consists of a description of the classes of phytoplankton and their geomorphological and physiological characteristics. Includes study on phytogeography, photosynthesis, ecology and factors affecting growth of phytoplankton.
Prerequisite: General Biology
Spring, 3 credits

MAR 519 Geochemistry Seminar
Seminar course dealing with geochemistry of recent marine sediments. Topics include diagenesis of organic matter; systematics of nitrogen, phosphorus, sulfur and carbon; diagenesis of trace metals; role of bioturbation in modifying diagent diagentic reactions and chemical transport across sediment — water interface and chronologies of marine sediments.
Prerequisite: MAR 503 or permission of instructor
Fall, 2 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 536 Environmental Law
Course covers legal, political, and economic implications of the National Environmental Policy Act and other statutes relating to protection of air, water, and natural resources; litigation strategies available to promote environmental protection; practical advice to scientists responsible for developing environmental impact statements.
Fall, alternate years, 3 credits

MAR 540 Marine Microbial Ecology
An historical perspective of the field; aspects of nutrition and growth; microbial metabolism and trophodynamic relationships with other organisms. Emphasis on roles of microorganisms in marine environments, such as salt marshes, estuaries, coastal pelagic ecosystems and the deep sea, as well as microbial contribution to geochemical cycles. Contemporary and classical methodologies covered.
Prerequisites: MAR 502 or permission of instructor
Spring, alternate years, 3 credits

MAR 545 Coastal Sedimentary Environments
Survey of depositional environments from nearshore continental shelf through the backbarrier estuarine complex. Emphasis placed on depositional processes and products within such varied environments as tidal deltas, barrier islands, tidal flats and salt marshes, point bass and river deltas.
Prerequisites: Introductory course in stratigraphy and sedimentation or permission of instructor
Fall, 3 credits

MAR 550 Topics in Marine Sciecnes
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 Nature of Marine Ecosystems, Science and Technology in Public Institutions, Plutonium in the Marine Environment and Problems in Estuarine Sedimentation.
Fall and spring, variable and repetitive credit

MAR 552 Directed Study
Individual studies under the guidance of a faculty member. Subject matter varies according to the needs of the students.
Prerequisite: Consent of Instructor
Fall, spring and summer, variable and repetitive credits

MAR 555 Introduction to Mathematics for Marine Scientists
Course is designed to assist non-math/physics majors who take required core courses as well as advanced courses in our program. Topics covered are differential equations, differential and integral calculus, (minimum) partial differential equations. Discussions include formulation of practical problems, i.e., application of differential equations.
Prerequisite: Calculus I or permission of instructor
Fall, 3 credits

MAR 560 Principles of Fishery Ecology
Biological basis for, and techniques of, managing fish populations. Biology of commercially important species. Methods of stock assessment, estimating population size, mortality, recruitment and yield. Role of aquaculture. Emphasis on, but not limited to, marine species.
Prerequisite: Permission of instructor
Fall, 3 credits

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 508.
Spring, 3 credits

MAR 569 Practicum in Teaching
Fall and spring, 1-3 credits, repetitive

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.
Prerequisite: Permission of instructor
Fall and spring, variable and repetitive credit

COASTAL OCEANOGRAPHY COURSES

OCN 563 Mathematical Marine Ecology
Course focuses on the use of mathematics in marine ecological problems. Topics include population dynamics; diffusion-reaction models; critical patch-size problems; biofluid mechanics; catastrophe-chaos problems; and animal swarming.
Prerequisite: Calculus (advanced) or consult with the instructor
Spring, 2 credits

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 presentation 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 fluctuation in diffusion. Course concludes with a study of the effect of diffusion on the space-time behavior of nonconservative properties such as chemical reactants and planktonic organisms.
Prerequisite: Partial differential equations
Fall, 3 credits

OCN 605 Acoustic Techniques in Coastal Marine Geology
Theory and practice of seismic techniques and echo-sounding in examination of geological features and processes. Study of seismic reflection and refraction methods and records interpretation to describe subsurface structure. Use of acoustic devices to study sediment transport. Field project required.
Prerequisite: MAR 506
Fall, 3 credits

OCN 606 Design of Field Experiments
Series of seminars focusing on experimental design and planning and implementation of field observations 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 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 tracrs in estuarine geochemical studies; geochemical processes at the benthic boundary layer.
Prerequisite: Permission of instructor
Fall, alternate years, 3 credits

OCN 612 Dynamical Oceanography I
The first course in a 2 course series on basic methods and results in dynamical oceanography. This course will emphasize unstratified fluids. Topics covered will include but are not limited to: basic conservation equations, effects of rotation, geostrophy, potential vorticity conservation, Ekman layers and Ekman pumping.
Prerequisite: MAR 501 or permission of instructor
Spring, 3 credits

OCN 615 Dynamical Oceanography II
Continuation of Dynamics I. Course will cover some of the basic effects of stratification. Topics would include potential vorticity for baroclinic motion and baroclinic instability.
Prerequisite: Dynamical Oceanography I
Fall, 3 credits

OCN 624 Oceanic Fronts, Physical Properties and Biological Significance
Course content will include description of various types of fronts including planetary scale fronts, major current boundary fronts (e.g., Gulf Stream) shelf-break fronts, upwelling fronts, plume fronts and tidal stirring fronts. This will be followed by basic frontal dynamics and circulation, time and space scales, design of observational programs and sampling strategies.
Prerequisites: MAR 501 and 502
Spring, 2 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 655 Directed Study
Individual studies under the guidance of a faculty member. Subject matter varies according to the needs of the student.
Prerequisite: Permission of Instructor
Fall, spring and summer, variable and repetitive, 1-9 credits

OCN 666 Long-Period Waves
Development of properties of long-period waves from equations of motion and continuity. Examination of experimental evidence for their existence and characteristics. Wave-trapping effects of stratification on properties and propagation.
Prerequisites: MAR 501, OCN 612 or permission of instructor
Fall, 2 credits

OCN 670 Practicum in Teaching
Fall and spring, 1-3 credits repetitive

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
Spring, 3 credits

OCN 676 Proposal Preparation
Course of independent study toward 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, 506, or equivalent, and consent of instructor
Fall, 3 credits

OCN 677 Benthic Ecology
Ecological interactions of benthic organisms with their habitat. There will be discussion of the nature of competition, predation and disturbance, and life history and feeding strategies. Most of course will cover investigation of invertebrate fauna of coastal marine sediments, but there will be discussions of intertidal, abyssal and lacustrine habitats.
Prerequisite: MAR 502, MAR 506 or permission of instructor
Fall, alternate years, 2 credits

OCN 682 Mechanics of Ocean Surface Waves
Review of hydrodynamic principles and the assumptions underlying various theoretical models of surface wave motion. Formulation and solution of the linear problem; solutions by superposition. Wave-bottom and wave-current interaction. Formulation of conservation relations for more energy in the nearshore zone, and wave refraction.
Prerequisites: MAR 501 and MAR 555 or permission of instructor
Spring, 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 nonconservative properties such as chemical reactants and plankton organisms.
Prerequisites: Partial differential equation. Crosslisted with BEE 693
Fall, 2 credits

The W. Averell Harriman College for Policy Analysis and Public Management

The W. Averell Harriman College for Policy Analysis and Public Management

Dean: Harry Weiner
Old Physics Building (516) 246-8275

The W. Averell Harriman College for Policy Analysis and Public Management prepares students for careers as analysts and managers in three fields: 1) government, at the state, local, federal and international levels; 2) the nonprofit sector; and 3) those areas of business that interact closely with government.

The curriculum differs from the traditional "public adminstration" 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 organizations. Substantive areas treated in the curriculum, and in which graduates specialize, include education policy, energy management, transportation, health care, social policy, criminal justice and others.

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, financial analysis, modeling for policy making and economic anaylsis, plus one semester-long course in political and adminstrative decision-making and another devoted to a workshop in which the classroom theory is brought to bear on one or more problems of public policy.

Internship

All students must successfully complete an internship. These positions are obtained with the help of the College and generally pay $250-$300 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 45-55 students, the second-year college courses generally have about half that number. The second-year courses offered n the Harriman Colege 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 nonprofit 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 policy analysis and public management 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 for Technology Policy in Development.

Facilities

The Harriman College occupies two floors of the Old Physics Building. Besides faculty and administrative offices, it has six classrooms of varying size. Upon admission, each first-year graduate student is assigned to a six-person office and provided with a desk, chair and file cabinet. Second-year students progress to two- and three-person offices. Although use is made of the University's main computer, most class problem sets are worked in the College's own Data Lab, equipped with four desk-top computers (two IBM PCs and two Hazeltine North Stars), printers and software. Thus, the College is "alive" at night and weekends, as students meet in their offices and the Data Lab for peer instruction, joint projects, etc. A professional atmosphere prevails.

Admission

The Harriman College is designed for ambitious and able students who are capable of applying what they learn toward the solution of public policy 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.

Students must satisfy the following admissions requirements in addition to the minimum requiremnts of the Graduate School:

A. A baccalaureate degree with minimum grade point average of 3.00. In exceptional cases, students not meeting this requirement must be admitted on a provisional basis.

B. Aptitude for quantitative analysis, demonstrated through previous coursework, standardized tests or practical experience.

C. Submission of Grauate Record Examination General 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 includes at lest one from a college faculty member, counselor or adminstrator.

E. Acceptance by both the W. Averell Harriman College 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 Policy Analysis
and Public Management
State University of New York at Stony Brook
Stony Brook, New York 11794-3775

Degree Requirements

Requirements for the Master of Science Degree

In addition to the minimum requirements of the Graduate School, the following are required:

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: i) a graduate degree from SUNY at Stony Brook in a department or school other than the Harriman College; ii) 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.

Barnhart, Michael A., Assistant Professor. Ph.D., 1980, Harvard University: U.S. foreign relations; 20th-century U.S.; modern Japan.

Carroll, T. Owen, Associate Professor.[2] Ph.D., 1968, Cornell University: Energy systems; educational finance; mental health.

Cohn, Barbara, Lecturer.[1] B.A., 1958, New York University: Analysis of municipal services.

Francis, Robert A., Lecturer.[1] Ph.D., 1981, Ball State Unversity: Education policy.

Kamer, Pearl M., Associate Professor.[1] Ph.D., 1976, New York University: Regional economic planning.

Kopplelman, Lee E., Professor.[1] Ph.D., 1967, New York University: Planning; energy policy; local government and intergovernmental relations.

Meier, Peter, Associate Professor. Ph.D., 1970, University of Massachusetts: Energy policy.

Nathans, Robert, Professor and Director, Institute for Technology Policy in Development. Ph.D., 1954, University of Pennsylvania: Energy modeling and policy analysis.

Preston, Frederick, Lecturer.[1] Ed.D., 1971. University of Massachusetts, School of Education; Human resources development systems; intercultural awareness/communications; community/organization development awareness; systems of oppression within organizations.

Rinaldo, David W., Lecturer.[1] Ph.D., 1980, University of Michigan: Health economics and health policy, economic analysis of public policy.

Rinaldo, Suzanne G., Lecturer.[1] Ph.D., 1981, University of Michigan: Social policy, organizational analysis; evaluation research; analysis of health and rehabilitation organizations and policies; administrative strategy.

Sexton, Thomas T., Assistant Professor. Ph.D., 1979, State University of New York at Stony Brook: Operations research, specifically, as applied to the anaylsis of transportation problems.

Weiner, Harry, Associate Professor and Dean, S.M., 1970, Massachusetts Institute of Technology: Redesign of organizational structures to improve programmatic capabilities.

Weinstein, Joan, Assistant Professor. M.A., 1965, University of California, Berkeley: Improving interpersonal relations and reducing intergroup 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.

Yasumura, Lee Bek-gran, Lecturer.[1] B.A., 1953, Vassar College: Labor relations and personnel.

Number of teaching graduate and research assistants, fall 1983: 36

[1] *Adjunct faculty*

[2] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1973-74.*

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 PAM graduate courses: PAM graduate student or permission of instructor.

PAM 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

PAM 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 or public agencies, regulation exit and voice theory, metropolitan governance and the role of formal planning.
Fall, 3 credits

PAM 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

PAM 535 Financial Analysis for the Public Sector
Topics include cover budgeting and accounting techniques. Building on basic practices in private sector, course develops practices unique to public and nonprofit sectors, e.g., government agencies. Special topics include cash flow management and debt financing and management.
Fall, 3 credits

PAM 541 Workshop in Policy Analysis and Public Management
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 cooperatively in small groups, all of which are important skills for the policy analyst.
Fall and spring, 3 credits each semester

PAM 543, 544 Modeling 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 modeling of national policy issues. Topics include linear and integer programming, networks and queuing. Applications to school busing, facility location, environmental and energy issues.
Fall and spring, 3 credits each semester

SECOND YEAR

PAM 518 Operations Research for the Public Sector
Documented applications of operations research techniques to the public sector. Among specific areas modeled are emergency services, sanitation, environmental protection, crime prevention, criminal justice, blood banking, energy supply and demand, manpower scheduling and education. Techniques discussed include queuing theory, simulation and Markov processes.
Fall, 3 credits

P 36 Critical Issues in an Policy
This course examines the financial and economic bases of a series of urban problems including transportation, employment, health, housing and fiscal management. Macro- and microeconomic theory will provide the framework for analysis.
Fall, 3 credits

PAM 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

PAM 552 Advanced Data Analysis
Advanced statistical techniques for analyzing data in the context of public policy making. Classical approaches to hypotheses 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 application of statistical concepts.
Spring, 3 credits

PAM 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

PAM 564 Interpersonal Communications
This course is designed to strengthen writing and speaking skills and to familiarize students with the forms of communication used by policy analysts and managers. Major emphasis will be on the development of effective strategies for organizing materials, defining problems, analyzing issues, and structuring arguments, but there will also be extensive practice in writing under pressure, in editing one's own work, in presenting material orally and in working in groups.
Spring, 3 credits

PAM 578 Theory and Management of Nonprofit Organizations
The purpose of the course is to develop an understanding of the role of nonprofit organizations in the U.S. economy, the public policy issues affecting the nonprofit sector, and the problems of managing nonprofit organizations. The scholarly literature on nonprofit organizations is examined, and case studies of problem solving and program development in the nonprofit sector are analyzed.
3 credits

PAM 581 Management of Organizations in 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 structure. Theory is drawn from Taylorism, the Hawthorne studies, job redesign, management by objectives.
Fall, 3 credits

PAM 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

PAM 591 Special Topics in Policy Analysis and Public Management
Designed to accomodate 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

PAM 592 Energy Policy
An overview of the major international and domestic energy issues, emphasizing the difficulties of policy formulation, and interactions with national security and economic development concerns.
Spring, 3 credits

PAM 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

PAM 595 Individual Directed Research in Policy Analysis and Public Management
Designed to accomodate independent research projects on an individual basis with faculty guidance.
Fall and spring, variable and repetitive credit

PAM 596 Small Group Studies in Policy Analysis and Public Management
Designed to accommodate ad hoc small group student research projects on an experimental basis. Projects will be designed by PAM faculty and students. Topics will be announced at the beginning of each semester.
Fall and spring, 1-3 credits each semester

PAM 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

The Health Sciences

The Health Sciences Center

The Health Sciences Center is a major division of the State University of New York at Stony Brook, comprising five professional schools and University Hospital, the major teaching facility for the educational programs of the center. The schools—Allied Health Professions, Dental Medicine, Medicine, Nursing and Social Welfare—offer full-time professional education to approximately 1600 students and conduct programs of research, service and continuing professional education. Professional, technical and laboratory resources support the academic activities of the students and faculty.

University Hospital opened in February 1980. University Hospital includes 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 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 University Hospital provides 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 that have entered into partnership agreements with the Health Sciences Center.

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.S., M.D., Ph.D., M.D./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.

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, audio-visual and classroom support and the Office of Student Services.

Students who wish detailed information on the extensive laboratory facilities available for various academic programs are encourged to address their inquiries to the appropriate school or department.

The Center and the Community

At present, over 2000 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, work-shops and lectures on major health issues for the general community.

School Organization

With the exception of the School of 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

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 Neurological Surgery
Department of Neurology
Department of Obstetrics and Gynecology
Department of Ophthalmology
Department of Oral Biology and Pathology
Department of Orthopaedic Surgery
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 Radiation Oncology
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 Programs in Basic Health Sciences described in detail within this section.

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 graduate program in health sciences leading to the Master of Science degree. The program is designed for practicing health professionals who wish to gain proficiency in teaching, supervision or research. Degree requirements include completion of a minimum of 36 credits and satisfaction of core, track, practicum and thesis requirements.

Through completion of core courses, students are required to demonstrate competence in medical care delivery, research methodology, communication and statistics. Each student is also required, in cooperation with her/his faculty advisor, to design and complete a 15-credit specialty track in either teaching, supervision or research. Finally, students must complete a four-credit practicum and a five-credit thesis.

All candidates must hold a baccalaureate degree, submit GRE scores, have professional status and one year's experience in the health field, and aspire to a career in teaching, supervision or research in that field.

Additional information may be obtained from the program director:

Rose A. Walton, Ed.D.
Department of Allied Health Resources
School of Allied Health Professions
Health Sciences Center
State University of New York at Stony Brook
Stony Brook, NY 11794-8204
(516) 444-3240

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 11794-8707
(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 11794-8432
(516) 444-2113

Nursing

The School of Nursing offers a graduate program leading to the master of science degree. The program is designed to prepare nurses for diverse leadership roles in clinical practice as nurse practitioners/clinical nurse specialists. Four specialty tracks are available: Critical Care, Mental Health, Family Health and Perinatal/Women's Health. Students must successfully complete 45 credits of study, including 9 core credits, 6-11 science credits, 16-21 advanced nursing credits, 2-6 credits in nursing electives, 3 credits of clinical nursing research and 2-4 credits of non-nursing interdisciplinary electives. All candidates must hold a baccalaureate degree in nursing from a school approved by the National League for Nursing and have a grade point average of 3.0 or better.

Further information may be obtained from:

Rose Meyers, R.N., M.A.
Assistant Dean for Student Affairs
School of Nursing
Health Sciences Center
State University of New York at Stony Brook
Stony Brook, New York 11794-8420
(516) 444-3200

Graduate Program in Social Welfare

The School of Social Welfare offers an accredited program leading to a Master of Social Work (M.S.W.) degree. Students accepted into the school must have a commitment to social change, which is defined as a concern with the insufficient response of existing institutions to the needs of people in this society. Previous involvement in shaping the social programs and policies of this society is desirable.

The school, as part of the Health Sciences Center, is involved in interdisciplinary education in the broad areas of health, mental health and human service programs.

The graduate program offers two areas of concentration: Direct Practice; and Planning, Administration and Research. These concentrations are structured to provide students with theoretical and practical expertise. In addition, students may specialize in one of the following areas: Administration, Alcoholism and Substance Abuse, Family Therapy, Health Care and Social Work, and Working with Youth.

In addition to the regular full-time program, the school has three alternative pathways to achieve the degree. Students who are employed may, under certain conditions, use their employment site to fulfill field work requirements. Courses are offered evenings and weekends.

Applicants 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 ethnic, income and sexual diversity into the student body.

All questions concerning admission to the School of Social Welfare should be addressed to:

Office of Admissions and Student Services
School of Social Welfare
Health Sciences Center
State University of New York at Stony Brook
Stony Brook, New York 11794-8237
(516) 444-3141

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, experimental pathology, pharmacological sciences, or physiology and biophysics. These graduate studies are designed to lead to careers in research and teaching.

Each graduate studies program is guided by its own director and executive committee and establishes its own entrace standards and degree requirements. 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 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.

The preclinical disciplines fundamental to the health professions are organized in the School of Medicine. These disciplines are represented by the Department 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 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*.

Anatomical Sciences (HBA)

Chairperson: Maynard Dewey
Health Sciences Center T-8, Room 060 (516) 444-2350

Graduate Program Director: Randall Susman
Health Sciences Center T-8, Room 060 (516) 444-2350

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 Graduate Program Director, Dr. Randall Susman.

Admission

In addition to the minimum Graduate School requirements, the following are required:

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 General 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.

Degree Requirements

M.S. Degree Requirements

The Graduate Studies in Anatomical Sciences normally does 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

In addition to the minimum requirements of the Graduate School, the following are required:

A. Formal Course Requirements
Successful completion of an approved course of study is required.

B. 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. Foreign language proficiency tests, if required, must be passed before permission can be granted to take the preliminary examination.

C. 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.

D. Research and Dissertation.
The general requirements of the Graduate School regarding the dissertation examination will be followed.

E. Minimum Residence.
Two years of full-time graduate study are required.

Faculty

Brink, Peter R., Assistant Professor. Ph.D., 1976, University of Illnois: 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, Federal Republic of 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., 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, German Democratic Republic: Quantitative morphology of the human brain; physical anthropology.

Jungers, William L., Associate Professor, Ph.D., 1976, University of Michigan: Paleoanthropology; comparative primate anatomy; biomechanics; primate paleontology and systematics.

Karten, Harvey J., Professor. M.D., 1959, 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 D., 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 *Dictostelium*; 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., Associate 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., Associate Professor and Graduate Program Director. 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: Microtubles and associated proteins; mitotic apparatus; nuclear structure.

Number of teaching, graduate and research assistantships, fall 1983: 6

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 536 Biological Clocks
A consideration of the temporal dimension of biological organization and of periodic phenomena that 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 adjustment 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. Crosslisted with BCD 536.
Prerequisite: Permission of instructor
Spring, 3 credits

HBA 537 Physiology and Biochemistry of the Cell Cycle
An integrated view of the cell developmental cycle in prokaryotes and eukaryotes. Topics include: cell cycle anatomy; measurements on fixed and living cells; kinetics of cell population growth; theory and methodology of batch, synchronized and continuous cultures; 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 BCD 537.
Prerequisite: Permission of instructor
Fall, 3 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 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
The comparative anatomy, evolutionary history and radiation of fossil and living mammals. A course requiring a major research project on any aspect of mammalian comparative anatomy. Supplemented by lectures and seminars on the evolutionary history and radiation of mammals. Comparative osteological and fossil cast collections will be utilized. Lecture/seminar series can be taken separately as HBA 581.
Prerequisites: Previous course in human or vertebrate anatomy and permission of instructor
Fall, odd years, 4 credits

HBA 581 Evolution of Mammals
A course on the evolutionary history and radiation of mammals from the Mesozoic to the present from a paleontological and anatomical perspective. Particular emphasis will be placed on the origin of mammals and the origin, evolution and anatomical diversity of modern and extinct orders of mammals.
Prerequisites: Previous course in human or vertebrate anatomy and 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 526.)
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 nonequilibrium 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, 1-2 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

Molecular Microbiology (HBM)

Chairperson: Eckhard Wimmer
Life Sciences Building, Room 210 (516) 246-2214

Graduate Program Director: Carol Carter
Life Sciences Building, Room 280 (516) 246-2202

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 intially 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 obtrained from the Graduate Program Director.

Facilities

The department occupies one and one-half floors of the Life Sciences Building. Approximately 29,500 net square feet of research space are available, including 32 research laboratory modules of 500 square feet each. Each research module is fully equipped and, in addition, the department provides a variety of communal central facilities and services. These include a Virus Preparation Lab, a Tissue Culture Lab, Glassware Washing Facility, Analytical Equipment Lab, Protein and Nucleic Acid Sequencing Lab, Environmental Rooms, Electron Microscope and Darkrooms, Monoclonal Antibody Production Facility, Animal Care Facility, and Fermentor Facility. Major items of equipment are organized into these central facilities which are readily available to trainees.

The H. Bentley Glass Biological Sciences Library is physically connected to the Life Sciences Building and contains an extensive collection of books and journals relating to all aspects of the biological sciences. This library currently maintains a collection of 48,000 books and 1,000 journal titles. The Health Sciences Library, located in the Health Sciences Center, contains collections of biological and medical books and journals presently totaling 150,000 volumes, including 3,700 journal titles. In addition, the Department of Microbiology maintains its own reading room with a collection of about 700 volumes of 14 major journals especially relevant to biological research.

Admission

Predoctoral trainees are admitted to the Graduate School of the State University of New York at Stony Brook by application to the particular graduate program. Admission to Graduate Studies in Molecular Microbiology requires in addition to the minimum Graduate School requirements:

A. Superior undergraduate performance in science.
B. High scores on the Graduate Record Examination.
C. Three letters of enthusiastic recommendation.

The program does not require, but prefers to see, evidence of research activity as an undergraduate. Whenever possible, prospective students are invited to Stony Brook for interviews with the program faculty.

All students who are accepted into the program are accepted with full support. The current level of support is $7,000 per calendar year plus full tuition waiver.

The final decisions concerning admissions are made by the Vice Provost for Research and Graduate Studies, and the candidate is notified by letter from the Vice Provost's office.

Degree Requirements

Requirements for the Ph.D. Degree, Graduate Studies in Molecular Microbiology

The predoctoral training program offers its students the opportunity to study questions in virology, bacteriology, immunology, biochemistry, and cell and developmental biology utilizing the experimental approaches of the molecular biologist and geneticist. Instruction and course planning involve faculty members from the Department of Microbiology and selected members from the Departments of Biochemistry, Pathology, and Pharmacology, and from two outside institutions, Cold Spring Harbor Laboratory and Brookhaven Nationa Laboratory. The general philosophy of the program is that a successful research career in the diverse and heterogeneous area of molecular biology requires a broadly based background, familiarity with at least all of the above areas, and a frame of mind that is receptive to new approaches.

In addition to the minimum requirements of the Graduate School, the following are required:

A. Each predoctoral trainee is assigned a faculty advisory committee whose primary responsibility is to ensure that the student's coursework is properly balanced. These committees monitor the student's progress during the training period and are especially active during the first year before a research advisor has been selected.

B. Students participate in a laboratory rotation in their first year where they spend two months in each of two or three laboratories

learning relevant techniques and research approaches, and all students participate in weekly intra-program seminars where reports on original research in Molecular Microbiology and in the literature are discussed. There is an active seminar program of outside speakers who present topics relevant to Molecular Microbiology, and there is a yearly symposium held to discuss ongoing research and recent progress in the field. This is held early in the fall in order to introduce new students to the faculty, to other students, and to the areas of ongoing research within the department.

C. Though it may vary for any particular student, a typical course of study for the first two years will look as follows:

1. First Year
   Fall
   Introductory Biochemistry I
   Molecular Genetics
   Laboratory Techniques in Nucleic Acids
   Microbiology Seminar

   Spring
   Introductory Biochemistry II
   Graduate Genetics
   Biological Macromolecules
   Experimental Microbiology
   (2 lab rotations with a 3rd possible in the summer)
   Microbiology Seminar

2. Second Year
   Fall
   Animal Cells
   Molecular Aspects of Immunology
   Monoclonal Antibodies
   Graduate Research
   Microbiology Seminar

   Spring
   Animal Virology
   Readings in Microbiology Literature
   Medical Microbiology
   (selected sections)
   Graduate Research
   Microbiology Seminar

D. Qualifying Exam

Faculty

Anderson, Carl W., Adjunct Associate Professor.[1] 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.

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.

Brynum, R. David, Assistant Professor. Ph.D., 1981, Dartmouth College: Cell motility, studied using the large free-living amoeba as a model system.

Carter, Carol A., Associate Professor and Graduate Program Director. Ph.D., 1972, Yale University; Role of convalent 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[1]. Ph.D., 1970, Rutgers University: Transcription, processing and translation of RNA.

Fiedling, Steven P., Adjunct Assistant Professor. M.D., 1968, State University of New York, Downstate Medical Center: Clinical infectious disease.

Gething, Mary-Jane, Adjunct Associate Professor[2]. Ph.D., 1973, University of Melbourne, Australia: Molecular genetics of influenza virus hemagglutinin.

Grodzick, Terri Adjunct Associate Professor.[2] Ph.D., 1969, Columbia University: Genetics of SV40 adenovirus junctions; development of animal virus genetic systems.

Hearing, Patrick, Assistant Professor. Ph.D., 1980, Northwestern University: MOlecular genetics of adenovirus; transcriptional control in eukaryotic cells.

Hicks, James B., Adjunct Associate Professor.[2] 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. Ph.D., 1956, University of North Carolina at Chapel Hill: Cell-mediated immunity to parasites; thymocyte migration studies.

Lucas, Joseph J., Assistant Professor. Ph.D., 1972, University of Pennsylvania: Nucelar-cytoplasmic interaction in eukaryotic cells studied by the techniques of enucleation with cytochalasin B and nuclear transportation.

Mathews, Michael B., Adjunct Associate Professor.[2] Ph.D., 1969, University of Cambridge, England: Expression of genetic information of large animal DNA viruses.

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.

Oliver, Donald B., Assistant Professor. Ph.D., 1980, Tufts School of Medicine: Investigation of protein localization in *E. coli* using genetic methods.

Pavlova, Maria, Adjunct Associate Professor.[1] M.D., 1957, Plovdiv Medical School, Bulgaria; Ph.D., 1969, Charles University, Czechoslovakia: Interaction between chemical carinogens and tumor viruses in carcinogenesis.

Setlow, Jane K., Adjunct Professor.[1] Ph.D., 1959, Yale University. Recombination and repair of microbial DNA.

Silver, Lee M., Adjunct Assistant Professor.[1] Ph.D., 1977, Harvard University: Study of genetic elements of the mouse.

Stillman, Bruce W., Adjunct Assistant Professor.[2] Ph.D., 1979, Australian National University: Mechanism of DNA replication, particularly in large animal virus systems.

Tegtmeyer, Peter, Professor. M.D., 1960, Saint Louis University: Molecular biology of transforming and productive infection by tumor virus SV40.

Wimmer, Eckard, Professor and Chairperson. Ph.D., 1962, University of Gottingen, Federal Republic of Germany: Structure and biological function of ribonucleic acids and of proteins of picornaviruses and RNA tumor viruses and of their host cells.

Number of teaching, graduate and research assistants, fall 1983: 34

[1] *Brookhaven National Laboratory*
[2] *Cold Spring Harbor Laboratory*

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, 3 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 504 Biochemistry of Macromolecules
This course is designed to provide an introduction to basic principles of protein and nucleic acid. The secondary and tertiary structures of these molecules will be discussed with emphasis on their roles in macromolecular interactions.
Prerequisite: Permission of instructor
Fall, 1 credit

HBM 505 Biophys[illegible] of Macromolecules
Introduction to the basic principles of physical chemistry as they relate to biological science. The topics to be covered are (1) principles of thermodynamics, (2) fundamentals of the chemistry of solution, (3) free energy and chemical equilibrium, (4) physical chemistry of polymers and polyelectrolytes and (5) nucleohistones and the structure of chromatin.
Prerequisite: Permission of instructor
Spring, 2 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 selction 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 53[illegible] Medical Microbiology
Information derived from molecular and experimental cellular biology will be presented to provide a foundation for understanding the basic [illegible]ects 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

HMB 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 techiques, 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, HBM 621—1 credit, HBM 622—2 credits

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

Oral Biology and Pathology (HBO)

Chairperson: Israel Kleinberg
Westchester Hall, Room 196 (516) 246-2860

Graduate Program Director: Jerry Pollock
Westchester Hall, Room 101 (516) 246-2876

Graduate Studies in Oral Biology and Pathology offers graduate courses for students interested in study and research toward 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 Graduate Program Director, Jerry Pollock.

Facilities

The Department of Oral Biology and Pathology currently occupies 18,000 square feet of research space. Facilities include scanning and transmission electron microscopes; X-ray diffraction; isotope counters and preparative ultracentrifuges; infrared, atomic absorption, ultraviolet/visible spectrophotometers; a mass spectrophotometer; an olfactometer; gas and high-pressure liquid chromatography system; high-voltage, particle-free flow and polyacrylamide gel electrophoresis systems; computer equipment; fluorescence densitometer, spectrophotometer and microscopes; microdensitometer; automated colony counter; amino acid analyzer, peptide synthesizer and peptide sequencer; autoanalyzer; 75-liter steam sterilizable fermenter; autoclaves and ethylene oxide sterilizer; tumor virus tissue culture facility; specialized anaerobic bacteriology, animal and clinical laboratories; and an isotope facility for custom radiolabeling and synthesis. Graduate students have access to computer facilities on two levels. The department has a Hewlett-Packard 9820A desktop computer with the following accessories: digitizer, typewriter, X-Y plotter, paper tape reader, magnetic tape reader. The University has a central computer facility with a Univac 1100.

The University library maintains 800,000 volumes and subscribes to approximately 7,000 periodicals and serial titles. Excellent collections are also available in Biology and Chemistry libraries. The Health Science Library contains 200,000 volumes and subscribes to 3,800 periodical and serial titles. Almost all the dental research journals are included in this collection. There is also an annex to the Health Sciences Library in the Dental School itself, which also serves as a study room.

Admission

In addition to the mimimum Graduate School requirements, the following are required:

A. A baccalureate degree and grade point average of 3.3 in the sciences and a 3.0 overall are required for admission into either the M.S. or Ph.D. programs in Oral Biology and Pathology.

B. In addition to their transcripts, applicants are also required to submit three letters of recommendation and proof of satisfactory performance on the General Aptitude and Advanced parts of the Graduate Record Examination.

C. All applicants are carefully screened by the credentials committee of the department and interviews and discussions are arranged with faculty members and graduate students.

D. Formal approval for acceptance into the program is given by the Basic Health Sciences Graduate Education Committee and final acceptance into the Graduate School is provided by the Vice Provost of Research and Graduate Studies.

Degree Requirements

In addition to the minimum degree requirements of the Graduate School, the following are required:

A. All students must complete all or parts of the Oral Biology and Pathology Oral Systems course. M.S. students must, in addition, complete three graduate courses selected from offerings within and outside the department. Ph.D. students are generally required to complete six course offerings at the graduate level.

B. To become a Ph.D. candidate, the student must pass an advancement to candidacy examination. In addition, the student must prepare a detailed written proposal in the format of a National Institutes of Health research grant application. A public seminar is presented by the student to members of his or her advisory committee, the department and the University community at large, where the student defends the proposal. This is followed by a further defense by the student before his or her advisory committee. A determination for advancement to candidacy is then made and forwarded to the Vice Provost for Research and Graduate Studies for official approval.

C. The candidacy examination is used to examine the student's ability to handle the intellectual and communicative processes involved in carrying out independent research.

D. An original research thesis is required for completion of both the M.S. and Ph.D. degrees. The format is similar to the advancement to candidacy examination in that the student defend the thesis in a public seminar followed by a second examination by the student's dissertation committee. If recommended for approval, this determination is submitted to the Vice Provost for Research and Graduate Studies who makes the final decision to award the degree.

E. Each student has the opportunity to engage in various aspects of the teaching program of the department and a major effort is made to assist students to attend and present papers at various scientific meetings.

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.

Cho, Moon-Ill, Research Assistant Professor. Ph.D., 1979, State University of New York at Stony Brook: Cell biology of periodontal ligament fibroblast and odontoblast; synthesis and degradation of collagen and glycoproteins in normal and diseased conditions; radioautography; immunocytochemistry.

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 autoradioraphic, 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 colagen 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; quanitation 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. Professor and Graduate Program Director. Ph.D., 1969, Weizmann Institute of Science, Israel: Determination of the biological role of lysozyme; 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 Associate 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 of 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 and 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 envirnomental 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 and 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.
Prerequisities: Oral Biology and 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 and 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 mechanism involved in differentiation, growth and development, and tumor formation as they relate to the biology and pathology of the oral apparatus.
Prerequisites: Oral Biology and 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.
Prerequisities: 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

Pharmacological Sciences (HBH)

Chairperson: Arthur P. Grollman
Health Sciences Center, T-7, Room 140 (516) 444-3080

Graduate Program Director: David Williams
Health Sciences Center, T-7, Room 148 (516) 444-3078

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, biophysical 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 Graduate Program Director, David Williams.

Facilities

The Department of Pharmacological Sciences is the primary training facility for graduate studies in pharmacological sciences. The department occupies 25,000 square feet in the University's Health Sciences Center and 10,000 square feet in the Life Sciences Building. Faculty laboratories are equipped for the most modern biochemical, biophysical and chemical research. Facilities of a specialized nature maintained by the department include: ultracentrifugation, radiation monitoring, spectroscopy, fluorimetry, recombinant DNA, tissue culture, chromatography, mass spectrometry and NMR. Specialized toxicology facilities include a carcinogen laboratory for biochemical work and a P3 facility for animal work at the University and an extensive inhalation toxicology facility at Brookhaven National Laboratory. The laboratories in pharmacological sciences are equipped with IBM Personal Computers, which are interfaced with central hard-disk storage. These computers serve everyday laboratory operations, on-line processing, DNA sequence analysis, literature search and retrieval functions and word processing. In addition, an IBM computer is provided specifically for graduate trainees. More sophisticated computing and graphics capabilities are provided by deparmtnet Interdata and PDP 11 computers and by the University's Computing Center. Library facilities include the Health Sciences Library, the H. Bentley Glass Biological Sciences Library and the Pharmacological Sciences Library.

Admission

Admission to the Ph.D. Program in Pharmacological Sciences

For admission to Graduate Studies in Pharmacological Sciences, the following, in addition to the minimum Graduate School requirements, are normally required:

A. A baccalaureate degree in an appropriate field (biology, chemistry, biochemistry, microbiology, physics, mathematics) with evidence of superior performance in science courses.

B. Letters of reference.

C. Graduate Record Examination Scores and one advanced test in biology, chemistry, physics, or mathematics and TOEFL for foreign students.

D. Acceptance by both the Department of Pharmacological Sciences and by the Graduate School.

E. Students accepted into the graduate program receive stipend support and full tuition waivers. The current stipend level (1984) is $7000.

Degree Requirements

Requirements for the Ph.D. Degree in Pharmacological Sciences

In addition to the minimum Graduate School requirements, the following are required:

A. Core courses in graduate biochemistry, laboratory techniques, and medical pharmacology.

B. One track course such as biochemical pharmacology, toxicology, biophysics, or medicinal course and two electives.

C. Four semesters of student seminar.

D. Completion of the qualifying examination for advancement to candidacy.

E. Preparation and defense of the Ph.D. dissertation.

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.

Brandwein, Harvey, Adjunct Assistant Professor. Ph.D., 1079, University of Connecticut: Role of cyclic nucleotides, especially cyclic GMP, in the regulation of biological function.

Cohen, Seymour S., Distinguished Professor. Ph.D., 1941, Columbia University: Biochemistry of polyamines and nucleotide analogs; biochemistry of virus multiplication.

Eisenberg, Moises, Associate Professor. Ph.D., 1972, California Institute of Technology: Molecular mechanism of ion transport through membranes mediated by pores; fundamental physical-chemical properties of lipid bilayer membranes.

Fisher, Paul A., Assistant Professor. M.D., Ph.D., 1980, Stanford University; Nuclear structure and function; DNA replication; nucleocytoplasmic exchange.

Grollman, Arthur P., Professor and Chairperson[1] M.D., 1959, Johns Hopkins University: mechanisms of action of antitumor drugs and chemical carcinogens.

Iden, Charles R., Assistant Professor, Ph.D., 1971, Johns Hopkins University: Biomedical applications of mass spectrometry; new ionization techniques; toxicology.

Johnson, Francis, Professor.[2] Ph.D., 1954, University of Strathclyde, Scotland: Synthesis of natural products; medicinal chemistry; antitumor agents.

Krantz, Allen, Adjunct Associate Professor. Ph.D., 1967, Yale University: Enzyme reaction mechanisms; rational approaches to drug design; physiological role of amine oxidases.

Malbon, Craig C., Associate Professor. Ph.D., 1976, Case Western Reserve University: Biochemistry of hormone action: modulation of catecholamine and peptide hormone action by thyroid hormones; receptor structure and function.

Marcus, Philip, Adjunct Assistant Professor of Clinical Pharmacology. M.D., 1973, State University of New York, Downstate Medical Center; Internal medicine-pulmonary disease.

Reich, Edward, Professor.[3] Johns Hopkins University: Role of plasminogen activator in normal and neoplastic states; properties of acetylcholine receptors.

Strickland, Sidney, Associate Professor. Ph.D., 1972, University of Michigan: Biochemistry of mammalian development, using mouse teratocarcinoma cells as a model system.

Takeshita, Masaru, Research Associate Professor. Ph.D., 1960, Tokyo Kyoiku University, Japan: Mechanism of action of antitumor agents on DNA.

Williams, David L., Associate Professor and Graduate Program Director. Ph.D., 1972, University of Illinois: Molecular actions of estrogens and anti-estrogens; regulation of lipoprotein synthesis.

Wu, Cheng-Wen, Professor. M.D., Ph.D., 1969, Case Western Reserve University: Mechanism and regulation of gene expression; protein-nucleic acid interactions; fast reactions in biological systems.

Wu, Felicia Y.-H., Associate Professor, Ph.D., 1969, Case Wastern Reserve University: Role of metals in gene expression; mechanism of action of antitumor drugs; mechanism of induction of metallothioneins.

[1]*Joint appointment, Department of medicing*
[2]*Joint appointment, Department of Chemistry*
[3]*Part-time*

Courses

HBH 531 Principles of Medical Pharmacology
Basic principles that underlie actions of drugs on physiological processes with particular reference to therapeutic and toxic actions. Primarily for medical, dental and graduate students.
Prerequisites: Physiology, biochemistry and 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, elective for others). Group discussion of current research topics in pharmacology. Attendance in HBH 531 required.
Prerequisite: Permission of instructor
Spring, 6 credits

HBH 535 Pharmacology: Intermediate Level
This course is aimed mainly at the Graduate Nursing and Physician's Assistant programs. It meets twice a week for two hours each, during modules 3, 4, 5 and 6 of the HSC calendar. It is both introductory and intermediate level, including a comprehensive coverage of drugs: therapy, interactions, adverse effects, mechanism of action, and basic principles of administration, distribution and elimination.
Prerequisites: Must be student in Graduate Nursing or Physician's Assistant program
Modules 3, 4, 5, 6, 5 credits

HBH 541 Medicinal Chemistry
Major themes deal with (a) the pharmacological principles that govern drug action; (b) selectivity and molecular mechanisms of drug action; and (c) the relationship of molecular structure to biological activity with emphasis on functional groups stereochemistry and charge distribution. Some aspects of drug synthesis, involving both naturally occurring and man-made substances, are dealt with.
Fall semester, 3 credits, even years

HBH 543 Principles of Toxicology
An examination of basic concepts of modern toxicology. Emphasis on biochemistry and pathology of toxicants. Topics discussed incude absorption and metabolism of toxicants; organ toxicology; mutagenesis; teratogenesis; chemical carcinogenesis; inhalation and pulmonary toxicology; insecticide toxicology; radiation toxicology, metal and environmental toxicology; evaluation of toxicity; epidemiology and other toxicology related areas.
Prerequisite: Open to graduate students only; permission of instructor
Fall, 3 credits, odd years

HBH 545 Biophysical Laboratory Techniques
An introduction to the theoretical principles and experimental techniques used in modern biochemical research. Lectures and demonstrations will be used to present topics in laboratory computers, chromatography, mass spectrometry, protein sequencing, cloning technology, sedimentation, electrophoresis, ligand binding and nuclear magnetic resonance. Procedures for the safe handling of toxic chemicals and radioisotopes will also be discussed.
Prerequisite: Permission of instructor
Fall, 3 credits

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.
Prerequisite: Permission of instructor
Fall, odd years, 3 credits

HBH 560 Topics in Biochemical Pharmacology
A literature-based course focusing on major research areas of molecular and biochemical pharmacology. Examines important drugs, hormones and neurotransmitters to illustrate how effector molecules interact with and modify the biochemistry of living systems. Topics include: the hormonal regulation of gene expression, interactions of drugs and regulatory proteins with nucleic acids and enzymes of nucleic acid metabolism, regulation of cellular function by peptides and proteins, etc.
Prerequisite: Graduate biochemistry
Spring, 3 credits, odd years

HBH 563 Advanced Toxicology
Examines three or four selected topics in toxicology. Topics rotate biannually. Some subject areas to be examined: carcinogenesis, mutagenesis, inhalation toxicology, and free radical mechanisms in toxicology.
Fall, 4 credits, even years

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 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 credits

Pathology (HBP)

Chairperson: Frederick Miller
Health Sciences Center, T-9, Room 140 (516) 444-3000

Graduate Program Director: Cahir A. McDevitt
Health Sciences Center, T-9, Room 168 (516) 444-3014

The Department of Pathology offers a full graduate track in Experimental Pathology leading to the Ph.D. degree in Basic Health Science. Experimental Pathology, the laboratory investigation of the pathogenesis of disease, employs the concepts and technology of the basic sciences toward understanding disease processes at organ or tissue level. Training is offered in a broad range of research areas including immunology and immunopathology, mechanisms of tissue injury and environmental pathology, biochemistry and cellular biology of connective tissues, molecular biology, pulmonary pathology and hematopathology. Students initially take the basic science courses of the first year medical school curriculum. The student then selects a research sponsor and pursues advanced courses selected to provide expertise in the investigative area of his or her research. All students participate in the weekly Departmental Journal Club. Further details of the program and admission packages can be obtained from the Graduate Program Director, Dr. Cahir McDevitt.

Facilities

The department is particularly well-equipped for research in all areas. The program transcends traditional departmental boundaries and involves faculty in the departments of Medicine, Surgery and Brookhaven National Laboratory.

Admission

In addition to the minimum requirements of the Graduate School, the following are required:

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, including laboratory.

B. A minimum grade point average of 2.75 (B-) in all undergraduate course and 3.00 (B) in science and mathematics courses.

C. Letters from three previous instructors and results of the General Test of the Graduate Record Examination and the Advanced Biology Test.

D. Acceptance by both the School of Medicine and 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 dificiencies within the first year according to the department requirements.

Degree Requirements

In addition to the minimum requirements of the Graduate School, the following are required:

A. Course Requirements

1. HBA 530: Microscopic Anatomy of the Human Body
2. HBC 531: Principles of Biochemistry
3. HBY 531: Introduction to Mamalian Physiology
4. HBA 532: Human Embryology
5. HBA 533: Basic Medical Genetics
6. HBA 531: Gross Anatomy of the Human Body
7. HBP 531: General Pathology
8. HBM 531: Medical Microbiology
9. BEE 532: Biometry

Courses 1 through 8 are taken in the first year of the program. Students in the first year are also obliged to spend one day a week in a laboratory rotation with the goal of selecting an environment for their post-first year research.

B. Participation in HBP 691, Pathology Journal Club and HBP 690, Seminar in Pathology.

C. Submission and successful defense of a research proposal before a preliminary examination committee. This obligation must be addressed before the end of the second academic year in the program. The committee is selected by the Graduate Program Director on the recommendation of the student and his/her advisor.

D. Successful participation in a selected systems course of the second year medical curriculum and three areas of specialized study designed by the preliminary examination committee. These obligations are normally addressed in the second year of the program.

E. All students, whether or not they are supported by teaching assistantships, are required to gain faculty-guided experience in teaching in HBP 390 and HBP 310.

F. When requirements A through E have been met the student is advanced to candidacy and his/her research is monitored by a thesis committee that normally meets with the student at least once a year.

G. The thesis committee recommends when the research is suitable for presentation as a thesis. A successful oral defense before the thesis committee and a seminar before the entire faculty and graduate students is required before the Ph.D. degree is awarded.

Faculty

Bachvaroff, Radislav, Associate Professor.[1] M.D., 1959, Higher Medical Institute, Sofia, Bulgaria: Transplantation immunology.

Benach, Jorge, Assistant Professor.[2] Ph.D., 1972, Rutgers University: Infectious disease immunology.

Chanana Arjun D., Associate Professor.[3] M.D., 1955, University of Rajputana, India; S.M.S., Medical College, Jaipur, Inida: Hematopoiesis; pulmonary pathobiology.

Coller, Barry S., Professor.[4] M.D., 1970, New York University: Coagulation; hematology.

Costa, Daniel L., Instructor.[3] Sc.D., 1977, Harvard University: Small-animal respiratory physiology and toxicology.

Deutsch, Dale, Assistant Professor. Ph.D., 1972, Purdue University: Neurobiochemistry; effect of drug abuse on brain biochemistry.

Drew, Robert, Associate Professor.[3] 1968, New York University: Pulmonary toxicology of environmental pollutants.

Elias, Jules, Associate Professor. Ph.D., 1982, Union for Experimenting Colleges and Universities: Immunohistochemistry of polypeptide hormones.

Fleit, howard B., Assistant Professor. Ph.D., 1980, New York University: Leukocyte Fc receptors; granulocyte/macrophage growth and differentiation.

Galanakis, Dennis, Associate Professor. M.D., 1962, University of Saskatchewan, Canada: Biochemistry; metabolism and physiology of fibrinogen in health and disease.

Ghebrehiwet, Berhane, Assistant Professor.[4] D.V.M., D.Sc., 1974, University of Paris, France: Molecular immunology; biochemistry and function of complement.

Golightly, Marc G., Assistant Professor. Ph.D., 1979, University of California, Los Angeles: Tumor immunobiology; natural killer cells.

Gorevic, Peter D., Associate Professor.[4] M.D. 1970, New York University, Amyloidosis; amlyoid proteins.

Habicht, Gail S., Associate Professor. Ph.D., 1965, Stanford University: Immunobiology of aging; immunoparasitology; lymphokines.

Janoff, Aaron, Professor. Ph.D., 1958, New York University: Proteases and protease-inhibitors in the lung; effects of tobacco smoke inhalation on lung metabolism; pathogenesis of pulmonary emphysema.

Joel, Darrell D., Associate Professor.[3] D.V.M., Ph.D., 1964, University of Minnesota: Immunology; responses of gastrointestinal tract to environmental pollutants.

Lane, Bernard P., Professor. Ph.D., 1963, New York University: Ultrastructural pathology; differentiation; carcinogenesis.

Marcu, Kenneth B., Associate Professor.[5] Ph.D., 1975, State University of New York at Stony Brook: Organization and mechanisms of expression and evolution of eukaryotic multigene systems.

McDevitt, Cahir A., Assistant Professor and Graduate Program Director. Ph.D., 1977, University of London, U.K.: Biochemistry of connective tissue macromolecules in aging and disease; cell-matrix interactions.

Miller, Frederick, Professor and Chairperson. M.D., 1961, New York University: Immunopathology; renal disease; protein and glycoprotein chemistry.

Peerschke, Ellinor I.B., Assistant Professor. Ph.D., 1980, New York University: Platelet physiology.

Peress, Nancy, Associate Professor. M.D., 1967, State University of New York, Downstate Medical Center: Neuropathology; immune disease of the nervous system.

Rapaport, Felix, Professor. M.D., 1954, New York University: Transplantation immunology.

Schutzbank, Ted E., Assistant Professor. Ph.D., 1980, Columbia University: Molecular virology; virus-host cell interactions.

Sokoloff, Leon, Professor. M.D., 1944, New York University: Arthritis and metabolic diseases of bone; biomechanics of joint lubrication; aging in tissue culture.

Sterman, Arnold B., Assistant Professor.[6] M.D., 1975, Cornell University: Enviromental agents in pathogenesis of neurotoxic disease.

Thomas, Lewis, University Professor. M.D., 1937, Harvard University: Transplantation biology.

Number of teaching, graduate and research assistants, fall 1983: 13

[1]Joint appointment, Department of Surgery
[2]N.Y. State Department of Health
[3]Brookhaven National Laboratory
[4]Joint appointment, Department of Medicine
[5]Joint appointment, Department of Biochemistry
[6]Joint appointment, Department of Neurology

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.
Prerequisites: Histology, gross anatomy, physiology and biochemistry, prior or concurrent microbiology and permission of instructor.
Spring, 6 credits with lab, 3 credits without lab

HBP 532 Immunology
A general introduction to the principles of immunology for professional students including 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. Biochemistry, genetics and histology helpful.
Prerequisites: Advanced course in biology and permission of instructor
Spring, 2 credits

HBP 533 Basic Immunology
Basic principles of immunology for graduate students in the biological sciences including 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 553 Pathology of Neoplasia
A study of the nature and behavior of neoplastic tissue, the etiologies of cancer, the effect of tumors upon the host. Includes laboratories to acquaint the student lacking a background in histology or physiology with the appearance and behavior of cancer on the tissue and organ level.
Prerequisite: Permission of instructor
Spring, 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 or 533
Spring, 2 credits

HBP 556 Laboratory Medicine
A four-week, full-time (6 h/day) course dealing with clinical laboratory decision-making and the basis for the laboratory evaluation of human disease. The presentations are both didactic and practical and are given by an interdepartmental faculty. While intended principally for senior medical students, the course might be taken by advanced microbiology or biochemistry students interested in clinical applications.
Prerequisite: Permission of instructor
Spring, 6 credits

HBP 558 Glycoproteins: Structure, Function and Molecular Pathology
Recent developments in glycoprotein research suggest that their carbohydrate moieties function as specific markers in a range of biological processes. Covers the structure, biosynthesis, catabolism, intermolecular interactions, immunochemistry, cell membrane interactions and the function in bacterial cell walls of glycoproteins in health and disease. Includes discussion of structure-function relationships of a range of specific glycoproteins.
Prerequisite: Permission of instructor
Spring, 2 credits

HBP 559 Preolytic Enzymes
Covers basic mechanisms of the action of proteases on protein and synthetic substrates; methods of purification, detection, measurement and mechanisms; uses of protease inhibitors. The role of proteases in several systems including intracellular and extracellular protein catabolism, blood coagulation complement, inflammation and the post-translational processing of proteins in various systems.
Prerequisite: Permission of instructor
Spring, 2 credits

HBP 563 Histochemistry
Application of histochemical techniques (enzyme histochemistry, radioautography, cytophotometry, electron histochemistry and immunohistochemistry) to the analysis of ehcmical components off cells and tissues.
Prerequisites: HBP 532 or 533 and permission of instructor
Fall, 3 credits

HBP 590 Seminars in Immunology
A series of monthly seminars focusing on 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 per semester

HBP 621 Clincical Histopathology
Histologic study of human pathologic anatomy as seen in surgical biopsy and necropsy tissues. Emphasis on correlation between clinical presentations of human disease and histomorphology. Special reference to diagnostic and therapeutic implications of the pathologic process. Designed for students in the health professions.
Prerequisite: Permission of instructor
Fall, variable credits 1-3

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
Fall, variable credit

HBP 690 Seminar in Pathology
Seminar in major topics in experimental pathology students, staff and visiting scientists
Prerequisites: Permission of instructor; open only to pathology graduate students.
Fall and spring, variable credit, 1-4 credits per semester

HBP 691 Journal Club in Pathology
Critical discussion of selected topics in experimental and descriptive pathology with presentation of papers from the literature.
Prerequisite: Permission of instructor.
Fall and spring, 2 credits

HBP 692 Advanced Tutorial in Experimental Pathology
An advanced tutorial in pathology under faculty supervision with emphasis on material not formally experienced in didactic course work. Directed readings and other educational experiences may relate to either preparation for thesis research or for the Ph.D. qualifying examinations.
Prerequisites: Permission of instructor and successful courses assigned by program committee
Fall and spring variable credits, 1-12 per semester

HBP 694 Thesis Research in Pathology
Original investigation under the supervision of a staff member.
Prerequisite: Permission of instructor
Fall and spring, variabable and repetitive credit

Physiology and Biophysics (HBY)

Chairperson: William Van der Kloot
Health Sciences Center, T-6, Room 140 (516) 444-2287

Graduate program Director: Leon C. Moore
Health Sciences Center, T-5. Room 151 (516) 444-3047

The Department of Physiology and Biophysics offers a program of study leading to the degree of Doctor of Philosophy in Basic Health Sciences. The department is particularly strong in training and research in cellular aspects of physiology and neurobiology. Members of the department collaborate in both teaching and research with scientists in the biology, biochemistry, chemistry and physics departments, and students are encouraged to do likewise. Much of the program involves tutorials, readings and independent research rather than formal classwork. The student is expected to be proficient in physical chemistry, mathematics through calculus, and physics before entering the department, although deficiencies in some areas may be made up during the first year. During their first two years, students generally rotate through three laboratories to gain research experience. After successful completion of the preliminary examinations, students choose their own, independent area of research, under the supervision of the faculty whose research interests are listed. Additional information about department requirements and programs can be obtained by writing to the Graduate Program Director, Leon C. Moore.

Facilities

Individual faculty laboratories are well equipped for biochemical, biophysical and physiological experimentation, and the shared facilities of the department include several laboratory and general purpose computers, a chemical stock room, a darkroom, facilities for washing and sterilizing glassware, a small machine shop, instrumentation for programmed isotope counting and for measuring ORD and CD, plus a wide variety of chromatographic, electrophoretic, spectrophotometric and electronic equipment.

Admission

For admission to the Ph.D. program in physiology and biophysics, the following, in addition to the minimum Graduate School requirements, are normally required:

A. A baccalaureate degree with preparation in mathematics through differential calculus; one year of inorganic and one year of organic chemistry including laboratory; one year of general physics (using calculus); one year of general biology (with laboratory). One year of physical chemistry must also be completed prior to the start of the second year of the program. It will be useful also to have additional preparation in the following subjects: quantitative analysis, cell biology, general and comparative physiology, and genetics. In exceptional circumstances, permission may be granted to correct the lack of any specific requirement during the first year of graduate study.

B. Three letters of reference.

C. The General Test of the Graduate Record Examination is required. Instructions on reporting scores to this campus will be included in the application materials. So that the scores will be available for a timely admission decision, the test should be taken no later than January. The deadline for receipt of applications for admission in the fall is March 1. The TOEFL examination is also necessary for international students; the minimum acceptable score is 550.

D. Acceptance by both the Department of Physiology and Biophysics and by the Graduate School.

E. Students may be admitted provisionally under the following circumstances:

1. If GREs have not been taken, they must be taken during the first semester of registration.

2. If TOEFL has not been taken or a score of 550 was not attained, proficiency in English can be demonstrated by:

a. Prior attendance at an "English-speaking" educational institution for at least two years.

b. Receipt of a score of 80/85 on ALI/GU test (American Language Institute of Georgetown University).

c. Certification from an English Language Institute before arrival at Stony Brook, or

d. Successful English language interview upon arrival at Stony Brook.

Degree Requirements

In addition to the minimum Graduate School requirements, the following are required:

A. Completion of HBY 531, HBY 561, HBY 590, HBY 591, HBY 690, HBY 694, HBY 695.

B Satisfactory completion of the preliminary examination at the end of second year of study.

C. Submission of a thesis research proposal by end of third year.

D. Participation in the teaching practicum.

E. Submission of an approved dissertation and successful oral defense.

F. Completion of all requirements within seven years.

Faculty

Benjamin, William B., Associate Professor. M.D., 1959, Columbia University: Endocrinology; mechanism of insulin action.

Bergofsky, Edward H., Professor.[2] M.D., 1952, University of Maryland: Respiratory physiology.

Cabot, John B., Assistant Professor[1]. Ph.D., 1976, University of Virginia: Central nervous system control of cardiovascular function.

Clausen, Chris, Assistant Professor. Ph.D., 1979, University of California, Los Angeles: Electrical properties of transporting epithelia.

Cohen, Ira S., Associate Professor. M.D., Ph.D., 1974, New York University: Electrophysiology of the heart; synaptic physiology.

Hurewitz, Adam, Assistant Professor.[2] M.D., 1973, New York Medical College: Respiratory physiology.

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: Biophysics of membranes.

Mendell, Lorne, Professor.[1] Ph.D., 1965, Massachusetts Institute of Technology: Physiology and modifiability of synapses in the spinal cord.

Moore, Leon C., Assistant Professor and Graduate Program Director. Ph.D., 1976, University of Southern California: Renal physiology.

Sampson, Michael, Assistant Professor[2]. M.D.C.M. 1974, McGill University: Respiratory physiology.

Seethala, Ramakrishna, Research Assistant Professor. Ph.D., 1975. Indian Institute of Science: Insulin action.

Shukla, Kamal K., Research Assistant Professor. Ph.D., 1977, State University of New York at Stony Brook: Molecular mechanism of muscle contraction.

Smaldone, Gerald C., Assistant Professor.[2] M.D., Ph.D., 1975, New York University: Respiratory physiology.

Van der Kloot, William G., Professor. Ph.D., 1952, Harvard University: Cellular neurophysiology.

[1]Joint appointments with the Department of Neurobiology and Behavior
[2]Joint appointments with the Department of Medicine

Courses

HBY 506 Transport
Molecular and ion transport mechanisms in microorganisms, higher cells and 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 human physiology. The principles of cellular physiology are presented, followed by an introduction to the circulator, respiratory, gastrointestinal, renal, encocrine and nervous sytems.
Prerequisites: Admission to medical or dental school or 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 credits

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. 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 and 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 561 Cellular Physiology
The physiology of animal cells with particular emphasis on excitable cells. Topics covered include excitation, contraction in contractility, conduction, synaptic transmission, ion transport, secretion and responses to transmitters and hormones.

HBY 590 Special Topics in Physiology and Biophysics
Student seminars and tutorials on advanced 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 supervision.
Prerequisite: Permission of instructor
Fall and spring, 1-4 credits each semester, repetitive

The Center for Continuing Education (CED, GSP)

The Center for Continuing Education (CED, GSP)

The Center for Continuing Education (CED) offers two options for part-time graduate study at the University. One leads to a Master of Arts in Liberal Studies (MA/LS) and is designed for persons seeking a broader post-baccalaureate education than is ordinarily found in programs that focus on a single discipline. 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 as non-matriculated students 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, graduate courses offered by other University departments or programs.

Admission and degree requirements are summarized below. For a bulletin or additional information, call or write the CED office, N-201 Social and Behavioral Sciences Building, State University of New York at Stony Brook, Stony Brook, NY 11794-4310 (516/246-5936).

Admission

Any person holding a baccalaureate degree or its equivalent, or an advanced degree from an accredited insitution of higher learning, is eligible for admission to the University either as a student in the Master of Arts in Liberal Studies Program or as a non-matriculated graduate student.

Degree Requirements

Requirements for the Master of Arts Degree in Liberal Studies

When ready to submit an application for admission into the MA/LS program, a student is asked to schedule a meeting with a CED advisor to review the degree requirements and to plan a 30-credit program of study which includes:

A. An 18-credit cluster of courses related by theme or subject. Students have the opportunity to develop, with the guidance and approval of an advisor, a cluster that suits their particular needs or interests.

B. Twelve elective credits. What courses are chosen depends on a student's overall needs in completing the degree requirements.

C. Courses from three general subject areas. Among the 30 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.

D. Two MA/LS essays from different areas. Each MA/LS student is required to submit two papers or projects which should be from different general subject areas and which show that the student can develop ideas and use analytical skills at the master's level. The essays are usually developed around papers or projects a student is required to submit to satisfy a graduate course requirement.

An MA/LS student may petition to transfer a maximum of six graduate credits from another institution toward the degree requirements.

E. 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

Teaching certification opportunities are available through CED. The minimum requirements are summarized below.

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 that includes student teaching is also available in the following secondary school subjects:

English
Foreign Languages
Science
Social Studies

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.

Directories and Maps

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 reserach 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 area 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 college 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."

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 Valhalia

Board of Trustees

Donald M. Blinken, B.A., Chairperson . . . . . New York City
Judith Davidson Moyers, B.S., Vice Chairperson . . Garden City
George L. Collins, Jr., B.S., M.D. . . . . Eden
Mrs. Judith Lasher Duken, B.S., M.S., C.A.S. . . . . Plattsburgh
Arnold B. Gardner, A.B., LL.B. . . . . Buffalo
John L.S. Holloman, Jr., B.S., M.D. . . . . East Elmhurst
Mrs. Nan Johnson, B.A., M.A. . . . . Rochester
Edward V. Mele, B.A. . . . . Barneveld
Edgar A. Sandman, A.B., J.D. . . . . Albany
Mrs. Jeanne C. Thayer . . . . . New York City
James M. Tierney . . . . . Albany
Thomas Van Arsdale, B.E.E. . . . . New York City
Darwin R. Wales, B.A., LL.B. . . . . Binghamton
Three appointments to the Board of Trustees are pending.

Clifton R. Wharton, Jr., B.A., M.A., Ph.D.
Chancellor of the University

Donald D. O'Dowd, B.A., M.A., Ph.D
Executive Vice Chancellor

Sanford H. Levine, A.B., J.D.
University Counsel and Vice Chancellor for Legal Affairs

Martha J. Downey, B.S., M.A.
Secretary of the University

Jerome B. Komisar, B.S., M.A., Ph.D
Provost

Harry K. Spindler, B.A., M.P.A.
Vice Chancellor for Finance and Business

*The Health Sciences Center 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.

Members of the Council

Subject to powers of State University trustees defined by law, the operations and affairs of the State Univeristy of New York 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 respnsibilities of the other members, is elected by the student body. All positions listed are correct as of February 1, 1984.

R. Christian Anderson
Chairperson
Brookhaven

Aaron B. Donner
Bay Shore

Leonard Eichenholtz
Valley Stream

Joel H. Girsky
Dix Hills

Betty Ostrander
Southampton

Greta M. Rainsford, M.D.
Hempstead

Jeffrey Sachs, D.D.S.
Hewlett

Ena D. Townsend
Central Islip

Andrew E. Ullmann
Cold Spring Harbor

Officers of Administration

All positions are correct as of February 1, 1984

John H. Marburger, B.A., Ph.D.
President

Homer A. Neal, B.S., M.S., Ph.D.
Provost

Emile Adams, A.A., B.A.
Associate Vice President for Student Affairs

Barbara Bently, B.S., M.S., Ph.D.
Associate Vice Provost for Graduate Studies

Francis T. Bonner, B.A., M.S., Ph.D.
Dean, International Programs

Richard Brown, A.A.S., B.A., C.P.A.
Assistant Vice President for Administration; Controller

Robert A. Francis, B.T., M.A., M.B.A., Ed.D.
Vice President for Campus Operations

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

David C. Glass, A.B., M.A., Ph.D.
Vice Provost for Research and Graduate Studies

Edward J. Gunnigle, B.S., LL.B., LL.M.
President and Director, Stony Brook Foundation

Carl E. Hanes, Jr., B.S.C.
Vice President for Administration

Stewart Harris, B.S., M.S., Ph.D.
Dean, College of Engineering and Applied Sciences

Richard Koehn, B.A., Ph.D.
Dean, Biological Sciences

Paul Madonna, B.A., M.A., D.Ed.
Assistant Vice President for Administration: Business Manager

Marion Metivier, B.A.
Special Assistant to the President for Affirmative Action

D. Terence Netter, B.A., M.A., L.S.T., M.F.A.
Director, Fine Arts Center

Egon Neuberger, B.A., M.A., Ph.D.
Dean, Social and Behavioral Sciences

Robert C. Neville, B.A., M.A., Ph.D.
Dean, Humanities and Fine Arts

William T. Newell, Jr., B.S., M.B.A.
Executive Director, University Hospital

J. Howard Oaks, A.B., D.M.D.
Vice President for Health Sciences

Lester G. Paldy, M.S.
Dean, Continuing Education

Frederick R. Preston, B.A., Ph.D.
Vice President for Student Affairs

Graham B. Spanier, B.S., M.S., Ph.D.
Vice Provost for Undergraduate Studies

Robert Schneider, A.B., M.A., Ph.D.
Associate Vice Provost for Research

Jerry K. Schubel, B.S., M.A.T., Ph.D.
Dean, Marine Sciences Research Center

John Brewster Smith B.S., M.S.
Dean, Library Services and Director of Libraries

Sei Sujishi, B.S., M.S., Ph.D.
Dean, Physical Sciences

Louise Vasvari, B.A., M.A., Ph.D.
Associate Provost

Harry Weiner, Ph.D.
Dean, W. Averell Harriman College for Policy Analysis and Public Management

The Graduate School

David C. Glass, Ph.D.
Vice Provost for Research and Graduate Studies

D. Ann Carvalho, M.A.
Assistant Vice Provost for Graduate Studies

Michael S. Denci, M.S.
Assistant Vice Provost for Graduate Studies

Joan B. Fry, M.A.
Assistant Vice Provost for Graduate Studies

Barbara Bentley, Ph.D.
Associate Vice Provost for Graduate Studies

Phyllis A. Reed, M.A.
Assistant to the Vice Provost for Graduate Studies

Office of Research Administration

Connie Angilella, M.P.A.
Assistant for Sponsored Research

Marie Murphy, M.P.A.
Assistant for Sponsored Research

Thomas O. Murphy, M.A.
Assistant for Sponsored Research

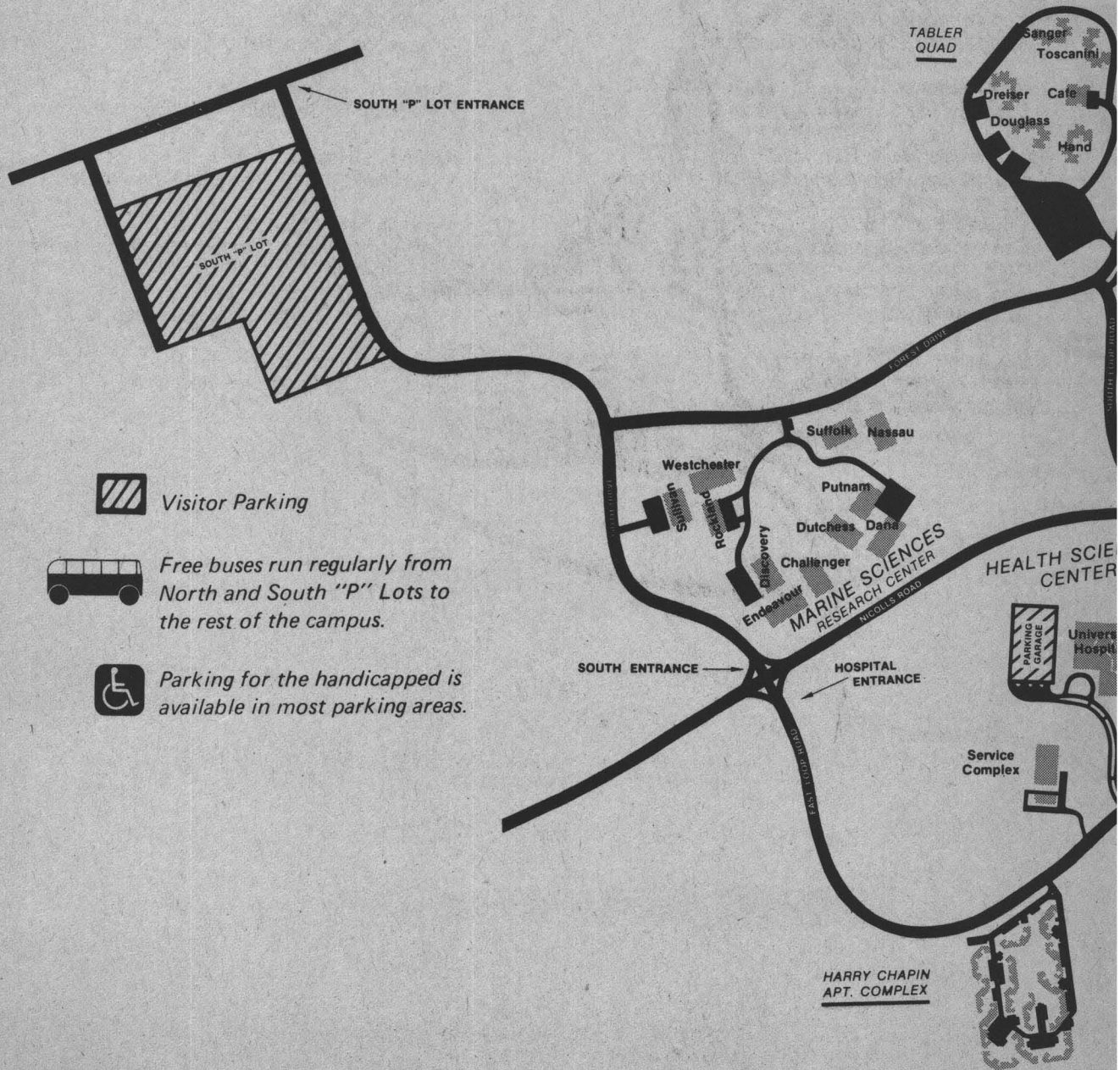
Kathryn S. Rockett, M.B.A.
Assistant Director, Research Administration

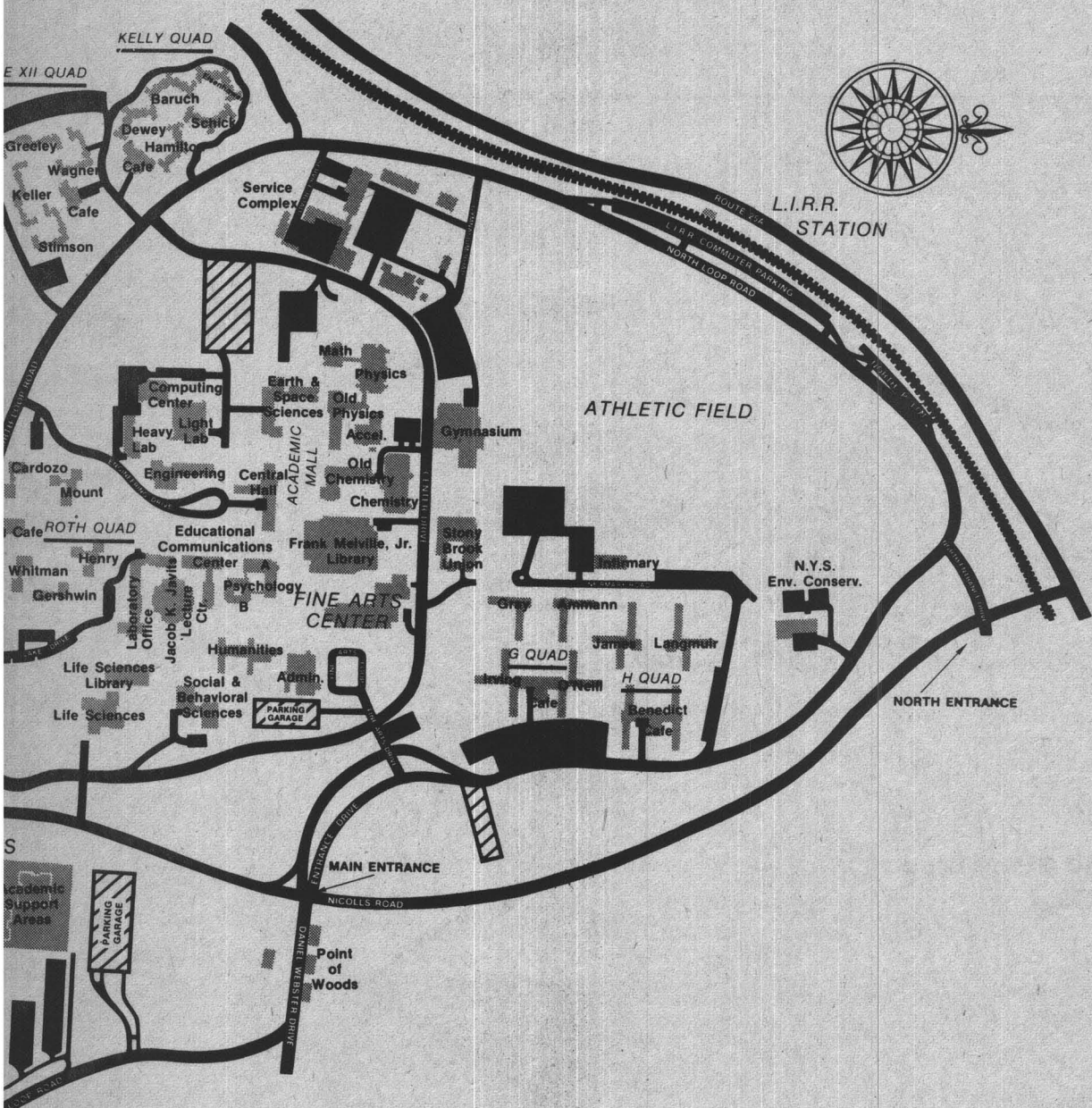
Peter M. Saal, M.S./L.S.
Assistant for Sponsored Research Information

Robert F. Schneider, Ph.D.
Associate Vice Provost for Research

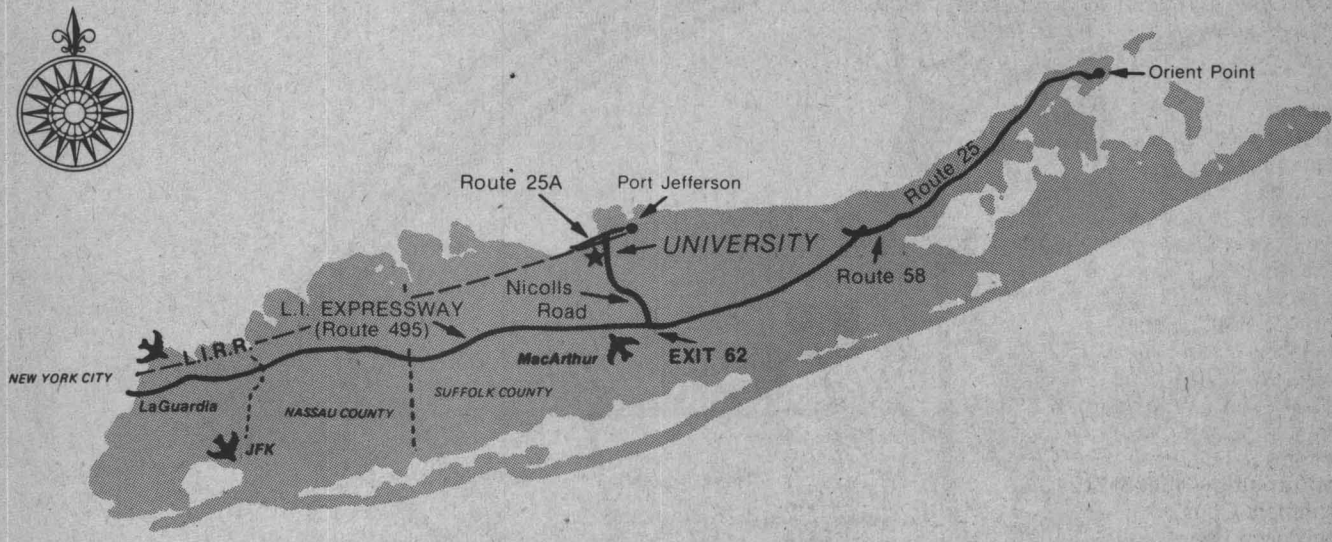
Karen L. Warren, B.A.
Assistant for Sponsored Research

Campus Map


TABLER QUAD
Sanger
Toscanini
Dreiser
Cafe
Douglass
Hand
SOUTH "P" LOT ENTRANCE
SOUTH "P" LOT
FOREST DRIVE
Suffolk
Nassau
Westchester
Putnam
Sullivan
Rockland
Dutchess
Dana
Discovery
Challenger
Endeavour
MARINE SCIENCES RESEARCH CENTER
NICOLLS ROAD
HEALTH SCIE CENTER
PARKING GARAGE
SOUTH ENTRANCE
HOSPITAL ENTRANCE
EAST CAMPUS ROAD
Service Complex
HARRY CHAPIN APT. COMPLEX
Visitor Parking
Free buses run regularly from North and South "P" Lots to the rest of the campus.
Parking for the handicapped is available in most parking areas.


KELLY QUAD
E XII QUAD
Baruch
Dewey
Senior
Hamilton
Greeley
Wagner
Cafe
Keller
Cafe
Stimson
Service Complex
L.I.R.R. STATION
ROUTE 25A
L.I.R.R. COMMUTER PARKING
NORTH LOOP ROAD
ATHLETIC FIELD
Math
Physics
Computing Center
Earth & Space Sciences
Old Physics
Heavy Lab
Light Lab
Accel.
Gymnasium
ACADEMIC MALL
Cardozo
Mount
Engineering
Central Hall
Old Chemistry
Chemistry
Cafe
ROTH QUAD
Educational Communications Center
Frank Melville, Jr. Library
Stony Brook Union
Infirmary
N.Y.S. Env. Conserv.
Henry
Whitman
Gershwin
Laboratory Office
Jacob K. Javits Lecture Ctr.
Psychology A
Psychology B
FINE ARTS CENTER
Humanities
Life Sciences Library
Social & Behavioral Sciences
Admin.
PARKING GARAGE
Life Sciences
G QUAD
H QUAD
Cafe
Benedict Cafe
NORTH ENTRANCE
MAIN ENTRANCE
NICOLLS ROAD
DANIEL WEBSTER DRIVE
Point of Woods
Academic Support Areas
PARKING GARAGE

Map of Long Island



Transportation to Stony Brook

BY CAR

Take the Long Island Expressway (Route 495) to Exit 62; follow Nicolls Road (Route 97) north for nine miles. Connecticut car ferries run from Bridgeport to Port Jefferson (516-473-0286) and from New London to Orient Point (516-323-2415); call for schedules, reservations.

BY RAILROAD

Take the Long Island Rail Road's Port Jefferson line from Penn Station (Manhattan). Change at Jamaica or Huntington, per timetable, for Stony Brook. Cross tracks for free campus bus.

BY AIR

Land at Kennedy or LaGuardia Airport, 50 miles west of campus, or at Long Island MacArthur Airport (515-467-6161), 10 miles south of campus. MacArthur has limousine and taxi service to campus.

BY BUS

Call Suffolk County Transit (516-360-5700) for schedules, rates and routes for buses to the campus from many local towns.

Index

Included in the index are the official degree programs that are registered with the New York State Department of Education, the degrees offered, and the HEGIS registration number. Enrollment in other than registered approved programs may jeopardize a student's eligibility for certain student aid awards.

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. **Concentrations** 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.

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, New York 11794-4433
(516) 246-5945

For assistance in obtaining updated information for the 1985-86 academic year, call the Graduate School Office (516) 246-5945 or the Office of University Affairs (516) 246-6570.